United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Alaska State Office
222 West Seventh Avenue, #13
Anchorage, Alaska 99513-7504
http://www.ak.blm.gov

TAKE PRIDE IN AMERICA

In Reply Refer To:
1610 (020)

NOV -9 2007

Dear Reader:

Enclosed for your review is the Proposed Resource Management Plan (PRMP) and Final Environmental Impact Statement (FEIS) for the Bay planning area. The PRMP was prepared by the Bureau of Land Management (BLM) in consultation with the State of Alaska and other local governments, taking into account public comments received during this planning effort. This PRMP provides a framework for the future management direction and appropriate use of the Bay planning area, located in southwestern Alaska. The document contains both land use planning decisions and implementation decisions that provide planning structure to facilitate management of the planning area. The PRMP is open for a 30-day review and protest period that begins on the date the Environmental Protection Agency (EPA) publishes the Notice of Availability of the FEIS in the *Federal Register*.

This PRMP and FEIS has been developed in accordance with the National Environmental Policy Act of 1969 (NEPA), and the Federal Land Policy and Management Act of 1976 (FLPMA). The PRMP is largely based on Alternative D, the preferred alternative in the Draft Resource Management Plan/Environmental Impact Statement (RMP/EIS), which was released on September 29, 2006. This document contains the proposed plan, summary of changes made between the Draft RMP/EIS and PRMP, predictable impacts of the proposed plan, summary of the written and verbal comments received during the public review period of the Draft RMP/EIS, and responses to the comments received.

Any person who participated in the planning process for this PRMP and has an interest that is or may be adversely affected may protest approval of this PRMP and land use planning decisions contained within it (see 43 Code of Federal Regulations 1610.5-2) during this 30-day period. Only those people or organizations who participated in the planning process leading to the PRMP may protest. The protesting party may raise only those issues submitted for the record during the planning process leading up to the publication of this PRMP. These issues may have been raised by the protesting party or others. New issues may not be brought into the record at the protest stage.

Protests must be filed with the BLM Director in writing. Regular mail protests should be sent to: Director (210), Attention – Brenda Williams, PO Box 66538, Washington D.C. 20035. Overnight mail should be sent to: Director (210), Attention – Brenda Williams, 1620 L Street NW, Suite 1075, Washington, D.C. 20036. Email and fax protests will not be accepted as valid

protests unless the protesting party also provides the original letter by either regular or overnight mail postmarked by the close of the protest period. Under these conditions, the BLM will consider the email or fax protest as an advance copy and it will receive full consideration. If you wish to provide the BLM with such advance notification, please direct emails to *Brenda_Hudgens-Williams@blm.gov* and faxes to (202) 452-5112 (Attn: BLM Protest Coordinator).

All protests must be postmarked or received not later than 30 days after publication of the EPA's Notice of Availability in the Federal Register.

IMPORTANT: In accordance with 43 CFR 1610.5-2 the protest must contain the information described in the following critical elements check list:

□ **The name, mailing address, and telephone number of the person filing the protest.**

□ **The "interest" of the person filing the protest (how will you be adversely affected by the approval or amendment of the resource management plan?)**

□ **A statement of the part(s) of the PRMP, and the issue(s) being protested. (To the extent possible, this should reference specific pages, paragraphs, sections, tables, maps, etc., which are believed to be incorrect or incomplete.)**

□ **A copy of all documents addressing the issue(s) that the protesting party submitted during the planning process OR a statement of the date they were discussed for the record.**

□ **A concise statement explaining why the protestor believes the BLM State Director's proposed decision is incorrect.**

All of these elements are critical parts of your protest. Take care to document all relevant facts. As much as possible, reference or cite the planning documents or available planning records (e.g. meeting minutes or summaries, correspondence, etc.) To aid in ensuring the completeness of your protest, a printable protest check list is available online at http://www.blm.gov/ak/st/en/prog/planning.1.html

The BLM Director will make every attempt to promptly render a decision on the protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior.

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment–including your personal identifying information–may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

Unlike land use planning decisions, implementing decisions are not subject to protest under planning regulations but are subject to administrative remedies and review, primarily through appeals to the Office of Hearings and Appeals (Interior Board of Land Appeals). Implementation decisions generally constitute the BLM's final approval, allowing on-the-ground actions to proceed. Where implementation decisions are made as part of the land use planning process, they are still subject to the appeals process or other administrative review as prescribed by specific resource program regulations after the BLM resolves the protests to land use planning decisions and makes a decision to adopt or amend the resource management plan (RMP).

These administrative remedies for final implementation decisions usually take the form of appeals to the Office of Hearings and Appeals, although for certain proposed or non-final implementation decisions such as proposed grazing decisions, the regulations provide for an internal agency review (usually a protest to the Authorized Officer) that must be completed before the final implementation decision can be appealed to the Office of Hearing and Appeals. This type of protest to the Authorized Officer should not be confused with the protest of land use planning decisions to the BLM Director.

Upon resolution of any protests, an Approved RMP and Record of Decision (ROD) will be issued. The Approved Plan will be mailed to all who participated in the planning process and will be available to all parties through the "Planning" page of the BLM-Alaska website: *(http://www.blm.gov/ak/st/en/prog/planning.1.html),* or by mail upon request. The Approved RMP and ROD will include the appeals process for implementing decisions that may be appealed to the Office of Hearing and Appeals following its publication.

Sincerely,

Thomas P. Lonnie
State Director

Bay Resource Management Plan and Environmental Impact Statement

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Proposed Action: Bay Proposed Resource Management Plan/Final Environmental Impact Statement (Proposed RMP/Final EIS) for lands within the Anchorage Field Office.

Type of Action: Draft ( ) Final (X)
Administrative (X) Legislative ( )

Abstract: The Bay Proposed RMP/Final EIS was developed based on information provided by BLM personnel, other agencies and organizations, and the public. Four Alternatives are described and analyzed in this document: Alternative A is the "no action" Alternative; Alternatives B and C propose varying levels of resource use and conservation; and Alternative D, the agency preferred Alternative and proposed RMP, provides a balance between resource conservation and development.

Major issues and management concerns analyzed include: minerals management, sustaining renewable resources, subsistence, land tenure adjustments, recreation, special designations, and management of cultural and natural resources.

Protests: Protests on the Bay proposed RMP/Final EIS must be received within 30 days of publication of the Environmental Protection Agency's Notice of Availability in the Federal Register. The close of the protest period will also be announced in news releases, newsletters, and on the Bay RMP Web site (http://www.blm.gov/ak/st/en/prog/planning/bay_rmp_eis_home_page.html).

Further Information:

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Executive Summary

A. Introduction

The Bureau of Land Management (BLM) has prepared this Proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) to provide direction for managing public lands within the Bay planning area boundaries and to analyze the environmental effects that would result from implementing the Alternatives presented in the Draft RMP/EIS.

The Bay planning area encompasses lands within the Bristol Bay and Goodnews Bay areas of southwest Alaska. Of the approximately 23,048,653 acres within the planning area, decisions in the RMP/EIS will apply to 1,923,261acres. After conveyances are complete in 2010, it is expected that approximately 1,163,604 acres, or approximately 5% of the total acreage in the Bay planning area, will remain under BLM management.

The Proposed RMP/Final EIS was prepared using BLM's planning regulations and guidance issued under the authority of the Federal Land Policy and Management Act of 1976 (FLPMA), and under requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality regulations for implementing NEPA (40 CFR 1500-1508), BLM's NEPA Handbook 1790-1, and BLM's Land Use Planning Handbook 1601-1 (March 2005).

B. Purpose and Need

The RMP will provide the BLM Alaska's Anchorage Field Office with a comprehensive framework for managing lands within the planning area under the jurisdiction of BLM. The purpose of an RMP is to provide a public document that specifies overarching management policies and actions for BLM-managed lands. Implementation-level planning and site or project-specific projects are then completed in conformance with the broad provisions of the RMP. The RMP is needed to update the Southwest Management Framework Plan (MFP) approved in 1981, and to provide a land use plan consistent with evolving law, regulation, and policy. This RMP meets the requirements of FLPMA, which states, "The Secretary shall, with public involvement . . . develop, maintain, and, when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands" (43 U.S.C. 1712).

C. Decisions to be Made

Land use plan decisions are made on a broad scale and guide subsequent site-specific implementation decisions. The RMP will make the following types of decisions to establish direction in the planning area:

- Establish resource goals, objectives, and desired future conditions.
- Describe actions to achieve goals, objectives, and desired future conditions.
- Make land use allocations and designations.
- Make land use adjustments.

Management under any of the alternatives would comply with State and Federal regulations, laws, standards, and policies. Each alternative considered in the Proposed RMP/Final EIS allows for some level of support of all resources present in the planning area. The alternatives are designed to provide general management guidance in most cases. Specific projects for any given area or resource would be

detailed in future implementation plans or site-specific proposals, and additional NEPA analysis and documentation would be conducted as needed in accordance with BLM's National Environmental Policy Act Handbook (H-1790-1).

After the comments on the Draft RMP/EIS were reviewed and analyzed, the responsible officials have decided that Alternative D will be BLM's Proposed RMP.

Following the 30-day protest period, and the resolution of any protests, a Record of Decision will be signed and an approved RMP will be released.

D. Issues

A planning issue is an area of controversy or concern regarding management of resources or uses on the BLM-managed lands within the planning area. Issues for the Bay RMP were identified through scoping, interactions with public land users, and resource management concerns of BLM, the State, and other Federal agencies. These issues drive the formulation of the plan alternatives, and addressing them has resulted in the range of management options across the proposed RMP alternatives. Additional discussion on each issue can be found in the Scoping and Issues section in Chapter I. Issues of primary concern in the development of this proposed RMP/EIS include:

- Determine which lands should be made available for oil and gas and hardrock mineral development, and how these lands will be managed to sustain natural resources and subsistence use.
- Explore land tenure adjustments that would allow BLM to consolidate discontiguous blocks of land to benefit land management.
- Determine how access will be provided to BLM-managed lands for various purposes including recreation, subsistence activities, and general enjoyment of public lands, while protecting natural and cultural resources.
- Determine whether any Special Management Areas will be identified.
- Determine whether eligible rivers should be recommended for inclusion in the National Wild Rivers System.

E. Alternatives

The basic goal in developing alternatives was to prepare different combinations of management actions to address issues and resolve conflicts among uses. Alternatives must meet the purpose and need; must be reasonable; must provide a mix of resource protection, use, and development; must be responsive to the issues; and must meet the established planning criteria. Each alternative constitutes a complete RMP that provides a framework for multiple use management of the full spectrum of resources, resource uses, and programs present in the planning area. Under all alternatives BLM would manage their lands in accordance with all applicable laws, regulations, and BLM policies and guidance.

Four alternatives were developed and carried forward for detailed analysis in the Draft RMP/EIS. Alternative A (the No Action Alternative) represents the continuation of current management practices. Alternatives B, C, and D describe proposed changes to current management, as well as what aspects of current management would be carried forward. These three alternatives were developed with input from the public, collected during scoping, from the BLM Planning Team, and through collaborative efforts conducted with the State of Alaska and the BLM-Alaska Resource Advisory Council (RAC). The alternatives provide a range of choices for meeting BLM planning and program management requirements, and resolving the planning issues identified through scoping. Alternative D, with modifications outlined in this document, represents BLM's Proposed RMP.

1. Alternative A

Alternative A represents the continuation of current management practices, also called the No Action Alternative. This alternative would include continued management under guidance of the existing Southwest Management Framework Plan (1981) for the Goodnews planning block only, and other management decision documents affecting all BLM-managed lands in the entire planning area. Direction contained in existing laws, regulations and policy would also continue to be implemented, sometimes overriding provisions in the Southwest MFP. The current levels, methods and mix of multiple use management of BLM land in the planning area would continue, and resource values would receive attention at present levels. No lands would be open to oil and gas leasing, including leasing for coalbed natural gas (CBNG), and large tracts would remain closed to locatable minerals activities due to retention of the Alaska Native Claims Settlement Act (ANCSA) 17(d)(1) withdrawals. No special management areas, such as Areas of Critical Environmental Concern (ACECs), Special Recreation Management Areas (SRMAs), or Wild and Scenic Rivers (WSRs), would be designated or recommended in this RMP for BLM-managed lands within the planning area, and lands would remain unclassified for off-highway vehicles (OHVs) and visual resources. In general, most activities would be analyzed on a case-by-case basis and few uses would be limited or excluded as long as their actions were consistent with State and Federal laws. Oil, gas, locatable mineral activities, and other permitted activities would be guided by requirements in specific Plans of Operations on a project-specific basis. The BLM publication, *Placer Mining in Alaska – A Guide to Mitigation and Reclamation (BLM 1989),* is incorporated by reference for Required Operating Procedures for Locatable Minerals.

2. Alternative B

Alternative B highlights actions and management that would facilitate resource development. All unencumbered BLM lands would be open to leasable and locatable mineral exploration and development unless they were withdrawn under some authority other than ANCSA 17(d)(1) (e.g. Military withdrawal, FERC withdrawal). The latter comprise withdrawals of approximately 3,968 acres. Selected lands whose selection is relinquished or rejected would also be open to mineral exploration and development. All ANCSA 17(d)(1) withdrawals would be revoked, allowing increased potential for mineral exploration and development. The BLM-managed lands within the planning area would be designated as “open” to OHV use. No SRMAs would be identified. In all areas, the focus would be on management of permits. As with Alternative A, no Special Management Areas (SMAs) would be designated and visual resources would be managed as Visual Resource Management (VRM) Class IV. Leasable and locatable mineral activities and other permitted activities would be guided by requirements in specific Plans of Operations on a project-specific basis.

3. Alternative C

Alternative C emphasizes actions and management that protect and enhance renewable resources, archaeological, and paleontological values. Leasable and locatable mineral activities would be more constrained than in Alternatives B or D, and where Areas of Critical Environmental Concern (ACEC) are proposed, salable mineral activities would be excluded to protect important resources. Two ACECs, the Bristol Bay ACEC and the Carter Spit ACEC, would be established and specific measures adopted to protect or enhance values within these areas. ANCSA 17(d)(1) withdrawals would be maintained within the Carter Spit ACEC, closing this area to mineral activities. All BLM-managed lands within the planning area would have a “limited” OHV designation, allowing for limitations on OHV activities to protect water quality, habitat, soil and vegetation, cultural resources, and recreation experiences. No SRMAs would be identified. In all areas, the focus would be on management of permits. ANCSA 17(d)(1) withdrawals would be maintained as an interim measure at locations where proposed Wild and Scenic river segments are located until Congress has had an opportunity to act on the proposals, in order to protect or maintain

resource values. Three river segments, a portion of the Alagnak River, and portions of the Goodnews River mainstem and Goodnews River Middle Fork would be recommended for WSR designation. Portions of these rivers recommended for a Wild River designation would be managed for VRM Class III, the proposed ACECs would be managed as VRM Class III, and most of the remainder of the BLM-managed lands within the planning area would be managed as VRM Class IV. Resources would be protected through Stipulations, Required Operating Procedures, and project-specific requirements.

4. Alternative D

Alternative D provides a balance of protection, use, and enhancement of resources. ANCSA 17(d)(1) withdrawals would be revoked, and the majority of unencumbered lands and any selected lands whose selection is relinquished or rejected would be open to leasable and locatable mineral activities subject to seasonal or other constraints. Approximately 3,968 acres would continue to be withdrawn under Agency withdrawals other than ANCSA 17(d)(1). ANCSA 17(d)(1) withdrawals would be revoked from the one proposed ACEC, the Carter Spit ACEC. Stipulations, Required Operating Procedures, and project-specific requirements would protect values within these areas. The ACEC would be closed to salable mineral entry. No WSRs would be recommended. Specified lands in the Goodnews Bay and Bristol Bay areas would be managed up to one-half mile from established winter trail or road systems at VRM Class III (Table 2.4). BLM lands in the full visible foreground up to one mile from the boundaries of Conservation System Units (CSU) would be managed at VRM Level III. The proposed ACEC would be managed at VRM Class III, and all other BLM lands would be managed at VRM Class IV. All BLM-managed lands within the planning area would have a “limited” OHV designation, allowing for limitations to be placed on OHV use to protect water quality, habitat, soil and vegetation resources, and/or recreation experiences. As with Alternative C, resources would be protected through Stipulations, Required Operating Procedures, and project-specific requirements.

5. BLM Preferred Alternative

Alternative D was selected as the Preferred Alternative based on examination of the following factors:

- Balance of use and protection of resources.
- Extent of the environmental impacts.

This alternative was chosen because it best resolves the major issues while providing for common ground among conflicting opinions. It also provides for multiple use of BLM-managed lands in a sustainable fashion. Alternative D provides the best balance of resource protection and use within legal constraints.

F. Environmental Consequences

Selection of Alternative A, the No Action Alternative, would maintain the current rate of progress in protecting resource values and in resource development. It would allow for use levels to mostly continue at current levels in the same places in the planning area, with adjustments required in order to mitigate resource concerns in compliance with existing laws and regulations. ANCSA 17(d)(1) withdrawals would be retained, precluding all leasable mineral activities and most locatable mineral activities, and the effects of those activities. With no Off-highway vehicle designations or weight limits, OHV activity could be the source of some impacts to vegetation, soil, and water resources.

Alternative B would allow for maximum resource development with the fewest constraints. This Alternative would result in greater impacts on the physical and biological environment than would implementation of Alternative C or D. Effects of leasable mineral activities would be the greatest under

this Alternative, but according to the Reasonable Foreseeable Development Scenario, would be limited to the Koggiling Creek planning block of BLM-administered land. Effects of locatable mineral activities would most likely occur in the Goodnews planning block due to renewal of pre-ANSCA placer mining and exploration for lode mining; however, the Klutuk Creek planning block could also be affected by placer or lode mining exploration. Cumulative effects from mining and infrastructure developments in the planning area but outside of BLM-administered lands could occur during the life of this plan. Impacts to vegetation, soil, and water resources could occur from an "Open" OHV designation.

Alternative C would have the least potential to impact physical and biological resources from BLM actions. Uses would be the most restrictive. ANCSA 17(d)(1) withdrawals would be revoked from all unencumbered BLM lands except the three Wild and Scenic River designations and one of the two proposed ACECs (Carter Spit). A "Limited" OHV designation would restrict OHVs to designated trails, avoiding impacts to vegetation, soils, and water resources.

Alternative D would allow for increased levels of resource development while providing for site-specific protection of resources through designation of one Area of Critical Environmental Concern and through Required Operating Procedures, Stipulations, and project-specific requirements. This Alternative would provide as much opportunity for mineral development as Alternative B. Closures to mineral entry and location would be limited to small, site-specific areas or to specific seasons of the year. This alternative could result in economic benefits to local economies from resource extraction. All unencumbered BLM lands in the planning area would be designated as "limited" to OHVs with a maximum gross vehicle weight rating of 2,000 pounds. On State-and Native-selected lands, OHVs would be managed consistent with the State's Generally Allowable Uses, resulting in less resource degradation than under Alternatives A or B. Alternative D provides a balance of protection and use of resources.

G. Public Involvement

Public involvement has been an integral part of BLM's planning effort. During scoping, nine public meetings were held from January 2005 until the end of March 2005. Public scoping meetings were held in Anchorage, Kenai, Homer, Dillingham, Iliamna, New Stuyahok, Aleknagik, King Salmon, and Naknek. Newsletters have been mailed to update interested parties on the progress of the Planning Team and stages of the planning process. In addition, numerous briefings were held with various groups and organizations during the preparation of the Draft RMP/EIS. BLM also invited all Native villages in the area for government-to-government consultation during the course of the process. Public involvement is described in more detail in Chapter V.

The comment period on the Bay Draft RMP/EIS extended for 90 days following publication of the Environmental Protection Agency's Notice of Availability in the Federal Register. After 90 days, comments were evaluated. Substantive comments were taken into consideration, and this proposed RMP and Final EIS was then completed. If protests are received on the Proposed RMP/Final EIS, they will be reviewed and addressed by the Director of the BLM before a Record of Decision and Approved Plan are released.

Six public meetings and subsistence hearings were held throughout the planning area. One additional public meeting was held in Anchorage and comments were taken via conference call from residents of Quinhagak. Comments received or postmarked by February 5, 2007 were reviewed and analyzed by the BLM Planning Team. Appendix I: Response to Comments outlines all substantive comments received on the Draft RMP/EIS and BLM's responses to those comments.

Changes made between the Draft and the Final EIS resulted from public and internal review of the Draft RMP/EIS. A summary of the changes can be found on pages ix–xi, and are highlighted in grey throughout the Proposed RMP/Final EIS.

A 30-day protest period will begin with publication of the Notice of Availability of the Proposed RMP/Final EIS in the Federal Register by the Environmental Protection Agency. All protests received will be reviewed and addressed by the Director of the BLM before a Record of Decision and Approved Plan are released.

Changes from Draft to Final

A. Introduction

This section summarizes changes that have occurred from the Draft RMP/EIS to the Proposed RMP/Final EIS. Editorial changes will not be described here. It is assumed that all changes needed for accuracy, clarity, consistency, improved readability, and incorporation of improved GIS data have been made based on public comment and internal review.

For a more detailed description of the comments received on the Draft RMP/EIS, the content analysis process, and BLM's responses to those comments see Appendix I: Response to Comments in Volume II of this document.

Throughout the Proposed RMP/Final EIS, any change that has taken place between the Draft and the Final is highlighted in grey. Any new table has only the Table Title highlighted, not all of the information presented in the table. Any new section added (e.g. a new Appendix) has only the Appendix title highlighted, not all of the information in the Appendix. The Table of Contents at the beginning of each chapter highlights new sections added in grey. The master Table of Contents in each volume highlights any new map, table, figure, or section of the document in grey.

B. Summary of Changes from Draft to Final

1. Changes to the Draft's preferred alternative that are now a part of the Final's Proposed RMP (Alternative D)

NOTE: These changes required additional analysis in Chapter IV and changes to Chapter II narrative or comparison tables in the Appendices.

- **Carter Spit ACEC:** The overall size has been reduced (62,862 acres to 36,220 acres) to account for ANILCA 906(e) top-filed lands becoming State-selected upon revocation of ANSCA 17(d)(1) withdrawals. In addition, public comment suggested adjusting the eastern boundary of the ACEC for improved identification by visitors at ground level (Appendix B).
- **Carter Spit ACEC:** additional text has been added to clarify that ANSCA 17(d)(1) withdrawals would be revoked within the proposed Carter Spit ACEC and this area would be open to locatable and leasable mineral activities but closed to salable mineral activities. A comment was received requesting clarification of the mineral status of the Carter Spit ACEC (Chapter II, pgs. 3-5).
- **Step-down plans:** additional planning efforts (activity or step-down plans) in excess of the Bay RMP will not be performed for the proposed Carter Spit ACEC (as described in Fish, Soil, Water, and Air, Fire Management, Cultural and Paleontological Resource Management sections). Instead, data collection efforts and monitoring of resources will be a Field Office priority pursuant to available funding. Relevant and Important resources and protection and mitigation measures for the resources have been identified within the Bay RMP.

- **Lands and Realty:** ANILCA 906(e) Topfilings have been addressed within the Proposed RMP/Final EIS. 61,105 acres of unencumbered BLM lands would become State-selected upon lifting of ANSCA 17(d)(1) withdrawals. These topfiled lands include the high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch. New locatable mineral activities would not be authorized through Federal mining claims as a result. The RFD for Locatable Minerals has been revised to acknowledge this fact.
- **Fish Management:** a description of Essential Fish Habitat has been added to Chapter III section B.6.i, and Chapter IV, section C.4.f.
- **Fish Habitat:** A 300-foot setback for surface disturbing activities has been added to unencumbered BLM lands along Klutuk Creek based on determination of navigability and subsequent State of Alaska Mineral Order No. 393 closing this water body to new locatable mineral leasing.
- **Fire Management and Ecology:** Fire management for the Carter Spit ACEC will be consistent with the surrounding area rather than develop fire strategies specific to the ACEC.
- **Livestock Grazing:** Livestock grazing has been changed from prohibited within the Carter Spit ACEC to: Livestock grazing will be managed on a case-by-case basis (Common to All Alternatives) to unnecessarily prohibit livestock grazing in compatible areas.
- **Mineral Leasing**: acreage open/closed to leasable, locatable, and salable mineral activities have been adjusted to represent land status as of February 5, 2007.
- **Travel Management**: A text box was added, describing Gross Vehicle Weight Rating (GVWR) vs. Curb Weight Rating
- **Travel Management:** Clarification was added to explain that BLM's "limited" designation is similar to the State's "Generally Allowed Uses on State Land," which requires OHVs to stay on existing trails whenever possible (Appendix F). Because of this similarity, BLM will apply the limited designation to State- and Native-selected lands until lands are conveyed from BLM management.
- **Recreation Management**: A comprehensive trails and travel management plan will be developed within five years of signing the ROD; this has been changed to: an activity plan will be developed to meet objectives of the Carter Spit ACEC. This is pursuant to LUP Handbook H-1601-1 Appendix C, Section II-D.
- **Lands and Realty**: Increased description of Rights-of-Way avoidance area for Carter Spit ACEC per LUP Handbook H-1601-1 Appendix C, Section II-E.
- **Required Operating Procedures and Stipulations (ROP/Stipulations)** are located in Appendix A and have been revised in the final document.

2. Other changes that required supplementary information added to the Final RMP/EIS, including additions to Chapter III or Chapter IV analysis

- **Assumptions for Analysis:** Based on public comment and clarifying statements added to Chapter II, a large portion of Chapter IV has been revised.
- **Designation of Subsistence Only Areas:** Several comments were received requesting that the BLM designate subsistence use only areas within the Bay RMP. Language has been added to the "Alternatives Considered But Not Carried Forward" section describing BLM's lack of authority to propose such a designation (Chapter II, section C).
- **Water**: Major watersheds which compose the planning area have been added, stating nine major watersheds makeup the planning area rather than six.
- **Water**: A description of general water resources has been revised, describing both the Goodnews and Bristol Bay regional water resources.

- **Water**: A reference to water quality studies has been added, indicating that buffering capacity of water filtered through sub-artic vegetation into tundra lakes is variable.
- **Water**: Per public request, a website reference to the USGS has been added to show stream gage and ground water information in the planning area.
- **Fisheries**: Descriptions of Essential Fish Habitat in the Bay planning area have been added to Chapters II and III.
- **Fisheries**: Additional text has been added describing the fisheries resource of the South and Middle Fork and mainstem Goodnews River, South and East Fork Arolik River, Faro Creek, Jacksmith Creek, and Cripple Creek.
- **Special Status Species**: Based on consultation with the U.S. Fish and Wildlife Service, references to spectacled eiders using lands within the Bay planning area have been revised to explain that spectacled eiders breeding distribution is only on the Yukon-Kuskokwim Delta.
- **Visual Resources Management (VRM):** a description of changes to current landscape condition that may be attributed to climate change has been added.
- **Geothermal Resources**: Due to public comment, a description of geothermal resources has been added to Chapter III.
- **Historical Locatable Mineral Development**: Due to public comments, the status of the proposed Pebble Mine on State of Alaska managed lands has been updated.
- **Recreation**: The amount of Special Recreation Permits issued by the BLM in the Bay planning area has been updated from six to four permits.
- **Recreation Opportunity Spectrum:** Tables 3.17 and 3.18 from the Draft RMP/EIS have been deleted and information from these deleted tables has been incorporated into Table 3.16.
- **Lands and Realty**: Based on public comment, a text box describing Conservation System Units (CSU) has been added.
- **Lands and Realty:** Additional text has been added to describe Discretionary Land Uses.
- **Lands and Realty:** Clarifying text has been added to Table 3.19 concerning the various ANCSA §17(d)(1) Withdrawals Public Land Orders.
- **Lands and Realty:** Withdrawals described as *other than ANCSA 17(d)(1) withdrawals* in the Draft RMP/EIS are referred to as *Agency withdrawals* in the Proposed RMP/Final EIS.
- **Lands and Realty:** A text box has been added to describe ANILCA 906(e) Topfilings.
- **Chapter IV** has been rewritten almost in entirety from that proposed in the DEIS. This is attributed to changes in Chapter II and response to public comments.

In addition to the above changes, several minor editorial changes have been made to the document, including spelling corrections and revised sentence structuring. Some tables, maps, photos, and appendices were re-numbered to maintain chronological order throughout the document, and to improve readability. This revised numbering is not highlighted in grey.

Table of Contents – Volume 1

Chapter I: Introduction

Chapter II: Alternatives

Chapter III: Affected Environment

Chapter IV: Environmental Consequences

Chapter V: Consultation and Coordination

List of Tables

Chapter IV Tables

Chapter V Tables

List of Photos

***See Volume 2 for Appendices, References, Acronyms and Glossary**
***See Volume 3 for Maps**

Chapter I: Introduction

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Chapter I: Introduction

A. Background

On December 6, 2004, the Bureau of Land Management (BLM) issued a Notice of Intent in the Federal Register to prepare a Resource Management Plan (RMP) and Environmental Impact Statement (EIS) for "public lands" administered by BLM's Anchorage Field Office (AFO). As defined by the Federal Land Policy and Management Act (FLPMA), "public lands" are those Federally-owned lands and interests in lands that are administered by the Secretary of the Interior, through BLM. This includes lands selected by, but not yet conveyed to the State of Alaska or Native corporations. This chapter establishes the purpose and need for this RMP/EIS. It also contains information about BLM's planning process.

BLM's Anchorage Field Office is preparing this RMP/EIS to provide a framework for managing and allocating uses of public lands and resources within the Bristol Bay and Goodnews Bay areas of southwest Alaska. FLPMA provides that "land use plans shall be developed for the public lands regardless of whether such lands previously have been classified, withdrawn, set aside, or otherwise designated for one or more uses." The approved RMP will meet that statutory requirement as well as the statute's further requirement for a comprehensive land use plan consistent with multiple use and sustained yield objectives. The EIS will fulfill requirements of the National Environmental Policy Act (NEPA) to disclose and address environmental impacts of proposed major Federal actions through a process that includes public participation and cooperation with other agencies. Planning regulations are contained in the Code of Federal Regulations, at 43 CFR 1600. Administrative procedures and guidance for planning are provided by BLM Manual 1601, *Land Use Planning*, and BLM's Land Use Planning Handbook (H-1601-1).

B. Purpose and Need for the Plan

The purpose of this Resource Management Plan (RMP) is to provide a comprehensive land use plan to guide management of the public lands and resources administered by the Anchorage Field Office within the Bay planning area. Current management of these lands is guided by the Southwest Management Framework Plan (MFP) (BLM 1981), which applies only to the Goodnews planning block. Additional plans impacting the Bay planning area can be found in section H of this chapter. Approximately 85% of the land under BLM management in the Bristol Bay region has never been addressed by a BLM land use plan. The planning area was included in a statewide plan amendment ensuring consistency with the National Fire Plan in 2005.

There is a need for this RMP because new regulations and policies require management considerations for public lands which are in addition to existing management prescriptions, or are entirely new management considerations where none existed before. New issues and concerns affecting all of these lands must be addressed. Consequently, some of the decisions in the MFP are no longer valid, have been superseded by requirements that did not exist when the MFP was prepared, and do not apply throughout the Bay RMP region. This RMP is also needed given that 85% of the land in the planning area has never addressed by a BLM land use plan. Further, satisfaction of land claims under ANSCA and the Alaska Statehood Act changes BLM's focus from custodial management of the land to managing the land for multiple use under FLPMA's mandate. These new issues and changes in management policy and the change in BLM's land management role drive the need for an inclusive, comprehensive plan that provides clear direction to both BLM and the public.

Additionally, this document will analyze impacts and make a recommendation for retention and revocation of ANSCA 17(d)(1) withdrawals (Chapter I, section E.1, Issue Statement 1). This is because State- and Native-selected lands have been acknowledged and are projected to be satisfied in the next few years.

Consequently, it is now possible to identify lands that will remain in Federal ownership. For those lands, this changes BLM's focus from custodial management of the land for the potential benefit of a claimant to FLPMA's mandate of managing the land for multiple use.

C. Description of the Planning Area

1. Land Ownership and Administration

Map 1.1 shows the location of the planning area within the State of Alaska and provides the varying ownership and conveyance status within the planning area. Of the approximately 23,048,654 acres within the planning area, the RMP/EIS will apply to 1,975,966 acres, as described below and as shown in Table 1.1 and Map 1.1. When conveyances are complete in 2010, approximately 1,163,604 acres, or approximately 5% of the total acreage in the Bay planning area, are expected to remain under BLM management. Until conveyances are approved, State-selected, Native-selected, Top Filed and dual-selected lands outside of National Park system lands or National Wildlife refuges will continue to be managed by BLM.

What actions produced the major land ownership patterns in the Bay planning area?

The following actions created the major outlines of today's land ownership in the planning area.

Early Withdrawals
Katmai National Monument, September 24, 1918, by presidential proclamation.

A small portion of what is today the Togiak NWR south of Goodnews was withdrawn as a Refuge prior to ANILCA; Cape Newenham NWR, Clarence Rhode NWR, Hazen Bay NWR and Nunivak Island NWR were also previously withdrawn and became parts of the Yukon Delta NWR with the passage of ANILCA.

Alaska Statehood Act 1959
Under the provisions of the Statehood Act, the State selected large tracts of land administered by the Federal government. To date, a majority of these selections have been patented or tentatively approved and are under State management.

Alaska Native Claims Settlement Act (ANCSA) 1971
Native regional and village corporations selected large tracts of land administered by the Federal government. To date, a majority of these selections have been interim conveyed to the corporations.

Alaska National Interest Land Conservation Act (ANILCA) 1980
ANILCA expanded Katmai National Monument to include Wilderness, National Park, and Preserve and established Lake Clark National Park and Preserve, Alaska Peninsula National Wildlife Refuge, and the Becharof National Wildlife Refuge.

Unencumbered BLM. These are lands that will most likely be retained in long-term Federal ownership. These lands, which constitute approximately 5% of the planning area, are not selected by the State or by Native corporations or villages.

State-selected. These are lands that were selected by the State of Alaska under the Alaska Statehood Act of 1958 and the Alaska National Interest Lands Conservation Act (ANILCA) of 1980. ANILCA allowed for overselection by the State of up to 25% of its entitlement (sec. 906[f]). Therefore, some State-selected lands will remain in Federal ownership. Per 43 CFR 2627.4(b), State-selected lands will be

segregated from all appropriations including leasable and locatable minerals. State-selected lands constitute approximately 348,388 acres of the planning area.

Top Filed Lands. Section 906(e) of ANILCA allowed for future land claims or "Top Filings" by the State of Alaska. Under this authority, the State filed claims for lands which were not available to the State under the provisions of §6(a) or (b) of the Alaska Statehood Act on the date of the filing. Upon revocation of ANSCA 17(d)(1) withdrawals, Top Filed lands currently designated as unencumbered BLM would become State-selected. Though ANSCA 17(d)(1) withdrawals would open lands to mineral entry, essentially ANILCA 906(e) would continue to prevent mineral entry as the lands become State-selected as described the previous paragraph, *State-selected*.

Native-selected. The Alaska Native Claims Settlement Act (ANCSA) of 1971 entitled Alaska Natives to select 44 million acres of land from a pool of public lands specifically defined and withdrawn by the Act for that purpose. Some ANCSA corporations filed selections in excess of their entitlements. Similar to that of over-selections by the State, some of the Native-selected lands will not be conveyed and will remain in Federal ownership. Per ANCSA, section 11, Native-selected lands will be segregated from all appropriations including leasable and locatable minerals. Native-selected lands constitute approximately 411,268 acres of the planning area.

Dual-selected. These are lands that have been selected by both the State and Native corporations. Because of overselection, some of these lands may remain in Federal ownership. Dual-selected lands constitute approximately 265,056 acres of the planning area.

Mineral estate. Alaska is a “split estate” property state in which there can be two distinct owners of a given parcel of land—the surface owner and the sub-surface owner. Federal split-estate lands are those where the surface estate has been patented out of Federal ownership, while all or a portion of the subsurface estate is retained by the United States. The rights of a surface owner generally do not include subsurface interests such as oil, natural gas or coal resources. Under the appropriate provisions and authorities of the Mineral Leasing Act of 1920, individuals and companies can prospect for and develop coal, petroleum, natural gas and other minerals or interests reserved by the Federal government. The subsurface estate lying beneath BLM lands is managed by BLM. The subsurface estate of some Native allotments is reserved to the Federal government. Within the planning area, BLM manages an estimated 52,705 acres of the subsurface estate where it does not manage the surface.

Table 1.1. Land Status within the Bay Planning Area

Land Category	Acres	Percent of the Planning Area
BLM-managed lands		
BLM public lands (unencumbered)*	1,163,604	5.05%
State-selected**	348,388	1.51%
Native-selected	411,268	1.78%
Dual-selected***	265,056	***
Mineral Estate	52,705	0.23%
BLM-managed lands subtotal	**1,975,965**	**8.57%**
National Park Service managed lands	**4,193,427**	**18.19%**
U.S. Fish and Wildlife Service managed lands	**4,400,956**	**19.09%**
Military	**10,832**	**0.06%**
State of Alaska	**9,731,275**	**42.2%**
Private**	**2,788,904**	**12.1%**
Total lands within the planning area	**23,048,654**	**100.0%**

*Includes a portion of the Neacola Block, in the northeastern most corner of the planning area, comprising 21,419 acres, which was addressed in the Ring of Fire RMP/EIS and will not be addressed in this plan.
**State-selected lands according to BLM Land Status.
*** Intersection of State priority selection with Native selected lands (according to BLM Land Status). Dual-selected acres are already included in the State-selected and Native-selected totals, and are not included in the total lands within the planning area acreage.
****Private lands include ANCSA lands, Native allotments, and all other privately owned lands. The vast majority of this acreage is comprised of Native corporation land.

Lands within the planning area that will not be covered by the RMP/EIS:

National Park Service lands. These are lands within Lake Clark National Park and Preserve, Katmai National Park and Preserve, and the Alagnak Wild River. These lands constitute approximately 18% of the planning area.

U.S. Fish and Wildlife Service lands. These are lands managed by the U.S. Fish and Wildlife Service within the Yukon-Kuskokwim Delta National Wildlife Refuge, the Alaska Maritime National Wildlife Refuge, the Togiak National Wildlife Refuge, and the Alaska Peninsula/Becharof National Wildlife Refuge. These lands constitute approximately 19% of the planning area.

Military lands. These lands are withdrawn for military purposes. If the withdrawals are revoked and the lands are returned to BLM during the life of this RMP, the management provisions contained in this RMP/EIS may apply. Military lands constitute one-tenth of one percent of the planning area.

State of Alaska lands. These are lands that have been conveyed to the State of Alaska. These lands constitute approximately 40% of the planning area.

Native lands. These are lands conveyed to village and regional Native corporations and are now private lands. These lands are listed in Table 1.1 with other private lands and, in total, constitute approximately 12% of the planning area.

Private lands. Aside from village and regional Native corporation lands, these lands are privately owned and include Native allotments and other private land. In Table 1.1, they are included with Native lands to comprise approximately 12% of the planning area.

2. Geographic and Social Setting

The Bay planning area includes lands adjacent to Bristol, Goodnews, and Jacksmith bays, and extends northerly to the Kanektok River. It includes the headwaters of the Togiak, Tikchik, King Salmon, Nushagak, Mulchatna, Kvichak-Alagnak, and Naknek river drainages. It also includes the east side of Iliamna Lake and Kakhonak Lake, the western portion of the Alaska Range and the Aleutian Range, and the upper portions of the Alaska Peninsula north of Becharof Lake and Egegik Bay (Map 1.1). This region consists primarily of broad, level to rolling upland tundra-covered river basins (Map 1.1). Residents of the Bay planning area are located in 25 villages. There are two State organized boroughs within the planning area, Bristol Bay and Lake and Peninsula Boroughs, and three ANCSA Regional Corporations have real estate holdings within the planning area; Calista, Incorporated, Ltd., Bristol Bay Native Corporation, and Cook Inlet Region, Incorporated.

People residing within the Bay planning area are heavily engaged in a subsistence economy. Besides the subsistence economy, commercial fishing, commercial guiding, and sports hunting and fishing are the primary pursuits in the planning area.

Natural gas, coal, and coal bed methane may be present in the region based on data collected from exploratory wells drilled on the Alaska Peninsula and offshore in the Bristol Bay basin. A few families have windmills, but most of the energy used to generate heat and electricity is derived from diesel fuel and heating oil that is barged to the region. Transportation is predominantly by air or water. The planning area contains approximately 92 miles of secondary roads, none of which are located on unencumbered BLM lands. Access to public lands is by boat, airplane, or snow machine, though a few areas are accessible by automobile or off-highway vehicle (OHV).

Photo 1.1. Alagnak River, View South.

In addition to BLM-managed lands, the planning area includes lands administered by the State of Alaska (State), Native corporations, the National Park Service (NPS), U.S. Fish and Wildlife Service (FWS) and private landowners (Map 1.1; Table 1.1).

Photo 1.2. Jacksmith Creek, Goodnews planning block

Photo 1.3. Bear Creek, Kvichak planning Block.

D. Planning Blocks

In order to more easily discuss specific locales within the Bay planning area, and to provide for some consistency among discussions within the RMP/EIS, the different blocks of unencumbered BLM land have been named. Map 1.1 provides the names.

The land ownership pattern in Alaska changes daily as BLM continues to convey land to Native entities and the State per the Alaska Land Transfer Acceleration Act, Public Law 108-45. The land ownership pattern within the planning area that existed on February 5, 2007 is the basis for the text that follows.

E. Issues and Management Concerns Identified During Scoping

The Bay Scoping Report was issued on May 30, 2005, and is available at the BLM website for the Bay RMP/EIS at *http://www.blm.gov/ak/st/en/prog/planning/bay_rmp_eis_home_page.html*, or a hard copy is available from BLM AFO upon request (BLM 2005). Scoping is an open public process for determining the range of issues to be analyzed in the RMP/EIS, and for identifying important issues related to the Bay planning area. Internal scoping meetings were held, meetings were arranged with other public agencies, and a series of five public meetings were conducted to provide the public with information about the planning effort to identify issues and concerns that should be addressed in the RMP/EIS, and to collect information that would enable selection of the best overall Alternative while meeting FLPMA's multiple use mandate. In addition to public scoping meetings, Government-to-Government consultations were carried out in six villages, and presentations were given to a wide variety of public interest groups. Comments were also received by letter and through the Bay planning website.

Comments received fell into three categories: (1) Issues and concerns that could be addressed in the planning document; (2) Issues that relate to BLM-managed lands but are beyond the scope of this RMP/EIS; (3) Issues that relate to lands administered by other agencies. The first two will be discussed here. With regard to the third, issues that relate to lands administered by other agencies or entities, comments were forwarded to the relevant agencies in formal letters, and letters were also sent to the commenters, informing them of our actions.

1. Issues Addressed

Public and internal scoping identified several issues and management concerns that are being addressed in the Bay RMP/EIS. They are:

Issue Statement 1: Which lands would be made available for oil and gas and other mineral development, and how should these lands be managed to sustain natural resources?

The plan makes recommendations for the location and number of acres available for Fluid Mineral leasing, Locatable Mineral entry, and the sale of Salable Minerals.

Withdrawal orders issued under the authority of Section 17(d)(1) of ANCSA withdrew substantial acreage within the planning area from all forms of appropriation under the public land laws, including mining and mineral leasing laws. These withdrawal orders were intended to be temporary – the lands were to be withdrawn until conveyance of the majority of State- and Native corporation-selected lands had taken place and a planning process was completed. The withdrawal orders close the land to mineral development and provide temporary protection of resources, but restrict BLM from fully realizing the multiple use potential of the lands it manages.

Under this plan, BLM proposes revoking the ANCSA 17(d)(1) withdrawals in the Bay planning area. Where necessary, some of the withdrawals may be replaced by appropriate management strategies aimed at resource conservation.

The Bristol Bay blocks of BLM land have a wide variety of world-class renewable and non-renewable resources, including much-utilized salmon, caribou, moose, and bear, the potential for the presence of rich cultural and paleontological resources, as well as a potential for oil, gas, and solid mineral development. These lands are the focus of current but limited multiple uses, including subsistence hunting, fishing, and gathering, sport hunting and fishing, and commercial fishing. Members of the public have expressed concern that these resource values be retained, including that of a properly functioning ecosystem. At the same time there is an interest in developing mineral resources and attendant infrastructure, creating the possibility of user conflict.

The lands in the Goodnews planning block are remarkable for their unique coastal beaches, wetlands and marshes, habitat for migrating waterfowl and shorebirds, and a wide variety of unique vegetation types. Ahklun Mountains habitat is non-forested alpine tundra with willow-lined drainages and tall willow and alder shrub thickets skirting the bases of the hills and occurring in scattered patches throughout (Photo 1.2). Salmon and freshwater fish are available in its rivers and streams. It is a focus of subsistence activities for this region's villages. A number of known historic sites are present on BLM lands in this planning block. BLM lands have moderate to high potential for locatable minerals, and mining has historically taken place in the area. There is a concern for potential user conflict.

These issues are addressed in the program Goals and Objectives in Chapter II, in the Alternatives, and in the Required Operating Procedures and Stipulations (Appendix A).

Issue Statement 2: What land tenure adjustments would allow BLM to consolidate discontiguous blocks of land to benefit land management for the people of the United States?

The pattern of State and Native corporation selections and conveyances leaves a number of small, scattered tracts for BLM to administer, creating management difficulties for BLM, subsistence, sport, and commercial users, and adjacent landowners. The situation also complicates permitting processes for activities that cross administrative lines. BLM wishes to consolidate these lands into larger blocks of land for management and administrative purposes.

After settling all of the State and Native corporation claims in the planning area, BLM would prefer to use the smaller, isolated blocks for exchange in order to consolidate its long-term holdings.

Issue Statement 3: How will access be provided to BLM-managed lands for various purposes including recreation, subsistence activities, and general public land use, while protecting natural and cultural resources?

The public expressed concern about the compatibility of new Rights-of-Way with other interests. Avoidance areas for Land Use Authorizations and Rights-of-Way would be identified in conjunction with the proposed Bristol Bay and Carter Spit ACECs in this plan. Because BLM currently has no development proposals for BLM lands in the Bay planning area, other avoidance areas will be identified on a case-by-case basis.

Members of the public expressed a desire to be informed about access to public lands via 17(b) easements. Existing 17(b) easements are identified and described in this plan. The summary tables in Appendix F provide identification of each 17(b) easement by the Easement Identification Number (EIN)

BLM will make recommendations in this RMP/EIS regarding how recreation opportunities on BLM lands will be managed, and will provide recommendations to establish Visual Resource Management and Recreation Opportunity Spectrum classes.

Commenters expressed the expectation that user conflicts would be expressly addressed in the RMP. Concerns expressed include:

- competition between subsistence hunters and sport hunters
- analysis of BLM's Special Recreation Permit program
- regulating aircraft access to BLM lands
- enforcement of regulations on BLM lands
- signing BLM lands

Both State and Federal statutes provide a priority for subsistence use of wildlife in Alaska. State regulations apply to all subsistence activities unless otherwise superseded by Federal regulations. The Federal Subsistence Board regulates subsistence harvests on unencumbered BLM-managed lands for rural residents while the State Division of Wildlife Conservation continues to have the responsibility to manage wildlife for all other users on all lands within Alaska. Withdrawals and mining claims are qualified Federal public lands and are under the authority of the Federal Subsistence Board. Potential subsistence management conflicts and potential management resolutions with respect to harvesting wildlife do not reside with BLM but rather with the State Board of Game and the Federal Subsistence Board.

That said, it remains that BLM, pursuant to the provisions of Title VIII of ANICLA, evaluates all land use applications for their effects on subsistence, and a section 810 (ANILCA) Compliance/Clearance Determination of Need is performed before any use is approved.

Prior to issuing any permits or use authorizations on Native-selected lands, the views of ANCSA Native corporations are obtained and considered. On State-selected lands, permit applications or use authorizations are not processed without first obtaining the concurrence of the State.

Enforcement of Bureau regulations and policies on BLM-managed lands will be performed by AFO Recreation Program staff, BLM Law Enforcement rangers, field staff, and other AFO specialists

conducting field compliance examinations. BLM will continue to seek the assistance of neighboring land management agencies and rural communities in pursuit of its monitoring and enforcement efforts.

Because conveyances under the Statehood Act, ANCSA and ANILCA are still in progress, the land ownership pattern is continually changing, thus signage identifying BLM lands and boundaries, while a very good idea, is not yet practical.

Issue Statement 4: Should eligible rivers be recommended for inclusion in the National Wild Rivers System?

Twenty eight rivers, river segments, streams, and lakes were nominated by the public during scoping to be evaluated for their eligibility for nomination to the Wild and Scenic River system. The details regarding these water bodies can be found in Appendix B.

The National Wild and Scenic River Act of 1968 was enacted to preserve the free flowing condition, water quality, and outstandingly remarkable values of select rivers. A four-step process is required before a river can be included in the National Wild and Scenic River System. Rivers are ranked based on eligibility, classification, and suitability. Recommended rivers are studied further by Congress before their inclusion in the Wild and Scenic River System.

The first step is an evaluation of a river's eligibility. For a river to be eligible, it must be free-flowing and possess one or more outstandingly remarkable values (ORV). An ORV is defined as a unique, rare or exemplary feature that is significant at a comparative regional or national scale. If a river is found eligible, its current level of development is documented. Next, a river is categorized as wild, scenic, and/or recreational. The final step is a suitability analysis which provides the basis for determining whether to recommend a river for inclusion in the Wild and Scenic River System.

2. Issues Considered But Not Further Analyzed

The following topics were raised during public scoping or in comments received after publication of the draft Bay plan but will not be addressed in this RMP. Some of these issues are beyond the scope of the plan, while others do not meet BLM policy or planning criteria and will not be addressed. The issues and concerns that will not be analyzed further are summarized below.

a) Wilderness Characteristics

In 1964, Congress enacted the Wilderness Act ". . . to assure that an increasing population . . . does not occupy and modify all areas within the United States . . . , leaving no lands designated for preservation and protection in their natural condition." The statutory criteria used to identify lands with wilderness character have been in effect since passage of the Wilderness Act over 40 years ago.

Alaska lands were inventoried, reviewed, and studied for their wilderness values under the Wilderness Act criteria beginning in 1971 when Congress enacted ANCSA. For eight years thereafter, the Department evaluated national parks, forests, wildlife refuges, wild and scenic rivers, and other lands for potential designation as wilderness.

Subsequently, Congress passed ANILCA, which preserved more than 150 million acres in specially protected conservation units. This represents more than 40% of the land area of the State of Alaska, and about 60% of the Federal land in Alaska. Pursuant to ANILCA, more than one-third of the lands preserved in conservation units, or 57 million acres, were formally designated as wilderness.

In recognition of the sensitive and protracted negotiations that resulted in the designation of large amounts of wilderness and the limitations wilderness designations impose on the multiple use of those

lands, Congress did not mandate further wilderness inventory, review, or study of BLM lands in Alaska, with one exception. Section 1001 of ANILCA mandated a study of Federal lands north of 68 degrees latitude and east of the western boundary of the National Petroleum Reserve-Alaska. These lands are not within the planning area.

Rather than mandating further wilderness inventory, review, or study, Congress granted the Secretary the discretion to undertake additional wilderness study of BLM lands but, per section 1326 (b) of ANILCA, precluded further study of any Department lands in the State of Alaska ". . . for the single purpose of considering the establishment of a conservation system unit, national recreation area, national conservation area, or for related or similar purposes" absent Congressional direction.

Shortly after the passage of ANILCA, the Secretary exercised this discretion to adopt a policy to not conduct further wilderness inventory, review, or study (outside of ANILCA) as part of the BLM planning process in Alaska. This policy was in effect for approximately 20 years. On January 18, 2001, Secretary Babbitt adopted another approach that deviated from this long-term policy.

Clearly, Congress may direct BLM to undertake further wilderness study in Alaska in future legislation. However, in the absence of further legislation, Congress has granted the Secretary the discretion to determine whether further wilderness inventory, review and study of BLM lands in Alaska is warranted.

Wilderness inventory was not conducted as part of this planning process, and wilderness areas are not considered in any of the alternatives in the Proposed RMP. There are no BLM-managed wilderness areas or wilderness study areas within the planning area. There are areas that possess opportunities for a primitive recreation experience, solitude, and naturalness. These areas are described in Chapter III in the Recreation Opportunity Regions section. These areas will not be recommended for congressional designation as wilderness areas.

b) Subsistence

Many comments were received on subsistence. Many people requested that subsistence be made a priority in the plan and on BLM lands, that subsistence resources and the subsistence way of life be protected, that important subsistence use areas be identified, and that impacts on subsistence from other uses be monitored. Iliamna residents noted that they were seeing a decline in moose, caribou, and salmon populations. Commenters placed a great deal of emphasis on salmon fisheries and the importance of maintaining the health of rivers that provide salmon spawning habitat. Infrastructure development (i.e. roads) was seen as being both positive for access to subsistence resources and as a potential source of user conflict.

This RMP will consider impacts to subsistence activities, access for subsistence use, and management of fish and wildlife habitat in support of maintaining a sustained yield of subsistence species. Appendix D provides a Section 810 (ANILCA) analysis.

c) Fish and Wildlife, Habitat, and Regulations

The majority of comments received during scoping addressed fish and wildlife as they relate to subsistence resources, hunting and fishing, and commercial activities involving fish and wildlife. Comments pointed out the unique nature of the Bay region with regard to fish and wildlife populations and the natural environment. Commenters urged preservation of fish and wildlife resources and habitat. They also highlighted the potential for conflict between maintenance and use of these resources and development of mineral resources and infrastructure in the Bay area.

BLM received many comments relating to habitat management for important subsistence species such as caribou and moose. This issue proved to be one of the most important themes at all of the public meetings and in written comments. Several comments noted that the planning area includes important

habitats and migration routes for moose and for the Nushagak and Mulchatna caribou herds. Twenty-five villages in and adjacent to the planning area depend on these resources. Comments reflected the serious concerns of subsistence and recreational users about various kinds of development on BLM lands, including infrastructure development. Commenters recommended an ecosystem management approach to habitat management.

Comments emphasized the world-class river systems within the Bay planning area and the spawning and rearing habitat found within those systems for five species of salmon and other anadromous and freshwater fish species. Salmon are the single most important species for subsistence users. There is concern that this habitat be retained intact. Specific rivers and streams were identified for their importance (Appendix B, Wild and Scenic Rivers).

Commenters were interested in BLM working with others to discuss enhancing moose and caribou populations and carefully tracking wildlife populations. Commenters in the villages repeatedly mentioned increased predation by wolves and bears on moose and caribou populations. BLM was encouraged to work with Togiak National Wildlife Refuge to adopt consistent conservation objectives to protect the Nushagak and Mulchatna caribou herds.

This RMP will not affect State and Federal hunting or fishing regulations, or predator control initiatives. Although BLM manages fish and wildlife habitat, the Alaska Department of Fish and Game (ADF&G) manages fish and wildlife populations, including harvest by recreational, commercial, and subsistence users on State lands, selected lands, and private lands. The Federal Subsistence Board manages qualified Federal subsistence harvests of fish and wildlife on Federally-administered public lands and waters in Alaska. Changes in hunting and fishing regulations, propagated by the Alaska Board of Fisheries and Game and the Federal Subsistence Board, are beyond the scope of this plan. BLM participates in the Federal Subsistence Board, and is a member of several fish and wildlife planning groups for the Bay planning area, including those addressing moose, the Mulchatna caribou herd, brown bear, salmon, migratory waterfowl, and shorebirds. Any actions that might affect hunting and fishing will be coordinated with Alaska Department of Fish and Game consistent with 43 CFR Part 24. Appendix G contains the Master Memorandum of Understanding between the agencies.

d) State of Alaska Administration of Guides, Outfitters, and Transporters

There were numerous comments about the State of Alaska's administration of guides, outfitters, and transporters. A State Commercial Services Board was recently reestablished to make recommendations to the State on how to better manage guides, outfitters, and transporters. BLM does not administer the State of Alaska program.

e) Special Status Species/Critical Habitat

Members of the public requested that BLM focus on identifying critical wetland and water habitat areas. Several commenters recommended that Kaskanak Creek be designated critical fish habitat, and critical habitat for moose, beaver, and migratory birds.

BLM manages fish and wildlife habitat on BLM lands, and can provide special attention to important habitat areas by using any of a number of planning tools. It is the function of the U.S. Fish and Wildlife Service to formally make a determination of critical habitat in conjunction with the Federal List of Endangered and Threatened Wildlife.

f) Implementation of the RMP

Public comments requested that BLM make clear in this RMP/EIS how it intends to implement proposed actions. The specifics of implementing this RMP/EIS will not be addressed in this plan, but will be addressed in the Record of Decision.

g) Education and Interpretation

Commenters recommended informing potential users of Federal Public Lands of local customs and concerns, including cultural values, subsistence needs, respect for the land and preservation of historic and prehistoric archaeological sites.

Chapter III, Section F and Appendix D (analysis of impacts to subsistence by the proposed Alternatives and subsistence use area maps) provide information on the subsistence customs and practices of the people in the Bay planning area, traditional subsistence hunting areas and hunting practices, and Native belief systems.

h) Co-Management

One comment expressed interest in co-management of lands and resources between BLM and Native entities. Although administration of BLM lands remains under BLM management, land management issues will be addressed on a case-by-case basis in Government-to-Government consultation with interested Native entities. Government-to-Government consultation can take place regarding any subject at any time; however, should a Native entity desire a more formal arrangement, AFO is willing to enter into a Memorandum of Agreement with any affected Tribe to provide a framework for those discussions.

i) Impacts to Subsistence Users of Activities Occurring on State or Private Lands.

Some comments that were outside the scope of the RMP included the impacts to subsistence users from lodges, guiding, and transporting activities on State lands, and the impacts on subsistence use from U.S. Air Force low flying aircraft. These issues will not be addressed in this RMP/EIS.

j) Pebble Project

The Pebble Project, state mining claims operated by Northern Dynasty Mines Inc. (NDM), is a copper-gold-molybdenum porphyry deposit on State of Alaska land. As of May 2007, the project is in the advanced exploration stage. Pebble is located approximately 17 miles northwest of the community of Iliamna, and is approximately 30 miles northeast of the nearest BLM-managed land. The proposed Pebble project is included as a potential cumulative influence within the planning area.

k) Subsistence Only Areas

Several requests were received during the draft EIS/RMP comment period to designate portions of BLM-managed lands as subsistence use only areas. FLPMA sec. 302(a) explains BLM's mandate to manage public lands under the principles of multiple use and sustained yield. Currently, BLM has no authority to designate "Subsistence Use Only" areas.

F. Planning Criteria and Legislative Constraints

FLPMA provides BLM with the authority to manage Federal public lands. The law sets forth the fundamental policy of managing the land for multiple use while preserving the sustainable yield of its renewable resources. It allows for land use planning, land acquisition and disposal, administration, range management, right-of-way grants, and designation of special management areas. Aspects of ANCSA and ANILCA provide additional land use planning considerations. NEPA provides a national charter of environmental responsibility and requires public disclosure of information regarding the environmental impacts of major Federal actions significantly affecting the quality of the human environment.

Planning criteria are the standards, rules and guidelines that help to guide data collection, Alternative formulation, and Alternative selection in the RMP/EIS development process. In conjunction with the planning issues, planning criteria assure that the planning process is focused. The criteria also help guide the selection of the Final RMP and provide a basis for judging the responsiveness of the planning options.

The AFO uses the following planning criteria for the Bay planning effort. BLM will:

- Encourage opportunities for public participation throughout the RMP/EIS process.
- Protect valid existing rights throughout the planning area.
- Consider subsistence uses and minimize adverse impacts in accordance with Title VIII of ANILCA.
- Cooperate with State and Federal agencies, Native corporations, Tribes, Municipal governments, and interested groups and individuals.
- Manage wildlife habitat consistent with Alaska Department of Fish and Game (ADF&G) objectives and Federal Subsistence Board requirements and mandates.
- Comply with FLPMA, the National Historic Preservation Act, the Wild and Scenic Rivers Act, and other Federal laws, regulations, and required policies. Prepare the RMP/EIS in compliance with Council on Environmental Quality (CEQ) regulations implementing NEPA, and comply with BLM's planning regulations at 43 CFR 1600 and the BLM H-11601-1 Land Use Planning Handbook (BLM 2005a), and BLM ACECs Manual 1613 (BLM 1988c).
- Utilize and comply with the Alaska Land Health Standards.
- Analyze land tenure adjustments, disposals and acquisitions. Include land transfers, exchanges, and sales as allowed under FLPMA, the Recreation and Public Purposes Act (R&PP) (1954), and other laws as land acquisition and disposal options. Emphasize exchanges of isolated parcels of unencumbered land for parcels that will help in consolidating existing discontiguous large blocks of unencumbered BLM land in the Bristol Bay area and the Goodnews Bay area.
- Consider plans and policies of adjacent Federal conservation system units, landowners and State and local governments. RMP/EIS decisions will be consistent with officially approved or adopted resource-related plans of other Federal, State, local and tribal governments to the extent those plans are consistent with Federal laws and regulations applicable to public lands. BLM's management of the subsurface estate in components of the National Wildlife Refuge and the National Park System will be consistent with the plans of the surface managers.
- Manage withdrawn lands consistent with the purpose for which the withdrawal was established.
- Identify, designate, and protect special management areas such as Areas of Critical Environmental Concern (ACECs), and Special Recreation Management Areas (SRMAs). Develop and incorporate management alternatives into the RMP/EIS.
- Focus management prescriptions on all resources and not the combination of uses that will give the greatest economic return or economic output.
- Analyze Visual Resource Management (VRM) class designations to reflect present conditions and future needs. Identify areas requiring modifications or restrictions for specific land uses to resolve conflicts.

- Include the preservation, conservation, and enhancement of important historic, cultural, paleontological, and natural components of public land resources.
- Maintain coordination with Alaska Native entities to identify sites, areas, and objects important to their cultural and religious heritage.
- Consult with USFWS and the National Marine Fisheries Service (NMFS) as required by the Endangered Species Act (ESA).
- Determine Wild and Scenic River eligibility and suitability in accordance with Section 5(d) of the Wild and Scenic Rivers Act (WSRA) and BLM Manual 8351.
- Complete designations for Off-Highway Vehicles for all public lands within the planning area according to the regulations found in 43 CFR 8342.

G. The Planning Process

This Resource Management Plan is intended to be a flexible and adaptive management tool for managing the public lands and their resources. Decisions in plans guide future management actions and subsequent site-specific implementation decisions. Plan decisions establish goals and objectives for resource management (desired outcomes) and the measures needed to achieve those goals and objectives (management actions and allowable uses).

The RMP provides broad, multiple use guidance for managing public lands and resources administered by BLM. In Alaska this applies to unencumbered BLM lands and, through concurrence and consultation with State or Native corporations, those lands that have been selected but have yet to be conveyed out of Federal ownership. RMP decisions are made on a broad scale and guide subsequent site-specific, day-to-day decisions.

Preparing an RMP is a prerequisite to taking specific resource management actions. The plan provides future direction for site-specific activity. BLM will follow the RMP when initiating subsequent implementation actions and will monitor the consistency of those actions with the direction laid out in the RMP.

In BLM, what is the relationship between a Resource Management Plan and an Environmental Impact Statement?

Section 202 of FLPMA requires carrying out comprehensive planning, while requirements in NEPA call for analyzing the impacts of Federal actions, including planning. A BLM Resource Management Plan is therefore developed in the context of an Environmental Impact Statement. Each of the Alternatives presented in Chapter II represents a different plan for the future management of BLM lands under its responsibility in the Bay planning area. These Alternatives also satisfy the requirements in NEPA that BLM consider alternative approaches to meeting its need to manage land and resources under its jurisdiction in the Bay planning area. The Record of Decision (ROD) that will be issued at the end of the planning process will provide the approved RMP that will guide BLM's management in the Bay planning Area.

1. Policy

The following policies and legislation are outside the scope of the plan but may influence decisions or constrain Alternatives.

a) State of Alaska and Native Selections

Under the Statehood Act, the State of Alaska has an entitlement to select Federal lands for conveyance to the State. Approximately 348,388 acres, or 1.51%, of all BLM-managed lands in the planning area are State-selected. ANCSA requires the conveyance of lands to Alaska Native corporations. Approximately 411,268 acres, or 1.78% of the BLM-managed lands in the planning area are Native-selected. Conveyance of State-selected and Native-selected lands within the planning area is ongoing. Selected lands will remain under interim management, as described in the RMP, until lands are conveyed. Rental receipts collected for the use of interim managed lands are placed into escrow and are dispersed upon conveyance.

b) Coastal Zone Management

The Coastal Zone Management Act of 1972 as amended (PL 92-583), directs Federal agencies conducting activities within the coastal zone or that may affect any land or water use or natural resources of the coastal zone to conduct these activities in a manner that is consistent "to the maximum extent practicable" (to the fullest degree permitted by existing law [15 CFR Sec. 930.32]) with approved State management programs.

The Alaska Coastal Zone Management Act of 1977, as amended, and the subsequent Alaska Coastal Management Program and Final Environmental Impact Statement (1979) establish policy guidance and standards for review of projects within or potentially affecting Alaska's coastal zone. In addition, specific policies have been developed for activities and uses of coastal lands and water resources within regional coastal resource districts. Most incorporated cities, municipalities, and boroughs as well as unincorporated areas (coastal resource service areas) within coastal zones now have State-approved coastal management programs.

Although State and coastal district program policies guide consistency determinations, more restrictive Federal agency standards may be applied. The Federal Coastal Management regulations state that when "Federal agency standards are more restrictive than standards or requirements contained in the State's management program, the Federal agency may continue to apply its stricter standards…" (15 CFR § 930.39[d]).

Certain Federal actions may require a Federal Consistency Determination. BLM will contact the Alaska Department of Natural Resources, Alaska Coastal Management Program for a consistency determination before approving a project that may affect a coastal zone.

c) RS 2477 Routes

Under Revised Statute (RS) 2477, Congress granted a Right-of-Way for the construction of highways over unreserved public land. Under Alaska law, the grant could be accepted by either a positive act by the appropriate public authorities or by public use. "Highways" under State law include roads, trails, paths, and other common routes open to the public. Although RS 2477 was repealed in 1976, a savings clause preserved any existing RS 2477 Rights-of-Way. The State of Alaska claims numerous Rights-of-Way across Federal land under RS 2477, including those identified in AS 19.30.400. The validity of RS 2477 Rights-of-Way is outside the scope of this document.

Table 1.2. Steps in the BLM Planning Process

Step		Description
1	**Identify Issues**	Identify major problems, concerns, and opportunities associated with the management of public lands in the planning area. The public, BLM, and other agencies and entities identify issues. The planning process focuses on resolving the planning issues.
2	**Develop Planning Criteria**	Identify planning criteria which will guide development of the RMP and prevent the collection of unnecessary data.
3	**Collect and Compile Inventory Data**	Collate and collect environmental, social, economic, resource, and institutional data. In most cases, this process is limited to information needed to address the issues.
4	**Analyze the Management Situation**	Assess the current management situation. Identify the way lands and activities are currently managed in the planning area, describe conditions and trends across the planning area, identify problems and concerns resulting from the current management, and identify opportunities to manage these lands differently.
5	**Formulate Alternatives**	Formulate a reasonable range of Alternatives for managing resources in the planning area. Alternatives include a combination of current management and other alternatives that seek to resolve the major planning issues while emphasizing different management scenarios. Alternatives vary by the amount of resource production or protection allowed, or in the emphasis of one program area over another.
6	**Describe the Affected Environment; Evaluate Potential Effects**	Describe the affected environment. Assess the physical, biological, economic, and social effects of implementing each Alternative in order to provide a comparative evaluation of impacts in compliance with CEQ regulations for implementing NEPA (40 CFR 1500).
7	**Select Preferred Alternative**	Based on the information resulting from the evaluation of effects, identify a Preferred Alternative. The Draft RMP/EIS is then prepared for printing and is distributed for public review and comment.
8	**Select Proposed RMP**	Following review and analysis of public comments on the Draft RMP/EIS, make adjustments as warranted and select a proposed RMP, which along with the Final EIS is published. A final decision is made after a 60-day Governor's Consistency Review and a 30-day public protest period are complete. BLM then publishes the ROD and prepares the approved RMP.
9	**Implement, Monitor and Evaluate**	Implement the approved RMP. Collect and analyze resource condition and trend data to determine the effectiveness of the plan. Implementation of decisions requiring subsequent action is also monitored. Monitoring continues from the time the RMP is adopted until changing conditions require revision of the whole plan or any portion of it.

2. Relationship to BLM Policies, Plans, and Programs

The following BLM plans and standards relate to or govern management in the planning area:

- Southwest Management Framework Plan (BLM 1981)
- Alaska Interagency Wildland Fire Management Plan (Alaska Department of Natural Resources et al. 1998)

- Land Use Plan Amendment for Wildland Fire and Fuels Management – Environmental Assessment (BLM 2004d) Decision Record (BLM 2005d)
- BLM's Alaska Statewide Land Health Standards (2004a)
- BLM-Alaska Fire Management Plan (BLM 2005g)

3. Forms of Public and Intergovernmental Involvement

Planning is a deliberate public process. BLM uses a number of methods to involve and work with members of the public, interest groups, and government entities.

Public involvement entails "The opportunity for participation by affected citizens in rule making, decision making, and planning with respect to the public lands, including public meetings or hearings….or advisory mechanisms, or other such procedures as may be necessary to provide public comment in a particular instance" (FLPMA, Section 103(d)).

Coordination**,** as required by FLPMA (Section 202(c)(9), involves ongoing communication between BLM managers and State, local, and Tribal governments to ensure that BLM considers pertinent provisions of non-BLM plans in managing public lands; seeks to resolve inconsistencies between such plans; and provides ample opportunities for State, local, and Tribal government representatives to comment in the development of BLM's RMPs (43 CFR 1610.3-1). The CEQ regulations implementing NEPA further require timely coordination by Federal agencies in dealing with interagency issues and in avoiding duplication with Tribal, State, county, and local procedures (40 CFR 1510).

Consultation involves attaining the advice or opinion of another agency regarding an aspect of land use management for which that agency has particular expertise or responsibility.

Collaboration is a process in which interested parties, often with widely varied interests, work together to seek solutions for managing public and other lands. Collaboration mandates methods, not outcomes, and does not imply that parties will achieve consensus.

a) Collaboration with Alaska Native Governments

EO 13175, Consultation and Coordination with Indian Tribal Government, signed by the President on November 6, 2000, and published November 9, 2000 (65 FR 67249), is intended to establish regular and meaningful consultation and collaboration between Federal agencies and Native tribal governments in the development of Federal regulatory practices that significantly or uniquely affect their communities. In preparing this RMP/EIS, BLM has participated in Government-to-Government consultation process with affected Native communities.

b) Other Stakeholder Relationships

It is important to the success of the Bay RMP/EIS that key stakeholders and other parties potentially affected by the outcome of the RMP planning process are identified and involved in the planning process. Interested parties have been identified as having a concern in the project because of:

- Jurisdictional responsibilities and review
- Proximity to the planning area
- Use of the planning area
- Expressed interest

These stakeholders have been contacted and are included in the Bay mailing list. Those identified as having potential interest in the project include Federal, State, and local agencies; elected and appointed

officials; Alaska Coastal Management Districts; ANCSA regional and village corporations, Village and Tribal councils, the Alaska Federation of Natives, and Alaska Inter-Tribal Council; and interested organizations, including individuals with an interest in recreation/tourism, mineral development, conservation, and individual citizens, media, and the BLM Resource Advisory Council (RAC), which is a citizen body representing a wide spectrum of public interests.

The BLM and ADF&G Master Memorandum of Understanding (MOU)

In 1983, ADF&G and BLM agreed to recognize their respective roles in managing fish and wildlife resources and their habitat. Through an MOU, ADF&G agreed to:

- Recognize BLM as the Federal agency responsible for multiple use management of BLM lands including wildlife habitat in accordance with FLPMA, ANILCA, and other applicable Federal laws.
- Regulate and manage use of fish and wildlife populations on BLM lands in such a way as to improve the quality of fish and wildlife habitat and its productivity.
- Act as the primary agency responsible for the management of all uses of fish and wildlife on state and BLM lands, pursuant to applicable State and Federal laws.

BLM agreed to:

- Recognize ADF&G as the primary agency responsible for management of use and conservation of fish and wildlife resources on BLM lands, pursuant to applicable State and Federal laws.
- Incorporate ADF&G's fish and wildlife management objectives and guidelines in BLM land use plans unless such provisions are not consistent with multiple use management principles established by FLPMA, ANILCA, and applicable Federal laws.

H. Related Plans

Plans previously written by Federal, State, local and Tribal governments that relate to management of lands and resources within and adjacent to the Bay planning area were reviewed and considered as the RMP/EIS was developed. BLM planning regulations require that BLM plans be consistent with officially approved or adopted resource-related plans of other agencies to the extent those plans are consistent with Federal laws and regulations applicable to public lands. Table 1.3 provides a list of major regional plans that have been reviewed in preparation of this RMP/EIS.

Table 1.3. List of Plans for Lands Within and Adjacent to the Bay Planning Area

Management Plan	Agency
Draft Ring of Fire Resource Management Plan/Environmental Impact Statement	BLM 2006
Alaska Peninsula/Becharof National Wildlife Refuge Complex Final Public Use Management Plan	USFWS 2004
Alaska Maritime National Wildlife Refuge Comprehensive Conservation Plan EIS/Wilderness Review Draft	USFWS 2006
Alaska Department of Fish and Game Habitat Protection Section State Game Refugees Critical Habitat Areas & Game Sanctuaries	ADNR 1981
Alaska Interagency Fire Management Plan, Kuskokwim-Illiamna Planning Area	Multiple, 1983
Alaska Interagency Fire Management Plan, Yukon-Togiak Planning Area	Multiple, 1984
Alaska Interagency Fire Management Plan, Kodiak-Alaska Peninsula Planning Area	Multiple, 1986
Alaska Statewide Land Health Standards	BLM 2004
Becharof National Wildlife Refuge Comprehensive Conservation Plan EIS/Wilderness Review Final	USFWS 1985
Bureau of Land Management Finding of No Significant Impact and Environmental Assessment for the Proposed Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska	BLM 2004
Bristol Bay Area Plan For State Lands	ADNR 1984
Bristol Bay Area Plan	ADNR 2004
Bristol Bay Borough Comprehensive Plan	ADNR and ADF&G 1985
Fire Management Plan for Western Arctic National Parklands, Alaska	NPS 2004
Integrated Natural Resources Management Plan King Salmon Airport	U.S. Air Force1999-2003
Integrated Natural Resources Management Plan South coastal Long Range Radar Sites, Alaska	U.S. Air Force 2000-2003
Integrated Natural Resources Management Plan Southwestern Inactive Sites, Alaska	U.S. Air Force 2001-2005
Katmai General Management Plan Wilderness Suitability Review Land Protection Plan	NPS 1986
Lake Clark General Management Plan National Park and Preserve/Alaska Environmental Assessment	NPS 1984
Lake Clark National Park and Preserve Resource Management Plan	NPS 1999
Bureau of Land Management Decision Record for the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska	BLM 2005
McNeil River State Game Refuge and State Game Sanctuary Management Plan	ADNR 1996
Nushagak & Mulchatna Rivers Recreation Management Plan Resource Assessment	ADNR Draft 2004
Southwest Planning Area Management Framework Plan Anchorage District Office	BLM 1981
Togiak National Wildlife Refuge Comprehensive Conservation Plan EIS/Wilderness Review	USFWS 1985
Wood-Tikchik State Park Management Plan	ADNR 2002

I. Organization of the Bay Resource Management Plan/Environmental Impact Statement

The plan is organized into chapters and sections.

Chapter I establishes the purpose and need for the Bay Resource Management Plan, describes the planning area, addresses scoping, including scoping issues addressed and those considered but not further analyzed, provides planning criteria and legislative constraints. Describes the planning process and identifies other related plans.

Chapter II provides a general description of each Alternative, and identifies management common to all Alternatives. It identifies the preferred Alternative.

Chapter III addresses the affected environment, presenting information needed to understand issues and environmental consequences, and provides a context for the Goals and Objectives.

Chapter IV provides analytical assumptions, including reasonably foreseeable development scenarios for mineral development. It addresses direct, indirect, and cumulative impacts of the proposed Alternatives, summarizes critical elements that are addressed, not affected, or not present, and identifies incomplete or unavailable information.

Chapter V includes a discussion of specific actions taken to consult and coordinate with agencies, entities, and the general public.

Chapter II: Alternatives

Chapter II: Alternatives

A. Introduction

This chapter outlines Alternatives that describe different approaches to the management of Bureau of Land Management (BLM) public lands and resources in the Bay planning area (Map 1.1). Each Alternative represents a complete and reasonable set of objectives, actions, and allocations that will guide future management of public land and resources in the planning area.

Four Alternatives are presented in this chapter. They are described in Section B. The Alternatives provide a range of choices for meeting BLM planning and program management requirements and resolving the planning issues identified through scoping. Alternatives were developed using an interdisciplinary team process that included BLM staff specialists and other interested agencies and entities. To begin the Alternative development process, goals and desired future conditions were identified by the planning team in consideration of public comment received through scoping and direction established by Bureau-wide initiatives and mandates. Each Alternative analyzed in the proposed Resource Management Plan (RMP) and Final Environmental Impact Statement (EIS) emphasizes a different combination of resource uses, allocations, and conservation measures to address issues and resolve conflicts among uses. Program goals are met in varying degrees across the Alternatives. Each Alternative is designed to guide future management and resolve land management issues identified during the early stages of the planning process. Implementation of decisions in any Alternative is subject to available funding.

The planning decisions identified for each Alternative generally apply to lands within the Bay planning area currently under BLM management, including unencumbered Federal public lands, State-selected lands, and Native-selected lands outside of the National Park and National Wildlife Refuge systems. Exceptions to the general applicability of the Alternatives described in this chapter are as follows:

- Management of the military withdrawals for the King Salmon Air Force Base would be the same under all Alternatives. These lands were withdrawn for military purposes by Public Land Order 6893. BLM retains jurisdiction of mineral and vegetative resources on the installations. However, the agency's authority is limited in scope. Under all Alternatives, BLM will continue to permit non-military activities consistent with the withdrawal orders and only with the concurrence of the military.
- Management of Agency withdrawals, other than Alaska Native Claims Settlement Act (ANCSA) 17(d)(1). These lands will remain withdrawn. They may be available for fluid mineral leasing, locatable or salable mineral entry as allowed under specific public land orders (PLO).
- Management of the Federal subsurface estate, within BLM's responsibility, in components of the National Wildlife Refuge System would be the same under all Alternatives. BLM is responsible for oil and gas leasing within refuges. The Alaska National Interest Lands Conservation Act (ANILCA)(1980) Section 206 withdrew new and expanded components of the National Park System from application of the mining laws. Provisions of ANILCA (Sections 304(b) and 1008) prohibit mineral leasing in refuges where the U.S. Fish and Wildlife Service (USFWS) determines that mineral leasing is incompatible with refuge purposes. The determination of compatibility is fulfilled through the development of refuge comprehensive conservation plans. The USFWS has determined that lands they manage in the Bay planning area are incompatible with oil and gas leasing.

Stipulations and Required Operating Procedures provide management guidance when making resource decisions in the planning area. They are developed through the RMP process and are based on knowledge of the resources in the planning area and current industry practices. Stipulations are specific

to oil and gas development and constitute significant restrictions on the conduct of operations under a lease. Required Operating Procedures are requirements, procedures, management practices, or design features that would be applied as applicable to permitted activities on BLM-managed lands. Required Operating Procedures have been developed to ensure that the Alaska Land Health Standards (BLM 2004) objectives are met. Required Operating Procedures and stipulations specific to this planning area are discussed in detail in Appendix A.

Alaska Native Claims Settlement Act (ANCSA) 1971
Native regional and village corporations selected large tracts of land administered by the Federal government. To date, a majority of these selections have been interim conveyed to the corporations.

ANCSA 17(d)(1) Withdrawals
Under the authority of ANCSA Section 17(d)(1), a series of public land orders were issued which withdrew and reserved lands for study and classification. These orders closed or segregated the lands to all forms of appropriation under the public land laws including mining and mineral leasing except for PLO 5180, which allowed location for metalliferous (locatable) minerals. The review of these withdrawals within the Bay planning area is addressed in this RMP/EIS. The revocation of the ANCSA 17(d)(1) withdrawals would remove the segregations and open the lands to mineral entry.

Alaska Statehood Act 1959
Under the provisions of the Statehood Act, the State selected large tracts of land administered by the Federal government. To date, a majority of these selections have been patented or tentatively approved and are under State management.

Alaska National Interest Land Conservation Act (ANILCA) 1980
ANILCA expanded Katmai National Monument to include Wilderness, National Park, and Preserve and established Lake Clark National Park and Preserve, Alaska Peninsula National Wildlife Refuge, and the Becharof National Wildlife Refuge.

B. General Description of Alternatives

1. Alternative A: No Action

Alternative A, the no-action alternative, promotes the continuation of current management practices. Land and resource management would continue under the guidance of the existing Southwest Management Framework Plan (1981) for the Goodnews Block only. Direction contained in existing laws, regulations and policy statements would sometimes override provisions in the Southwest MFP. The current levels, methods and mix of multiple use management of BLM land in the planning area would continue. No lands would be open to mineral leasing and large tracts would remain closed to new Locatable Minerals activities due to retention of the Alaska Native Claims Settlement Act (ANCSA) 17(d)(1) withdrawals. No Special Designations would be proposed, such as Areas of Critical Environmental Concern (ACECs), Special Recreation Management Areas (SRMAs), or Wild and Scenic Rivers (WSRs) and lands would remain unclassified for off-highway vehicles (OHVs) and visual resource values. In general, proposed land use would be analyzed on a case-by-case basis. Leasable and locatable mineral activities would be guided by requirements in specific Plans of Operations on a project-specific basis.

2. Alternative B

Alternative B highlights actions and management that would facilitate resource development. All ANCSA 17(d)(1) withdrawals would be revoked, opening all unencumbered BLM lands to leasable and locatable mineral activities. Selected lands whose selection is relinquished or rejected would also be open to mineral exploration and development. BLM-managed lands within the planning area would be designated as "open" to OHV use. No Special Recreation Management Areas (SRMA) would be identified. In all areas, the focus would be on management of permits. No Special Designations would be proposed and visual resources would be managed as Visual Resource Management (VRM) Class IV. Leasable and locatable mineral activities and other permitted activities would be guided by requirements in specific Plans of Operations on a project-specific basis.

3. Alternative C

Alternative C emphasizes actions and management that protect and enhance renewable resources, archaeological, and paleontological values. Leasable and locatable mineral activities would be more constrained than in Alternatives B or D.

Areas of Critical Environmental Concern (ACEC) would be proposed, including the Bristol Bay ACEC (974,970 acres) and the Carter Spit ACEC (61,251 acres). ANCSA 17(d)(1) withdrawals would be retained for the Carter Spit ACEC; this area would remain closed to mineral activities. ANCSA 17(d)(1) withdrawals would be lifted from the Bristol Bay ACEC, opening this area to mineral activities subject to Stipulations and Required Operating Procedures. Both proposed ACECs would be closed to salable mineral activities.

ANCSA 17(d)(1) withdrawals would be maintained for proposed Wild and Scenic rivers as an interim to protect Wild and Scenic rivers until Congress has had an opportunity to act on the proposals. Three eligible river segments, portions of the Alagnak River, and portions of the Goodnews River mainstem and Goodnews River Middle Fork, would be found suitable for inclusion in the National WSR system.

All proposed WSR segments and ACECs would be managed as VRM Class III, and most of the remainder of the BLM-managed lands within the planning area would be managed as VRM Class IV. All BLM-managed lands within the planning area would be designated as "limited" to OHV use and a 2,000-lb gross vehicle weight restriction would be enforced. No SRMAs would be identified. In all areas, the focus would be on management of permits. Resources would be protected through Stipulations, Required Operating Procedures, and additional constraints as identified through project-specific NEPA analysis.

4. Alternative D: Preferred Alternative

Alternative D provides a balance of protection, use, and enhancement of resources. ANCSA 17(d)(1) withdrawals would be revoked, and the majority of unencumbered lands and any selected lands whose selection is relinquished or rejected would be open to leasable and locatable mineral activities. ANCSA 17(d)(1) withdrawals would be revoked within a proposed Carter Spit ACEC (36,220 acres). Stipulations, Required Operating Procedures, and additional constraints as identified through project-specific NEPA analysis would be used to protect recognized resources within this area. The Carter Spit ACEC would be closed to salable mineral entry. No WSRs would be recommended. BLM-managed lands up to one-half mile from established winter trail or road systems would be managed as VRM Class III.

BLM lands in the full visible foreground up to one mile from the boundaries of Conservation System Units (CSU) would be managed as VRM Class III. The proposed Carter Spit ACEC would be managed as VRM Class III, and all other BLM-managed lands would be managed as VRM Class IV.

All BLM-managed lands within the planning area would be designated as "limited" to OHV use and a 2,000-lb gross vehicle weight restriction would be enforced. Stipulations, Required Operating Procedures, and additional constraints as identified through project-specific NEPA analysis would be used to protect resources on BLM-managed lands within the Bay planning area.

C. Alternatives Considered But Not Carried Forward

The Bay RMP has considered a full range of Alternatives consistent with the goals of the plan. BLM has considered, but eliminated from detailed analysis, Alternatives that would address issues not within the scope of the plan. These issues, and the reasons for not further considering them, are provided here.

1. Nomination of the Kvichak River as a Wild and Scenic River

Among the issues listed but not addressed as an Alternative is the proposed nomination of the Kvichak River as a WSR. Recently a Recordable Disclaimer of Interest finding was issued by the Bureau of Land Management for the Kvichak River. This Disclaimer clarifies that the Federal government does not have a competing interest (with the State of Alaska) in the submerged lands. Because BLM does not have jurisdiction for the Kvichak River, the proposal was not carried forward.

2. Nomination of Special Recreation Management Areas (SRMAs)

The BLM Anchorage Field Office considered SRMA status for each block of unencumbered BLM land within the Bay planning area. However, the use patterns and types of recreation opportunities to justify SRMA status were not found.

3. Designation of Subsistence Only Areas

A request to designate portions of BLM-managed lands as subsistence use only areas was expressed through public concern for subsistence values within the planning area. FLPMA sec. 302(a) explains BLM's mandate to manage public lands under the principles of multiple use and sustained yield. Currently, BLM has no authority to designate "Subsistence Use Only" areas.

4. Additional Alternatives for Leasable Minerals

Additional alternatives for mineral leasing were not considered, though all action alternatives (Alternatives B, C, D) propose to open over one million acres of unencumbered BLM lands. Current alternatives for leasable minerals include retaining ANSCA 17(d)(1) withdrawals in Alternative A, providing no acres open to leasable minerals, and revocation of all ANSCA 17(d)(1) withdrawals in Alternative B, opening all unencumbered BLM lands (1,103,138 acres) to mineral leasing. Additionally, Alternative C proposes to open approximately 40,000 fewer acres to mineral leasing than Alternative B. The Reasonably Foreseeable Development Scenario for leasable minerals predicts one gas field in the Koggiling Creek planning block only. Any additional alternatives considered would provide no greater benefit to the range of alternatives in this document because opening and closing the Koggiling Creek planning block is captured in Alternatives A and B. Chapter III, section C.3.a describes prospects for oil and gas exploration and development in the planning area. Though presently uncertain, the commercial demand for the oil and gas resources from the Federal domain within the planning area is expected to be low during the life of the plan.

D. Detailed Descriptions of the Alternatives

This section provides a detailed description of proposed management, organized into four categories: Resources, Resource Uses, Special Designations, and Social and Economic Conditions. Goals are listed under each resource, resource use, or program. They are followed by a description of objectives, management actions, and allocations proposed to achieve the goals and to address issues. Goals are consistent across Alternatives. Objectives, management actions and allocations may change by Alternative. Management that is common across the Alternatives is presented first, followed by descriptions of management by Alternative.

1. Resources: Air Quality, Soil, Vegetation, and Water Resources

a) Vegetation, Wetlands, and Riparian Habitat

(1) Goals

- BLM will maintain and protect vegetative land cover that provides for healthy fish and wildlife habitat on BLM-managed lands.
- Treatments to alter the vegetative composition of a site, such as prescribed burning, seeding, or planting will
    - be based on the potential of the site and will retain or promote infiltration, permeability, and soil moisture storage;
    - contribute to nutrient cycling and energy flow;
    - protect water quality and fish habitat;
    - help prevent the introduction and spread of invasive and noxious weeds;
    - contribute to the natural diversity of plant communities, plant community composition, and structure;
    - maintain proper functioning condition;
    - support the conservation of Special Status Species.
- BLM will take action to minimize the destruction, loss, or degradation of wetlands and riparian areas, and to preserve and enhance their natural and beneficial values.

(2) Management Common to All Alternatives

Wildland fire and fuels would be managed consistently with the BLM Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004, 2005).

(3) Alternative A

This Alternative would continue existing management. The Southwest MFP (1981), applicable only to the Goodnews Block, provides little guidance related to vegetation other than that of the Walpole poppy. Proposed permitted or authorized uses would be analyzed through the appropriate NEPA document. Based on this analysis, mitigation would be developed to minimize impacts from proposed activities to vegetative resources. The resulting mitigation measures would be included in the permit that authorized the use. BLM would continue to comply with applicable policy relative to management of riparian vegetation.

(4) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

- Support monitoring and assessment of riparian areas for proper functioning condition, as defined in the BLM manual Technical Reference 1737-3. Develop maintenance and restoration projects. Priority areas will include rivers determined suitable for inclusion as wild or scenic, designated ACECs, areas known to be in need of restoration, and riparian areas within anticipated or ongoing mining activity.
- Assess impacts of OHV trails, especially in high-use areas where riparian and wetland resources or water quality are at risk.
- Lessees and all parties receiving BLM authorizations for activities impacting riparian and/or wetlands would be required to comply with protective measures listed in the Required Operating Procedures, Stipulations, Standard Lease Terms, and project-specific requirements.

(b) Management Decisions

- Vegetation treatments will be designed to achieve BLM Alaska Statewide Land Health Standards and desired conditions clearly described in activity plans or timber sales. Desired conditions will be based on the ecological capability of a given site and will be expressed as cover types or seral stages within cover types, based on management objectives.
- Vegetation treatments will be designed to prevent introduction or spread of noxious weeds.
- Prescribed burn plans will contain and implement weed prevention stipulations.
- Burn plans for large burns will prescribe conditions that result in a mosaic of burned or unburned areas within the burn unit. Smaller burns may not require a mosaic, dependent on objectives.
- Timber sales are not anticipated; however, should they occur, any ground disturbing equipment used in timber sales will be free of any material that could contain weed seeds.
- Timber sales will rely, to the extent possible, on natural regeneration through proper site preparation.
- Permitted livestock grazing is not expected to occur; however, should it occur, it will be conducted in a manner that meets AK Statewide Land Health Standards and maintains long-term vegetation productivity.
- One plant species in the planning area is currently on the BLM-AK Special Status Species (SSS) list-the Walpole poppy (*Papaver walpolei*). It no longer meets the criteria for SSS and is expected to be removed from the list. When populations of species on the SSS list are found, measures will be taken to prevent the need for listing under the Endangered Species Act.

(c) Land Use Requirements

Resource protection would be applied on a site-specific basis for permitted activities and uses that affect vegetation based on guidelines provided in the Required Operating Procedures, as described in Appendix A. Oil and gas leases would be subject to the Oil and Gas Lease Stipulations, also listed in Appendix A.

b) Soil, Water and Air

(1) Goals

- **Resource Protection** – maintain, improve, and restore the health of watersheds. Ensure that watersheds are in, or are making significant progress toward, a properly functioning physical condition that includes stream banks, wetlands, and water quality. BLM will protect and enhance the quality of air resources associated with BLM-managed lands in the planning area as well as

consider, if practicable, minimizing the impacts of smoke to human health, communities, recreation and tourism from wildfire and prescribed burns. Smoke and its public health impacts are a parameter in fire suppression decisions. BLM will manage soils to promote healthy, sustainable, fully functioning ecosystems by maintaining the soils, which support a wide range of public values and uses.

- **Air and Water Quality** – meet or exceed local, State, and Federal requirements. Minimize negative impacts to soils and wetland vegetation and prevent soil erosion. Maintain desired ecological conditions as defined by the BLM Alaska Statewide Land Health Standards.
- **Resource Uses** – support planning, use authorizations, compliance, and special designations.
- **Service to Communities** – support collaboration in shared watersheds.
- **Management Excellence** – promote program financial efficiency and improve data quality, security, and availability.

(2) Alternative A

This Alternative would continue existing management. The Southwest MFP (1981), which applies only to the Goodnews Block in the Bay planning area, contains little guidance relative to management of soil, water, and air resources. The use of OHVs on interim managed encumbered lands is limited to 1,500 lbs curb weight as defined by the State's "Generally Allowed Uses on State Land," (Appendix H). This Alternative also recommends that BLM file for water rights under State law to secure water for needed BLM uses on an as-needed basis. To date, BLM has not filed for water rights in the planning area. Proposed permitted or authorized uses would be analyzed through the appropriate NEPA document. Based on this analysis, BLM would develop mitigation to minimize impacts from proposed activities to soil, water, and air resources. The resulting mitigation measures would be included in the permit that authorized the use. BLM would continue to comply with applicable legislation, state and Federal regulations, and policy relative to soil, water, and air.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

- Inventory and monitoring data should be collected according to a Quality Assurance Project Plan." Development of a Quality Assurance Project Plan (QAPP) that meets the elements of the state and/or EPA requirements listed on the following web sites will help ensure the quality of collected data and that other resource agencies, as well as the public, can utilize that data.
  - ADEC Quality Assurance Project Plan elements: http://www.dec.state.ak.us/water/wqsar/pdfs/qappelements.pdf.
  - EPA Requirements for Quality Assurance Project Plans: http://www.epa.gov/r10earth/offices/oea/epaqar5.pdf
- Develop a water quality monitoring program implementing U.S. Geological Survey – National Water Quality Assessment (NAWQA) protocol to determine baseline water quality values in areas having critical aquatic habitats or potential for significant impacts due to permitted activities. Monitor for significant alterations to water quality value and water flow in accordance with State and Federal regulations.
- Collect data necessary for an Alaska in-stream water reservation on water bodies having critical aquatic habitats, within ACEC boundaries, or nominated for NLCS designation.
- Contract soil surveys in areas of high resource value or proposed development as needed.

(b) Management Decisions

- In cooperation with the appropriate Federal, State, local or Native requirements, identify area-wide use restrictions, or other protective measures, to ensure compliance with the Clean Water Act, State water quality standards, and Federal wetlands and floodplain requirements.

- In order to comply with the Safe Drinking Water Act and protect the quality and quantity of drinking water, BLM will consult with owners/operators of potentially affected, federally-regulated public water supply systems when proposing management actions in State-designated Source Water Protection Areas. The locations of public water supply systems and Source Water Protection Areas are available from the Alaska Department of Environmental Conservation Drinking Water and Wastewater Program.
- File for water rights under State law, when necessary, to secure water needed for BLM management purposes.
- BLM will stipulate that all direct or authorized emission-generating activities occurring on BLM-managed lands within the planning area comply with the Federal and State air quality laws and regulations. All permittees will be required to mitigate any activity that may result in air pollution.
- BLM will also implement interagency wildland fire smoke mitigation measures adopted by the Alaska Wildland Fire Coordinating Group and consider public health and safety in all fire management activities.
- BLM will provide for a wide variety of public land uses without compromising the long-term health of soil resources. BLM will require permittees to mitigate for all activities that may cause accelerated soil erosion, and to follow Stipulations and Required Operating Procedures.

(c) Land Use Requirements

Resource protection would be applied on a site-specific basis for permitted activities and uses that affect soil, water and air, based on guidelines provided in the Required Operating Procedures, as described in Appendix A. Leasable mineral activities would be subject to the Oil and Gas Leasing Stipulations also in Appendix A.

c) Floodplains

(1) Goals

- Reduce flood damage and loss of life and property.
- Minimize the impacts of floods on human safety, health and welfare.
- Sustain, restore and preserve the natural resources, ecosystems, and other functions of the floodplain, and the other beneficial values served by floodplains. Beneficial processes include maintaining the frequency and duration of floodplain/wetland inundation.

(2) Management Common to All Alternatives (A, B, C, and D)

This Alternative would continue existing management. Proposed permitted or authorized uses would be analyzed through the appropriate NEPA document. Based on this analysis, BLM would develop mitigation to minimize impacts from proposed activities to floodplains. The resulting mitigation measures would be included in the permit that authorized the use. BLM would continue to comply with applicable legislation, Federal regulations, and policy pertaining to floodplains.

Floodplain management guidelines are defined within Executive Order 11988 (Floodplain Management). For administrative purposes, the 100-year floodplain serves as a basis for floodplain management on public land. If available, floodplain boundaries are based on the Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency (FEMA). If FEMA maps are not available, floodplain boundaries will be based on the best available information. The following are steps to be taken in order to determine whether an activity will be allowed in the floodplain.

- Before taking any action, determine whether the proposed action will occur within a floodplain.
- Provide for public review.
- Identify and evaluate practicable Alternatives for locating in the floodplain.

- Identify the impacts of the proposed action.
- Minimize threats to life, property and to natural and beneficial floodplain values, and restore and preserve natural and beneficial floodplain values.
- Re-evaluate Alternatives including no action.
- Issue findings and a public explanation.
- Implement the action (or no action).

In addition, BLM may undertake projects as required to restore and preserve the natural and beneficial values served by floodplains. Stipulations and Required Operating Procedures apply to Alternatives B, C, and D.

d) Fish and Wildlife

(1) Goals

(a) Fish

- Work in conjunction with other programs and agencies to manage riparian areas.
- Achieve fish habitat stability and manage the aquatic habitat of various life stages of anadromous and resident fish.
- Provide for the continuing availability of fish habitat that contributes to the social, scientific, and economic aspects of the local communities and the nation.
- Determine and maintain or restore the fisheries potential of the aquatic habitat in BLM jurisdiction in the Bay planning area.

(b) Wildlife

- Maintain high enough quality and quantity of habitat to support healthy wildlife populations.
- To the extent practical, mitigate impacts to wildlife species and their habitats from authorized and unauthorized uses of BLM-managed lands.
- In cooperation with Alaska Department of Fish and Game (ADF&G), ensure a natural abundance and diversity of wildlife resources and habitat.

(2) Alternative A

This Alternative continues current management. The Southwest MFP (BLM 1981), which applies only to the Goodnews Block in this planning area, excepts “crucial habitat” from opening to various kinds of settlement entry and calls for preparing habitat management plans for wildlife and riparian habitat. Outside of crucial habitats, and outside of the Goodnews Block, other uses would be mitigated to prevent any significant alterations in wildlife populations. Proposed permitted or authorized uses would be analyzed through the appropriate NEPA document. Based on this analysis, mitigation would be developed to minimize impacts from proposed activities. These mitigation measures would be included in the permit that authorized the use.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

i. Fish

- BLM Alaska has a Master Memorandum of Agreement with the State of Alaska for management of fish and wildlife (Appendix G).
- Inventory and monitor fish habitat in cooperation with ADF&G, other Federal agencies, private non-profit corporations and tribal agencies.

- Inventory habitat for Special Status fish species.
- In cooperation with ADF&G, monitor priority species population trends where issues exist or are pending and populations may be impacted.

ii. Wildlife

- Manage fish and wildlife in accordance with BLM Alaska's Master Memorandum of Agreement with the State of Alaska for management of fish and wildlife.
- In cooperation with ADF&G and other Federal agencies, BLM will monitor habitats and populations of important subsistence species to provide information necessary to develop subsistence regulations and bag limits on Federal lands, monitor priority migratory bird species, identify habitats of importance to special status species, and identify habitats for priority species.

(b) Essential Fish Habitat

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation Act (MSA) requires all Federal agencies to consult with the Secretary of Commerce on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity, and can include fresh and saltwater habitats. For Alaska, freshwater EFH includes all streams, lakes, ponds, wetlands, and other water bodies that have been historically accessible to salmon.

(c) Management Decisions

i. Fish

- Additional site-specific objectives and habitat management actions for priority species will be made based on application requests of proposed activities.

ii. Wildlife

- In cooperation with ADF&G, ensure a natural abundance and diversity of wildlife habitat to assist ADF&G in ensuring sustained populations and a natural abundance of wildlife.
- BLM will work cooperatively with ADF&G, other Federal agencies, and adjacent land managers to implement the Mulchatna Caribou Herd Monitoring Plan, the Western Brown Bear Management Area planning group, the Unit 18 Goodnews/Arolik Moose Moratorium and Restoration Plan, the migratory bird MOU, and the Boreal Partners in Flight Conservation Plan.

iii. Essential Fish Habitat

- Comply with provisions of the Magnuson-Stevens Fishery Conservation and Management Act to protect Essential Fish Habitat. If land use activities are likely to adversely affect EFH, consult with the Secretary of Commerce through NMFS to mitigate these effects. Adverse effect is defined in 50 CFR 600.910(a) as any impact that reduces the quality and/or quantity of EFH.

(d) Land Use Requirements

- BLM will consult with USFWS and NMFS under Section 7 of the ESA for all discretionary actions that may affect listed species or designated critical habitat, or confer if actions are likely to jeopardize the continued existence of a proposed species or result in the destruction or adverse modification of proposed critical habitat.
- BLM will participate in the ESA Threatened and Endangered Species Recovery Plans as appropriate, and will take into consideration BLM Special Status sensitive species for all land use decisions.
- All permitted activities would operate under the Stipulations, Required Operating Procedures, and Standard Lease Terms provided in Appendix A. These procedures were developed through the

NEPA process and are based on current knowledge of resources in the planning area and current permitting procedures.

(4) Alternative B

This Alternative would be the same as that described in "Management Common to All Action Alternatives." Stipulations and Required Operating Procedures would apply.

(5) Alternative C

This Alternative would be the same as Alternative B except seasonal restrictions or other constraints would be applied to leasable and locatable mineral activities in portions of the planning area comprising the Goodnews, Koggiling Creek, Yellow Creek, Kvichak, Iliamna West, Alagnak, and Klutuk Creek planning blocks. Two ACEC would be proposed. Stipulations, Required Operating Procedures, and project-specific requirements would apply.

(6) Alternative D

This Alternative would be the same as Alternative B except portions of the planning area comprising the Goodnews, Koggiling Creek, Yellow Creek, Kvichak, Iliamna West, Alagnak, and Klutuk Creek planning blocks would be open to leasable and locatable mineral activities subject to seasonal restrictions or other constraints. One ACEC would be proposed. Stipulations, Required Operating Procedures, and project-specific requirements would apply.

Tables 2.1 and 2.13 describe special provisions for fish and wildlife habitat management under each Alternative.

Table 2.1. Fish and Wildlife Habitat – Summary of Alternatives

Alternative A	Proposed permitted or authorized uses analyzed through the NEPA process on a case-by-case basis. Mitigation measures developed to minimize impacts from proposed activities would be included in the permit that authorized use.
Alternative B	Same as Alternative A. Stipulations, Required Operating Procedures, and project-specific requirements apply.
Alternative C	Two ACECs, Carter Spit ACEC (61,251 acres) and the Bristol Bay ACEC (989,202 acres), would be proposed for protection of fish and wildlife habitat. Inventory and monitoring of the ACECs would be a field office priority pursuant to available funding. ANSCA 17(d)(1) withdrawals would be retained for the Carter Spit ACEC and proposed Wild River segments of the Alagnak, mainstem Goodnews River, and Goodnews Middle Fork Rivers (12,210 acres) as an interim measure to provide an opportunity for Congressional action. Koggiling Creek, Yellow Creek, Kvichak, Iliamna West, Alagnak, Klutuk Creek, and portions of the Goodnews planning blocks would be open to leasable and locatable mineral activities subject to seasonal constraints. ROP FW-6a would establish a 300-ft. minimum setback on BLM-managed lands for segments of the East and South Fork Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek to protect riparian areas and soils adjacent to sensitive aquatic habitat.
Alternative D	One ACEC, Carter Spit ACEC (36,220 acres), would be proposed for protection of federally-listed migratory bird species. Koggiling Creek, Yellow Creek, Kvichak, Iliamna West, Alagnak, Klutuk Creek, and portions of the Goodnews Blocks would be open to leasable and locatable mineral activities subject to seasonal constraints. ROP FW-6a would establish a 300-ft. minimum setback on BLM-managed lands for segments of the East and South Fork Arolik River, Faro Creek, South Fork Goodnews River and Klutuk Creek to protect riparian areas and soils adjacent to sensitive aquatic habitat.

e) Special Status Species

(1) Goals

- Identify and monitor the abundance of Special Status Species and their habitats.
- Manage habitats consistent with the conservation needs of Special Status Species and BLM sensitive species, and in a manner that will not contribute to the need to list any species under the Endangered Species Act (ESA).
- Manage plant and animal resources and wildlife habitat to ensure compliance with the ESA and to ensure progress towards recovery of listed species.
- Manage habitats consistent with the conservation needs provided in Recovery Plans for listed species.

(2) Alternative A

This Alternative would continue current management practices. The Southwest MFP (BLM 1981), applicable only to the Goodnews Block, does not contain any specific guidance for the general management of Special Status Species, which would be managed according to BLM policy, applicable laws, and Federal regulations. Land use proposals would be addressed on a case-by-case basis through

interagency cooperation and the NEPA process with project-specific requirements and mitigation on proposed actions. If actions authorized, funded, or carried out by BLM had the potential to affect any federally-listed species or designated critical habitat, consultation under Section 7 of the ESA would be initiated with the USFWS and NOAA Fisheries. Proposed permitted or authorized uses that may affect special status species are analyzed through the appropriate NEPA document. Based on this analysis, mitigation is developed to minimize impacts from proposed activities. The resulting mitigation measures are included in the permit that authorizes the use.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

- Identify botanically unexplored BLM lands within the planning area and prioritize for floristic inventory.
- Assess project proposals for potential impacts to Special Status Species plants and their habitats. Conduct pre-project inventories when SSS habitat is likely to occur in project area prior to ground disturbing activities.
- Monitor Special Status Species plant populations and associated habitats for population trends and threats.
- Contribute data on Special Status Species plant locations, population numbers, and trends (and voucher specimens as needed) to the Northern Plant Documentation Center (University of Alaska Fairbanks Museum Herbarium) and Alaska Natural Heritage Program in a cooperative effort to build a statewide rare plant database.
- Inventory Special Status Species habitat and populations on BLM-managed lands in accordance with the ESA.
- Cooperate with USFWS and other agencies to monitor habitats and populations of Threatened and Endangered Species (T&E).

(b) Management Decisions

- Plant and wildlife resources and habitat will be managed to ensure compliance with the ESA.
- T&E evaluations will occur on all actions proposed and mitigation or consultation carried out where listed species may occur.
- Additional site-specific actions needed to manage habitat for Special Status Species will be made through project specific NEPA process or as mitigation on proposed activities.
- An Area of Critical Environmental Concern (ACEC) is proposed for the Carter Spit/Goodnews Bay area to provide additional protection to federally-listed migratory bird species (Steller's eiders) in Alternatives C and D.

(c) Land Use Requirements

- Cooperate with USFWS in the development and implementation of recovery plans, management plans, and conservation strategies for T&E that occur on BLM lands.
- Wildlife resources will be managed to comply with the ESA to facilitate recovery of listed species and to prevent listing of additional species.
- Consult with USFWS or National Marine Fisheries Service under Section 7 of the ESA for all actions that may affect listed species or designated critical habitat or confer if actions are likely to jeopardize the continued existence of a proposed species or result in the destruction or adverse modification of proposed critical habitat.

f) Fire Management and Ecology

(1) Goals

- Protect human life and property.
- Provide appropriate management response on all wildland fires, with an emphasis on firefighter and public safety.
- Management of wildland fires and fuels will focus on maintaining intact and functioning key ecosystem components.
- Reduce adverse effects of fire management activities.
- Base fire and fuels management activities on land use and resource objectives.
- Continue interagency collaboration and cooperation.

(2) Alternative A

Under Alternative A, current management which emphasizes firefighter and public safety as the highest priority in all activities related to fire management would continue. Historically, fire has not been a dominant ecological agent within the planning area. When fires do occur, they would be used to protect, maintain, and enhance natural resources and, as much as possible, function in a natural ecological role. The Southwest MFP (BLM 1981), applicable only to the Goodnews Block, requires that BLM preserve forest resources until the economics for harvest are more favorable; protect commercial grade timber stands; manage moose habitat emphasizing high value moose winter range and benefit moose browse by prescribed burning out of viewshed; identify and protect from fire caribou habitat with substantial lichen component; provide for a natural fire occurrence (mosaic) where other important resource values would not be harmed; protect and preserve cultural sites; include constraints in Burn Plans to protect climax-dependent species, swan and raptor habitat, recreation and view shed; and prohibit OHVs from areas after a burn to prevent erosion.

Current guidance for fire management is provided by the BLM Alaska Land Use Plan Amendment for Wildland Fire and Fuels Management (BLM 2005f). Under this Alternative, BLM would continue to cooperate and collaborate with other Federal, State, and Native land managers, to address issues and concerns related to wildland fire management in Alaska and to implement operational decisions. Fire management programs stress the protection of human life and site-specific values while recognizing fire as an ecological process and natural agent of change to ecosystems. This Alternative recognizes wildland fire as a viable management tool to support land use and resource management objectives. Vegetative communities would be monitored for cumulative effects of wildland fire and suppression activities as funding permits. Fuels management projects and prevention programs would be proposed and funded on a case-by-case basis.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

- Monitor the number and size of wildland fires for cumulative impacts on wildlife habitat, particularly caribou winter range.
- Monitor vegetative communities for cumulative effects of wildland fire and suppression actions.
- Monitor cultural resources for effects of wildland fire and suppression actions.

(b) Management Decisions

- Ensure wildland fire management option designations are compatible with land use and resource goals and objectives.

- Manage vegetation adjacent to populated areas to reduce risk of wildfires.
- Use wildland fire and fuel treatments as management tools to meet land use and resource objectives.
- Reduce risk and cost of uncontrolled wildland fire through wildland fire use, prescribed fire, manual or mechanical treatment.
- Reduce adverse effects of fire management activities.
- Continue interagency collaboration and cooperation.

(4) Alternative B

Alternative B would be the same as Alternative A. Required Operating Procedures would apply.

(5) Alternative C

Alternative C would be the same as Alternative A. Required Operating Procedures would apply. Wildland fire management strategies would support the management objectives of the Special Designations for the proposed Carter Spit ACEC and Bristol Bay ACEC, National Wild and Scenic River (WSR) segments and other land use and resource objectives identified under Alternative C.

(6) Alternative D

Alternative D would be the same as Alternative A. Required Operating Procedures would apply. Wildland fire management strategies would support the management objectives of the Carter Spit ACEC and other land use and resource objectives identified under Alternative D.

Table 2.2. Summarizes Fire Management and Ecology for the Alternatives.

Table 2.2. Fire Management and Ecology – Summary of Alternatives

Alternative A	Firefighter and public safety is the highest priority. This Alternative would continue the management of wildland fire and fuels under the BLM Land Use Plan Amendment for Wildland Fire and Fuels Management (2004, 2005). Wildland fire use for resource benefit is permitted throughout the planning area and strategies are tiered to land use and resource management objectives.
Alternative B	Same as Alternative A. Required Operating Procedures would apply.
Alternative C	Same as Alternative A. In addition, fire strategies would support the management objectives for Special Designations for the proposed Carter Spit ACEC and Bristol Bay ACEC and National Wild and Scenic River (WSR) segments.
Alternative D	Same as Alternative A. Required Operating Procedures would apply. The fire management for the Carter Spit ACEC would be consistent with ACEC objectives.

g) Cultural and Paleontological Resources

(1) Goals

- Identify, protect, and preserve significant cultural resources.
- Manage cultural and paleontological resources for a variety of uses, including scientific use, conservation for future use, public education and interpretation, traditional use (in the case of Cultural Resources), and experimental use.

(2) Alternative A

Under Alternative A, current management would continue. Currently, decisions regarding specific inventory, data recovery, monitoring and stabilization projects are made through the statewide program workshops and the cultural resource business plan. The Southwest MFP (BLM 1981), applicable only to the Goodnews Block of the Bay planning area, requires protecting significant Cultural Resources and developing a paleontological resource management program for the protection and research of paleontological resources.

Decisions about avoidance or other forms of mitigation of impacts to cultural and paleontological sites would be made based on weighing the relative value of the resources, the effects on development interests, and the interests and needs of the present and future public. Priorities for inventory would be assigned based on a combination of expected development activities and resource values. Non-destructive data recovery (e.g. mapping) would be done as necessary based on management needs and resource values. Limited destructive forms of data recovery (testing and excavation) and limited collection of artifacts and specimens would be allowed when other information is limited and/or the resource is threatened. Most sites would be designated as suitable for current research. Known and newly discovered sites would be assigned to multiple use categories. Suitable sites would be designated for educational/interpretive purposes in areas having general public access. Cultural sites would be designated for traditional use as they are identified.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

- Continue to conduct non-Section 106 related inventories as funds are available.
- Monitor cultural and paleontological resource sites in danger of alteration or destruction from natural or human-made causes, including wildland fires and the effects of fire suppression.
- Develop partnerships to achieve goals.

(b) Management Decisions

- All cultural properties on BLM-managed lands in the Bay planning area would be managed for their scientific use (preserved until their research potential is realized).
- Identify area wide criteria or site-specific restrictions that apply to special cultural resource issues, including traditional cultural properties that may affect location, timing, or method of development or use of other resources in the planning area. Identify measures to proactively manage, protect, and use cultural and paleontological resources.

(c) Land Use Requirements

All actions that may impact cultural resources will comply with the National Historic Preservation Act (NHPA) Sections 106 and 110, and with the Native American Graves Protection and Repatriation Act (NAGPRA), as well as laws governing the protection or consideration of cultural resources. When any Federal undertaking, including any action funded or authorized by the Federal Government with the potential to directly or indirectly affect any archaeological or historic site is planned, a consultation with the State Historic Preservation Officer (SHPO) under the 1997 National Cultural Programmatic Agreement and the 1998 State Protocol that stands in place of 36 CFR 800. If archaeological or historic sites are identified in the project area their significance will be evaluated to determine their eligibility for inclusion in the National Register of Historic Places. The State requests that the SHPO be notified if archaeological or historic sites are identified through this planning process. The State may request that recreational or commercial uses be precluded in order to protect archaeological and historic sites.

(4) Alternative B

Alternative B would be similar to Alternative A. Under Alternative B, decisions regarding avoidance of sites would be made after considering input from interested parties. When avoidance is not possible, given the overall benefits of the development, mitigate the impacts. Priority for non-Section 106 survey and inventory would be assigned to broad areas because of the likelihood of development impacts. Non-destructive data recovery would be conducted in areas where development is anticipated; destructive data recovery would be allowed in mitigation when avoidance is not feasible for the approved development project. Most sites would be designated as suitable for current research use. Allow other uses only to the extent that they do not restrict research use. Balance public use designations with other resource developments. Required Operating Procedures and Stipulations would apply.

(5) Alternative C

Alternative C would be similar to Alternative A. Under Alternative C, impacts to cultural and paleontological resources would be avoided except when it is physically impossible to do so. Priority for non-Section 106 survey and inventory would be assigned based on the value of the resource. Priority would be given to areas known to include important and/or numerous sites. Non-destructive data recovery would be conducted in areas of known or expected high resource values; destructive data recovery would be allowed to address important research topics when part of the site would be left intact for the future. Destructive data recovery would also be allowed in cases when there is danger of destruction of significant cultural resources by natural forces. Most sites would be reserved for conservation for future use unless threatened. Uses that would lead to destruction or major changes in sites would be avoided.

Under Alternative C, Stipulations and Required Operating Procedures would apply, and cultural and paleontological resource strategies and priorities specific to Special Designations would be developed for the proposed Carter Spit ACEC and Bristol Bay ACEC and the nominated Wild Rivers, the Alagnak River, Goodnews River mainstem, and Goodnews River Middle Fork.

(6) Alternative D

Alternative D would be similar to Alternative C. Under Alternative D, Stipulations and Required Operating Procedures would apply. An inventory of cultural and paleontological resources would be a field office priority for the proposed Carter Spit ACEC dependant upon available funding.

Table 2.3 provides the comparison of how these management actions proposed for cultural and paleontological resources are applied under each Alternative.

Table 2.3. Cultural and Paleontological Resource Management – Summary of Alternatives

Alternative A	Identify, protect, and preserve significant cultural and paleontological resources; manage cultural and paleontological resources for a variety of scientific, conservation, public education, interpretation, traditional, and experimental use.
Alternative B	Same as Alternative A.
Alternative C	Same as Alternative A. An inventory of cultural and paleontological resources would be a field office priority for the proposed Carter Spit and Bristol Bay ACECs dependant upon available funding.
Alternative D	Same as Alternative A. An inventory of cultural and paleontological resources would be a field office priority for the proposed Carter Spit ACEC dependant upon available funding.

h) Visual Resources

(1) Goals

Protect the quality of scenic values of these lands.

What Do Visual Resources Management (VRM) Classes Mean for Future Management?

The objectives for the VRM classes are:

Class	Objective
I	Preserve the existing character of the landscape; change to the characteristic landscape should be very low and should not attract attention.
II	Preserve the existing character of the landscape; change to the characteristic landscape may be seen, but should be low and should not attract the attention of the casual observer.
III	Partially retain the existing character of the landscape; change to the characteristic landscape should be moderate and may attract attention, but not dominate the view of the casual observer.
IV	Provides for action that would make major modifications to the existing character of the landscape; change to the characteristic landscape can be high, dominate the view, and be the major focus of the viewer.

(2) Alternative A

Alternative A would continue current management. The Southwest MFP (BLM 1981), applicable only to the Goodnews Block, contains guidance for the general management of Visual Resources. It requires that all proposed management activities be evaluated using the visual resource management contrast rating system. In that way, areas that have not been classified for visual resources can be evaluated. The following guidance is provided:

The MFP VR-1 Objective 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 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 encourages activities that are compatible or designed to be compatible with the character of the natural landscape.

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

Under Alternative A, no VRM classes would be established on BLM-managed lands within the Bay planning area. The visual resources of an area would be identified and assigned inventory classes using the BLM visual resource inventory process (Manual 8400). The principles of the visual contrast rating system (Manual 8431) would be used to identify mitigation measures and to develop stipulations to meet the objectives of the assigned inventory class.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

All BLM unencumbered, State-selected, and Native-selected lands within the Bay planning area would be inventoried for scenic qualities, sensitivity level analysis, and distance zone classification utilizing the visual resource inventory system as described in BLM Manual 8410 – Visual Resource Inventory. VRM Management Classes would be assigned based upon this analysis.

(b) Management Decisions

- Visual resources within the planning area would be managed at the assigned VRM Inventory Classification unless or until VRM Management Classes are established in the final RMP/EIS.
- All proposed actions within the planning area would be analyzed individually for impacts on visual resources utilizing the Visual Resource Contrast Rating System as described in BLM Manual 8431 – Visual Resource Contrast Rating. This analysis would determine if the potential visual impacts from proposed surface-disturbing activities or developments would meet VRM Inventory Class management objectives assigned for the area, or whether design adjustments would be required.
- All actions would be mitigated to reduce impacts on visual resources utilizing design techniques including proper siting and location, reducing unnecessary disturbance, and the repetition of the basic elements of form, line, color, and texture found in the existing visual landscape. Design strategies and appropriate stipulations will be employed to ensure that surface-disturbing activities are in harmony with their surroundings and VRM management classes.
- Consult with neighboring Federal, State, and Native corporation land managing agencies to coordinate compatible VRM management along common boundaries.

(4) Alternative B

Under Alternative B, all lands in the Bay planning area would be managed as VRM Class IV (Maps 2.1 and 2.4). The principles of the visual resource contrast rating system (Manual 8431) would be used to identify mitigation measures and to develop stipulations to meet the objectives of VRM Class IV. Development would be allowed with mitigation. Stipulations and Required Operating Procedures would be applicable (Appendix A).

VRM Classification percentages are approximately 0% (III) and 100% (IV).

(5) Alternative C

Under Alternative C, BLM lands in the full visible foreground based on GIS analysis up to five miles from established winter trail/road systems would be managed as VRM Class III, including Goodnews to Quinhagak coastal and Arolik River routes; Goodnews Bay to Dilllingham route; Dillingham to Aleknagik; Dillingham to Koliganek; Ekwok to Naknek; New Stuyahok to Levelock; and Naknek to King Salmon. BLM lands in the full visible foreground up to five miles from main river travel routes would be managed as VRM Class III, including portions of the North Fork Goodnews River; Middle Fork Goodnews River; South Fork Goodnews River; and East Fork Arolik River, Nushagak River; Kvichak River; Lower Mulchatna River; and Alagnak Wild River.

BLM lands in the full visible foreground up to five miles from the boundaries of Togiak NWR, Becharof NWR, Katmai NPP, and Lake Clark NPP would be managed as VRM Class III.

The proposed Carter Spit and Bristol Bay ACECs would be managed as VRM Class III. The proposed National WSRs, a portion of the Alagnak River, Goodnews River mainstem and Middle Fork Goodnews River would be managed as VRM Class III.

All other BLM lands would be managed as VRM Class IV. (Maps 2.2 and 2.5)

VRM Classification percentages are approximately 50% (III) and 50% (IV).

Stipulations and Required Operating Procedures, located in Appendix A, would apply.

(6) Alternative D

Under Alternative D, BLM lands in the full visible foreground based on GIS analysis up to one-half mile from established winter trail/road systems would be managed as VRM Class III, including Goodnews to Quinhagak coastal and Arolik River routes; Goodnews Bay to Dilllingham route; Dillingham to Aleknagik; Dillingham to Koliganek; Ekwok to Naknek; New Stuyahok to Levelock; and Naknek to King Salmon.

BLM lands in the full visible foreground up to one-half mile from main river travel routes would be managed as VRM Class III, including portions of the North Fork Goodnews River; Middle Fork Goodnews River; South Fork Goodnews River; and East Fork Arolik River; Nushagak River; Kvichak River; Lower Mulchatna River; and Alagnak Wild River.

BLM lands in the full visible foreground up to one mile from the boundaries of Togiak NWR, Becharof NWR, Katmai NPP, and Lake Clark NPP would be managed as VRM Class III. The proposed Carter Spit ACEC would be managed as VRM Class III.

All other BLM lands would be managed as VRM Class IV (Maps 2.3 and 2.6).

VRM Classification percentages are approximately 10% (III) and 90% (IV).

Stipulations and Required Operating Procedures, located in Appendix A, would apply.

Tables 2.4 and 2.13 provide the comparison of how these management actions proposed for visual resource management are applied under each Alternative.

Table 2.4. Visual Resource Management - Summary of Alternatives

	Classification of BLM-managed Unencumbered Lands for Visual Resource Management	VRM Classification in Special Designations
Alternative A	No VRM classes would be established on BLM-managed lands within the Bay planning area.	No Special Designations would be recommended.
Alternative B	All lands in the Bay planning area would be managed as VRM Class IV (Maps 2.1 and 2.4).	No Special Designations would be recommended.
Alternative C	BLM lands in the full visible foreground based on GIS analysis up to 5 miles from established winter trail/road systems would be managed as VRM Class III including (Maps 2.2 – 2.5): Goodnews Bay region • Goodnews to Quinhagak coastal and Arolik River routes • Goodnews Bay to Dillingham Bristol Bay region • Dillingham to Aleknagik • Dillingham to Koliganek • Ekwok to Naknek • New Stuyahok to Levelock • Naknek to King Salmon BLM lands in the full visible foreground up to five miles from main river travel routes would be managed as VRM Class III including: Goodnews Bay region • North Fork Goodnews River • Middle Fork Goodnews River • South Fork Goodnews River • East Fork Arolik River Bristol Bay rivers • Nushagak River • Kvichak River • Lower Mulchatna River • Alagnak Wild River BLM lands in the full visible foreground up to five miles from the boundaries of Togiak NWR, Becharof NWR, Katmai NPP, and Lake Clark NPP would be managed as VRM Class III. All other BLM lands would be managed as VRM Class IV.	Proposed Carter Spit and Bristol Bay ACECs would be managed as VRM Class III. Proposed National WSR Alagnak River (Wild, Recreational) would be managed as VRM Class III. Proposed National WSR Goodnews River mainstem and Middle Fork Goodnews River (Wild) would be managed as VRM Class III.

	Classification of BLM-managed Unencumbered Lands for Visual Resource Management	VRM Classification in Special Designations
Alternative D	BLM lands in the visible foreground up to one-half mile from established winter trail/road systems would be managed as VRM Class III including (Maps 2.3 and 2.6): Goodnews Bay region • Goodnews to Quinhagak coastal and Arolik River routes • Goodnews Bay to Dillingham Bristol Bay region • Dillingham to Aleknagik • Dillingham to Koliganek • Ekwok to Naknek • New Stuyahok to Levelock • Naknek to King Salmon BLM lands in the visible foreground up to one-half mile from main river travel routes would be managed as VRM Class III including: Goodnews Bay region • North Fork Goodnews River • Middle Fork Goodnews River • South Fork Goodnews River • East Fork Arolik River Bristol Bay rivers • Nushagak River • Kvichak River • Lower Mulchatna River • Alagnak Wild River Manage BLM lands in the visible foreground up to one mile from the boundaries of Togiak NWR, Becharof NWR, Katmai NPP, and Lake Clark NPP as VRM Class III. All other BLM lands would be managed as VRM Class IV.	Proposed Carter Spit ACEC would be managed as VRM Class III.

2. Resource Uses

a) Forest Products

(1) Goals

- Manage forests and woodlands to sustain their health, productivity, and biological diversity.
- Consistent with other resource values, provide opportunities for personal and commercial use of timber and other vegetative resources. Requests for commercial timber or vegetative resources are not anticipated.

(2) Alternative A

Alternative A would continue current management. Under this Alternative, requests for forest resources would be considered on a case-by-case basis as permits were received. Forested lands would be managed for a sustained yield of forest products. The Southwest MFP (1981), which applies only to the Goodnews Block within the Bay planning area, provides for the use of forestry products in the Goodnews Block with priority areas opened for settlement entry. No potential commercial harvest areas have been identified for BLM-managed lands in the planning area. No commercial timber harvesting is anticipated within the life of this plan, due to the lack of commercial grade timber on BLM lands in the Bay planning area.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

Should any exist, BLM will identify potential commercial harvest areas and high interest personal use areas. If any of these areas are identified within the proposed ACECs, management will be consistent with the objectives of the proposed ACEC.

(b) Management Decisions

- All forestry management practices would be conducted consistent with guidelines described in the stipulations and Required Operating Procedures (Appendix A).
- The natural range of variation in plant composition and structure and the high value of natural resources will be sustained.
- Issue permits to authorize harvest of personal use firewood and house logs consistent with 43 CFR 5400 on a case-by-case basis.
- Issue free use permits to harvest vegetative products for personal use consistent with 43 CFR 5500 on a case-by-case basis.

(4) Alternative B

Under Alternative B, forested lands would be managed for a variety of sustainable public uses, including firewood, house logs, and other forest products for subsistence, personal and commercial use. The feasibility of fuel reductions, prescribed fire, or salvage logging in localized areas of insect and disease killed trees would be assessed. Requests for forest products would be considered on a case-by-case basis as applications are received. Required Operating Procedures, Stipulations, and additional requirements identified through project-specific NEPA analysis would apply.

(5) Alternative C

Under Alternative C, forested lands would be managed as in Alternative B. In addition, further restrictions on harvest of forest products would apply in the Carter Spit ACEC and the Bristol Bay ACEC and rivers found eligible/suitable for inclusion to the National Wild and Scenic River (WSR) system, including but not limited to seasonal restrictions. These restrictions will be determined through project specific NEPA analysis.

(6) Alternative D

Under Alternative D, forested lands would be managed as in Alternative B. In addition, further restrictions on harvest of forest products would apply in the Carter Spit ACEC, including but not limited to seasonal restrictions. Additional restrictions may be determined through project-specific NEPA analysis.

b) Livestock and Reindeer Grazing

(1) Goals

- Avoid conflicts between livestock grazing uses, fisheries and wildlife habitat, and subsistence uses.
- Determine range suitability for livestock, and the potential allocation of forage for livestock in the planning area ecosystems.
- Maintain habitat needed to support healthy populations of wildlife to meet population viability and human use demands, as required by FLPMA and the Land Health Standards.

(2) Management Common to All Alternatives

The Southwest MFP (1981), which is applicable only to the Goodnews planning block in the Bay planning area, allows seasonal grazing for domestic livestock and reindeer on a local level where public demand warrants and where compatible with other resources. Livestock grazing would be managed on a case-by-case basis as permit applications are received. Incidental grazing by pack animals associated with special recreation use permits would be considered on a case-by-case basis. Conflicts with wildlife and subsistence, compatibility, and suitability would be taken into consideration.

(a) Inventory and Monitoring

- Currently there is no livestock or reindeer grazing permitted on BLM-managed lands in the Bay planning area, nor has there been interest expressed. In the future, should there be an interest, BLM would consider cooperative monitoring with adjacent landowners and agencies to assess range conditions and use and to provide the necessary information to manage all aspects of grazing activities. BLM could also work with NRCS and others to assess seasons of use, grazing systems, suitability and compatibility.
- BLM would inventory habitat to ensure priority for wildlife species, and that conflicts or threats are adequately addressed.

(b) Management Decisions

- Avoid conflicts between grazing, habitat requirements of fish and wildlife, and other human uses.
- Develop allotment management plans for proposed grazing that includes grazing systems and fire management and allows for maintaining long-term native vegetative communities, composition, diversity, distribution and productivity.
- Allow incidental grazing of pack animals associated with special recreation permits on a case-by-case basis consistent with the permitting process for special recreation use permits, Required Operating Procedures and the Alaska Statewide Land Health Standards.
- Special recreation permits and casual use of grazing animals require evaluation for suitability and compatibility before authorizing use.
- Grazing permits would be subject to Required Operating Procedures and project-specific requirements, to maintain habitat needed to support healthy populations.

Table 2.5. Livestock and Reindeer Grazing – Summary of Alternatives

Resource	Management Common to All Alternatives
Livestock and Reindeer Grazing	Livestock grazing would be considered and administered on a case-by-case basis as permits are received. The type of livestock or reindeer use authorized will likely be limited to reindeer grazing and incidental grazing by pack animals associated with special recreation use permits.
Grazing Management in Special Designations	Livestock grazing would be considered and administered on a case-by-case basis as permits are received. The type of livestock or reindeer use authorized will likely be limited to reindeer grazing and incidental grazing by pack animals associated with special recreation use permits.

c) Minerals

Lands currently under selection by the State and Native Corporations are segregated from locatable mineral entry and leasing to avoid potential encumbrances on selected lands prior to conveyance[1]. These lands comprise approximately 759,656 acres of the 1,927,083 acres currently managed by BLM. Therefore, decisions made within this land use planning effort to "open" areas for mineral exploration or development by revoking withdrawals would not go into effect unless selected lands are retained long-term in Federal ownership. In addition, 3,482 acres of Agency withdrawals exist within the Bay planning area. Of this, 3,318 acres are closed to leasables activities and 3,395 is closed to locatable activities.

c.1. Fluid Leasable Minerals (Oil and Gas)

(1) Goals

Public lands and Federal mineral estate will be made available for orderly and efficient exploration (including geophysical exploration), development and production of fluid leasable minerals, including oil, natural gas, tar sands, coal bed methane and geothermal steam, unless a withdrawal or other administrative action is justified in the national interest.

(2) Alternative A

Under Alternative A, current management would continue. Approximately 1,927,083 acres of BLM-managed lands would be closed to leasing. No withdrawal review would occur and all ANCSA 17(d)(1) withdrawals would remain in place, pending future legislation or unrelated management direction. However, where Federal oil and gas resources are being drained from lands otherwise unavailable for leasing, there is implied authority for BLM to lease such lands. (Maps 2.7 and 2.8)

The Southwest MFP (BLM 1981), which addresses only the Goodnews planning block of the planning area, called for opening all BLM-managed public lands to oil and gas leasing under Section 1008 of ANILCA (PL 96-487 Title 10 §1008). This action was not carried forward after publication of the MFP.

[1] State-selected lands: 43 CFR 2627.4(b); Native-selected lands: ANCSA, section 11

What is Drainage?

Drainage of oil or gas occurs whenever an oil or gas well on property adjacent to BLM-managed subsurface estate produces from a reservoir or reservoirs that extend onto both properties. In such a case, Federal resources are being drained through a well on lands owned or administered by others, and BLM would lease the Federal subsurface estate or, at a minimum, pursue an agreement for payment of royalties on the government's share of the oil and gas produced.

(3) Management Common to All Action Alternatives (B, C, and D)

- Lands currently under selection by the State and Native corporations are segregated from mineral leasing to avoid potential encumbrances on selected lands prior to conveyance.
- Areas for potential leasing would be identified consistent with the goals, standards, and objectives for natural resources within the planning area. Areas where oil and gas development could coexist with other resource uses would be open to leasing under Standard Lease Terms or with added stipulations.
- Oil and Gas Stipulations and Required Operating Procedures described in Appendix A apply to all BLM-managed lands in the Bay planning area open to oil and gas leasing. Stipulations notify the leaseholder that development activities may be limited, prohibited, or implemented with mitigation measures to protect specific resources. The stipulations would condition the leaseholder's development activities and provide BLM the authority to require other mitigation or to deny some proposed exploration and development methods.
- Additional constraint might also be required based on project-specific NEPA analysis. Additional information can be provided to the lessee in the form of a lease notice. This notice does not place restrictions on lease operations, but does provide information about applicable laws and regulations, and the requirements for additional information to be supplied by the lessee.
- The BLM land use planning process determines availability of Federal lands for oil and gas leasing where BLM is the surface management agency. For Federal oil and gas where the surface is managed by another Federal agency, BLM will consult with that agency before issuing leases.
- All areas open to mineral leasing would be open to geophysical exploration, except those lands containing No Surface Occupancy (NSO) restrictions, which would only be available for geophysical exploration in winter conditions, subject to Stipulations and through Casual Use as described in 43 CFR 3150.05(b) during non-winter conditions. On a case-by-case basis geophysical exploration may be allowed in areas closed to oil and gas leasing based on the nature and level of impacts from the exploration, and consistency with other applicable policy. Oil and gas geophysical exploration activity on public lands in Alaska, the surface of which is administered by BLM, is governed by regulations found at 43 CFR Subparts 3150, 3152, and 3154. A Federal oil and gas lease is not required to conduct geophysical exploration. BLM will review Notices of Intent to Conduct Geophysical Exploration (NOI) in the planning area and develop appropriate mitigation measures so as not to create unnecessary or undue degradation. A site-specific environmental analysis will be prepared for each NOI filed. The oil and gas lease stipulations developed in this document serve as the starting point for developing required mitigation measures for each NOI.
- Geothermal resources would be available for leasing in areas open to oil and gas leasing. Areas closed to oil and gas leasing are also closed to geothermal leasing. There are no Known Geothermal Resource Areas (KGRAs) on BLM-managed lands within the planning area. A site-specific environmental analysis would be prepared should interest be expressed in exploring for or developing geothermal resources in the planning area. This analysis would address the application of stipulations and develop additional mitigating measures over and above the lease stipulations. Stipulations developed in this document for oil and gas leases would be applied to any geothermal lease issued if appropriate.

- Coal bed natural gas (CBNG) development is authorized by the same process as oil and gas.
- Public lands available for oil and gas leasing would be offered first by competitive bid at an oral auction. Stipulations, terms, and conditions would be applied at the time of leasing. Leasing of available lands under jurisdiction of another Federal agency would only occur following consultation, and consent if necessary, from the surface managing agency. Notices of Intent to conduct geophysical exploration would be reviewed and mitigation measures developed to prevent unnecessary or undue degradation.
- Where oil or gas is being drained from lands otherwise unavailable for leasing, there is implied authority in the agency having jurisdiction of those lands to grant authority to BLM to lease such lands (43 CFR 3100.0-3(d)). Leasing of such lands would only occur following consultation, and consent if necessary, from the surface managing agency.
- The terms of existing oil and gas leases cannot be changed by the decisions in this document. However, when the lease expires, the area will be managed for oil and gas according to the decisions made in this RMP/EIS.

No Surface Occupancy

No Surface Occupancy (NSO) is a limitation of oil and gas leasing. It denotes an area that is open for mineral leasing, but that analysis has found that in order to protect other resources, no surface development or occupancy are allowed on the specified lands. Resource extraction can occur by using directional drilling techniques from another location.

As described in BLM Manual 1624, Federal oil and gas resources (including CBNG) fall into one of the following categories relative to restrictiveness:

- **Areas open to leasing, subject to the terms and conditions of the standard lease form.** These are areas where it has been determined through the planning process that the standard terms and conditions of the lease form combined with applied ROPs and Stipulations (Appendix A) are sufficient to protect other land use or resource values.
- **Areas open to leasing, subject to additional constraints such as seasonal restrictions.** These are areas where it has been determined through the planning process that moderately restrictive lease Stipulations may be required to mitigate impacts to other land use or resource values. This category of leases frequently involves timing limitations such as restricting construction activities in important designated big game habitats, or controlled surface use Stipulations such as creating a buffer zone around a key resource.
- **Areas open to leasing, subject to NSO Stipulations.** These are areas where it has been determined through the planning process that highly restrictive lease stipulations are required to mitigate impacts to other land use and resource values. This category of leases may prohibit the construction of well production and support facilities. These areas are subject to directional drilling, if technologically and economically feasible.
- **Areas closed to leasing.** These are areas where it has been determined through the planning process that other land use or resource values cannot be adequately protected with even the most restrictive lease stipulations. Appropriate protection can be ensured only by closing the lands to leasing.

(4) Alternative B

Under Alternative B, all existing ANCSA 17(d)(1) withdrawals would be revoked to allow increased opportunities for leasable minerals activities.

Approximately 1,103,138 acres of unencumbered BLM lands and any State-selected or Native-selected lands whose selections are relinquished or revoked would be open to fluid mineral leasing subject to

standard lease terms. There would be no restriction under this Alternative for seasonal closures or for NSO (Maps 2.9 and 2.10). Additionally, oil and gas Stipulations #6, #7, and #9 and ROPs FW-3b, FW-3d, and FW-6a in Appendix A would not be applicable under this Alternative. Agency withdrawals would close approximately 3,318 acres to leasing.

(5) Alternative C

Under Alternative C, lands available for leasable mineral activities would be reduced and subject to more constraints compared to Alternatives B or D. Approximately 1,063,129 acres of unencumbered BLM lands and any State- or Native-selected lands whose selections are relinquished or revoked would be open to fluid mineral leasing subject to constraints.

Unencumbered BLM lands within the Bristol Bay ACEC would be open to leasable mineral activities with seasonal restrictions. To protect caribou calving, and insect relief areas, leasable mineral activities will be required to adhere to Stipulations #6 and #7, and ROPs FW-3b and FW-3d.

ANCSA 17(d)(1) withdrawals would be retained for all eligible/suitable Wild River Segments (12,210 acres), including portions of the Alagnak, Goodnews mainstem and Goodnews Middle Fork rivers, until Congressional action is completed. ANSCA 17(d)(1) withdrawals would be retained within the proposed Carter Spit ACEC (61,251 acres), closing this area to leasable mineral activities.

Total Acreage subject to no surface occupancy (NSO) is 1,834 acres. Areas subject to NSO include a 300-ft. buffer on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek to protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish (Stipulation 9, Appendix A; Maps 2.11 and 2.12).

(6) Alternative D

Under Alternative D, all existing ANCSA 17(d)(1) withdrawals would be revoked to allow for increased opportunities for exploration, development and production of fluid leasable minerals. No eligible WSR segments would be found suitable and thus no WSR designations would be proposed for the Alagnak, Goodnews mainstem and Goodnews Middle Fork rivers.

Approximately 1,101,304 acres of unencumbered BLM lands and any State-selected or Native-selected lands whose selections are relinquished or revoked would be open to fluid mineral leasing subject to standard lease terms.

ANCSA 17(d)(1) withdrawals would be revoked within the proposed 36,220 acre Carter Spit ACEC. ROPs SS-1a, 1b, and SS-2a would apply to protect habitat for federally-listed migratory bird species (Appendix A).

Total Acreage subject to no surface occupancy (NSO) is 1,834 acres. Areas subject to NSO include a 300-ft. buffer on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek to protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish. (Stipulation 9, Appendix A; Maps 2.13 and 2.14)

Existing Agency withdrawals of approximately 3,318 unencumbered acres would remain withdrawn from fluid mineral leasing.

To protect caribou calving and insect relief areas, oil and gas exploration and development activities will be required to adhere to Stipulations #6 and #7, and ROPs FW-3b, and FW-3d.

There are no oil and gas leasing closures proposed with the exception of existing Agency withdrawals.

Tables 2.6 and 2.13 provide a comparison of fluid leasable minerals applied under each Alternative.

Table 2.6. Fluid Leasable Minerals - Summary of Alternatives

Management Action	Alternative A (Current management)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
Areas Open to Fluid Mineral Leasing Subject to Standard Lease Terms	No BLM-managed lands would be open for fluid mineral leasing.	1,103,138 acres unencumbered BLM lands, and any State- or Native-selected lands relinquished from current selection.	1,063,129 acres of unencumbered BLM lands and any State- or Native-selected lands relinquished from current selection.	1,101,304 acres BLM-managed lands, and any State- or Native-selected lands relinquished from current selection.
Areas Closed to Fluid Mineral Leasing	All BLM lands would be closed to fluid mineral leasing (1,927,083 acres)	Existing Agency withdrawals, of approximately 3,318 acres would remain withdrawn from fluid mineral leasing.	Approximately 76,779 acres of unencumbered BLM lands: Existing Agency withdrawals, of approximately 3,318 acres would remain withdrawn from fluid mineral leasing. Proposed Wild River segments of the Alagnak, Goodnews and Goodnews Middle Fork Rivers (12,210 acres). ANCSA 17 (d)(1) withdrawals would be retained for these river segments as an interim measure to provide an opportunity for Congressional action. ANCSA 17 (d)(1) withdrawals would be retained for Carter Spit ACEC (61,251 acres).	Existing Agency withdrawals, of approximately 3,318 acres would remain withdrawn from fluid mineral leasing.

Management Action	Alternative A (Current management)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
Areas Open to Fluid Mineral Leasing Subject to Seasonal Constraint	No Federal leases would occur on BLM-managed lands within the Bay planning area.	No acres are subject to seasonal constraints. Stipulations #6 and #7 and ROPs FW-3b, and FW-3d (Appendix A) do not apply under this Alternative.	Bristol Bay ACEC (973,862 acres) To protect caribou habitat, Stipulations #6 and #7 and ROPs FW-3b, and FW-3d (Appendix A) would apply under this Alternative.	Carter Spit ACEC (36,220 acres) ROPs SS-1a, 1b, and SS-2a would apply to protect habitat for federally-listed migratory bird species. (Appendix A) To protect caribou habitat, Stipulations #6 and #7 and ROPs FW-3b, and FW-3d (Appendix A) would apply under this Alternative.
Areas Open to Fluid Mineral Leasing Subject to No Surface Occupancy	No Federal leases would occur on BLM-managed lands within the planning area.	0 acres. Stipulation #9 and ROP FW-6a (Appendix A) do not apply under this Alternative.	1,834 acres. Stipulation #9 and ROP FW-6a (Appendix A) would apply under this alternative. 300-ft. NSO buffer on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.	1,834 acres. Stipulation #9 and ROP FW-6a (Appendix A) would apply under this alternative. 300-ft. NSO buffer on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.

c.2. Solid Leasable Minerals

Currently there are no known coal resources on BLM-managed lands in the Bay planning area. The Governor of any state with an approved regulatory program may request that the Secretary of the Department of the Interior enter into a cooperative agreement to grant the State the authority to implement the Surface Mining Control and Reclamation Act of 1977 on Federal lands. At present, Alaska has no such agreement in place. However, should coal operations be developed on Federal lands, an agreement would likely be developed between the State and the Office of Surface Mining defining the regulatory role of the State in these mining operations (30 CFR 745).

(1) Goals

- Public lands and the Federal mineral estate will be made available for orderly and efficient exploration, development and production of solid leasable mineral resources (including coal and oil shale, and non-energy leasable minerals (including potassium, sodium, phosphate and gilsonite), unless continued withdrawal from mineral entry is justified in the national interest.
- All solid leasable minerals actions will comply with goals, objectives, and resource restrictions (mitigations) to protect other resource values in the planning area.

(2) Alternative A

Under Alternative A, current management would continue. No BLM-managed lands would be identified as open for solid leasable mineral leasing in the Bay planning area. The Southwest MFP (BLM 1981), which addresses only the Goodnews planning block of the planning area, called for providing opportunities for leasing or permitting of coal reserves on all BLM-managed public lands. This action was not carried forward after publication of the MFP.

(3) Management Common to All Action Alternatives (B, C, and D)

The following management direction applies to all BLM-managed lands within the Bay planning area.

(a) Land Use Plan Decisions

- Leasing and exploration licensing are subject to BLM standard lease terms and BLM Alaska's Oil and Gas Stipulations and Required Operating Procedures, located in Appendix A.
- Coal and oil shale exploration and leasing will comply with the Mineral Leasing Act of 1920, as amended, the Surface Mining Control and Reclamation Act of 1977, the Federal Coal Leasing Amendments Act of 1976, the Mineral Leasing Act for Acquired Land of 1947 and other Federal resource and environmental laws, coal regulations and coal planning criteria.
- Identify BLM-managed public lands acceptable for further consideration for coal leasing and the methods under which such development may take place, consistent with unsuitability assessment procedures outlined in 43 CFR 3461, including:
    - areas unacceptable for further consideration for coal leasing and development by all mining methods
    - areas acceptable for further consideration for coal leasing and development by only certain stipulated mining methods
- All unencumbered BLM-managed lands within the Bay planning area subject to coal leasing under Part 43 CFR 3400.2 are open to coal exploration and study through the issuance of an exploration license. To date, no areas within the Bay RMP have been identified as having economic coal reserves. Therefore, the coal screening process (as identified by 43 CFR 3420.1-4) has not been conducted for this plan. Interest in exploration or leasing of Federal coal would be handled on a case-by-case basis. If an application for a coal lease should be received in the

future, an appropriate land use and environmental analysis, including the coal screening process, would be conducted to determine whether or not the coal areas are acceptable for further consideration for leasing under 43 CFR 3420.1-4(e). The Bay RMP/EIS would be amended as necessary.

- Should coal operations be developed on Federal lands, an agreement would likely be developed between the State of Alaska and the Office of Surface Mining defining the regulatory role of the State in these mining operations (30 CFR 745).
- The Mineral Leasing Act authorizes the leasing of Federal lands for the development of oil shale. However, there are currently no regulations governing the leasing of oil shale. Oil shale will be leased on a case-by-case basis and issued under the authority of 30 U.S.C. Chapter 3A, Subchapter V, Section 241.
- Solid leasable minerals include chlorides, sulfates, carbonates, borates, silicates or nitrates of potassium or sodium and related products; sulphur, phosphate and related minerals; oil shale, coal and gilsonite (including all vein-type solid hydrocarbons). The likelihood of commercially valuable deposits of these minerals occurring on BLM-managed lands in the planning area is not presently known. If solid leasable mineral deposits (excluding oil shale and coal) were discovered, subsequent leasing, exploration, and development would be analyzed on a case-by-case basis and would be subject to regulations under 43 CFR 3500 (Leasing of Solid Minerals other than Coal and Oil Shale). Non-energy leasable mineral exploration and leasing will comply with the Mineral Leasing act of 1920, as amended, the Mineral Leasing Act for Acquired Land of 1947, as amended, Federal resource laws, the Reorganization Plan No. 3 of 1946, non energy leasable minerals regulations and planning criteria.
- Lands under selection by the State and Native Corporations are segregated from mineral leasing. The categories and constraints identified in this section only apply on lands retained in long-term Federal ownership.
- Leasable mineral Stipulations prescribed for Federal mineral development in split estate situations apply only to the development of the Federal minerals. These stipulations do not dictate surface management.

Stipulations, Required Operating Procedures, and project-specific requirements would apply.

c.3. Locatable Minerals and Salable Minerals

(1) Goals

Maintain or enhance opportunities for mineral exploration and development while preventing undue and unnecessary degradation of other resource values from the development of locatable and salable mineral resources. Tables 2.7 and 2.13 provide a comparison of the locatable and salable mineral management actions proposed under each Alternative.

(2) Alternative A

Under Alternative A, current management would continue. All ANCSA 17(d)(1) withdrawals would remain in place, pending future legislation or unrelated management direction. Approximately 138,627 acres would be available for locatable mineral entry. Other Agency withdrawals of approximately 3,968 acres would remain closed to locatable and salable mineral entry per specific PLO. Approved Plans of Operations would contain stipulations based on site-specific resource concerns (Maps 2.15 – 2.18).

The Southwest MFP (BLM 1981), which addresses only the Goodnews planning block of the Bay planning area, required reviewing areas presently closed to the various mining laws and the Mineral Leasing Act of 1920 for potential opening under those laws. However, this action was never implemented.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

- In open areas identify area-wide terms, conditions, or other special considerations needed to protect resource values.

(b) Management Decisions

- Mining of locatable minerals and salable material, including existing mineral claims, would be subject to the surface management regulations found in 43 CFR 3809. Surface occupancy under the mining laws will be limited to uses incident to the mining operation. Bonding will be required in accordance with BLM policy. Specific measures that would be utilized to minimize surface impacts and to facilitate rehabilitation and revegetation of mined areas can be found in the Required Operating Procedures in Appendix A.
  - All operations must file a Plan of Operations with BLM. The Plan of Operations must be approved prior to commencement of on-the-ground activities. Areas withdrawn from mineral location in which valid existing rights are being exercised require the filing of a Plan of Operations.
  - Lands under selection by the State and Native corporations are segregated from locatable mineral and salable material entry. For State- and Native-selected lands, revocation or modification of ANCSA (d)(1) withdrawals as indicated below only apply if lands are retained in long-term Federal ownership.

(c) Land Use Requirements

Mining of locatable minerals and salable material will be subject to the surface management regulations found in 43 CFR 3809.

(4) Alternative B

Under Alternative B, ANCSA 17(d)(1) withdrawals would be revoked and approximately 1,102,489 acres of unencumbered BLM lands and any selected lands (820,627 acres) of which selection is revoked or relinquished would be available for locatable entry. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals other than ANCSA 17(d)(1). Exploration and development would be guided by Required Operating Procedures (Appendix A), and project-specific requirements. ROPs FW-3b, FW-3d, and FW-6a would not apply under this alternative (Maps 2.19 - 2.22).

(5) Alternative C

Under Alternative C, ANCSA 17(d)(1) withdrawals would be revoked except for one ACEC (Carter Spit ACEC, 61,251 acres) and proposed inclusions in the National WSR system (Alagnak River, Goodnews River mainstem, and Goodnews River Middle Fork, totaling 12,210 acres. Approximately 1,064,313 acres of unencumbered BLM lands and any selected lands (785,341 acres) of which selection is revoked or relinquished would be available for locatable entry and the sale of mineral materials with the following exceptions: Within the Bay planning area, approximately 3,968 acres of Agency withdraws will remain closed to mineral entry. Bristol Bay ACEC would be open to locatable mineral activities and closed to the sale of mineral materials (979,970 acres). Exploration and development would be guided by Required Operating Procedures and project-specific requirements (Appendix A). ROP FW-6a would apply under this alternative to protect riparian and aquatic habitat (Maps 2.23 - 2.26).

(6) Alternative D

Under Alternative D, ANCSA 17(d)(1) withdrawals would be revoked. Approximately 1,102,489 acres of unencumbered BLM lands and any selected lands (817,464 acres) of which selection is revoked or relinquished would be available for locatable entry. Within the Bay planning area, approximately 3,968 acres of Agency withdraws will remain closed to mineral entry. Carter Spit ACEC would be closed to salable mineral development (36,220 acres). Exploration and development would be guided by Required Operating Procedures (Appendix A), and project-specific requirements. ROP FW-3b, FW-3d, and FW-6a would apply under this alternative (Appendix A). (Maps 2.27 – 2.30)

Tables 2.7 and 2.13 provide the comparison of management actions proposed for locatable minerals under each Alternative.

Table 2.7. Locatable Minerals and Salable Minerals - Comparison of Alternatives

Management Action	Alternative A (Current Management)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
Locatable Minerals	138,627 acres of BLM lands would be identified as open for locatable mineral entry. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals.	ANCSA 17(d)(1) withdrawals would be revoked. Approximately 1,102,489 acres of unencumbered lands would be available for locatable mineral entry. 820,627 acres of selected lands would be made available if the selection is revoked or relinquished. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. ROPs FW-3b, FW-3d, and	1,064,313 acres of BLM unencumbered lands would be open to locatable mineral activities. The following lands would be closed to locatable mineral entry: Proposed wild river segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork (12,210 acres). ANCSA 17(d)(1) withdrawals for these river segments would be retained as an interim measure to provide an opportunity for Congressional action. ANCSA 17(d)(1) withdrawals would be retained within the proposed Carter Spit ACEC (61,251 acres). ROP FW-3b, FW-3d, would apply under this alternative. ROP FW-6a, which	Same as Alternative B, except 1,102,489 acres of unencumbered BLM land would be available for locatable mineral activities. Proposed Carter Spit ACEC (36,220 acres) would be open to locatable mineral activities. ROPs SS-1a, 1b, and SS-2a would apply to protect habitat for federally-listed migratory bird species. Approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. ROP FW-3b, FW-3d, would apply under this alternative. ROP FW-6a, which establishes additional protective measures within 300 feet on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork

Management Action	Alternative A (Current Management)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
		FW-6a would not apply under this alternative.	establishes additional protective measures within 300 feet on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals.	Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.
Locatable Minerals	Approved Plans of Operations would contain restrictions based on site-specific resource concerns.	Same as Alternative A, with the addition that an approved Plan of Operations will contain guidelines as listed in the Required Operating Procedures in Appendix A.		
Salable Minerals	Approximately 1,163,594 acres of unencumbered lands would be available for sale of mineral materials. Selected lands would be made available if the selection were revoked or relinquished. Within the Bay planning area, approximately 3,968 acres of unencumbered lands would remain withdrawn from mineral entry due to Agency	Approximately 1,102,484 acres of unencumbered lands would be available for sale of mineral materials. Selected lands would be made available if the selection were revoked or relinquished. Within the Bay planning area, approximately 3,968 acres of unencumbered lands would remain withdrawn from mineral entry due to	115,163 acres of unencumbered BLM lands would be available for salable mineral activities. Same as Alternative A, except the following lands would be closed to sale: • Proposed Carter Spit ACEC (61,251 acres) • Proposed Bristol Bay ACEC (974,970 acres) • Proposed Wild river segments of the Alagnak,	1,100,654 acres of unencumbered BLM lands would be available for salable mineral activities. The following lands would be closed to sale: • Proposed Carter Spit ACEC (36,220 acres) Approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. ROPs FW-3b, FW-3d, and FW-6a would

Management Action	Alternative A (Current Management)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
	withdrawals. Approved Plans of Operations would contain stipulations based on site-specific resource concerns.	Agency withdrawals. Same as Alternative A, with the addition that approved Plans of Operations would contain guidelines as listed in the Required Operating Procedures in Appendix A. ROPs FW-3b, FW-3d, and FW-6a would not apply under this alternative.	Goodnews mainstem, and Goodnews Middle Fork (12,210 acres). Approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. ROPs FW-3b, FW-3d, and FW-6a would apply under this alternative. (Appendix A)	apply under this alternative. (Appendix A)

d) Recreation Management

(1) Goals

- Manage recreation to maintain a diversity of recreational opportunities.
- Improve access to appropriate recreational opportunities.
- Ensure a quality experience and enjoyment of natural resources
- Provide for fair value in recreation on BLM-managed lands

(2) Management Common to All Action Alternatives

Permit Availability

- Issuing an SRP is a discretionary action.
- Factors considered before approval of a Special Recreation Permit (SRP) include existing recreation conflicts, diversity of services provided to the public, number of similar services already offered, and whether the public land area available is sufficient to accommodate the proposed use.
- SRPs may be issued until the affected area's desired use level is reached. The desired use level is determined in resource management plans (RMPs), recreation area management plans (RAMPs), or in their absence, through analysis of resources and visitor use for each area using the Recreation Opportunity Spectrum (ROS) limits of acceptable change (LAC) or other valid methods.
- Each SRP application is analyzed for impacts to subsistence in accordance with ANILCA 810 through application specific NEPA processes.

(3) Alternative A

Under Alternative A, all unencumbered BLM-managed lands in the Bay planning area (1,163,604 acres) and selected lands (759,656 acres) until they are conveyed, would be managed as "Semi-Primitive Motorized" under the Recreation Opportunity Spectrum (Table 2.8).

Table 2.8. Current ROS Class Acreages and Descriptions for BLM-Managed Lands in the Bay Planning Area

Class (acres/% of planning area)	Description
Primitive 0 Acres (0%)	Area is characterized by an essentially unmodified natural environment of fairly large size. Concentration of users is low and no conflicts with users are evident. Sights and sounds of road systems are nonexistent and area is remote. Human-built structures are few and far between, or are inconspicuous. Vegetation and soils remain in a natural state.
Semi-Primitive Non-Motorized 0 Acres (0%)	Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other area users. Area is generally free of motorized trails and roads. Sights and sounds of transportation systems (mainly air) are encountered. Local traditional subsistence use is evident but impacts are fairly minimal. Vegetation and soils are predominantly natural but some impacts exist.
Semi-Primitive Motorized 2,503,822 Acres (100%)	Area is characterized by a predominantly unmodified natural environment of moderate to large size. Concentration of users is low, but there is often evidence of other users. Area is accessible to specialized OHVs but is generally not accessible to most four-wheel drive vehicles. Sights and sounds of the road system may or may not be dominant. Some portions of the area may be distant from road systems, but all portions are near motorized trails. Vegetation and soils are predominantly natural but localized areas of disturbance may exist. Local traditional subsistence use is evident but environmental impacts are minimal.
Roaded Natural 0 Acres (0%)	Area is characterized by a generally natural environment with moderate evidence of sights and sounds of humans. Resource modification and utilization practices are evident, but harmonize with the environment. Concentration of users is low to moderate, and rustic facilities may exist for user convenience and safety. The area is accessible to conventional motorized vehicles and roads are maintained on a regular basis. Sights and sounds of the road system are evident and traffic levels may be highly variable. Areas of localized vegetation and soil impacts exist. User concentrations are low to moderate but may be high in popular recreational sites such as waysides, trailheads, and water access points.
Rural 0 Acres (0%)	Area is characterized by a substantially modified natural environment. Resource modification and utilization practices are obvious. Sights and sounds of humans are readily evident and concentration of users is moderate to high. Some facilities may be designed for use by a large number of people. Areas typically are readily accessible to conventional motorized vehicles and are in areas where other camp structures are fairly common. Traffic levels are fairly constant. Areas of modified soil and vegetation exist.
Urban 0 Acres (0%)	Area is characterized by a highly modified environment, although the background may have natural elements. Vegetation is often exotic and manicured. Soils may be protected by surfacing. Sights and sounds of humans predominate. Large numbers of users should be expected. Modern facilities may exist for the convenience and comfort of large numbers of people.

(4) Management Common to All Action Alternatives (B, C, and D)

- Opportunities for commercial recreation will be provided consistent with area objectives for recreation management.
- The entire planning area would be designated as an Extensive Recreation Management Area. Management for dispersed recreation use and no facilities would be developed. No significant amounts of recreational staffing would be expended for the area.
- Camping associated with commercial activities would be prohibited without written authorization from BLM. Short-term commercial camping would be limited to 14 days within a 28-day period. After a camp has been occupied for 14 days, the camp must be moved at least 2 miles to start a new 14-day period. Short-term camping associated with non-commercial activities would be allowed for less than 14 days in one location.

(5) Alternative B

Under Alternatives B, the entire recreation area setting, including all unencumbered BLM-managed lands (1,163,604 acres) and selected lands (759,656 acres) until they are conveyed, would be managed as Roaded Natural (Table 2.8).

Table 2.8 and Table 2.13 provide a comparison of the recreation management actions proposed under each Alternative.

(6) Alternative C

Same as Alternative A, the entire recreation area setting, including all unencumbered BLM-managed lands (1,163,948 acres) and selected lands (759,656 acres) until they are conveyed, would be managed as Semi-Primitive Motorized.

(7) Alternative D

Same as Alternative A, the entire recreation area setting, including all unencumbered BLM-managed lands (1,163,948 acres) and selected lands (759,656 acres) until they are conveyed, would be managed as Semi-Primitive Motorized.

e) Travel Management – Off-Highway Vehicles

(1) Goals

- Manage access to BLM-managed lands and water.
- Ensure protection of natural and cultural resources from OHV impacts.
- Improve access to appropriate recreation opportunities on BLM-managed lands and water.
- Incorporate BLM's national strategy for motorized off-highway vehicle use.
- Provide OHV access consistent with the provisions of ANILCA
- Manage OHV access for resource development by applying Required Operating Procedures and Stipulations.

(2) Alternative A

Under Alternative A, there would be no OHV designations within the Bay planning area.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Inventory and Monitoring

Inventory trails in order to identify all existing trails and assess trail density and resource impacts. Inventory and assessment information would also be used to prioritize trail maintenance needs.

Gross Vehicle Weight Rating (GVWR) vs. Curb Weight Rating

GVWR: the maximum allowable total weight of a vehicle that is loaded, including the weight of the vehicle itself plus fuel, driver, passengers, and cargo. Common 2,000-lb GVWR vehicles found operating on trails within the Bay planning area include: three, four, and six wheel all-terrain vehicles (ATVs); and amphibious six-to-eight wheel drive Argos. This method is more practicable to administer and enforce because vehicle weight capacities are normally found on a plate affixed to a vehicle, or is easily obtained from the manufacturer.

Curb Weight Rating: the weight of a vehicle, full fuel tank, and all fluids topped off but does not include passengers or cargo. This method is much more difficult to determine and enforce without specialized equipment.

The State's 1,500-lb curb weight limit and the 2,000-lb GVWR limitation provide comparable protection to resources within the Bay planning area.

(b) Management Decisions

- Consider all access to public lands, including recreational, traditional, commercial, industrial, public roads and airstrips.
- Vehicle weight limits for OHV activities in "limited" designation areas would be to 2,000 pounds gross vehicle weight rating (GVWR includes the weight of the vehicle itself plus fuel, driver, passenger, and load) on all BLM-managed lands. Upon conveyance, designation of lands would be at the discretion of the new land manager.
- Any activity-level plan or integrated activity plan (IAP) such as for an ACEC, would include a trails inventory in the activity planning area and describe specific resource concerns or conflicts, and could describe specific designated trails and trail conditions or limitations of use (seasonal, vehicle class). Such a planning process would include public, State, and Native coordination. These plans would identify and prioritize specific maintenance needs and opportunities for trail development or loops. Unencumbered BLM lands would be first priority for implementation-level planning.
- OHVs will use existing trails whenever possible (i.e. subsistence hunting need for game retrieval), consistent with the State's Conditions on Generally Allowed Uses (11 AAC 96.025) (Appendix H). OHV use will be conducted in a manner that minimizes disturbance of vegetation, disturbance of soil stability, or impacts to drainage systems; changing the character of, polluting, or introducing silt and sediment into streams, lakes, ponds, seeps, or marshes; and disturbance of fish and wildlife. Snowmachines will be allowed open cross-country travel when adequate snow cover is present – that is, adequate to avoid crushing vegetation or removing ground cover.
- All proposals for OHV management under consideration would be consistent with Section 811 of ANILCA, which allows for "appropriate use for subsistence purposes of snowmobiles, motorboats, and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulation.

What is Meant by "Open," "Limited," and "Closed" OHV Designations?

To comply with BLM regulation 43 CFR 8342.1, all BLM lands must be designated in one of the following three categories:

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

(4) Alternative B

Under Alternative B, all lands within the Bay planning area would be designated as “open” to OHV use.

(5) Alternative C

Under Alternative C, all lands would be designated as “limited” to OHV use, allowing for limitations on OHV activities to protect habitat, soil and vegetation, water quality, cultural resources, and recreation experiences. Additional limitations within the proposed Carter Spit ACEC and Bristol Bay ACEC would be defined through the development of activity plans to meet the objectives of the proposed Special Designations.

(6) Alternative D

All lands would be designated as “limited” to OHV use, allowing for limitations on OHV activities to protect habitat, soil and vegetation, water quality, cultural resources, and recreational experiences. Additional limitations within the proposed Carter Spit ACEC would be defined through the development of activity plans to meet the objectives of the proposed Special Management Area.

Tables 2.9 and 2.13 compare the OHV management actions proposed under each Alternative.

Table 2.9. Comparison of Alternatives – Recreation Management. Off-Highway Vehicles and Recreation Opportunity Spectrum

Management Actions	Alternative A – Current Management	Alternative B	Alternative C	Alternative D – Preferred Alternative
Travel Management on BLM-Managed Unencumbered Lands				
Designation of BLM-managed unencumbered lands for Off-Highway-Vehicle (OHV) Use	There would be no OHV designations on BLM-managed lands within the planning area.	All unencumbered BLM-managed lands within the planning area would be designated as "open" for OHV use. Required Operating Procedures and Stipulations apply to authorized or permitted activities.	All unencumbered BLM-managed lands would be designated as "limited" for OHV use. Vehicle weight limits for OHVs would be 2,000 pounds gross vehicle weight rating (GVWR, includes load capacity). Allowing OHV travel on designated roads and trails vs. existing roads and trails would be addressed through the development of an activity plan if any significant resource impacts are observed. Limitations within the proposed Bristol Bay and Carter Spit ACECs would be defined through the development of activity plans to meet the objectives of the proposed Special Management Area. Required Operating Procedures and Stipulations apply to authorized or permitted activities.	All unencumbered BLM-managed lands would be designated as "limited" to OHV use. Vehicle weight limits for OHVs would be 2,000 pounds gross vehicle weight rating (GVWR, includes load capacity). Allowing OHV travel on existing roads and trails vs. designated roads and trails. The need for designated routes would be addressed through the development of an activity plan if any significant resource impacts are observed. Limitations within the proposed Carter Spit ACEC would be defined through the development of a comprehensive trails and travel management plan within 5 years of signing the ROD. Required Operating Procedures and Stipulations apply to authorized or permitted activities.
	No route restrictions; cross-country travel allowed everywhere on BLM lands within the planning area.	Same as Alternative A.	The "limited" designation is similar to the State's "Generally Allowed Uses on State Land," which requires OHVs to stay on existing trails whenever possible (Appendix H).	Same as Alternative C.

Management Actions	Alternative A – Current Management	Alternative B	Alternative C	Alternative D – Preferred Alternative
Designation of interim BLM-managed encumbered lands for Off-Highway-Vehicle (OHV) Use	There would be no OHV designations on BLM-managed lands within the planning area.	All interim BLM-managed encumbered lands within the planning area would be designated as "open" for OHV use. Required Operating Procedures apply to authorized or permitted activities.	All interim BLM-managed encumbered lands would be designated as "limited" for OHV use. The "limited" designation is similar to the State's "Generally Allowed Uses on State Land," which requires OHVs to stay on existing trails whenever possible (Appendix H). Vehicle weight limits for OHVs would be 2,000 pounds gross vehicle weight rating (GVWR, includes load capacity). Allowing OHV travel on designated roads and trails vs. existing roads and trails. Designated routes would be addressed through the development of an activity plan if any significant resource impacts are observed. Required Operating Procedures apply to authorized or permitted activities.	All interim BLM-managed encumbered lands would be designated as "limited" to OHV use. The "limited" designation is similar to the State's "Generally Allowed Uses on State Land," which requires OHVs to stay on existing trails whenever possible (as described in Appendix H). Vehicle weight limits for OHVs would be 2,000 pounds gross vehicle weight rating (GVWR, includes load capacity). Allowing OHV travel on existing roads and trails vs. designated roads and trails. The need for designated routes would be addressed through the development of an activity plan if any significant resource impacts are observed. Required Operating Procedures and Stipulations apply to authorized or permitted activities.
Recreation Opportunity Spectrum for BLM-Managed Unencumbered Lands				
Designation of BLM-managed unencumbered lands for Recreation Experience Opportunities.	Manage as "Semi-Primitive Motorized" under the Recreation Opportunity Spectrum.	Manage the entire recreation area setting as "Roaded Natural."	Same as Alternative A.	Same as Alternative A.

f) Renewable Energy

(1) Goals

Make BLM-managed lands available for development of renewable energy sources.

(2) Alternative A

Currently there are no permits issued for renewable energy facilities. No areas have been classified for hydropower on BLM-managed lands in the Bay planning area. Requests for permits to develop renewable energy sources would be considered on a case-by-case basis.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Management Decisions

Potential exists for the development of a variety of sources of renewable energy on BLM-managed lands in the Bay planning area, including solar, wind, and biomass renewable energy facilities. No authorizations for these purposes have been issued on BLM-managed lands within the planning area to date, nor has any interest been expressed. BLM would consider applications for permit or lease to conduct such developments on a case-by-case basis, subject to the constraints developed through project-specific NEPA analysis.

(b) Land Use Requirements

Permits for development of renewable energy would include Required Operating Procedures, Stipulations and project-specific requirements that minimize impacts to resources. Required Operating Procedures and Stipulations can be found in Appendix A.

g) Lands and Realty Actions

(1) Goals

- Meet public needs for use authorizations while minimizing adverse impacts to other resource values.
- Adjust land ownership to consolidate public land holdings, acquire lands with high public resource values, and meet public and community needs.
- Assist with Alaska goal of completing the Alaska Lands Transfer program by established timeframes.
- Satisfy State and local government land use needs as well as public and/or private demonstrated needs as they arise.
- Identify disposal areas based on specific disposal criteria and other evaluation factors identified in this plan.
- Revoke BLM-held withdrawals deemed inappropriate and restore them to the public domain.
- Revoke withdrawals for other agencies at their request, provided that the lands are suitable to be restored to the public domain.

(2) Alternative A

Under Alternative A, the Lands and Realty program would continue in its current role of supporting other BLM programs, authorizing the use of public lands, and supporting the BLM Alaska State Office in conveyances. No specific lands would be identified for disposal, exchange, or acquisition. Authorizations such as FLPMA leases, permits, and rights-of-way would continue to be dealt with on a case-by-case basis, as would unauthorized uses, such as trespass cabins. Withdrawal review would not occur for

ANCSA 17(d)(1) withdrawals or other smaller administrative withdrawals. Some uses would continue to be constrained by such withdrawals.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Land Tenure Adjustments

Land tenure adjustments could consist of a sale or an exchange. BLM may identify disposal areas by parcel or by specific areas that would be subject to disposal based on the application of the specific disposal criteria (FLPMA, Section 203 or 206) and other evaluation factors (e.g. resource values and concerns, accessibility, public investment, encumbrances, and community needs) identified in this plan. A goal of future adjustments would be to exchange identified isolated parcels of land for those which would help BLM to consolidate its unencumbered lands.

Lands withdrawn under the public land laws or segregated by State or Native selection would not be offered for disposal until such time as the State and Native corporations reach full entitlement.

(b) Entitlement and Settlement

The BLM Anchorage Field Office will assist in the conveyance of lands pursuant to legislative mandates. These mandates include the Alaska Statehood Act (1958), ANCSA (1971), and the Native Allotment Act (1906).

(c) Sales

Public lands meeting one or more stated criteria could be disposed of through FLPMA Section 203 (43 CFR 2710). No specific parcels available for sale are identified in this RMP.

What is the R&PP Act?

The Recreation and Public Purposes (R&PP) Act (43 CFR 2740, as Amended, 2001) authorizes the sale or lease of public lands for recreational or public purposes to State and local governments and to qualified nonprofit organizations. Examples of typical uses under the Act are historic monument sites, campgrounds, schools, fire houses, law enforcement facilities, municipal facilities, landfills, hospitals, parks and fairgrounds. Lands patented under this Act contain a reversionary clause in the patent, requiring continued use for the intended purpose.

(d) Recreation and Public Purposes (R&PP) Act Sales

Lands identified for disposal under this authority that are selected by either the State or Native corporations would have to be fully adjudicated before BLM would entertain a sale. In order to be analyzed for disposal under the R&PP Act (43 CFR 2740, as amended, 2001), the following conditions must exist:

- Lands must be readily accessible to a qualified applicant.
- The qualified applicant must have a defined purpose for the land and secure funding to develop it.
- R&PP sales would not be implemented on lands withdrawn for another agency without that agency's approval.
- Lands within proposed Special Designations (i.e. SRMA or ACEC) would not be considered available under R&PP, nor would lands acquired by the Federal government for inclusion in the proposed special designation.

- In most instances, BLM would first lease lands under this Act and then sell the lands only after the project is constructed in compliance with an approved development and management plan. An important exception to this would be tracts proposed for projects that may include the disposal, placement, or release of hazardous materials (i.e., sanitary landfills), which would always be sold and go directly to patent; they would not be leased (BLM Handbook H-2740-1, VI, B).
- Application for tracts where hazardous materials would be disposed, placed or released would only be conveyed with a clause that would prohibit reversion to the Federal government.
- Existing leases where the purpose of the lease is to dispose, place or release hazardous materials must be converted to patents containing a clause prohibiting reversion to the Federal government.

No lands in the Bay planning area have been identified for disposal under this authority.

(e) Recreation and Public Purposes Act Leases

A lease allows the lessee to conduct authorized activities on BLM lands, for a less than fair market value rent; however, the land remains in Federal ownership. Should the land be patented (authorized for sale), the land would be removed from Federal ownership via a patent with a reversionary clause.

R&PP leases would not be issued for projects that may include the disposal, placement, or release of hazardous materials (i.e., sanitary landfills). In the case of an existing lease where the purpose of the lease is to dispose, place or release hazardous materials, the land must be converted to patent without a reversionary clause, thereby preventing the land from returning to Federal ownership.

(f) Airport and Airway Improvement Act of September 3, 1982

BLM would continue to process airport conveyances as requested by the Federal Aviation Administration. Each conveyance must contain appropriate covenants and reservation requested by the Federal Aviation Administration. As a condition to each conveyance, the property interest conveyed must revert to the Federal government in the event the lands are not developed for airport or airway purposes or are used in a manner inconsistent with the terms of the conveyance.

(g) Exchanges

BLM would seek to put in place mutually beneficial public interest land exchanges, which are authorized in Alaska by FLPMA, ANCSA, and ANILCA. Where feasible, BLM will consider land exchanges to resolve issues of split estate ownership of surface and subsurface interests. When considering public interest, full consideration must be given to efficient management of public lands and to secure important objectives including protection of fish and wildlife, cultural resources, and aesthetic values; enhancement of recreational opportunities; consolidation of mineral holdings for more efficient management; expansion of communities; promotion of multiple use values, and fulfillment of public needs. Exchanges would not be pursued until State and Native entitlements are fulfilled. Parcels of land in the Iliamna East block, Iliamna West block and two sections east of Aleknagik have been identified in this RMP/EIS for potential exchange.

(h) Withdrawals

Chapter III discusses the numbers and types of withdrawals on BLM lands in the Bay planning area and their purposes. Under all Alternatives, BLM would maintain Agency withdrawals (other than ANCSA 17(d)(1) withdrawals) until the agency for which the land was withdrawn, requested revocation of the withdrawal. Under Alternatives B, C, and D, BLM would revoke ANCSA 17 (d)(1) withdrawals, except that in Alternative C, ANCSA 17(d)(1)s would be retained in the proposed Carter Spit ACEC and three nominated WSRs until Congress had opportunity to act on the nominations.

(i) Acquisitions

The BLM Anchorage Field Office (AFO) does not anticipate acquiring lands within the Bay planning area during the life of this plan except perhaps through exchange or donations.

(j) Land Use Authorization and Right-of-Way administration on Selected Lands

A land use authorization is an authorization issued by BLM to use public lands in accordance with section 302 of FLPMA. The two most commonly issued authorizations in the planning area are leases and permits.

A right-of-way is an authorization issued by BLM to use BLM public lands in accordance with Title V of FLPMA or Section 28 of the Mineral Leasing Act.

The State of Alaska and ANCSA Native Corporations have selected BLM-managed lands in the Bay planning area for conveyance. State and Native selections affect BLM's processing of land use authorizations and rights-of-way.

Selected and Unencumbered Lands

The term "selected lands" refers to selections on those BLM lands made in Alaska pursuant to the Alaska Statehood Act (1958) and ANCSA (1971). A selection serves to withdraw the lands from all forms of appropriation under the public land laws. Selected lands continue to be managed by BLM, but depending on the selecting entity, BLM is required to obtain concurrence or to seek and consider comments on any authorization to use the lands. The term "unencumbered lands" refers to lands that are managed by BLM without these constraints. To note, the unencumbered lands withdrawn under PLO 5181 unencumbered lands may contain a top filing by the State of Alaska (see Chapter III for topfiling discussion).

- **Native-selected lands**. Prior to issuing a use authorization the views of the Native corporation shall be obtained and considered. Monies received for any use authorization on Native-selected lands would go into an escrow account to be disbursed to the Native corporation upon conveyance.
- **State-selected lands.** In accordance with 906(k) of ANILCA, BLM must receive a letter of concurrence from the State of Alaska prior to issuance of any use authorization. BLM may then incorporate State terms and conditions in the use authorization if they comply with Federal laws and regulations. Money received for any use authorization on State-selected lands would go into an escrow account to be disbursed to the State upon conveyance. If the State objects to the use authorization, BLM would not issue it. If the proposal is for an authorization on land that has been top filed by the State, pursuant to 906(e) of ANILCA, a letter of concurrence is not required because the top filing is not yet a valid right, but a future interest in the land.

1. FLPMA Leases

FLPMA Leases are use to authorize the use of public lands involving substantial construction, development, or land improvement 43 CFR 2920.1-1(a). Stipulations and Required Operating Procedures would apply, and NEPA compliance is necessary for FLPMA Leases.

All FLPMA leases would be at market value rental, or determined according to a rental schedule. Cabins or permanent structures used for private recreation cannot be authorized under this authority. Proposals for leases for commercial use cabins, special use cabins, or subsistence use cabins would be considered on a case-by-case basis. Currently there are no commercial use cabins special use cabins or subsistence use cabins located on BLM lands in the Bay planning area. 43 CFR 2920.1-1 clarifies when a lease, permit, or easement is required.

2. FLPMA Permits

FLPMA permits are short-term revocable authorizations to use public lands for a specific purpose (43 CFR 2920.1-1(b)). Permits are also issued at market value rental, or determined according to a rental schedule. According to 43 CFR 2920.2-2, they may be granted for a land use if BLM determines that the use is in conformance with the agency plans, policies, and programs, local regulations, and other requirements, and will not cause appreciable damage or disturbance to the public lands, their resources, or improvements.

In general:

- Cabins or permanent structure permits would not be issued for private recreation purposes.
- Commercial use cabins, special use cabins, or subsistence use cabins may be authorized with short-term (maximum three year) permits renewable at the discretion of BLM. Once the permittee demonstrated conformance to policies and regulations, the Authorized Officer could reissue the authorization as a lease or renew as a permit. (Trapping shelters would be authorized by short-term (three years maximum) FLPMA sec. 302 permits renewable at the discretion of the BLM and tied to the applicant's ability to show actual use for profitable trapping purposes).
- Shelters, tent platforms, and other temporary facilities and equipment used for hunting and fishing are allowed on BLM lands under Section 1316 of ANILCA.

3. FLPMA Easements

A FLPMA easement is an authorization for a non-possessory, non-exclusive interest in lands that specifies the rights of the holder and the obligation of BLM to use and manage the land in a manner consistent with the terms of the easement. Each proposal for an easement would be considered on a case-by-case basis and, pursuant to 43 CFR 2920.7, would contain terms and conditions protecting the environment and public health and safety.

4. Rights-of-Way

A Right-of-Way is public land authorized to be used or occupied pursuant to a Right-of-Way grant. These grants are non-exclusive and authorize the holder to construct, operate, and maintain a project for a specified use for a specified amount of time. Rental fees for Rights-of-Way are at market value rental, or determined according to a rental schedule. BLM may exempt, waive or reduce rent for a grant under certain circumstances except that there are no reductions or waivers for Mineral Leasing Act authorizations. Construction within new Rights-of-Way would consider valid existing rights and uses.

Rights-of-Way for oil or gas pipelines and their related facilities are issued under the authority of Section 28 of the Mineral Leasing Act (1920). In accordance with 43 CFR 2880, BLM shall place stipulations on these Rights-of-Way requiring:

- Restoration, revegetation, and curtailment of erosion.
- Compliance with air and water quality standards.
- Control or prevention of damage to the environment, to public or private property, and hazards to public health and safety.
- Protection of the subsistence interests of those living along the Right-of-Way.

Stipulations and Required Operating Procedures (Appendix A), and project-specific requirements would apply.

Title V of FLPMA authorizes the issuance of Rights-of-Way for other uses, such as transportation systems (roads and trails), water pipelines and reservoirs, systems for generation and transmission of electric energy (hydro power and wind energy), and various types of communication sites. According to 43 CFR 2800 and ANILCA, BLM may grant such Rights-of-Way provided that:

- The natural resources located on public lands administered by a government agency, where the public lands are adjacent to private or other lands, are protected.
- Undue or unnecessary environmental damage to the lands and resources is prevented.
- The utilization of Rights-of-Way in common with respect to engineering and technological compatibility, national security and land use plans compatibility are promoted.
- Coordination, to the fullest extent possible, takes place with the State, local governments, interested individuals and appropriate non-governmental entities.
- Transportation corridors and communication sites will be considered on a case-by-case basis.

(k) Unauthorized Use

Possible management actions with respect to unauthorized cabins (trespass) include removal of the structure, authorization by lease or permit for legitimate uses if they are consistent with identified area objectives, or relinquishment to the U.S. Government for management purposes. If unauthorized cabins become the property of the U.S. Government they can be managed as administrative sites, as emergency shelters, or as public use cabins. Criteria for prioritizing which unauthorized cases would receive the highest consideration are:

- Situations involving new unauthorized construction, public safety, or public complaints
- Areas identified for long-term Federal management
- Selected lands on which resources are being removed without authorization or where resource damage is occurring or the presence of a trespass cabin is holding up a conveyance
- Other selected lands

(l) 17(b) Easements

Section 17(b) of ANCSA provided for the reservation of easements across Village and Regional Native corporation lands to provide public access to publicly owned lands or major waterways for the purpose of facilitating transportation; however easements are also reserved for utility, utility purposes, air, light and visiblity easements or easements to guarantee international treaty obligations. BLM is responsible for identifying and reserving these easements during the conveyance process in accordance with 43 CFR § 2650.4-7. The management of these easements lies with BLM or, under a Memorandum of Understanding, the appropriate Federal land manager. BLM does not have a similar agreement for transferring easement management to the State of Alaska. Consequently, BLM retains management responsibilities for easements reserved to access State lands.

BLM would continue to administer ANCSA Section 17(b) easements that have been reserved in patents or interim conveyances to ANCSA corporations as staffing and budgets allow. ANCSA 17(b) easement management will be transferred to the NPS or the USFWS for those easements that access lands administered by these agencies or are wholly within the boundaries of the park, preserve, Wild and Scenic River corridor, or refuge. On BLM-managed lands, BLM will continue to locate, mark and sign, GPS survey, map, and monitor ANCSA 17(b) easement locations as staffing and budgets allow. BLM reserves easements to ensure access to Federal, State, and municipal corporation lands as ANCSA conveyances occur. BLM would continue to identify, sign, map, monitor use, and realign ANSCA 17(b) easements, with priority based on:

- Easements with safety hazards.
- Easements accessing lands that are permanently managed by BLM or are important to BLM programs.
- Easements receiving high use.
- Easements required to implement an activity or implementation plan.
- Easements where landowners have made a request to work cooperatively on marking projects.
- Easements where environmental damage is occurring.

(m) Conservation Easements

BLM would continue to manage conservation easements for the specific purpose for which they were acquired. Currently there are no conservation easements on BLM-managed lands in the Bay planning area.

(4) Alternative B

Under Alternative B five isolated parcels in the planning area would be identified for exchange in order to consolidate BLM long-term holdings. Existing ANCSA 17(d)(1) withdrawals would be revoked. Avoidance or exclusion areas would be identified on a case-by-case basis. Required Operating Procedures and stipulations would apply to permitted activities.

(5) Alternative C

Under Alternative C, no lands would be identified for disposal or land exchange. Existing ANSCA 17(d)(1) withdrawals would be revoked, except that those on proposed wild river segments of the Alagnak River, Goodnews River mainstem, and Goodnews River Middle Fork would be retained until Congressional action is completed. The Carter Spit ACEC and the Bristol Bay ACEC would be identified as avoidance areas for Land Use Authorizations. Required Operating Procedures and stipulations would apply to permitted activities.

(6) Alternative D

Under Alternative D, as in Alternative B, five isolated parcels in the planning area would be identified for exchange. Existing ANCSA 17(d)(1) withdrawals would be revoked. The Carter Spit ACEC would be identified as an avoidance area for Land Use Authorizations (avoidance areas are defined as areas to be avoided but may be available for location of rights-of-way with special stipulations). Required Operating Procedures and stipulations would apply to permitted activities.

Tables 2.10 and 2.13 provide the comparison of Alternatives for Lands and Realty.

Table 2.10. Comparison of Alternatives – Lands and Realty

Management Actions	Alternative A – Current Management	Alternative B	Alternative C	Alternative D – Preferred Alternative
Withdrawals	ANCSA 17(d)(1) withdrawals would be retained. Withdrawals other than ANCSA 17(d)(1) would be retained (3,970 acres).	ANCSA 17(d)(1) withdrawals would be revoked. Agency Withdrawals (other than ANCSA 17(d)(1)) would be retained (3,970 acres).	Same as Alternative B. ANCSA 17(d)(1) withdrawals would be retained on proposed Wild River segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork would be retained (12,210 acres) until Congress has opportunity to act on the nominations. ANCSA 17(d)(1) withdrawals would be retained on the proposed Carter Spit ACEC (61,251 acres)	Same as Alternative B.

Management Actions	Alternative A – Current Management	Alternative B	Alternative C	Alternative D – Preferred Alternative
Land Use Authorizations and Rights-of-Way	Land Use Authorizations: Right-of-Way avoidance areas, or exclusion areas, would be identified on a case-by-case basis.	Same as Alternative A.	Same as Alternative A. The proposed Carter Spit ACEC (61,251 acres) and the proposed Bristol Bay ACEC (974,970 acres) would be identified as avoidance areas for Land Use Authorizations.	Same as Alternative A. The proposed Carter Spit ACEC would be identified as an avoidance area for Land Use Authorizations (36,220 acres).
Disposal or Land Exchange	No lands identified for disposal (sale) or land exchange.	Parcels identified for land exchange: Chekok Creek, T2 and 3S, R30W. (5,749 acres). Chulitna River, T1N, R32W Sec. 21, 22, 23, 28, 31, 32 (3,840 acres). Katmai Boundary T11S R35W Sec. 1. (323 acres). T11S R37W Sec. 2, 3, 4, 9, 10; Sec. 16, 21 portions. (3,533 acres). T11S R44W Sec. 5, 6, 7, 8, 17, 18, 19. (4,415 acres) Aleknagik Vicinity, T10S R53W Sec. 7, 18, if not conveyed out of Federal ownership (1228 acres). T9S R72W Sec. 18. BLM land that is not State-selected but	Same as Alternative A.	Same as Alternative B.

Management Actions	Alternative A – Current Management	Alternative B	Alternative C	Alternative D – Preferred Alternative
		may be Top Filed; however, it is not a priority (605 acres). Parcels identified for land exchange or disposal (sale): Aleknagik Vicinity, T10S R55W Sec. 32, U.S. Survey 12403, lots 1 and 2, (5 acres) Clarks Point Vicinity, T14S R55W Sec. 8, (46 acres) Clarks Point Vicinity, T15S R55W Sec. 6,7,18, (25 acres)		

3. Special Designations

A detailed description of the criteria and processes for determining special designations can be found in Appendix B of this document.

a) Areas of Critical Environmental Concern

(1) Goals

To highlight areas where special management attention is needed to protect and prevent irreparable damage to important historic, cultural, and scenic values, fish and wildlife resources or other natural systems or processes through designation of ACECs.

(2) Alternative A

Alternative A is a continuation of current management practices. Currently there are no Special Designations placed upon BLM-managed lands in the Bay planning area. Under this Alternative, there would be no designated ACECs.

(3) Alternative B

Same as Alternative A.

(4) Alternative C

Under Alternative C, 1,036,221acres would be designated as ACECs in two separate areas (Maps 2.31 and 2.32). The proposed ACECs will not encumber any State-selected or Native-selected lands.

Designation of an ACEC would not encumber selected lands within the proposed boundary. Selected lands would be managed to maintain the resource values of the lands until conveyance. The ACEC management prescription would not attach to conveyed lands. Following adjudication of all selections, the boundaries of Special Designations may be adjusted.

- Additional site-specific monitoring needed to manage ACECs would be a field office priority but based on project proposals and available funding.
- A mining Plan of Operations would be required on any mining activity within an ACEC. Required Operating Procedures and project-specific requirements would be in effect.
- A Comprehensive Trails and Travel Management Plan will be performed within five years after signing of the ROD.
- OHVs would be limited to designated trails.
- The area would be open to leasable mineral entry subject to Required Operating Procedures, Stipulations, seasonal closures, and additional provisions determined through project specific NEPA processes.
- Opening the area to locatable mineral entry but closing it to salable mineral development, subject to Required Operating Procedures and project-specific requirements as determined through project specific NEPA analysis.
- Designating the area as a Right-of-Way avoidance area (Right-of-Way can be available but with special stipulations).
- Livestock grazing would be managed on a case-by-case basis as permits are received.
- Inventories and assessments of biological and habitat resources will be a field office priority determined by available funding and proposed project specific data needs.
- Paleontological resource strategies and priorities specific to the Special Designations would be developed for the proposed ACEC.
- ACEC will be managed as VRM Class III.

(a) Carter Spit ACEC

The Carter Spit and adjacent spits and wetlands would be designated as an ACEC to include 61,251acres. ANSCA 17(d)(1) withdrawals would be retained. Should lands adjacent to the ACEC be relinquished from selection, they may be added to the ACEC. This would be performed through a plan amendment at a later date.

(b) Bristol Bay ACEC

The Bristol Bay blocks of BLM land would be designated as an ACEC to include 974,970 acres, all of which are BLM lands unencumbered by a valid selection currently in place. Should lands adjacent to the ACEC be relinquished from selection, they may be added to the ACEC. This would be performed through a plan amendment at a later date.

(5) Alternative D

Under this Alternative, 36,220 acres would be designated as an ACEC in one area (Map 2.33).

(a) Carter Spit ACEC

The Carter Spit and adjacent spits and wetlands would be designated as an ACEC to include 36,220 acres. ANSCA 17(d)(1) withdrawals would be revoked. Should lands adjacent to the ACEC be

relinquished from selection, they may be added to the ACEC. This would be performed through a plan amendment at a later date.

In addition to Required Operating Procedures and Stipulations (Appendix A), measures identified within the ACEC to protect scenic, wildlife, fisheries, botanical, and cultural values would include:

- OHVs would be limited to designated trails.
- The area would be open to leasable mineral entry subject to Required Operating Procedures, Stipulations, seasonal closures, and additional provisions determined through project-specific NEPA analysis.
- The area would be opened to locatable mineral entry but closed to salable mineral development, subject to Required Operating Procedures and project-specific requirements as determined through project specific NEPA analysis.
- The area would be designated as a Right-of-Way avoidance area (Rights-of-Way can be available but with special stipulations).
- Livestock grazing would be managed on a case-by-case basis as permits are received.
- Inventories and assessments of biological and habitat resources will be a field office priority determined by available funding and proposed project specific data needs.
- Paleontological resource strategies and priorities specific to the Special Designations would be developed for the proposed Carter Spit ACEC.
- Carter Spit ACEC will be managed as VRM Class III.
- ROP, SS-1a, SS-1b and SS-2a (Appendix A), would be applied to protect federally-listed migratory bird species.

The preceding information is summarized in Table 2.11 and Table 2.13.

b) Wild and Scenic Rivers

(1) Goals

- Identify and recommend for designation any rivers in the planning area that are suitable for designation as components of the National WSR System.
- Identify and develop protection strategies for outstanding river-related values in the planning area.
- Protect water quality.

What is the Role of the RMP Process in the Wild and Scenic River Designation Process?

BLM identifies rivers in the planning area that are *eligible* and *suitable* for inclusion in the National WSR System.

Eligibility is based on the physical attributes of a river. *Eligible* rivers are free-flowing and possess one or more "outstandingly remarkable values" such as exemplary scenery, recreation opportunities, or characteristics that are unusual enough to attract visitors to the region, geologic features that are rare or unique to the region, and regionally or nationally important fish or wildlife.

Suitability is a management determination of the appropriateness of adding eligible rivers to the National WSR System. BLM assesses a number of factors, including the manageability of adding the river to the system (cost, legal jurisdiction), support for designation, and the compatibility of designation with other overall management of the area.

If BLM determines that a river is eligible and suitable as part of the National WSR System, it will recommend its designation in the Record of Decision (ROD) for the RMP. The Secretary of the Interior can choose to forward or change the recommendation, and Congress and the President must ultimately decide whether to make the river part of the system.

(2) Alternative A

Current management practices will continue under this Alternative. No rivers, river segments, lakes, or streams would be evaluated for eligibility or suitability for inclusion in the National WSR System.

(3) Alternative B

Under Alternative B, no rivers found eligible would be recommended as suitable for designation under the Wild and Scenic Rivers Act.

(4) Alternative C

Under Alternative C, three river segments, a portion of the Alagnak River, a portion of the Goodnews River mainstem, and a portion of the Goodnews River Middle Fork would be found eligible and suitable for recommendation to Congress for designation as Wild Rivers in the National WSR System (Map 2.34 and 2.35). ANCSA 17(d)(1) withdrawals would be retained at these locations until Congress had an opportunity to act on the recommendation, precluding oil, gas, and solid mineral exploration or development.

(5) Alternative D

Alternative D would be the same as Alternative B.

The rationale for not carrying the eligible and suitable rivers identified in Alternative C forward to Alternative D is due to the complexity of managing three river segments located where there is a patchwork of land ownership, where the proposed water bodies are short segments of larger rivers, and (based on formal scoping) where there is a demonstrated lack of support by residents using the rivers.

Recommendations for Wild and Scenic River (WSR) designation under each Alternative are summarized in Tables 2.11 and 2.13.

Table 2.11. Comparison of Alternatives – Special Management Areas.

Management Actions	Alternative A (Current Management)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
Recreation Management Areas	No recreation management areas would be established.	All BLM lands in the Bay planning area would be managed as an Extensive Recreation Management Area.	Same as Alternative B.	Same As Alternative B.
Wild and Scenic Rivers	No National System designations would be recommended.	The following eligible river segments would not be found suitable for inclusion to the National WSR System: **Bristol Bay Region** Alagnak River,	The following eligible river segments would be found suitable for inclusion to the National WSR System **Bristol Bay Region** Alagnak River, portion (Wild, Recreational)(662 acres) **Goodnews Bay**	Same as Alternative B.

Management Actions	Alternative A (Current Management)	Alternative B	Alternative C	Alternative D (Preferred Alternative)
		portion (Wild, Recreational)(662 acres) **Goodnews Bay Region** (Map 2.35): Goodnews River, mainstem (Wild)(7,737 acres) Goodnews River, middle fork, portion (Wild)(7,926 acres).	**Region** (Map 2.35): Goodnews River, mainstem (Wild)(7,737 acres) Goodnews River, middle fork, portion (Wild)(7,926 acres). ANCSA 17 (d)(1) withdrawals for these river segments would be retained as an interim measure to provide an opportunity for Congressional action.	
Area of Critical Environmental Concern	No Areas of Critical Environmental Concern would be recommended.	Same as Alternative A.	The following areas of unencumbered BLM land would be proposed as Areas of Critical Environmental Concern • Bristol Bay ACEC (974,970 acres) Carter Spit ACEC, retain ANSCA 1 (d)(1) withdrawals (61,251 acres)	The following area of unencumbered BLM land would be proposed as an Area of Critical Environmental Concern. • Carter Spit ACEC (36,220 acres).
Wildlife and Wildlife Habitat	BLM would manage wildlife habitat and address concerns on a case-by-case basis during review of permits.		Same as Alternative A. Inventory and monitoring efforts of wildlife and wildlife habitat will be a field office priority but determined by available funding.	

4. Social and Economic

a) Public Safety: Abandoned Mine Lands and Hazardous Materials

(1) Goals

- Protect public health and safety and environmental resources by minimizing environmental contamination from chemical, biological and radiological sources on public lands and BLM-owned or operated facilities.
- Comply with Federal and State hazardous materials standards and meet all Federal and State mandates, laws, Executive Orders, regulations and policies.
- Maintain the health of ecosystems through location, assessment, cleanup, and restoration of contaminated sites.
- Manage oil and hazardous materials related risks, costs, and liabilities.
- Integrate environmental protection and compliance with all environmental statutes into all BLM activities.

(2) Alternative A

BLM would continue to comply with Federal and State oil and hazardous materials management laws and regulations. As sites were discovered, they would be remediated. The Southwest MFP does not provide any guidance on hazardous materials management or abandoned mine lands.

(3) Management Common to All Action Alternatives (B, C, and D)

(a) Management Decisions

- Impacts caused by past hazardous materials management on BLM lands will be mitigated subject to the availability of funds.
- BLM will prevent creation of new hazardous material sites through implementation of best management practices for all land use permits, leases, ROW, and mining claims and will include pollution prevention measures in all permits, leases, and grants of ROW.

(b) Land Use Requirements

BLM will coordinate and consult with appropriate regulatory agencies for all cleanup plans, and will notify and coordinate hazardous materials activities with specific Native Corporations on Native-selected lands.

b) Subsistence

(1) Goals

- Maintain and protect subsistence opportunities.
- Determine how the management actions, guidelines, and allowable uses prescribed in response to the other issues will affect subsistence opportunities, resources, and the socio/economic environment.
- Maintain sufficient quality and quantity of habitat to support healthy populations of important subsistence species of fish and wildlife.
- BLM will effectively manage subsistence harvests through regulations established by the Federal Subsistence Board, and in cooperation with ADF&G, other Federal agencies, the Subsistence Regional Advisory Councils, and the subsistence users.
- Ensure that rural residents engaged in subsistence use have reasonable access to subsistence resources on public lands.
- To the extent possible, minimize displacing resources from traditional harvest areas due to permitted activities.
- Avoid user conflicts over multiple use resources. Involve subsistence users in issue identification and conflict resolution.

(2) Alternative A

Under this Alternative, BLM would continue to manage subsistence in accordance with sec. 802 of ANILCA. Before BLM approves any action, the effect of such use, occupancy, or disposition on subsistence uses and needs would be evaluated in compliance with Sec. 810 of ANILCA. The Southwest MFP (1981), applicable to the Goodnews planning block only, does not provide any specific direction on subsistence management. However, the decisions under wildlife to protect wildlife habitat and to mitigate impacts of other uses on wildlife provides support for the subsistence program. Under this Alternative, most activities would be analyzed on a case-by-case basis and few uses would be limited or excluded. This Alternative provides few constraints on activities that have the potential to negatively affect subsistence resources.

(3) Management Common to All Alternatives (A, B, C, and D)

The opportunity for subsistence uses by rural residents on Federal public lands in Alaska is assured by law [sec. 802(1) of ANILCA]. Decisions made within this RMP will not affect BLM's role in administration of subsistence on Federal public lands. Under all Alternatives, BLM will continue to carry out or participate in the following administrative functions:

- **Involve Subsistence Users in Issues Identification.** Ten Subsistence Regional Advisory Councils (SRACs) were established in Section 100.22 of the Subsistence Management Regulations for Public Lands in Alaska as an administrative structure to provide a "meaningful voice" for subsistence users in the management process. The Bay planning area encompasses parts of the Bristol Bay and Yukon Kuskokwim Delta Federal Subsistence Regions. BLM field staff members as well as those of other agencies meet twice each year with both Subsistence Regional Advisory Councils to identify emerging issues in conservation, allocation, and appropriate regulation of subsistence harvests.
- **Manage Land/Habitat; Assess Impacts to Subsistence.** ANILCA Section 810 establishes a distinct set of requirements for assessment of potential impacts to subsistence from Federal land decisions. These supplement the discussion of potential impacts to subsistence resources and uses found as part of conventional NEPA environmental reviews.
- **In a Multi-agency Setting, Monitor Resource Populations Used for Subsistence Purposes.** When these monitoring efforts are focused on key subsistence resources, they are a major contribution to the quality of subsistence management efforts.
- BLM will work cooperatively with ADF&G and other Federal agencies to implement the Mulchatna Caribou Herd Monitoring Plan, the Western Brown Bear Management Area planning group, the Unit 18 Goodnews/Arolik Moose Moratorium and Restoration Plan, the migratory bird MOU, Boreal Partners in Flight Conservation Plan, and other cooperative management efforts of which BLM is a part.
- **In a Multi-agency Setting, Manage Subsistence Harvests through regulations established by the Federal Subsistence Board.** With heavy reliance on SRAC input and interagency coordination, the development of subsistence regulations is a multi-step process.

(4) Land Use Requirements

- BLM will consult with USFWS and NMFS under Section 7 of the ESA for all actions that may affect listed species or designated critical habitat, or confer if actions are likely to jeopardize the continued existence of a proposed species or result in the destruction or adverse modification of proposed critical habitat.
- All permitted activities would operate under the Stipulations, Required Operating Procedures, and Standard Lease Terms provided in Appendix A. These procedures were developed through the EIS process and are based on current knowledge of resources in the planning area and current permitting procedures. All oil and gas leases would be subject to the Oil and Gas Leasing Stipulations listed in Appendix A.

E. Comparison of Alternatives

Table 2.12. Alternative Summary Table

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
Fish and Wildlife Habitat		Proposed permitted or authorized uses analyzed through the NEPA process on a case-by-case basis. Mitigation measures developed to minimize impacts from proposed activities would be included in the permit that authorized use.	Same as Alternative A. Stipulations, Required Operating Procedures, and project-specific requirements would apply.	Same as Alternative B. Stipulations, Required Operating Procedures, and project-specific requirements would apply. For Fluid Leasable Minerals, Goodnews, Koggiling Creek, Yellow Creek, Kvichak, Iliamna West, Alagnak, and Klutuk Creek planning blocks would be open to leasing subject to seasonal restrictions or other constraints. A 300-ft. minimum setback on unencumbered BLM lands on segments of the East and South Fork Arolik River, Faro Creek, and South Fork Goodnews River and Klutuk Creek would be required (ROP FW-6a). This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.	Same as Alternative B. Stipulations, Required Operating Procedures, and project-specific requirements would apply. For Fluid Leasable Minerals, Goodnews, Koggiling Creek, Yellow Creek, Kvichak, Iliamna West, Alagnak, and Klutuk Creek planning blocks would be open to leasing subject to seasonal restrictions or other constraints. A 300-ft. minimum setback on BLM unencumbered lands on segments of the East and South Fork Arolik River, Faro Creek, and South Fork Goodnews River and Klutuk Creek would be required (ROP FW-6a). This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
Fire Management and Ecology		This Alternative allows wildland fire use and fuels treatments to meet land use and resource management objectives, reduce the risk and costs of wildland fires and supports interagency collaboration.	Same as Alternative A. Required Operating Procedures would apply.	Same as Alternative A. Required Operating Procedures would apply. Fire strategies would be designated that support the management objectives for Carter Spit and Bristol Bay ACECs and wild and scenic river corridors.	Same as Alternative A. Required Operating Procedures would apply. Fire management for the Carter Spit ACEC would support the management objectives.
Cultural and Paleonto-logical Resource Management		This Alternative would identify, protect, and preserve significant cultural and paleontological resources; and manage cultural and paleontological resources for a variety of scientific, conservation, public education, interpretation, traditional, and experimental use.	Same as Alternative A.	Same as Alternative A. An inventory of cultural and paleontological resources would be a field office priority for the proposed Carter Spit and Bristol Bay ACECs pursuant to available funding.	Same as Alternative A. An inventory of cultural and paleontological resources would be a field office priority for the proposed Carter Spit ACEC pursuant to available funding.
Visual Resource Management	**VRM Classifica-tions**	No VRM Classes would be established within the Bay planning area.	All lands within the Bay planning area would be managed as VRM Class IV.	BLM lands in the full visible foreground based on GIS analysis up to 5 miles from established winter trail/road systems would be managed as VRM Class III including: Goodnews planning block: • Goodnews to Quinhagak coastal and Arolik River routes • Goodnews Bay to Dillingham Nushagak/Kvichak/Alagnak Drainages	BLM lands in the full visible foreground based on GIS analysis up to 1/2 mile from established winter trail/road systems would be managed as VRM Class III including: Goodnews planning block: • Goodnews to Quinhagak coastal and Arolik River routes • Goodnews Bay to Dillingham Nushagak/Kvichak/Alagnak Drainages

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
				• Dillingham to Aleknagik • Dillingham to Koliganek • Ekwok to Naknek • New Stuyahok to Levelock • Naknek to King Salmon BLM lands in the full visible foreground up to 5 miles from main river travel routes would be managed as VRM Class III including the navigable portions of: Goodnews planning block: • North Fork Goodnews River • Middle Fork Goodnews River • South Fork Goodnews River • East Fork Arolik River Nushagak/Kvichak/Alagnak Drainage • Nushagak River • Kvichak River • Lower Mulchatna River • Alagnak Wild River BLM lands in the full visible foreground up to five miles from the boundaries of Togiak NWR, Becharof NWR, Katmai NPP, and Lake Clark NPP would be managed as VRM Class III. All other BLM lands would be managed as VRM Class IV.	• Dillingham to Aleknagik • Dillingham to Koliganek • Ekwok to Naknek • New Stuyahok to Levelock • Naknek to King Salmon BLM lands in the full visible foreground up to 1/2 mile from main river travel routes would be managed as VRM Class III including the navigable portions of: Goodnews planning block: • North Fork Goodnews River • Middle Fork Goodnews River • South Fork Goodnews River • East Fork Arolik River Nushagak/Kvichak/Alagnak Drainage • Nushagak River • Kvichak River • Lower Mulchatna River • Alagnak Wild River BLM lands in the full visible foreground up to one mile from the boundaries of Togiak NWR, Becharof NWR, Katmai NPP, and Lake Clark NPP would be managed as VRM Class III. All other BLM lands would be managed as VRM Class IV.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
	VRM Classifica-tions in Special Mgmnt Areas		Proposed Carter Spit and Bristol Bay ACECs would be managed as VRM Class III	Proposed Carter Spit and Bristol Bay ACECs would be managed as VRM Class III. Proposed National WSR Alagnak River and Kvichak River (Wild, Recreational) would be managed as VRM Class III. Proposed National WSR Goodnews River and Middle Fork Goodnews River (Wild) would be managed as VRM Class III.	Proposed Carter Spit ACEC would be managed as VRM Class III.
Livestock and Reindeer Grazing		Alternative A would continue current management. Livestock grazing would be managed on a case-by-case basis as permits were received. Livestock permitted would be limited to reindeer.	Same as Alternative A. Permits subject to Required Operating Procedures.	Same as Alternative B.	Same as Alternative B.
Fluid Leasable Minerals	**Areas Open to Fluid Mineral Leasing Subject to Standard Lease Terms**	No BLM-managed lands would be open for fluid mineral leasing.	1,103,138 acres unencumbered BLM lands, and possibly 820,627 acres of State- or Native-selected lands if relinquished from current selection.	1,063,129 acres of unencumbered BLM lands, and possibly 785,341 acres of State- or Native-selected lands if relinquished from current selection.	1,101,304 acres BLM-managed lands, and possibly 817,464 acres of State- or Native-selected lands if relinquished from current selection.
Fluid Leasable Minerals		Notwithstanding the provisions listed within this management action, BLM may lease lands in cases where oil and gas is being drained from the Federal subsurface estate by wells drilled on adjacent lands.			

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
		Oil and Gas Stipulations and Required Operating Procedures described in Appendix A apply to all BLM-managed lands in the Bay planning area open to oil and gas leasing.			
	Areas Closed to Fluid Mineral Leasing	All BLM lands would be closed to fluid mineral leasing.	Existing Agency withdrawals of approximately 3,318 acres would remain withdrawn from fluid mineral leasing.	Approximately 76,779 acres of unencumbered BLM lands. Existing Agency withdrawals of approximately 3,318 acres would remain withdrawn from fluid mineral leasing. Proposed Wild River segments of the Alagnak, Goodnews and Goodnews Middle Fork rivers (12,210 acres). ANCSA 17(d)(1) withdrawals would be retained for these river segments as an interim measure to provide an opportunity for Congressional action. ANCSA 17 (d)(1) withdrawals would be retained for Carter Spit ACEC (61,251 acres).	Existing Agency withdrawals (3,318 acres) would remain withdrawn from fluid mineral leasing.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
Fluid Leasable Minerals	**Areas Open to Fluid Mineral Leasing Subject to Seasonal Constraints**	No Federal leases would occur on BLM-managed lands within the Bay planning area.	No acres are subject to seasonal or other minor constraints. Stipulations #6, #7 and #9 and ROPs FW-3b and FW-3d (Appendix A) do not apply under this Alternative.	Bristol Bay ACEC (973,862 acres) To protect caribou habitat, Stipulations #6 and #7 and ROPs FW-3b, and FW-3d (Appendix A) would apply under this Alternative.	Carter Spit ACEC (36,220 acres) ROPs SS-1a, 1b, and SS-2a would apply to protect habitat for federally-listed migratory bird species. (Appendix A). To protect caribou habitat, Stipulations #6 and #7 and ROPs FW-3b, and FW-3d (Appendix A) would apply under this Alternative.
	Areas Open to Fluid Mineral Leasing Subject to No Surface Occupancy	No Federal leases would occur on BLM-managed lands within the planning area.	0 acres. Stipulations #6 and #7 and ROPs FW-3b, and FW-3d (Appendix A) do not apply under this Alternative	1,834 acres. Stipulation #9 (Appendix A) would apply under this alternative. 300-ft. NSO buffer on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.	1,834 acres. Stipulation #9 (Appendix A) would apply under this alternative. 300-ft. NSO buffer on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
Locatable Minerals		138,627 acres of BLM lands would be identified as open for locatable mineral entry. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals.	ANCSA 17(d)(1) withdrawals would be revoked. Approximately 1,102,489 acres of unencumbered lands would be available for locatable mineral entry. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals.	1,064,313 acres of BLM unencumbered lands would be open to locatable mineral activities. The following lands would be closed to locatable mineral entry: ANCSA 17(d)(1) withdrawals for these river segments would be retained on proposed wild river segments, Alagnak, Goodnews mainstem, and Goodnews Middle Fork (12,210 acres), as an interim measure to provide an opportunity for Congressional action. ANCSA 17(d)(1) withdrawals would be retained within the proposed Carter Spit ACEC (61,251 acres). ROP FW-6a, which establishes additional protective measures within 300-feet on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals.	Same as Alternative B, except 1,102,313 acres of unencumbered BLM land would be available for locatable mineral activities. Proposed Carter Spit ACEC (36,220 acres) would be open to locatable mineral activities. ROPs SS-1a, 1b, and SS-2a would apply to protect habitat for federally-listed migratory bird species. Approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. ROP FW-6a, which establishes additional protective measures within 300-feet on either side of the East and South Forks of the Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek. This setback would protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
		Approved Plans of Operation would contain stipulations based on site-specific resource concerns.	Same as Alternative A, with the addition that an approved Plan of Operations will contain guidelines as listed in the Required Operating Procedures in Appendix A.		
Salable Minerals		Approximately 1,163,594 acres of unencumbered lands would be available for sale of mineral materials. Selected lands would be made available if the selection were revoked or relinquished. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals	Approximately 1,102,484 acres of unencumbered lands would be available for sale of mineral materials. Selected lands would be made available if the selection were revoked or relinquished. Within the Bay planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals	115,163 acres of unencumbered BLM lands would be available for salable mineral activities. Same as Alternative A, except the following lands would be closed to sale: • Proposed Carter Spit ACEC (61,251 acres) • Proposed Bristol Bay ACEC (974,970 acres) • Proposed Wild river segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork (12,210 acres). Approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. ROP FW-6a would apply under this Alternative. (Appendix A).	1,100,654acres of BLM unencumbered lands would be available for salable mineral activities. The following lands would be closed to sale: • Proposed Carter Spit ACEC (36,220 acres) Approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. ROP FW-6a would apply under this Alternative. (Appendix A)

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
		Approved Plans of Operation would contain stipulations based on site-specific resource concerns.	Same as Alternative A, with the addition that approved Plans of Operations would contain guidelines as listed in the Required Operating Procedures in Appendix A.		
OHV Designation BLM-Managed Lands		There would be no OHV designations on BLM-managed lands within the planning area.	All unencumbered BLM-managed lands within the planning area would be designated as “open” for OHV use.	All unencumbered BLM-managed lands would be designated as “limited” for OHV use. All interim BLM-managed encumbered lands would be designated as “limited” for OHV use. The “limited” designation is the similar to the “Generally Allowed Uses on State Land,” which among other things, requires OHVs to stay on existing trails whenever possible (Appendix H).	All unencumbered BLM-managed lands would be designated as “limited” to OHV use. All interim BLM-managed encumbered lands would be designated as “limited” for OHV use. The “limited” designation is similar to the “Generally Allowed Uses on State Land,” which among other things requires OHVs to stay on existing trails whenever possible (as described in Appendix H). Limitations within the proposed Carter Spit ACEC would be defined through the development of activity plans to meet the objectives of the proposed Special Management Area.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
		No route restrictions; cross-country travel allowed everywhere on BLM lands within the planning area.	Same as Alternative A.	OHV use would be limited to existing roads and trails. This limitation is the same as the *Generally Allowed Uses on State Land*, which requires OHVs to stay on existing trails whenever possible.	Same as Alternative C.
ROS Classification for BLM-Managed Lands		Manage as "Semi-Primitive Motorized" under the Recreation Opportunity Spectrum.	Manage the entire recreation area setting as Roaded Natural.	Same as Alternative A	Same as Alternative A.
Lands and Realty	**Disposal or Land Exchange**	No lands would be identified for disposal (sale) or land exchange.	Parcels would be identified for land exchange: Chekok Creek, T2 and 3S, R30W. (5,749 acres). Chulitna River, T1N, R32W Sec. 21, 22, 23, 28, 31, 32 (3,840 acres). Katmai Boundary T11S R35W Sec. 1. (323 acres). T11S R37W Sec. 2, 3, 4, 9, 10; Sec. 16, 21 portions. (3,533 acres). T11S R44W Sec. 5, 6, 7, 8, 17, 18, 19. (4,415 acres) Aleknagik Vicinity, T10S R53W Sec. 7, 18, if not conveyed out of Federal ownership (1,228 acres).	Same as Alternative A.	Same as Alternative B.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
			T9S R72W Sec. 18. BLM land that is not State-selected but may be Top Filed; however, it is not a priority (605 acres). Parcels identified for land exchange or disposal (sale): Aleknagik Vicinity, T10S R55W Sec. 32, U.S. Survey 12403, lots 1 and 2, (5 acres)		
	Withdrawals	ANCSA 17(d)(1) withdrawals would be retained. Withdrawals other than ANCSA 17(d)(1) would be retained (3,970 acres).	ANCSA 17(d)(1) withdrawals would be revoked. Agency Withdrawals (other than ANCSA 17(d)(1)) would be retained (3,970 acres).	Same as Alternative B, except: Existing ANCSA 17(d)(1) withdrawals on proposed wild river segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork would be retained until Congressional action is completed (12,210 acres). Withdrawals other than ANCSA 17(d)(1) would be retained (3,970 acres).	Same as Alternative B.

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
	Land Use Authorizations and Rights-of-Way	Land Use Authorizations: Right-of-Way avoidance areas, or exclusion areas, would be identified on a case-by-case basis.	Same as Alternative A.	Same as Alternative A. The proposed Carter Spit ACEC (61,251 acres) and the proposed Bristol Bay ACEC (974,970 acres) would be identified as avoidance areas for Land Use Authorizations.	Same as Alternative A. The proposed Carter Spit ACEC would be identified as an avoidance area for Land Use Authorizations (36,220 acres).
Recreation Management Areas		No Recreation Management Areas would be established.	All BLM lands in the Bay planning area would be managed as an Extensive Recreation Management Area (Appendix C).	Same as Alternative B	Same as Alternative B

		Alternative A - Current Management	Alternative B	Alternative C	Alternative D - Preferred
Special Manage-ment Area Designa-tions	**Wild and Scenic Rivers**	No National System designations would be recommended.	The following eligible river segments would not be found suitable for inclusion to the National WSR System: **Bristol Bay Region** Alagnak River, portion (Wild, Recreational)(662 acres) **Goodnews Bay Region** (Map 2.35): Goodnews River, mainstem (Wild)(7,737 acres) Goodnews River, middle fork, portion (Wild)(7,926 acres).	The following eligible river segments would be found suitable for inclusion to the National WSR System **Bristol Bay Region** Alagnak River, portion (Wild, Recreational)(662 acres) **Goodnews Bay Region** (Map 2.35): Goodnews River, mainstem (Wild)(7,737 acres) Goodnews River, middle fork, portion (Wild)(7,926 acres). ANSCA 1 (d)(1) withdrawals for these river segments would be retained as an interim measure to provide an opportunity for Congressional action.	Same as Alternative B
	Area of Critical Environ-mental Concern	No Areas of Critical Environmental Concern would be recommended.		The following areas of unencumbered BLM land* would be proposed as Areas of Critical Environmental Concern: • Carter Spit ACEC (61,251 acres) • Bristol Bay ACEC (974,970 acres)	The following area of unencumbered BLM land* would be proposed as an Area of Critical Environmental Concern: • Carter Spit ACEC (36,220 acres)
		*Should the contiguous block of selected land adjacent to the proposed ACECs be returned to BLM administration, a portion of it may be included in the ACECs.			

Table 2.13. Summary and Comparison of Effects on Resources by Alternative

Alternative A	Alternative B	Alternative C	Alternative D
Effects to Air Quality			
Much of the Bay planning area is designated as unclassifiable, with regard to air resources (USEPA 2004a). Impacts to air quality would be low and air quality should remain good throughout the planning area. Leasable mineral exploration and development would not occur; some locatable mineral exploration and development would be possible. Smoke from wildland fire would have short-term effects on air quality and visibility. This alternative predicts actual mining disturbance of 23 acres on BLM-managed lands. This limited amount of mining may have localized impacts on air quality due to dust and airborne deposition of heavy metals.	Alternative B may result in a greater magnitude of impacts due to potential locatable mineral development or OHV activity. This alternative predicts that natural gas development could occur in the Koggiling Creek planning block, potentially leading to air quality impacts from the emissions of hydrocarbons and windborne particulates. Flaring, a flow test, would contribute gaseous byproducts of combustion briefly during the test. Impacts from OHV activity will be localized and would be expected to dissipate quickly. This alternative predicts actual mining disturbance of 115 acres on BLM-managed lands. This amount of mining may have localized impacts on air quality due to dust and airborne deposition of heavy metals. Smoke from wildland fire would have short-term effects on air quality and visibility.	Impacts to air quality would be low and air quality should remain in attainment throughout the planning area. Both locatable mineral development and natural gas development could occur and impacts from these activities would be the same, including wind-blown particulates, smoke and exhaust. Flaring, a flow test used in natural gas development, would contribute gaseous byproducts of combustion briefly during the test. Smoke from wildland fire would have short-term effects on air quality and visibility. There might be an increase in OHV activity; effects would be localized and temporary. This alternative predicts actual mining disturbance on 43 acres on BLM-managed lands. This limited amount of mining may have localized impacts on air quality due to dust and airborne deposition of heavy metals.	The level of impact would be similar to Alternative B. Impacts to air quality would be low and air quality should remain in attainment throughout the planning area. Both locatable mineral development and natural gas development could occur, and impacts from these activities would be the same, including wind-blown particulates, smoke and exhaust. Flaring, a flow test used in natural gas development, would contribute gaseous byproducts of combustion briefly during the test. Smoke from wildland fire would have short-term effects on air quality and visibility. There might be an increase in OHV activity associated with resource development; effects would be localized and temporary.
Cumulative Effects: Cumulative air quality impacts may result from the emissions of hydrocarbons or gaseous byproducts of combustion, which may add to the region's atmosphere increased concentrations of specific pollutants, or may contribute to chemical reactions that form ozone, which may degrade air quality. However, only one small natural gas project is proposed for BLM lands in the planning area over the life of the plan. Ambient air quality in western Alaska is relatively pristine, and it is expected that it will remain so for the foreseeable future. Projects for development of locatable minerals on BLM lands are expected to be small; however, other large mining projects are proposed in the area, and cumulatively could contribute to increased wind-borne particulates including heavy metals and other hazardous materials. Development of infrastructure, including regional roads and access would have impacts throughout the area of activity, including increased airborne particulates, especially during construction.			
Effects to Water Resources			
Impacts to water resources would remain low. No leasable mineral	Impacts to water resources would remain low, but would be higher	Impacts to water resources would remain low, but might be slightly	Impacts to water resources would remain low, but might be higher than

Alternative A	Alternative B	Alternative C	Alternative D
exploration or development would occur. Approximately 5% of BLM-managed lands would be open to locatable mineral development. The most likely mineral development to occur would be placer mining, but it is only predicted to occur on 23 acres of BLM-managed lands under this alternative. Disturbance to soil could result in soil erosion, sedimentation and turbidity of water bodies. Other effects could include ponding, diversion or blockage of stream flow, water contamination by human waste or a variety of toxic chemicals, and alteration of natural lake chemistry. OHV use for stream crossings may cause streambank erosion, sedimentation and turbidity.	than in Alternative A. Leasable mineral exploration would most likely occur in the Koggiling Creek planning block. Water resources would be drawn from nearby streams or lakes for the operation. Except for withdrawals other than 17(d)(1), unencumbered BLM lands are open for locatable mineral exploration and development. The most likely mineral development to occur would be placer mining in the Goodnews planning block, with a total predicted disturbance of 115 acres on BLM-managed lands. Disturbance to soil could result in soil erosion, sedimentation and turbidity of water bodies. Other effects could include ponding, diversion or blockage of stream flow, water contamination by human waste or a variety of toxic chemicals, and alteration of natural lake chemistry. OHV use for stream crossings may cause streambank erosion, sedimentation and turbidity. Because the area would be classified as “open” for OHVs, these effects would occur at approximately the same level as under Alternative A.	higher than in Alternative A. Leasable mineral exploration would most likely occur in the Koggiling Creek planning block. Water resources would be drawn from nearby streams or lakes for the operation. Except for withdrawals other than 17(d)(1) and those in the Carter Spit ACEC, unencumbered BLM lands are open for locatable mineral exploration and development. The most likely mineral development to occur would be placer mining in the Goodnews planning block, predicted at 43 acres of actual disturbance. Disturbance to soil could result in soil erosion, sedimentation and turbidity of water bodies. Other effects could include ponding, diversion or blockage of stream flow, water contamination by human waste or a variety of toxic chemicals, and alteration of natural lake chemistry. OHV use for stream crossings may cause streambank erosion, sedimentation and turbidity. However, there would be fewer of these effects from OHVs under this alternative because of a limited designation, designated routes in some areas, and a 2,000-lb. weight limit.	in Alternatives A or C. Leasable mineral exploration would most likely occur in the Koggiling Creek planning block. Water resources would be drawn from nearby streams or lakes for the operation. Except for withdrawals other than 17(d)(1), unencumbered BLM lands are open for locatable mineral exploration and development. The most likely mineral development to occur would be placer mining in the Goodnews Planning block with estimated actual disturbance of 115 acres. Disturbance to soil could result in soil erosion, sedimentation and turbidity of water bodies. Other effects could include ponding, diversion or blockage of stream flow, water contamination by human waste or a variety of toxic chemicals, and alteration of natural lake chemistry. OHV use for stream crossings may cause streambank erosion, sedimentation and turbidity. However, there would be fewer of these effects from OHVs under this alternative because of a limited designation, designated routes in some areas, and a 2,000-lb. weight limit.
Cumulative Effects: Past and present actions affecting fresh water resources within and adjacent to the Bay planning area have included climate change, mining activities, transportation projects and transportation-related accidents, military activities, industrial and domestic activities and related disposal of hazardous materials, and construction of facilities. Cumulative effects from locatable mineral exploration and development can include substantial decrease in water supplies in local aquifers, alteration of drainage patterns, and degradation of water quality. Cumulative effects from oil and gas exploration and development could include those effects already listed and disturbance of stream banks or lake shorelines, temporary blockage of natural channels and disruption of drainage patterns, increased sedimentation and turbidity, the removal of water from lakes or streams for ice roads and pads, and removal of gravel from riverine pools and lakes.			

Alternative A	Alternative B	Alternative C	Alternative D
Effects to Soils			
Impacts to soils would be low. Leasable mineral exploration and development would not occur; some locatable mineral exploration and development would be possible, but predicted at only 23 acres under this alternative. Locatable mineral exploration and development would have localized effects including loss of vegetative cover, erosion, rutting, ponding, mechanical removal of soil, and compaction of soils from vehicles and heavy equipment. Impacts from OHV activity would be localized but would include a proliferation of trails that could result in scarring of the terrain, soil compaction, erosion, and rutting.	Alternative B may result in a greater magnitude of impacts than Alternative A due to potential leasable mineral (natural gas) exploration in the Koggiling Creek planning block, and potential locatable mineral exploration and development. Actual mining under this alternative is predicted at 115 acres of disturbance. Impacts to soils would be localized, and would include loss of vegetative cover, removal of topsoil, melting of permafrost, erosion, rutting, and ponding. Impacts from OHV activity would be localized but could include a proliferation of trails that could result in scarring of the terrain, soil compaction, erosion, and rutting. The extent of OHV impacts would be similar to Alternative A.	Alternative C may result in a greater magnitude of impacts than Alternative A due to potential leasable mineral (natural gas) exploration in the Koggiling Creek planning block, and potential locatable mineral exploration and development. Actual mining is predicted to occur on 43 acres under this alternative. Impacts to soils would be localized, and would include loss of vegetative cover, removal of topsoil, melting of permafrost, erosion, rutting, and ponding. Impacts from OHV activity would be localized, a weight limit imposed, and traffic would be restricted to existing trails, meaning fewer impacts to soils than in Alternatives A or B. Impacts from OHV use could include soil compaction, erosion, and rutting.	Alternative D may result in a greater magnitude of impacts than Alternatives A and C due to potential leasable mineral (natural gas) exploration in the Koggiling Creek planning block, and potential locatable mineral exploration and development. Actual mining is predicted to occur on 115 acres of BLM-managed lands. Impacts to soils would be localized, and would include loss of vegetative cover, removal of topsoil, melting of permafrost, erosion, rutting, and ponding. Impacts from OHV activity would be localized, a weight limit imposed, and traffic would be restricted to existing trails, meaning fewer impacts on soils than in Alternatives A or B. Impacts from OHV use could include soil compaction, erosion, and rutting.
Cumulative Effects: Based on the Reasonably Foreseeable Development Scenario for Locatable and Salable Minerals (BLM, 2006), 7,881 acres of total surface disturbance on non-BLM lands could occur from mining. These numbers, combined with the highest projected numbers of surface disturbance on BLM lands (115 acres under alternatives B and D) from mining disturbance, total 7,996 acres of projected reasonably foreseeable surface disturbance for all lands within the planning area. This represents a significant impact to soils directly disturbed by mining operations. However, the cumulative projected disturbed acreage of 7,996 represents only .03 percent of the total acres in the planning area. Reclamation on both State and BLM lands prescribed in Plans of Operations would help to restore soils and vegetation to pre-mining productivity. Cumulative impacts to soils from OHV use associated with mineral exploration on State or Native land in the planning area is expected to increase, common to all alternatives.			
Effects to Vegetation			
Mineral development under this alternative on BLM-managed lands is predicted at 23 acres of actual disturbance. This development may negatively impact vegetation by	Effect would occur over a larger area than Alternative A as the level of mineral exploration and development would have the opportunity to increase. Both	Effects would occur over a smaller area than predicted for Alternatives B or D because of constraints associated with ACECs. Both leasable and locatable mineral	For mineral development and exploration, effects would be similar to Alternative B. All BLM lands would be classified as limited to OHVs, with OHVs staying on

Alternative A	Alternative B	Alternative C	Alternative D
removing the vegetative mat, re-routing water flow, covering vegetation with gravel, and compacting soils. Long term surface disturbance increases the potential for introduction of noxious and invasive plants. OHV use may destroy the vegetation mat, compact soils, accelerate permafrost melt, and lead to soil erosion and ponded water, crushing plants and degrading their habitats. Under this alternative, OHV use would remain unregulated on BLM lands and some trail proliferation may occur.	leasable and locatable mineral exploration and development would be expected in the Koggiling Creek planning block and the Goodnews planning block during the life of this plan. Potential effects of oil development include compression of the vegetation mat, broken shrubs and crushed tussocks from seismic activity; mortality of plants due to oil, gasoline, or diesel spills; compression of the tundra mat and localized die-off of plants under access roads and pads; and destruction of vegetation at the location of facility development. Under all action alternatives, these effects would be limited to approximately 50 acres, including all associated gravel roads. OHV designations would not be restrictive, allowing for free movement of OHVs and magnitude of effects similar to Alternative A.	exploration and development would be expected to be localized to the Koggiling Creek planning block and the Goodnews planning block during the life of this plan. Actual mining disturbance is predicted at 43 acres on BLM-managed lands. Potential effects of oil development include compression of the vegetation mat, broken shrubs and crushed tussocks from seismic activity; mortality of plants due to oil, gasoline, or diesel spills; compression of the tundra mat and localized die-off of plants under access roads and pads; and destruction of vegetation at the location of facility development. All BLM lands would be classified as limited to OHVs, with OHVs staying on existing or designated trails. Additionally, there would be a 2,000 lb. weight limit on OHVs. This would decrease impacts to vegetation from OHVs compared to Alternatives A and B.	existing or designated trails. Additionally, there would be a 2,000 lb. weight limit on OHVs. This would decrease impacts to vegetation from OHVs compared to Alternatives A and B.
Cumulative Effects: Increased levels of mineral development on State and private lands, combined with similar activities on BLM-managed lands could result in cumulative surface disturbance with adverse effects on riparian and tundra vegetation over the long-term. Blowing dust and contaminants from projects on non-BLM-managed lands that are deposited on vegetation could have negative effects to the vegetation and to the animals and subsistence users dependent upon it. Dispersed recreation effects, OHV travel, remote landing sites for bush aircraft, and campsites could have minor adverse and cumulative impacts to riparian and tundra vegetation on BLM-managed lands. The potential for displacement of native vegetation by noxious and invasive weeds will increase as the level of surface disturbance to once-intact habitat rises.			
Effects to Fish			
Permitted activities, including exploration and development of locatable minerals, road construction, and use of OHV trails and stream crossings would impact fish and aquatic habitat. Currently BLM lands in the planning area are	Under Alternative B, most BLM unencumbered lands would be available for leasable mineral exploration and development and locatable mineral exploration and development. Potential impacts would be greater than those under	Under Alternative C, fewer BLM unencumbered lands would be available for leasable mineral exploration and development because of retention of ANCSA 17(d)(1) withdrawals within the Carter Spit ACEC and within river	Under Alternative D, all BLM unencumbered lands would be available for leasable mineral exploration and development and locatable mineral exploration and development unless they were withdrawn under other than 17(d)(1)

Alternative A	Alternative B	Alternative C	Alternative D
closed to leasable mineral exploration and development and all but 6% of BLM lands are closed to locatable minerals. This alternative anticipates 23 acres of disturbance from mining activities on existing mining claims. There is no restriction on OHV travel or weight limits, and it is from OHV activity that the most serious impacts would come. Negative effects to fisheries from OHV crossings could occur from increased sedimentation as well as physical breakdown of streambanks, thus negatively affecting fish habitat.	Alternatives A, C, or D and would include gas exploration activities in Koggiling Creek planning block, placer mining activities in Goodnews planning block (115 acres disturbance predicted), potential infrastructure development, and OHV travel. This alternative would designate the area as "open" for OHVs, and associated impacts would be similar to Alternative A.	corridors considered suitable for inclusion as Wild and Scenic. Potential impacts would be greater than those under Alternative A, and would include gas exploration activities in Koggiling Creek planning block, placer mining activities in Goodnews planning block (43 acres of disturbance predicted), potential infrastructure development, and OHV travel. A beneficial effect would be the imposition of a "limited" OHV designation and a 2,000-lb OHV weight limit. OHVs would be limited to existing or designated trails, which would minimize proliferation of unmanaged stream and river crossings.	withdrawals. This alternative anticipates similar levels of mineral development as Alternative B (one gas field in the Koggiling Creek planning block and 115 acres of actual mining surface disturbance). However, application of ROPs (300 foot buffers on specific streams) would minimize impacts to fisheries on these streams. This ROP would not apply under Alternative B. Potential impacts would be greater than those under Alternatives A and C, but less than B. A beneficial effect would be the imposition of a "limited" OHV designation and a 2,000-lb OHV weight limit.
Cumulative Effects: Any changes of current water and land use practices, by private, State, and other Federal agencies in the planning area, would affect fish habitat within the planning area, including on BLM-managed lands. Currently a number of locatable mineral projects are proposed for State lands at the headwaters of the Kvichak and Nushagak rivers. BLM-managed lands lie downstream of those projects in the two watersheds in question, and sediment and water quality issues that influence the quality of fish habitat downstream from the source could be a concern. Should OHV use increase it could also be a concern for the same reason. Coordinating with regional planning actions and conducting interagency watershed planning efforts could help protect important fisheries values in the Bristol Bay and Goodnews Bay watersheds.			
Wildlife			
Low levels of mineral exploration and development, land use authorizations, and dispersed recreational and OHV use would have minor localized effects on wildlife. Impacts would include stress and disturbance of wildlife, and degradation of habitat. Impacts would not have population level effects.	Increased mineral exploration and development is anticipated after revocation of ANCSA 17(d)(1) withdrawals. This alternative anticipates the development of one gas field in the Koggiling Creek planning block and 115 acres of surface disturbance from mining. This would increase the level of impacts to wildlife and their habitat in localized areas. Specific stipulations providing timing restrictions for caribou habitat protection would not apply under	Leasable mineral exploration and development in the Koggiling Creek planning block would increase impacts to wildlife and habitat in localized areas. However, application of specific stipulations restricting oil and gas activities during caribou calving or in areas of heavy caribou concentration would minimize impacts. Locatable mineral exploration and development would be more limited than in Alternative B because of designation of two ACECs. This	This alternative anticipates similar levels of mineral development as Alternative B (one gas field in the Koggiling Creek planning block and 115 acres surface disturbance from mining). Impacts to caribou would be decreased by the application of timing stipulations under this alternative to protect caribou. Impacts from OHV use would be less due to a "limited" designation for access and a 2,000 pound GWVR weight limit. The Carter Spit ACEC would be designated to

Alternative A	Alternative B	Alternative C	Alternative D
	this alternative. Impacts from OHV use would be similar to Alternative A.	alternative anticipates surface disturbance of 43 acres from mining. Impacts in these localized areas would include loss of habitat and animal displacement. Impacts from OHV use would be less due to a "limited" designation for access and a 2,000-lb GWVR weight limit. The two ACECs would be designated to provide additional management emphasis in important wildlife habitats.	provide additional management emphasis in important wildlife habitats.
Cumulative Effects: The possibility of solid mineral exploration and development in the planning area on non-BLM lands would have cumulative impacts on wildlife and wildlife habitat. Depending on the location of development, these impacts may include short or long-term disturbance to caribou calving habitat, insect relief habitat, and migratory routes; disruption of caribou movements; stress and disturbance impacts to caribou during all seasons of the year; and possible reductions in herd productivity. Any new development would result in additive impacts to the herd. If significant activity occurred within the calving grounds or important insect relief habitat, these impacts could be significant. Construction of additional roads would also affect caribou movements and would greatly increase access into caribou habitat. Privatization of State or Native corporation lands has the potential to negatively affect wildlife and wildlife habitat by opening up areas to private development. Impacts would include habitat fragmentation, increased access into wildlife habitats, increased disturbance, increased potential for mortality from road kills, and possible alteration of behavior or movement patterns of wildlife.			
Effects to Cultural Resources			
Few impacts to cultural resources would be anticipated from authorized activities due to the remoteness of most BLM-managed lands and the nature of most permitted activities. Currently the primary permitted activity in the planning area is Special Recreation Permits for big game guides, with little potential for impacts. Significant conflicts with cultural resources have not occurred. OHVs would be the greatest potential source of impact from authorized uses.	There could be an increase in potential for impacts under Alternative B. Exploration for leasable minerals and development of locatable minerals in the form of placer mining would result in substantial surface disturbance in limited areas of Koggiling Creek planning block and Goodnews planning block. Exploration for leasable minerals involves little potential for impacts. BLM would require inventory and appropriate mitigation in advance of ground-disturbing activities. The greatest impact from authorized activities exists in the "open" designation for OHVs on BLM lands and the potential for unmanaged proliferation of OHV trails.	This alternative anticipates the development of one gas field in the Koggiling Creek planning block and the disturbance of 43 acres from mining activity. BLM would require inventory and appropriate mitigation in advance of ground-disturbing activity. A "limited" designation for OHVs under this Alternative would also provide beneficial impacts for cultural resources since OHV will be confined to existing trails. Beneficial effects to cultural resources would be expected with the proposed Carter Spit ACEC, the proposed Bristol Bay ACEC, and the proposed Wild and Scenic Rivers.	This alternative anticipates similar levels of mineral development as described in Alternative B. BLM would require inventory and appropriate mitigation in advance of ground disturbing activities. A "limited" designation for OHVs under this Alternative would also provide beneficial impacts for cultural resources since OHV will be confined to existing trails. Beneficial effects to cultural resources would be expected with the proposed Carter Spit ACEC.

Alternative A	Alternative B	Alternative C	Alternative D
Cumulative Effects: Cumulative impacts to cultural resources could occur through incremental degradation of the resource base from a variety of sources which reduce the information and interpretive potential of historic and prehistoric properties, or which affect traditional cultural values important to Alaska Natives.			
Effects to Paleontological Resources			
Federal undertakings and unauthorized uses may cause irreversible disturbance and damage to paleontological resources. Impacts from authorized use would be mitigated through project redesign and specimen recovery. This alternative anticipates a lower level of authorized activities than any other alternative. Geologic formations with exposures containing vertebrate and non-vertebrate fossils could be impacted from natural agents, unauthorized public collection, and vandalism. Impacts would stem almost exclusively from unauthorized uses and natural causes. Lack of knowledge about paleontological resources in the planning area makes it difficult to estimate the extent and nature of impacts.	This alternative anticipates development associated with leasable and locatable minerals in the Goodnews planning block and the Koggiling Creek planning block. This development could have adverse impacts on paleontological resources through surface disturbing activities. Impacts to paleontological resources from uses other than mineral development would be negligible.	This alternative anticipates a similar level of leasable mineral development as alternative B (development of one gas field in the Koggiling Creek planning block. Where paleontological resources are not known, activities associated with gas field development, such as construction of roads or wellpads, could unearth or disturb paleontological resources. Limited locatable mineral development is expected under this alternative (43 acres of disturbance anticipated) so impacts would be minimal.	Impacts to paleontological resources would be the same as Alternative B.
Cumulative Impacts: Cumulative impacts to paleontological resources could result from development on non-BLM-managed lands and from natural agents and unauthorized uses throughout the area.			
Effects to Visual Resources			
Visual resources would be managed on a project-by-project basis as no visual management classes would be established. Surface altering activities and events such as fire, mineral development and OHV use, and authorizations that result in facility or infrastructure construction such as powerlines or roads can alter or negatively impact visual	Alternative B anticipates the greatest amount of resource development and adopts the least-restrictive VRM classes. Effects to visual resources could occur over a larger area than under Alternative A due to increased mineral development. Impacts from activities associated with exploration for gas would primarily be	Alternative C anticipates less mineral development than alternatives B or D. ANCSA 17(d)(1) withdrawals would be maintained in the Carter Spit ACEC and in river corridors deemed suitable for inclusion as Wild and Scenic. This would prohibit mineral entry or leasing in these areas. Mineral development and	Alternative D is similar to Alternative B, except that OHVs would be restricted to travel on existing roads and trails vs. designated roads and trails. The need for designated routes would be addressed through the development of an activity plan if any significant resource impacts are observed. Additionally,

Alternative A	Alternative B	Alternative C	Alternative D
resources. Few impacts are anticipated from authorized activities due to the remoteness of these BLM-managed lands and the nature of most permitted activities.	associated with the construction of support facilities.	associated infrastructure can impact visual resources through surface alteration and the addition of linear features such as roads, pipelines, or powerlines. OHVs would be restricted to existing trails.	alternative D adopts a Class III visual resource management class within the Carter Spit ACEC and within the viewsheds of Conservation System Units in the area.
Cumulative Effects: Continued development of OHV trails, roads, infrastructure, mining activities, overland explorations, and fire management may lead to changes to existing visual resources by altering basic visual elements of form, line, color and texture at the landscape level. These changes will influence the design of similar projects on adjacent BLM lands where repeating these basic elements is an objective of the visual resource management class.			
Effects to Leasable Minerals			
No BLM-managed lands would be open for fluid mineral leasing due to the retention of ANCSA 17(d)(1) withdrawals. Under this Alternative no oil and gas exploration and development would occur, rendering these resources unavailable during the life of this plan or as long as selected lands are BLM-managed.	Alternative B provides the greatest opportunity for leasable mineral development. Approximately 1,103,138 acres (99%), 820,627 acres of which are State-selected or Native-selected, would be available for mineral leasing subject to Standard Lease Terms. Approximately 3,318 unencumbered acres, withdrawn under withdrawals other than ANCSA 17(d)(1), would remain withdrawn from fluid mineral leasing.	Under Alternative C, approximately 1,063,129 acres (57%) of which 785,341 of which are State-selected or Native-selected, would be available for mineral leasing subject to Standard Lease Terms, Required Operating Procedures, and Stipulations. Areas closed would be the proposed Wild River segments of the Alagnak, Goodnews and Goodnews Middle Fork rivers (12,210 acres), where existing ANCSA 17(d)(1) withdrawals would be retained. 973,862 acres (42%), none of which are State-selected or Native-selected, would be open to mineral leasing subject to seasonal or other minor constraints. These constraints would limit exploration and development during specific time periods and increase recovery costs. 1,834 acres (>1%) of BLM unencumbered lands on the Arolik River, Faro Creek, and South Fork Goodnews River would be subject to NSO. These areas are low potential for oil and gas, and low potential for leasable mineral	Under Alternative D, approximately 1,101,304 acres (58%), of which 817,464 acres are State-selected or Native-selected, would be available for mineral leasing subject to Standard Lease Terms, Required Operating Procedures, and Stipulations. Existing Agency withdrawals or approximately 3,318 unencumbered acres, would remain withdrawn from fluid mineral leasing. 36,220 acres (42%). 1,834 acres (>1%) of unencumbered BLM lands on the Arolik River, Faro Creek, and South Fork Goodnews River would be subject to NSO. These areas are low potential for oil and gas, and low potential for leasable mineral development. Closing these areas to leasing would preclude oil and gas development and render these resources unrecoverable during the life of this plan.

Alternative A	Alternative B	Alternative C	Alternative D
		development. Closing these areas to leasing would preclude oil and gas development and render these resources unrecoverable during the life of this plan.	
Cumulative Effects: Cumulative impacts to leasable mineral development would include retention of withdrawals, imposition of minor or major constraints, and requirements of Required Operating Procedures and Stipulations. There could be a reduction in lease value resulting from the application of stipulations and regulations and increased operating costs. Restrictions on Federal leases could impact leasing and development of adjacent non-Federal leasable minerals. An area in the beginning stages of economic development could become non-profitable by imposing restrictive guidelines, resulting in the displacement of mineral activities to adjacent landowners.			
Effects to Locatable Minerals			
ANCSA 17(d)(1) withdrawals and Agency withdrawals) would remain in place. 138,627 acres would be identified as open for locatable mineral entry. These withdrawals would continue to discourage mining interests and prevent exploration and evaluation of mineral potential. Much of this land has been unavailable for mineral assessment for more than 30 years. In the meantime markets for new commodities have developed, ore deposit theory has advanced significantly, and new mining and milling processes which are less expensive, more efficient and environmentally friendly have been developed.	This Alternative would have the fewest impacts to locatable mineral development. ANCSA 17(d)(1) withdrawals would be revoked. Approximately 1,102,489 acres of unencumbered lands would be open to locatable mineral entry. 3,968 acres of Agency withdrawals would remain withdrawn from mineral entry. Administration of Notices and Plans of Operations, compliance, and mine reclamation would continue.	Under this Alternative, 1,064,313 acres would be available for locatable mineral entry. ANCSA 17(d)(1) withdrawals would be retained for the nominated Wild and Scenic River segments, to provide opportunity for Congressional action, and the proposed Carter Spit ACEC, closing this area to mineral entry. Approximately 3,968 acres of Agency withdraws will remain closed to mineral entry. Bristol Bay ACEC would be open to locatable mineral activities and closed to the sale of mineral materials The BLM would continue to regulate surface disturbing activities on valid Federal claims through Notices and Plans of Operations, and Required Operating Procedures would be implemented.	Alternative D is the same as Alternative B. Under this Alternative, 3,968 acres would remain closed to locatable mineral entry due to withdrawals other than ANCSA 17(d)(1). However, the proposed Carter Spit ACEC (36,220 acres) would be subject to more stringent Required Operating Procedures. Administration of Notices and Plans of Operations, compliance, and mine reclamation would continue. Required Operating Procedures would be implemented.
Cumulative Effects: Impacts that are individually minor may cumulatively reduce exploration and production of commodities from BLM-managed land. Factors that affect mineral extraction and prospecting, such as permitting and permitting delays, regulatory policy, public perception, travel management, transportation, mitigation measures, proximity to sensitive areas, low commodity prices, taxes, and housing and other necessities for workers are mostly issues over which BLM has no control. These factors result in additional costs or permitting delays that can individually or cumulatively add additional costs to projects. Lack of access could reduce the amount of mineral exploration and development that may occur. Mineral resources in other ownerships may not be developed if the adjacent BLM lands are withdrawn from mineral entry because the deposit may not be economically feasible to develop if only a portion is available for development. Overall, Alternatives A and C would be the most restrictive to mineral development and could result in the most cumulative impacts.			

Alternative A	Alternative B	Alternative C	Alternative D
Effects to Mineral Materials			
Development of mineral materials sites would not be constrained except as restricted by the interim management guidelines for selected lands. No unencumbered Federal lands would be closed to mineral material sales and permits.	Impacts would be the same as Alternative A except the ROPS would apply to mineral material sales.	Development of mineral materials sites on BLM-managed lands would be severely constrained under Alternative C. Unencumbered BLM lands in the Bristol Bay ACEC and Carter Spit ACEC would be closed to mineral materials development (1,052,398 acres).	Under this alternative, the Carter Spit ACEC would be closed to mineral materials development. (36,220 acres).
Cumulative Effects: Under Alternative C the closure of two ACECs to sale/permit of mineral materials would essentially close BLM-managed land in the planning area to mineral materials development and production.			
Effects to Recreation Management			
No SRMAs would be designated under Alternative A. BLM land in the planning area would be managed to retain existing ROS classes of Primitive, Semi-primitive, and semi-primitive motorized.	No SRMAs would be designated. The entire area would be managed to allow for a Roaded Natural ROS class. This would allow a higher level of resource development and increased recreation visitation.	The entire area would be managed to allow for a semi-primitive motorized ROS class. This would allow for a continued diversity of the existing ROS classes of primitive, semi-primitive, and semi-primitive motorized. Determination of suitability of segments of three river corridors for inclusion as Wild and Scenic could increase visitation to those rivers, with an associated increase in impacts.	The entire area would be managed to allow for a semi-primitive motorized ROS class. This would allow for a continued diversity of the existing ROS classes of primitive, semi-primitive, and semi-primitive motorized.
Cumulative Effects: The planning area currently provides diverse recreation opportunities which are expected to continue over the life of the plan regardless of the Alternative selected.			
Effects to Travel Management/OHV			
There are no OHV designations in the planning area.	The planning area would be designated as “open” to OHV use. More lands would be open to mineral entry under this Alternative, potentially creating improved access. Given the low level of mineral development anticipated, effects would be minor. However, unmanaged proliferation of OHV trails with associated resource impacts could continue to occur.	The planning area would be designated as “Limited” for OHV use. There would be a 2,000-lb GVWR weight limit. Proposed restrictions would impact users by limiting OHV use where no limits have been in place before. In designated ACECs further limitations may be placed upon OHV use. Effects of this Alternative on OHV users are expected to be minimal, since users access BLM-	The planning area would be designated as “Limited” for OHV use. There would be a 2,000-lb GVWR weight limit. Proposed restrictions would impact users by limiting OHV use where no limits have been in place before. In designated ACECs further limitations may be placed upon OHV use. Effects of this Alternative on OHV users are expected to be minimal, since

Alternative A	Alternative B	Alternative C	Alternative D
		managed lands primarily by boat and aircraft.	users access BLM-managed lands primarily by boat and aircraft.
Cumulative Effects: BLM-managed lands are somewhat remote from the villages and hubs in the planning area. Most users access BLM lands by boat or by aircraft. Decisions made in this plan would not be expected to have major impacts on OHV users. Travel management occurring on non-BLM lands (such as road or trail construction associated with mineral development) is more likely to have an impact on access.			
Effects to Lands and Realty			
Management of vegetation, fish, wildlife, Special Status Species, cultural and paleontological resources may result in restrictions or additional mitigation, increasing the cost of projects.	Impacts in Alternative B would be similar to those in Alternative A. In addition, a 2,000 pound GVWR weight restriction would be implemented for OHVs. Requirements to meet VRM management classes could increase project cost, although VRM classes are the least restrictive under this Alternative. More lands would be available for mineral development due to revocation of ANCSA 17(d)(1) withdrawals, potentially resulting in a greater demand for land use authorizations such as ROWs. However, given the level of development likely to occur, these additional impacts would be minor. ROPS and Stips would restrict land uses in certain areas.	Impacts in Alternative C would be similar to those in Alternative B. Additional, the proposed Carter Spit ACEC and the proposed Bristol Bay ACEC would be identified as avoidance areas for Land Use Authorizations. Under this Alternative, five parcels would be proposed for land exchange. They would need to be inventoried for the presence of hazardous materials. The presence of contaminants could lead to modification or abandonment of a land action, or to remediation in the form of cleanup and removal of the contaminants. ROPS and Stips would restrict land uses in certain areas.	Impacts in Alternative D would be similar to those in Alternative B. Additional restrictions would include no Land Use Authorizations in the proposed Carter Spit ACEC. Under this Alternative, five parcels would be proposed for land exchange. They would need to be inventoried for the presence of hazardous materials. The presence of contaminants could lead to modification or abandonment of a land action, or to remediation in the form of cleanup and removal of the contaminants. ROPS and Stips would restrict land uses in certain areas.
Cumulative Effects: Effects from any exchange proposal in any Alternative for BLM-managed lands in the planning area are minor compared to conveyances to Native Corporations and the State of Alaska. The recently signed Alaska Lands Transfer Acceleration Act (P.L. 108-452) will facilitate the conveyance process, with a target of completing conveyances by 2009. Once entitlements are met, land exchanges may be considered to consolidate land ownership patterns. The number of land use authorizations, particularly Rights-of-Way and permits, is a function of demand for these uses. Additional future development of adjacent Federal, State, and private lands would likely result in additional requests for and approval of land use authorizations for facilities such as roads, utilities, and communication sites.			
Effects to Areas of Critical Environmental Concern			
No ACECs exist in the planning area	No ACECs would be proposed	Two ACECs would be managed to protect relevant and important values (Appendix B). Impacts to these values are discussed under the various resource management programs such as Fish and Wildlife.	One ACEC would be managed to protect relevant and important values (Appendix B). Impacts to these values are discussed under the various resource management programs such as Fish and Wildlife.

Alternative A	Alternative B	Alternative C	Alternative D
Cumulative Effects: Cumulative impacts could have a wide range of effects on the different resources that are intended to benefit from the various ACECs proposed. These impacts largely stem from actions that are not guided by BLM management decisions. Values within certain ACECs could be diminished by cumulative impacts in the unlikely scenario in which numerous development projects occur within or adjacent to them.			
Effects to Social and Economic Conditions			
Income generated by BLM expenditures and permitted activities would have minimal effects on the regional economy.	Natural gas exploration in the Koggiling Creek planning block is projected to take place within the life of the plan; should it go forward, economic effects of a gas field will more likely impact the Dillingham area, and will be less likely to impact the remainder of the planning area. Up to three placer mining operations could be developed in the Goodnews planning block. A small number of workers could be employed. At this level, mineral development would be unlikely to have a negative impact on the existing subsistence economy, the commercial fishing industry, and the sports hunting and fishing guiding industries.	For leasable minerals, the effect on the regional economy from leaseable mineral development is expected to be the same as Alternative B. For locatable minerals, this alternative anticipates mining activity mostly limited to existing claims. Thus, economic effects would not be significant. There may be some economic opportunity generated from increased outfitter/guide activity in association with the river corridors suitable for inclusion as Wild and Scenic.	Same as Alternative B.
Cumulative Effects: Under Alternatives B, C, and D, natural gas exploration and locatable mineral exploration and development on BLM-unencumbered lands in the planning area might generate a small amount of income for the region; however, such developments taken cumulatively with other developments on State and Native-owned lands could have a negative impact on the existing subsistence economy, the commercial fishing industry, and the sports hunting and fishing guiding industries.			
Effects to Environmental Justice			
The Altuiiq, Athabascan, and Central Yup'ik Native people predominate in 25 villages in the Bay planning area. Under Alternative A, BLM-managed lands would remain closed to leasable and most locatable mineral exploration and development. Residents' main livelihood is dependent upon a mix of subsistence hunting and fishing, commercial fishing, sports hunting	Alternative B would allow leasable and locatable mineral exploration and development on BLM lands in areas previously closed to those activities. Year round activities from these sources could increase the amount of area affected, the duration of effects, and spread the effects where development occurs. Disturbances to residents' current economic pursuits from these	Alternative C would designate two ACECs for protection of resource values and anticipates less mineral development than Alternatives B or D. At the anticipated development level, this alternative would have little impact on subsistence hunting and fishing, commercial fishing, outfitter/guiding, and support services for those activities.	Same as Alternative B.

Alternative A	Alternative B	Alternative C	Alternative D
and fishing guiding, and support services for those activities. Under this alternative, there would be minimal effects to those activities from authorized uses on BLM lands.	sources would be greater than in Alternative A.		
Cumulative Effects: Alaska Natives are the predominant residents of southwestern Alaska, the area potentially most affected by activities under Alternatives B, C, and D and other activities associated with cumulative projects in Alaska. Effects on Alaska Natives could occur because of their reliance on subsistence foods, and potential effects could impact subsistence resources and harvest practices. Potential cumulative effects from noise, disturbance, and spills on subsistence resources, harvest practices and socio-cultural patterns would focus on communities throughout the planning area. The commercial fishing industry has long since affected considerable changes in the cultures of southwest Alaska. Expanded locatable mineral exploration and development, and development of supporting infrastructure would bring about disturbances to subsistence species and harvest patterns cumulatively. Southwestern Alaska still has vast undisturbed areas, but the subsistence hunting environment continues to change in response to increased visitation and development.			
Effects to Subsistence			
Impacts from authorized activities such as exploration or development of locatable minerals, leases, permits, and OHV use may include temporary displacement of wildlife from harvest areas, access constraints, or increased competition for resources. These impacts would be minimal under this alternative. There would be no limits on OHV use. Unlimited access by OHVs can provided increased access to subsistence resources but can also bring increased competition for resources.	Impacts would have a larger footprint than in Alternative A. The Koggiling Creek planning block is projected to be the location of any leasable mineral exploration and development, and while all unencumbered BLM lands in the planning area would be open to locatable mineral exploration and development, this alternative anticipates actual surface disturbance from mining on only 115 acres. Subsistence hunters may be reluctant to hunt in areas used for development purposes or for intensive recreational activities, as demonstrated by the historic and current hunting patterns summarized in Chapter III. Subsistence users tend to shift away from their traditional harvest areas when too much activity from outside sources occurs. There would be no limits on where OHVs could travel. BLM-managed lands would be managed as an Extensive	This alternative anticipates the development of one gas field in the Koggiling Creek planning block and 43 acres of actual disturbance from mining. Subsistence hunters may be reluctant to hunt in areas used for development purposes or for intensive recreational activities, as demonstrated by the historic and current hunting patterns summarized in Chapter III. Subsistence users tend to shift away from their traditional harvest areas when too much activity from outside sources occurs. There would be limits on where OHVs could travel, and weight limits would be at 2,000 pounds. BLM-managed lands would be managed as an Extensive Recreation Management Area with few restrictions. The proposed Carter Spit ACEC, Bristol Bay ACEC, and three WSR segments might provide some benefit to subsistence resources by providing protective measures and	Impacts would have a larger footprint than in Alternative A. The Koggiling Creek planning block is projected to be the location of any leasable mineral exploration and development, and while all unencumbered BLM lands in the planning area would be open to locatable mineral exploration and development, this alternative anticipates actual surface disturbance from mining on only 115 acres. Subsistence hunters may be reluctant to hunt in areas used for development purposes or for intensive recreational activities, as demonstrated by the historic and current hunting patterns summarized in Chapter III. Subsistence users tend to shift away from their traditional harvest areas when too much activity from outside sources occurs. There would be no limits on where OHVs could travel. BLM-managed lands would be managed as an Extensive

Alternative A	Alternative B	Alternative C	Alternative D
	Recreation Management Area with few restrictions. New applications for outfitter/guiding on BLM lands would require a Special Recreation Permit. These permits are discretionary and prior to issuance are subject to an ANILCA 810 review to determine impacts to subsistence resources or opportunities.	limiting some resource development. New applications for outfitter/guiding on BLM lands would require a Special Recreation Permit. These permits are discretionary and prior to issuance are subject to an ANILCA 810 review to determine impacts to subsistence resources or opportunities.	Recreation Management Area with few restrictions. New applications for outfitter/guiding on BLM lands would require a Special Recreation Permit. These permits are discretionary and prior to issuance are subject to an ANILCA 810 review to determine impacts to subsistence resources or opportunities.
Cumulative Impacts: Mineral development, privatization of land, and development of regional infrastructure would have cumulative impacts on subsistence. These activities have the potential to negatively affect wildlife resources, and consequently subsistence. Development of regional infrastructure such as roads may improve access for non-local hunters, increasing competition for subsistence resources. Improved access may concentrate hunting efforts, depleting subsistence resources and potentially altering harvest.			

Chapter III: Affected Environment

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Chapter III: Affected Environment

A. Introduction

1. How to Read This Chapter

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

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

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

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

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

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

3. Geographic Scope

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

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

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

4. The Planning Process and Existing Management

a) The Planning Process and Public Participation

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

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

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

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

b) Existing Management

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

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

B. Resources

1. Geography and Climate

a) Physiographic Regions

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

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

b) Environmental Change

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

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

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

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

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

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

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

The following effects are anticipated should the current trend continue:

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

2. Air Quality

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

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

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

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

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

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

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

a) Smoke Management

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

b) Critical Thresholds

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

3. Soil resources

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

a) Soils Inventory

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

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

(1) Inceptisols (Map 3.4)

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

(2) Spodosols (Map 3.4)

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

(3) Histosols (Map 3.4)

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

(4) Entisols (Map 3.4)

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

(5) Rough Mountainous Land (Map 3.4)

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

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

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

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

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

b) Soils Overview

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

c) Permafrost

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

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

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

d) Soils Demand Analysis and Forecast

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

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

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

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

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

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

e) Critical Thresholds

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

4. Water Resources

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

a) Mineral Development

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

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

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

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

b) Recreation

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

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

c) Fire Management

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

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

d) Forest Products

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

5. Vegetation

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

a) Alaska Earth Cover Classification

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

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

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

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

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

b) The Natural Vegetation Cover

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

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

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

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

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

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

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

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

d) Noxious and Invasive Plant Species in the Planning Area

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

e) Treatments

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

6. Fish and Wildlife

a) Wildlife

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Photo 3.3. Ole Creek, Southwest Iliamna Block

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

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

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

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

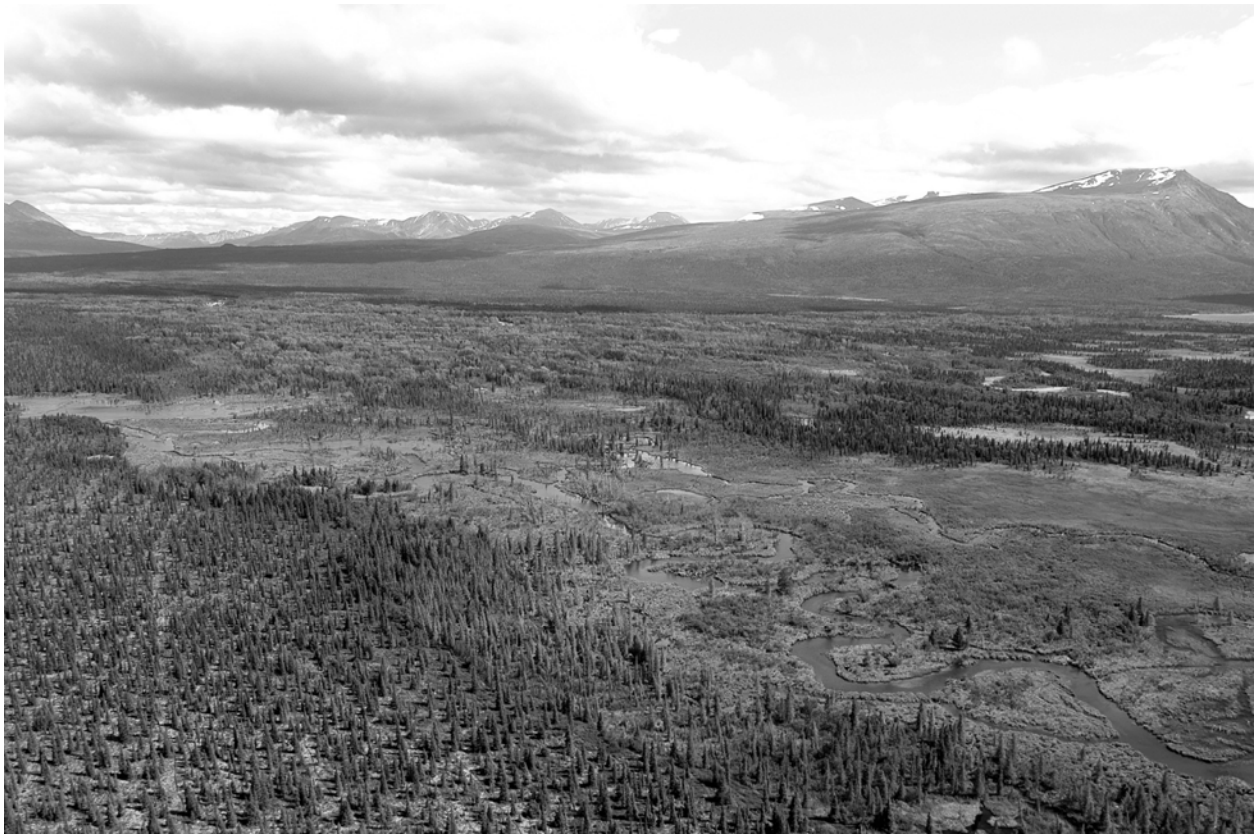


Photo 3.4. Chekok Creek, View North East. BLM lands in the background are in GMU 9(B) UCU 0303.

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

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

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

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

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

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

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

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

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

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

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

Photo 3.5. Coffee Creek

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

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

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

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

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

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

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

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

Photo 3.6. Confluence of Branches of Ben Courtney Creek

Photo 3.7. Headwaters of Ben Courtney Creek

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

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

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

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

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

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

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

Photo 3.8. Upper Yellow Creek, View North West

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

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

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

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

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

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

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

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

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

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

Photo 3.9. King Salmon Creek

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

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

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

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

Photo 3.10. Klutuk Creek

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

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

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

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

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

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

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

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

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

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

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

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

Photo 3.11 . Klutuk Creek in regional perspective

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

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

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

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

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

Photo 3.12. Takiketak, View South

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

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

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

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

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

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

d) Large Mammals

(1) Caribou

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(2) Moose

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

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

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

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

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

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

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

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

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

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

(3) Brown (Grizzly) Bears

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

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

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

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

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

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

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

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

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

(4) Black Bears

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

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

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

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

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

(5) Dall Sheep

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

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

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

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

(6) Wolf

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

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

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

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

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

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

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

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

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

e) Furbearers

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

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

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

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

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

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

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

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

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

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

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

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

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

f) Small Mammals

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

g) Marine Mammals

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

h) Birds

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

(1) Landbirds

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

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

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

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

(2) Waterfowl

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

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

(3) Upland Game Birds

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

(4) Shorebirds and other Waterbirds

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

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

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

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

(5) Raptors

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

(6) Seabirds

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

i) Fish

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

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

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

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

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

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

(1) Essential Fish Habitat

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

(2) Fish Habitat Description

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(3) Factors Affecting Fish Habitat and Production

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

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

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

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

7. Special Status Species

a) Special Status Plants

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

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

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

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

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

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

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

b) Special Status Fish

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

c) Special Status Wildlife

(1) Threatened, Endangered, and Sensitive Species

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

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

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

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

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

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

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

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

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

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

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

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

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

(3) Candidate Species

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

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

(4) State Listed Species

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

(5) BLM Sensitive Species

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8. Fire Management and Ecology

a) Wildland Fire and Fuels

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

(1) Fire Policy in Alaska

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

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

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

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

(2) Fire Management

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

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

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

Table 3.13. Fire Suppression Classes

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

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

(3) Fuels Management

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

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

(4) Fire History

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

9. Cultural Resources

a) Introduction

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

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

(1) Central Yup'ik Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

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

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

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

Table 3.14. Cultural Contexts for the Bay Planning Area

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

Table 3.15. Timeline for Historic Period

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

Historic People

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

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

Russian Period

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

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

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

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

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

American Period

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

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

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

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

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

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

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

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

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

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

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

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

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

Current Status

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

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

(2) Alutiiq Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

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

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

Historic Native People

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

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

Russian Period

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

American Period

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

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

Current Status

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

(3) Dena'ina Area Prehistory and History

Overview of Archaeological Data from the Region and the General Area

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

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

Historic Native People

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

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

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

Russian Period

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

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

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

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

American Period

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

Current Status

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

10. Paleontological Resources

a) Introduction

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

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

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

b) Nushagak/Iliamna/Naknek Region

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

c) Goodnews Bay Region

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

11. Visual Resources

a) Visual Resources Management Introduction

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

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

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

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

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

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

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

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

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

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

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

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

b) Description of Bay Visual Resources

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

Goodnews Block.

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

Nushagak/Kvichak Area

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

Iliamna Area

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

c) Condition and Trend

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

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

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

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

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

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

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

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

d) Visual Resource Management Classes

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

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

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

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

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

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

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

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

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

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

C. Resource Uses

1. Forest Products

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

2. Livestock and Reindeer Grazing

a) Livestock Grazing

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

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

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

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

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

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

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

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

b) Reindeer Grazing

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

3. Minerals

a) Leasable Minerals

(1) Regional or National Demands

Oil and Gas

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

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

Coal and other Leasable Minerals

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

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

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

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

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

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

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

(2) Local Dependence on Public Lands

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

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

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

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

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

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

b) Locatable Minerals

(1) Mineral Terranes

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

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

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

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

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

(2) Geologic Units

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

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

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

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

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

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

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

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

(3) Minerals Occurrence, Potential, and Administration

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

(4) History and Development

Pebble Copper-Gold-Molybdenum Deposit Area.

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

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

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

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

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

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

Lode Deposits

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

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

Redtop Mercury Mine

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

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

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

Goodnews Mining Camp

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

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

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

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

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

Gold Placer Deposits

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

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

(5) Resource Allocation

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

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

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

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

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

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

(6) Mining Claims and BLM Management

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

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

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

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

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

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

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

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

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

c) Salable Minerals (Mineral Materials)

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

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

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

4. Recreation Management

a) General Recreation

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

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

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

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

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

b) Special Recreation Permits

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

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

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

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

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

c) Recreation Opportunity Spectrum

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

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

(1) Definition and Examples of Recreation Opportunity Spectrum Classes

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

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

(2) Recreation Opportunity Spectrum (ROS) Prescription Tables

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

Table 3.16. Semi-Primitive Motorized Recreation Opportunity Spectrum Prescriptions

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

(3) Summary

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

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

d) Recreation Opportunity Regions

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

These areas are as follows:

(1) Alagnak River Region

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

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

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

(2) Goodnews Bay Region.

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

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

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

(3) Iliamna Lake Region.

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

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

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

(4) Kvichak/Nushagak Region

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

5. Travel Management

a) Travel Management Overview

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

b) Roads & Trails

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

(1) State-recognized RS 2477 Routes

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

(2) 17(b) Easements

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

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

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

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

c) Off-Highway Vehicle Management

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

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

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

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

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

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

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

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

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

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

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

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

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

6. Renewable Energy

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

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

a) Photovoltaics (PV)

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

b) Wind Resources

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

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

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

c) Biomass

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

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

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

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

7. Lands and Realty

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

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

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

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

Conservation System Unit (CSU)

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

a) Discretionary Land Uses

(1) Land use authorizations

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

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

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

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

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

(2) Rights-of-Way

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

(3) Withdrawals

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

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

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

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

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

(4) Recreation and Public Purposes Act

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

(5) Land Tenure Adjustment

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

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

(6) Trespass Abatement

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

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

(7) Subsurface Estate

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

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

b) ANCSA 17(b) Easement Identification and Management

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

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

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

ANILCA 906(e) Topfilings

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

c) Detailed Descriptions of Planning Blocks

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

(1) Dillingham/Aleknagik Vicinity

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

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

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

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

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

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

(2) Naknek/King Salmon Vicinity

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

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

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

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

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

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

(3) Alagnak Planning Block

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

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

Photo 3.13. Bristol Bay Cellular Partnership Communications Site

Land Use Authorizations/Rights-of-Way

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

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

Alagnak Planning Block 17 (b) Easements

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

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

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

Agency Withdrawals
There are no withdrawals within the planning block.

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

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

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

(4) Goodnews Bay Planning Block

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Agency Withdrawals
There are no withdrawals within the planning block.

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

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

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

(5) Iliamna East Planning Block

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(6) Iliamna West Planning Block

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

Photo 3.14. Iliamna West Block Communication Site

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

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

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

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

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

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

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

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

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

(7) Koggiling Creek Planning Block

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

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

ANCSA 17(b) Easements

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

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

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

Agency Withdrawals

There are no withdrawals within the planning block.

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

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

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

(8) Klutuk Creek Planning Block

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

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

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

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

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

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

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

Agency Withdrawals
There are no withdrawals within the planning block.

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

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

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

(9) Kvichak Planning Block

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

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

ANCSA 17(b) Easements

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

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

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

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

Agency Withdrawals
There are no withdrawals within the planning block.

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

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

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

(10) Yellow Creek Planning Block

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

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

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

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

Table 3.25. Yellow Creek 17(b) Easements

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

Agency Withdrawals
There are no withdrawals within the planning block.

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

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

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

D. Special Designations

1. Areas of Critical Environmental Concern

a) Background

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

b) Nominated Areas

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

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

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

(1) Carter Spit ACEC

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

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

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

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

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

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

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

(2) Bristol Bay ACEC

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

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

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

2. Wild and Scenic Rivers

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

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

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

Below are the factors considered for each resource team specialist.

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

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

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

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

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

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

E. Social and Economic

1. Public Safety

a) Abandoned Mine Lands

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

b) Hazardous Materials Management

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

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

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

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

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

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

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

(1) Affected Environment

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

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

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

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

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

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

Table 3.26. Activities and Associated Hazardous Materials

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

Source: (BLM 2004b; BLM 2004c)

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

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

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

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

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

2. Social and Economic Conditions

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

a) Regional Overview

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

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

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

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

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

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

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

Energy is very expensive in the region. Market basket surveys conducted by the University of Alaska Fairbanks Cooperative Extension Service in December, 2004 reported Dillingham area electricity 76% more expensive than Anchorage, and 156% higher than the U.S. average; heating oil 17% less expensive than Anchorage; unleaded gasoline 82% higher than Anchorage; and propane 91% higher than Anchorage. Census 2000 reported that almost 22% of workers in the Dillingham Census Area walked to work and 17% used "other means," referring to personal modes of transportation other than motor vehicles and public transportation. Diesel generated electricity provides the main source of power throughout the region. Food costs are much higher in the planning area than urban centers in Alaska. The market basket for a family of four in Dillingham cost 1.76 times of the price of the same basket of goods in Anchorage and 1.9 times the price in Fairbanks in March, 2005.

Data used in this analysis are largely from the Alaska Department of Labor and Workforce Development, the Alaska Department of Commerce, Community, and Economic Development, the U.S. Census Bureau, and from the Sonoran Institute's Economic Profile System.

b) Community Profiles

Community profiles for all villages, towns, and cities in the state, in both summary and detailed report forms, are available at the Alaska Department of Commerce and Community Development, Community Database or online at http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm. Detailed information on planning area communities can be found at this site.

c) Demographics

Diilingham (2,466), has the highest population in the planning area, followed by Togiak (809), Naknek (678), Quinhagak (555), and New Stuyahok (471). The remaining 19 villages within the planning area range in population from 36 (Portage Creek) to 399 (Manokotak). The planning area encompasses two boroughs, the Dillingham Census Area, and three towns in the Bethel Census Area. The population is approximately 70% Alaska Native, primarily indigenous Alutiiq, Athabascan, and Central Yup'ik people. In comparison, Alaska Natives comprised 16% of the state's population, which is a larger percentage of Native Americans than in any other state. The balance of the racial distribution in the area and the state is primarily white, comprising as much as 70% of the state population. Although the Alaska Native population has doubled in the last 30 years, the population growth in these regional communities slowed

in the 1990s. Tables 3.28 and 3.29 are a compilation of historic and modern population figures for communities and boroughs in the planning area.

Alaska Natives are migrating to urban population centers including the Matanuska-Susitna Borough, and Anchorage. The growth rate of the Native population for these two areas is 68.3% and 30% respectively. The growth rate of Native population in Fairbanks North star Borough is relatively low at 7.2% for the decade, which is half the growth rate for the state (See Table 3.27, Growth of Alaska Native Population).

Overall, the population growth in the three boroughs/census areas touching the planning area is very similar to the population growth rate for the State of Alaska, while it is far below the population growth rate of southcentral Alaska. The median age ranges from 29 in the Dillingham Census Area and Lake and Peninsula Borough to 36 years in the Bristol Bay Borough. The State median age was just over 32 years (2000).

Out migration is evident with 3.4 persons per year per 1,000 individuals within the population leaving the Dillingham census Area, and 14.8 persons per year per 1,000 individuals within the population left both Bristol Bay and Lake and Peninsula Boroughs between1990 and 2003. This is similar to Fairbanks North Star Borough (-11.5/1000/year), and similar to most of rural Alaska. Net positive migration was reported in Juneau, Anchorage, the Kenai Peninsula, and the Matanuska-Susitna Borough (highest at 25.5/1,000/year) during the same reporting period (Alaska Department of Commerce, 2005).

d) Employment and Income

Table 3.33 provides information about local employment. Commercial salmon and herring fishing has long been the predominant economic activity in Bristol Bay and in Southwest Alaska. As elsewhere in rural Alaska, public employment is very important to the economy of the planning area. The largest employers in the region are the Bristol Bay Area Health Corporation, Bristol Bay Native Association, Wards Cove Packing Association, and Borough government and school districts.

Table 3.27. Growth of Alaska Native Population

Area/Year	1990	2000	Percent Growth
Alaska	85,698	98,043	14,4%
Anchorage	14,569	18,941	30%
Fairbanks	5,330	5,714	7.2%
Mat-Su	1,939	3,264	68.3%
Dillingham Census Area	2,925	3,452	18%
Bristol Bay Borough	455	550	20.9%
Lake and Peninsula Borough	1,261	1,340	6.2%

Source: U.S. Census Bureau, Census 1990, 2000

Table 3.28. Population per Community, Historic U.S. Census Data

	Year				
Community	1960	1970	1980	1990	2000
Aleknagik	231	128	154	185	221
Clark's Point	138	95	79	60	75
Dilliingham	424	914	1,563	2,017	2,466
Ekwok	106	103	77	77	130
Goodnews Bay	154	0	168	241	230
Igiugig	36	36	33	33	53
Iliamna	47	58	94	94	102

Community	1960	1970	1980	1990	2000
King Salmon	227	202	545	696	442
Kokhanok	57	88	83	152	174
Koliganek	100	142	117	181	182
Levelock	88	74	79	105	122
Manokotak	149	214	294	385	399
Naknek	249	178	318	575	678
New Stuyahok	145	216	331	391	471
Newhalen	63	88	87	160	160
Nondalton	205	184	173	178	221
Pedro Bay	53	65	33	42	50
Platinum	43	55	55	64	41
Port Alsworth	0	0	22	55	104
Portage Creek	0	60	48	5	36
Quinhagak	228	340	412	501	555
South Naknek	142	154	145	136	137
Togiak	220	383	470	613	809
Twin Hills	0	67	70	66	59

Source: U.S. Census Bureau, Census 2000

Table 3.29. Population of Selected Boroughs, Census Areas

Regional Entity	Year				
	1960	1970	1980	1990	2000
Fairbanks North Star Borough	43,412	45,864	53,983	77,720	82,840
Anchorage Municipality/Borough	82,833	126,385	174,431	226,338	260,283
Dillingham Census Area	1,213	2,322	3,203	4,012	4,922
Bristol Bay Borough	618	1,147	1,094	1,410	1,258
Lake and Peninsula Borough			1,384	1,668	1,823

Source: ADOL 2005b

Both seafood harvesting and processing are seasonal industries in Bristol Bay. Salmon and herring fishing comprise most of the harvest activity which occurs between May and September. In 2003, 21% of private sector workers in Alaska were nonresidents of the state. (ADOL 2005b) Seafood processing employs the highest number of nonresident workers (63.4%) in this state. In 2002, there were 2,820 fish harvesting jobs in Southwest Alaska. This was 21% of all private sector employment. Adding seafood processing workers (3,900) makes the fishing industry in Southwest Alaska the largest sector of employment (49% of private jobs). The State reports fish harvesting jobs using a regional approach, estimating employment since the number of workers does not correspond to wage and salary employees who are qualified for workers compensation. Although Southwest Alaska includes areas outside the planning area, it is a reasonable measure of the Bristol Bay region.

Table 3.30. Workers and Wages in the Seafood Processing Industry

Locale	Total Workers	Total Wages (millions)	Nonresident Workers	Nonresident Percent	Nonresident Wage (millions)	Nonresident Percent
Bristol Bay Borough	1,316	$9.2	1,071	81.4%	$7.1	76.8
Dillingham	228	$2.0	180	78.9%	$1.6	81.0
Lake and Peninsula Borough	337	$2.9	318	94.4%	$2.7	91.8
Plan area Total	1881	$14.1	1,569	83.4	$11.4	80.9
Alaska	19,480	$247.4	13,858	71.1%	$156.8	63.4

Source: ADOL 2005b

Table 3.31. Commercial Fishing Permits Held by Residents

Community	Permits
Aleknagik	33
Clark's Point	16
Dillingham	277
Ekwok	6
Goodnews Bay	41
Igiugig	5
Iliamna	17
King Salmon	36
Kokhanok	8
Koliganek	18
Levelock	15
Manokotak	96
Naknek	115
New Stuyahok	43
Newhalen	7
Nondalton	14
Pedro Bay	3
Platinum	9
Port Alsworth	4
Portage Creek	Not reported
Quinhagak	83
South Naknek	43
Togiak	244
Twin Hills	15
Total	**1148**

Source: Alaska Department of Commerce, Community & Economic Development, Alaska Economic Information System 2004

Government employment includes State of Alaska, borough, city, and Federal agency jobs in the planning area. The Alaska Department of labor reported that government employment ranged from 33% of the workforce in Bristol Bay Borough (398 of 1,203), 39% in the Dillingham Census Area (904 of 2,332), to 50% in the Lake and Peninsula Borough (320 of 636) during 2003.

Table 3.32. Employment by Sector (Percentage of Total Employment)

Employment by Sector	Dillingham Census Area	Bristol Bay Borough Area	Lake and Peninsula Borough	Alaska
Agriculture, forestry, fishing, hunting, mining	3.9	0.9	1.4	4.9
Construction	4.2	11.4	4.8	7.3
Manufacturing	1.9	1.5	1.2	3.3
Wholesale trade	0.6	0.3	0.5	2.6
Retail trade	10.0	7.7	5.7	11.6
Transportation, warehousing and utilities	9.9	17.4	10.2	8.9
Information	1.1	6.4	0.9	2.7
Finance, insurance, real estate, rental and leasing	2.7	2.4	1.0	4.6
Professional scientific, management, administrative and waste management	1.8	4.1	2.4	7.6
Education, health and social services	37.9	23.6	33.9	21.7
Arts, entertainment, recreation, accommodation and food services	2.9	7.2	6.2	8.6
Other services	9.4	2.2	7.2	5.6
Public administration	13.7	14.7	24.6	10.7

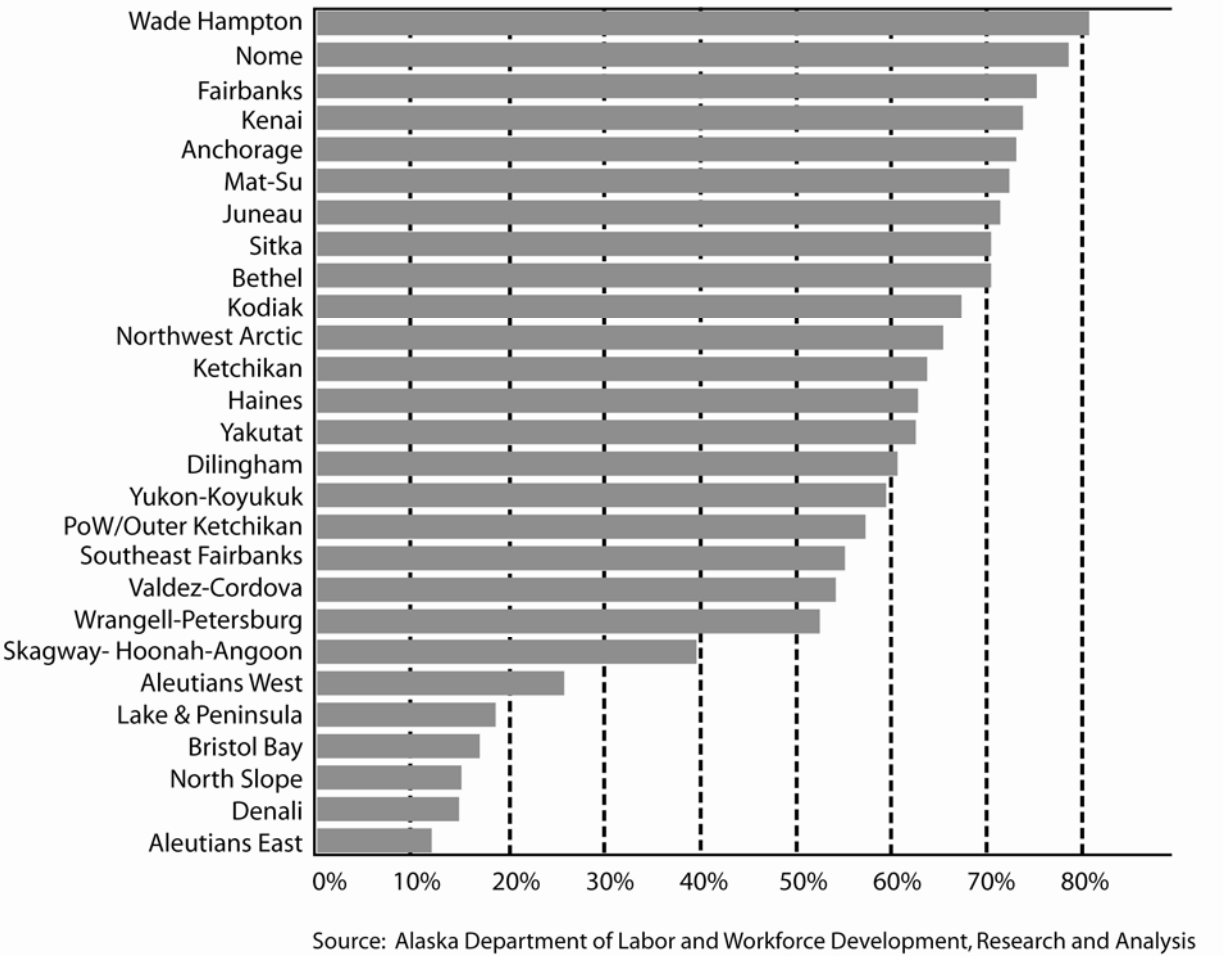
Source: U.S. Census Bureau, Census 2000.

State of Alaska statewide data indicate that mining, oil and gas, and oil and gas service industries employed 24% to 26% non-resident workers in 2003. North Slope Alaska industry employs less than 15% within region labor. These industries, which may be expanding presence in southwest Alaska, are likely to provide jobs to Alaskans; however, they will be primarily out of region residents. Teck Cominco Alaska has worked with NANA Regional Corporation to employ NANA shareholders at Red Dog Mine in northwest Alaska. However, most of the NANA shareholders employed at the mine are out of region residents.

Teck Cominco Alaska provided 412 direct jobs to employees and contractors in 2003. This is slightly over 14% of wage and salary employment, and 22% of non-government employment in the Borough. Over 50% of mine workers are NANA shareholders. Those directly employed by Teck Cominco Alaska receive free transportation to the job site from their residence within the state. As a result only about 140 employed NANA shareholders live in the planning area. The mine operation also resulted in the Borough's largest source of revenue through payments in Lieu of taxes of $5.9 million in 2003 (ADOL 2004).

Even visitor related industry provides a significant number of jobs to non-resident Alaskans. ANCSA Corporations and subsidiaries provide jobs in some locations within the planning area. The regional corporation is headquartered in Anchorage.

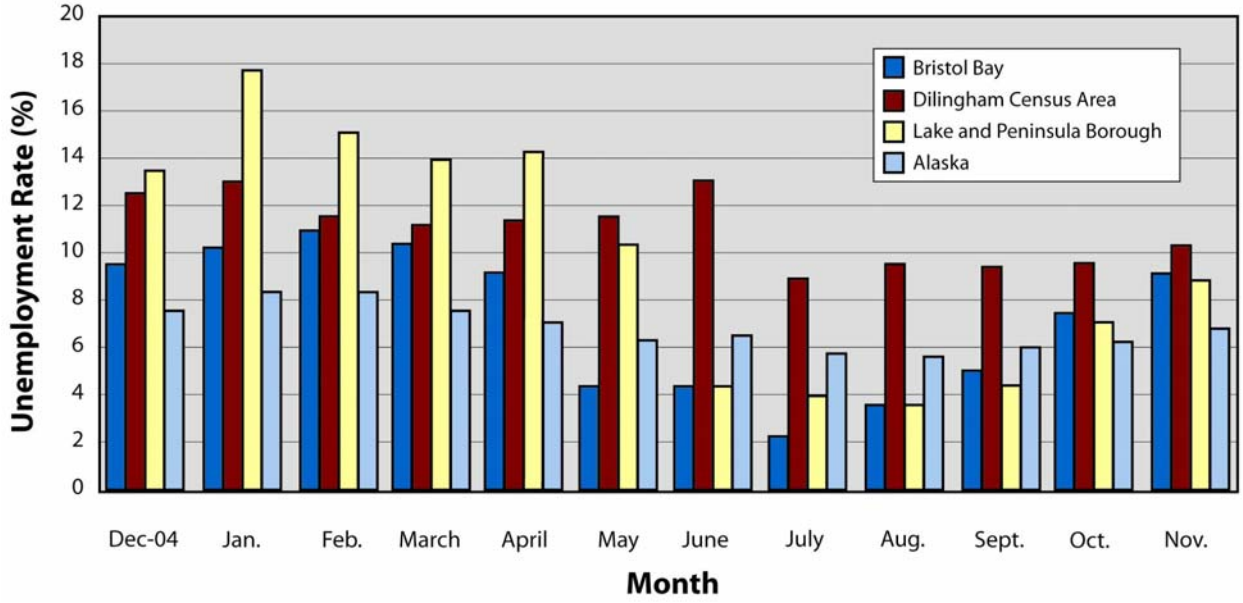
Table 3.33. Percent of Private Sector Workers Who Are Local Residents



Source: Alaska Department of Labor and Workforce Development, Research and Analysis
Jeff Hadland, et.al., Nonresidents Working in Alaska-2003, Alaska Department of Labor and Workforce Development, January 2004.

Unemployment in the planning area fluctuates widely compared with urban centers in Alaska and the state average. According to State of Alaska data, average unemployment during 2004 ranged from 6.6% in Bristol Bay, 10.2% in the Lake and Peninsula Borough, and 11.2% in Dillingham Census Area. At the same time the state average was 7.5% (ADOL 2005a).

Table 3.34. Comparative Unemployment Rates December 2004-November 2005

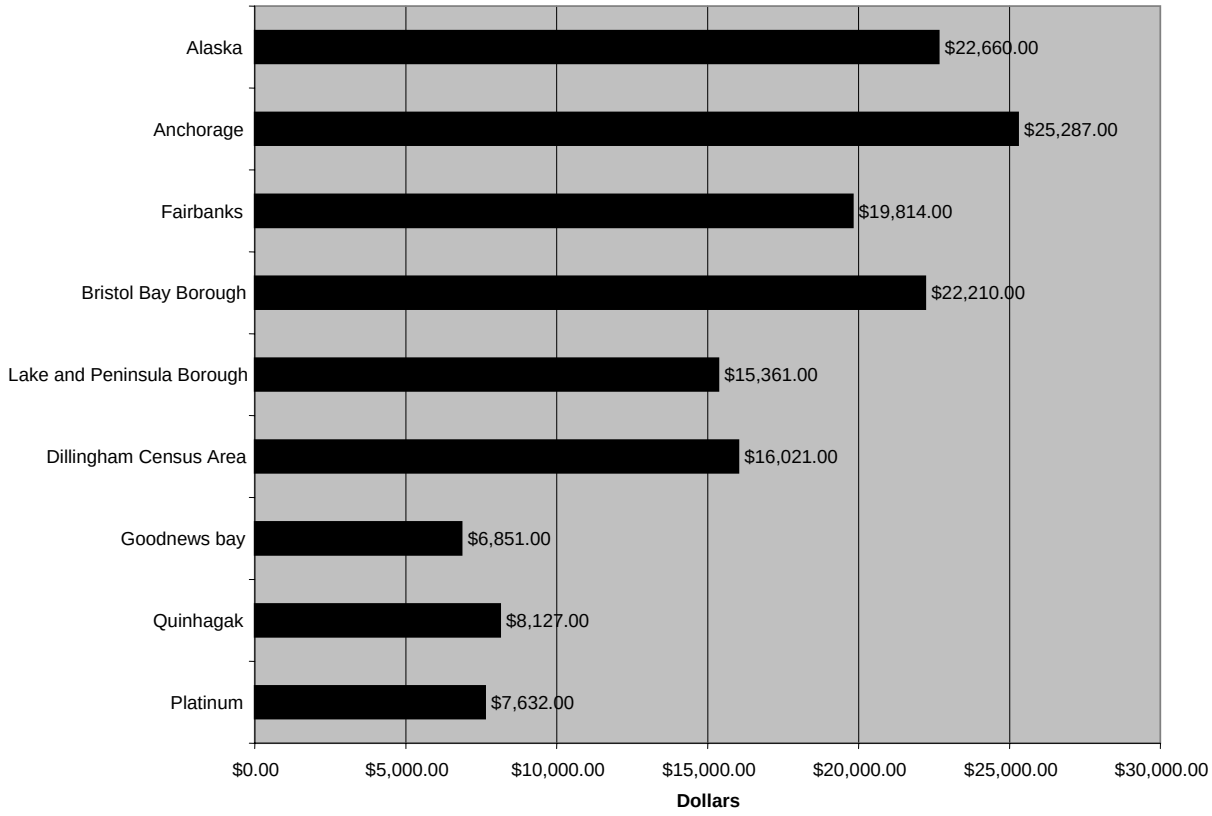


This measure reports the number of individuals in a census area that are not seeking employment. Labor force participation rates are low as is typical in bush Alaska (Table 3.34). Census data shows that Kokhanok has the lowest participation rate in the planning area, where about 64% of the population was not in the labor force in 2000. Eleven villages in the planning area have labor force participation rates in excess of 50%. This underscores the relative scarcity of jobs, and emphasizes the role and importance of subsistence activities or the phenomena could be attributable to the dynamics of acculturation and cross culturalization.

The educational attainment curve lags in bush villages. Over 88% of the residents in the State have completed high school, 60% of the residents in Alaska have some college education; and almost 25% have college degrees. In the planning area, 59% of the residents completed high school, and 11% hold bachelor's degrees or advanced degrees. The difference may be attributable to skewing as a result of out-migration by individuals with higher education; perhaps, a consequence of the dynamics of acculturation and cross culturalization between Western culture and the culture of an indigenous people.

Per capita income in the planning area ranges from almost equal to the Alaska average in Bristol Bay Borough to under $8,000 per year in smaller villages (Table 3.35 and Table 3.36). Only in the regional centers does per capita income begin to track with the high cost of living.

Table 3.35. Comparison of Per Capita Income (2000)



The number of individuals considered at or below poverty level in the planning area is much higher than the average for the state of Alaska. In the Bristol Bay Borough 9.5% Individuals were below poverty level in 2000. In the Dillingham Census Area 21.4% Individuals were below poverty level in 2000. In the Lake and Peninsula Borough, 18.9% of the population was below poverty level in 2000. In comparison, 9.4% of individuals in Alaska were below the poverty level in 2000.

e) Environmental Justice

The United States Department of the Interior and the Bureau of Land Management are under a legislative mandate to "…cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources...." of the federal public lands in Alaska, 18 U.S.C. §3112 (1), and an Executive Order to "…identify… the need for ensuring protection of populations with differential patterns of subsistence consumption of fish and wildlife….", E.O. 12898, dated February 11, 1994.

A Presidential Memorandum accompanying Executive Order 12898 requires Federal agencies to "… analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. section 4321 et seq."

Alaska Natives, Yup'ik, Alutiiq, and Dena'lina Athabascan, are the predominant minority population of the planning area. Demographic characteristics for communities within the planning area are presented in Table 3.36. Data shows that all but four villages and towns have very high minority populations, in excess of 50%. These same locales have high percentages of individuals and households with incomes

below poverty level, although there is wide variability between villages. The work force participation percentage for all communities in this area is consistently lower than the participation rate for the state as a whole. Unemployment rates are high in Bristol Bay. Despite the positive income effect of commercial fishing in the region, poverty rates remain high in most Bristol Bay communities. The Western concept of poverty maybe an inappropriate label when one factors in considerations of and an appreciation for the significance of a subsistence lifestyle, a lifestyle engaged in throughout the planning area.

President Clinton's cover memo to Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, emphasizes public participation in the NEPA process. Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments," requires the BLM to consult with tribal governments in the planning area on Federal matters that significantly or uniquely affect their communities. The EPA's Environmental Justice guidance of July 1999 stresses the importance of government-to-government consultation. In fostering tribal participation, the BLM held scoping meetings in seven villages in the planning area.

Scoping meetings and alternative development meetings were held during development of the draft plan and draft EIS. Six scoping meetings were held from January through April 2005 at communities in the planning area, and in Homer and Anchorage. During this scoping process, BLM received feedback on potential Environmental Justice concerns of the local residents**.**

Major concerns expressed at these meetings included:

- The Native community wants continued access and opportunity for subsistence hunting, but is concerned about impacts to subsistence activities, mostly related to mining, and increased recreational or sport hunting and fishing activities.
- A more detailed discussion of public concerns is provided in the Bay Resource Management Plan Scoping Report (June, 2005).
- Subsistence activity is an important source of food and material which offsets high cost of living and high unemployment.

Table 3.36. Environmental Justice Data from the 2000 Census

State or City	Per Capita Income	Percent of Population as a Minority	Percent of Individuals Below Poverty Level Income	Percent of Households Below Poverty Level Income	Percent of Unemployed Population Over 16 Years of Age	Percent Population Over 16 Years of Age Not In The Labor Force
Alaska	$22,660	19.0	9.4	6.7	6.1	28.7
Aleknagik	$10,973	81.9	40.8	21.7	13.3	39
Clark's Point	$10,988	90.7	45.7	20	5.1	53
Dillingham	$21,537	52..6	11.7	9.2	7.1	27
Ekwok	$11,079	91.5		29.2	11.1	44
Goodnews Bay	$6,851	92.6	39.0	37.8	9.9	55
Igiugig	$13,172	71.7	6.9	0	0	55
Iliamna	$19,741	50.0	3.1	0	0	28
King Salmon	$26,755	29.0	12.4	8.8	6.9	22
Kokhanok	$7,732	86.8	42.6	40.0	4.1	64
Koliganek	$13,242	87.4	19.3	14.9	9.2	30
Levelock	$12,199	89.3	24.5	16.7	0	53
Manokotak	$9,294	94.7	35.3	32.5	5.5	54
Naknek	$21,182	45.3	3.7	3.1	6.7	29
New Stuyahok	$7,931	92.8	31.7	32.6	9.2	46
Newhalen	$9,448	85.0	16.3	26.7	17.9	43
Nondalton	$8,411	89.1	45.4	37.3	18.7	50
Pedro Bay	$18,420	40.0	6.0	0	0	21
Platinum	$7,632	90.2	22.0	33.3	20.0	26.7
Port Alsworth	$21,716	4.3	6.0	0	0	29
Portage Creek	$8,010	86.1	0	0	0	50
Quinhagak	$8,127	96.0	26.1	27.2	6.3	59
South Naknek	$13,019	83.9	27.1	16.1	12.5	48
Togiak	$9,676	86.3	29.9	32.5	11.9	55
Twin Hills	$16,856	84.1	27.9	22.2	0	50

Source: Census 2000

There is some income outflow evident in the planning area. In Bristol Bay Borough, the outflow decreased from 45.6% in the 1980's to 28% in 2000 (EPS 2005). The Dillingham Census Area and the Lake and Peninsula Borough experience income outflow to a far lesser degree.

f) Revenue

Local government revenue in the planning area is influenced by exemption of ANCSA village corporations and regional corporations from certain forms of property taxation.

Villages and boroughs are empowered to levy and collect tax revenues if they are incorporated political subdivisions. Several villages or towns in the planning area levy sales taxes and specific use or product taxes. The City of Dillingham and the Bristol Bay Borough collect property tax.

Table 3.37, 2004 Per Capita Tax Revenues in Dollars, lists collections by those villages and boroughs that levy taxes. The columns labeled "Other Tax" aggregate collections for items such as liquor, tobacco, bed use, and fish processing. The North Slope Borough collections and revenue are greatly enhanced by North Slope oil field property taxes. This greatly skews the per capita revenues compared with the rest of

the state. Anchorage, Fairbanks North Star Borough, Matanuska-Susitna Borough, and the city of Fairbanks are included in the table for comparison purposes.

Table 3.37. 2004 Per Capita Tax Revenues in Dollars

Municipality[1]	Property Tax (Inc. Oil & Gas)	Sales Tax	Other Taxes	Total Taxes Reported	Population (2004)	Per Capita Revenue
Lake and Peninsula Borough	0	0	$731,799	$731,799	1627	$450
Bristol bay Borough	$1,747,532	0	$363,737	$2,111,269	1,103	$1,914
Anchorage	$322,352,907	0	$19,681,861	$342,034,768	273,565	$1,250
Fairbanks North Star Borough	$71,382,439	0	$1,375,192	$ 72,757,631	82,131	$886
Matanuska-Susitna Borough	$55,571,134	0	$716,992	$56,288,126	67,526	$834
Fairbanks, City[2]	$8,685,154	0	$3,748,522	$12,433,676	29,002	$429
Aleknagik	0	$93,429	$618	$2,484,947	235	$400
Dillingham	$1,339,892	$2,014,814	$328,551	$3,683,257	2,390	$1,754
Quinhagak	0	$77,506	0	$77,506	578	$134
Togiak	0	$76,097	$32,680	$108,777	820	$133
Manokotak	0	$1,185	0	$1,185	405	$3
All other towns	0	0	0	0	0	0
Average statewide per capita revenue (excluding the North Slope Borough)						1,224
Average statewide per capita revenue (including North Slope Borough)						1,518

Source: ADCCED 2005c

[1] Only those municipalities that levy sales, severance, property, or other type of local tax are included in this table.

[2] Both the city of Fairbanks and the borough in which it is located levy taxes.

[3] Per capita revenue encompasses both city and borough taxes.

F. Subsistence

1. Definition of Subsistence

The Federal Subsistence Board assures a subsistence priority among consumptive uses on Federal public lands under ANILCA Title VIII. This means that rural residents have priority for the use of fish and wildlife resources on Federal lands for wildlife and on Federal reserved waters for fisheries. There are no Federal reserved waters on BLM lands in the planning area that fall under the BLM subsistence management responsibility. State- and Native-selected lands are not within the jurisdiction of the Federal subsistence management program, except within Federal CSUs, such as national parks, preserves, and wildlife refuges. Title VIII of ANILCA defines subsistence uses as:

> The customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of inedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade (16 U.S.C. § 3113).

Under state law, subsistence use means:

> The noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal or family consumption, such as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible by-products of the fish and wildlife resources taken for personal or family consumption; and for customary trade, barter, or sharing for personal or family consumption (AS 16,05.940[32]).

The state does recognize preferential allocation of resource harvest opportunities for rural or non-rural user groups where uses are allowed.

2. The Federal Subsistence Program

The Federal Subsistence Program, unique to Alaska, and without precedent in Federal law, implements ANILCA Title VIII through the Federal Subsistence Board (FSB), Secretary of Interior-appointed Subsistence Regional Advisory Councils (SRACs), and interagency staff specialists. The FSB consists of the Regional or State Directors of the U.S. Fish and Wildlife Service, BLM, U.S. Forest Service, National Park Service and Bureau of Indian Affairs. The FSB is chaired by a subsistence user representative appointed by the Secretary of the Interior. The FSB is tasked with management of subsistence resources relative to customary and traditional use determinations, animal population health and maintenance, bag limit determinations, seasons of harvest, methods and means of taking determinations, and regulatory and public processes.

The planning area lies within Regions 4 and 5 of the ten Federal Subsistence Program's regions in Alaska. Each region is represented by a Federal Subsistence Regional Advisory Council. These councils provide an opportunity for rural Alaskans to contribute in a meaningful way to management and use of subsistence wildlife, fish and shellfish resources.

The planning area encompasses, wholly or in part, Game Management Units 9(B), 9(C), 17(A), 17(B), 17(C) and 18 of the State's 25 Game Management Units, Management Areas 6 and 7 of the State's 14 Fishery Management Areas and the Bering Sea Management Area of the eight Alaska Shellfish Management Areas.

The program provides for customary and traditional uses by rural Alaska residents of wild, renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken. A person must be a qualified rural Alaska resident to harvest fish and wildlife under Federal Subsistence Regulations on Federal public land in and Federal reserved waters in Alaska. All communities within the planning area are rural, as it is defined in the current rural determination. While the majority of planning area inhabitants are Alaska Native and have established the patterns for subsistence use in Alaska, the Federal subsistence regulations apply to all rural residents who have a customary and traditional use of fish and wildlife in the area, irrespective of their race or ethnicity.

Subsistence resources are highly valued and are central to the economies, customs and traditions of many families and communities in Alaska. Customs and traditions include sharing and distribution networks, cooperative hunting, fishing, gathering, and ceremonial activities. Subsistence fishing, hunting, and gathering are important sources of nutrition and livelihood in all of the rural communities in the planning area. ADF&G (2000) estimated that approximately 43.7 million pounds of useable weight of wild foods are harvested annually by residents of rural areas of the state. That would be about 375 pounds per person per year for rural residents. ADF&G (2000) suggests that in Southwest Alaska 65% of rural households harvest game, 86% harvest fish, and 90–94% use fish and game. Because there may be little cash available for store-bought groceries, this region's residents participate in a mixed subsistence – cash economy. A 2005 survey comparing living expenses across Alaska indicates that groceries for a family of four for one week in Dillingham cost $227, compared with $122 for the same groceries in Anchorage (University of Alaska Fairbanks 2005).

A person must have his or her primary, permanent residence in a rural area to qualify to hunt and fish under Federal subsistence regulations. Seasonal residence in a rural area does not qualify a person as a rural resident. The FSB determines which communities have customarily and traditionally taken specific fish and wildlife populations in which areas. These customary and traditional use determinations are listed along with seasons and harvest limits for each management unit in the Federal regulations. The Federal program publishes separate hunting/trapping and fishing regulation booklets annually. If there is a positive customary and traditional use determination for specific communities or areas, only those communities and areas have a Federal subsistence priority for that specific species in that management unit. If no customary or traditional use determination for a wildlife/fish population in a management unit has been determined by the FSB, then all rural residents of Alaska may harvest fish or wildlife from that population. The FSB may determine that there is no customary and traditional use of a specific fish or wildlife population.

The planning area has within its borders over 6,400 people in 25 Federally-qualified subsistence communities ranging in population from less than 50 to over 2400 people and the additional rural residents not associated with a community. The following rural communities lie within the planning area.

Table 3.38. Bay Planning Area Communities and their Locations With Relation to the Subsistence Game Management Units

Game Management Unit(s)	9(B)	9(C)	17(A)	17(B)	17(C)	18	Other
Aleknagik					√		
Clarks Point					√		
Dillingham					√		
Ekuk					√		
Ekwok					√		
Goodnews Bay						√	
Igiugig	√						
Iliamna	√						
King Salmon		√					
Kokhanok	√						
Koliganek				√			
Levelock	√						
Manokotak					√		
Naknek		√					
Newhalen	√						
New Stuyahok					√		
Nondalton							
Pedro Bay							
Platinum						√	
Portage Creek					√		
Port Alsworth							√
Quinhagak						√	
South Naknek		√					
Togiak			√				
Twin Hills			√				

Depending upon subsistence determinations, other rural residents of Alaska residing outside the planning area are also qualified subsistence users on Federal Public land in the planning area

3. Historic Subsistence Use Patterns, Social Organization and Sharing Patterns

The following brief overviews of social organization and sharing patterns describe those encountered at the time of European contact. While these traditions may continue into the present day, a number of influences brought changes to traditional ways of life. Several epidemics (smallpox, influenza, tuberculosis and measles) decimated local populations and interrupted the transmission of culture. The introduction of European and Euroamerican economic, religious and political practices also brought changes.

Historically, these groups practiced a central based settlement pattern. This typically included an established winter village from which families or small groups would venture to seasonally based camps for fishing, hunting, trapping, and gathering activities such as gathering eggs, berries, basketry materials or pottery supplies.

a) Central Yup'ik

Historically a winter village would contain at least one men's house (*quasig*) and individual houses inhabited primarily by women and younger children. This was an egalitarian society where leaders are chosen by ability, knowledge and articulate speaking. A winter ceremonial season enhanced visiting and hospitality between villages (Fienup-Riordan 1994; Oswalt 1990).

Sharing was highly valued in the society in the past, and continues to be important today. Men might distribute meat after a kill to hunting partners but when the meat was brought home, the women became responsible for sharing it with family and friends. The first kills by young hunters were often completely given away especially to Elders (Fienup-Riordan 1990).

b) Alutiiq

Historically the Alutiit were a ranked society. Wealth and leadership were concentrated among high-ranking lineages and each village was run by a chief who inherited power from his family. The chiefs directed hunting and trading expeditions. Ordinary families made up a class of free, common people and a lower class of slaves was composed of orphans and people captured in raids or taken in trade from other groups. Within the group were also specialists such as whalers, shamans, weather forecasters, healers and midwives (Crowell and Leer 2001).

The cultural emphasis upon sharing was reflected in large ceremonials noted for their lavish hospitality and gift-giving. Like other groups of the region, a boy's first kill was given away.

c) Dena'ina Athabascan

Historically the Dena'ina were a ranked society with a redistributive economic system. High ranking individuals or "rich men" took the role as leaders and functioned as a center for redistribution of goods. They were responsible for caring for their kin group and were responsible for widows, orphans, and the infirm. Their trading partnerships linked their group with other groups in the region (Ellanna and Balluta 1992).

In the Dena'ina area leaders selected for their generosity, willingness to help others, hunting ability, bravery and ability in warfare. An aspiring leader rose through the system by trading to acquire prestige symbols and gathering supporters (Ellanna and Balluta 1992; Townsend 1981).

Sharing of meat was typical between hunting partners. Potlatches were given for several reasons. Large potlatches were given to honor the deceased and smaller ones were given to honor marriages, and to help the poor. A small potlatch would be given by a father when his son killed his first big game (Osgood 1976; Townsend 1981).

4. Sociocultural, Socioeconomic and Cosmological Aspects of Subsistence Lifeways

For Alaska Natives today, subsistence is more than the harvesting, processing, sharing, and trading of land and sea mammals, fish, and plants. Subsistence subsumes holistically the cultural, social, and spiritual values that are the essence of Alaska Native cultures. The Alaska Federation of Natives (2002) described subsistence as

> The hunting, fishing, and gathering activities which traditionally constituted the economic base of life for Alaska's Native peoples and which continue to flourish in many areas of the state today…Subsistence is a way of life in rural Alaska that is vital to the preservation of communities,

> tribal cultures, and economies. Subsistence resources have great nutritional, economical, cultural, and spiritual importance in the lives of rural Alaskans…Subsistence, being integral to our worldview and among the strongest remaining ties to our ancient cultures, is as much spiritual and cultural as it is physical.

There are several significant differences between traditional approaches to subsistence and the western notion of hunting. Traditional groups often adhere to recognition of an individual's or a family's customary ownership through long-term use of a hunting locality that may be passed on generation after generation. For example, Dena'ina hunting grounds are passed on from father to son. If anyone else kills game there the owner usually is paid a quarter of the meat from the hunt (Ellanna and Balluta 1992).

A common belief is that animal souls return after death to be born into new animals. The hunter's respectful treatment of animals is reflected in his future success and often the success of the entire group. If respect is not shown, an animal will not continue to give itself to people. Animals may abandon an area if not respectfully treated or they may hide themselves from hunters. Since hunting was a survival situation for groups, behavior was regulated and social sanctions were often enforced (Crowell and Leer 2001; Fienup-Riordan 1994).

Some behavior seen as ethical in western hunting and fishing practices, such as catch-and-release fishing, is seen as disrespectful in traditional Native society (Fienup-Riordan 1990). In the traditional view this type of behavior may threaten future fish runs.

5. Historic and Contemporary Subsistence Use Patterns

Archaeological evidence indicates that the Bristol Bay region has been continuously inhabited by humans for at least the past 8,000 years or more (Dumond 1981). Among the three linguistic groups present at European contact, all of them had subsistence economies and all participated in widespread formal trade which was well-established in the region and beyond prior to the arrival of the Europeans (Fitzhugh and Crowell 1988). However, the Russian trappers and traders who explored the region in the 18th and early 19th Centuries were the first to develop an export market economy of large scale (Wright et al. 1985; Fitzhugh and Crowell 1988). The Russians established trading posts and churches in parts of the region in the early 1800s. In 1867 the Russians sold Alaska to the United States and subsequently the fur trade declined (Wright et al. 1985). Commercial salmon fishing began in the late 1800s, and became the dominant industry (Wright et al. 1985).

Many of the communities in the Bay planning area remain predominantly Alaska Native (Table 3.39) and in many of these communities traditional patterns of subsistence hunting, fishing and gathering activities have been retained flexibly, accommodating a part-time cash economy that includes the commercial fishery, trapping for a commercial market as well as for personal use, hunting and fishing guiding activities, and other cash-generating activities (Wright et al. 1985; McClenahan 2004). Having a cash income has proven beneficial in that it provides for the purchase of modern equipment and gasoline that make subsistence activities more efficient and productive. However, it has also required some changes in the duration and timing of some subsistence activities to accommodate wage employment.

A detailed discussion of the subsistence use of salmon and freshwater fish, caribou, and moose was presented in the wildlife portion of Chapter III. In addition to these three leading subsistence resources, upland game, grizzly and black bears, furbearers and waterfowl are all important local subsistence resources but are of lesser importance in terms of biomass harvested for food and fiber than fish, caribou and moose (ADF&G 2005c).

Table 3.39. Bay Planning Area Communities and their Alaska Native Population Composition (U.S. Census Bureau 2004)

Community	Population	Percent Alaska Native
Aleknagik	221	85
Clarks Point	75	92
Dillingham	2466	56
Ekuk	2	0
Ekwok	130	94
Goodnews Bay	230	94
Igiugig	53	83
Iliamna	102	58
King Salmon	442	30
Kokhanok	174	91
Koliganek	187	87
Levelock	57	95
Manokotak	437	95
Naknek	601	47
Newhalen	183	91
New Stuyahok	477	96
Nondalton	205	90
Pedro Bay	47	64
Platinum	39	93
Portage Creek	49	86
Port Alsworth	113	22
Quinhagak	612	97
South Naknek	88	84
Togiak	805	93
Twin Hills	67	94

6. Resources Harvested

Residents of regional centers like Dillingham participate in a mixed subsistence and cash economy. Residents earn cash through commercial fishing and employment in government, service, and trades, but they also harvest substantial quantities of wild foods and share those foods with other households and other communities. Dillingham residents share in non-commercial distribution of fish and game with other communities. This balance of commercial and subsistence activities makes Dillingham, Naknek, and King Salmon distinctive among communities in Southwest Alaska. At the same time, Dillingham residents participate in the overall pattern of resource harvesting activities that are part of the economic system of the Bristol Bay region (Fall et al. 1986).

The cash economy of Dillingham, like the rest of the Bristol Bay region, is inextricably linked to the commercial salmon fishing industry, which is a seasonal industry. About 44% of the sampled households in 1984 were involved in commercial fishing, with a smaller percent employed in fish processing or in businesses that provide services to commercial fishermen (Fall et al. 1986).

a) Harvest Estimates

Table 3.40 provides the rates of participation and harvest levels for those Bay area communities for which data are available, for one study year. These data are not current. The discussion by BLM block in the wildlife section of this chapter provides more recent harvest information including locations by Game Management Unit of harvest for caribou, moose, and brown bear in the planning area.

Table 3.40. Bay Planning Area Communities' Subsistence Take for One Study Year (Alaska Department of Fish and Game Community Profile Database 2005)

Community	Study Year	Study Year Population	All Resources	Salmon	Non-Salmon Fish	Large Land Mammals	Small Land Mammals	Marine Mammals	Birds and Eggs	Marine Invertebrates	Vegetation
Aleknagik	1989	143	54,079.00	13,556.00	8,749.00	21,619.00	1,669.00	2,171.00	2,007.00	450.00	3,859.00
Dillingham	1984	2041	494,486.00	288,651.00	35,649.00	117,878.00	16,612.00	6,067.00	10,807.00	2,488.00	16,328.00
Ekwok	1987	107	85,260.00	48,827.00	7,340.00	20,524.00	6,155.00	0.00	390.00	0.00	2,025.00
Goodnews Bay	*										
Igiugig	1983	47	43,028.00	30,961.00	5,439.00	3,447.00	884.00	183.00	485.00	0.00	1,628.00
Iliamna	1991	98	82,915.00	42,204.00	7,492.00	24,702.00	980.00	4,063.00	1,516.00	321.00	1,637.00
King Salmon	1983	369	81,261.00	37,854.00	5,873.00	36,429.00	1,104.00	0.00	0.00	0.00	
Kokhanok	1992	173	175,639.00	97,626.00	18,325.00	45,658.00	4,931.00	728.00	3,942.00	573.00	3,855.00
Koliganek	1987	186	154,705.00	67,520.00	17,743.00	54,699.00	8,550.00	0.00	2,148.00	240.00	3,878.00
Levelock	1992	111	97,677.00	51,710.00	7,279.00	27,742.00	2,466.00	5,548.00	1,311.00	71.00	1,551.00
Manokotak	1985	308	118,337.00	41,847.00	26,229.00	18,610.00	10,661.00	10,052.00	5,197.00	1,391.00	4,349.00
Naknek	1983	383	72,110.00	39,259.00	7,134.00	24,766.00	554.00	397.00	0.00	0.00	
New Stuyahok	1987	353	247,494.00	144,394.00	12,718.00	67,096.00	16,717.00	207.00	1,382.00	139.00	4,840.00
Newhalen	1991	158	117,716.00	66,192.00	5,925.00	32,229.00	3,863.00	1,310.00	3,276.00	513.00	4,409.00
Nondalton	1983	280	329,274.00	215,447.00	48,946.00	50,323.00	5,498.00	0.00	2,442.00	0.00	6,619.00
Pedro Bay	1996	63	24,931.00	18,269.00	1,626.00	4,560.00	0.00	0.00	135.00	132.00	210.00
Platinum	*										
Port Alsworth	1983	76	27,416.00	18,209.00	881.00	7,205.00	142.00	0.00	332.00	84.00	564.00
Quinhagak	1982	474	363,740.00	162,125.00	70,815.00	49,000.00	6,850.00	58,964.00	13,863.00		2,124.00
South Naknek	1992	134	39,893.00	19,451.00	2,703.00	14,832.00	48.00	269.00	277.00	272.00	2,042.00
Togiak	*		Supplemental data for these communities can be accessed at: http://www.subsistence.adfg.state.ak.us/CSIS/index.cfm/FA/commInfo.summary/CommID/345/Year/1992-								
Twin Hills	*										

*Data currently are not available.

b) Annual Round of Seasonal Subsistence Activities

Because salmon and freshwater fish are the primary resource for subsistence users in the planning area, and because a substantial number of planning area residents also commercial fish, the spring – summer – fall portion of the annual round of seasonal subsistence activities is focused largely on their timing and availability, particularly those of salmon. To a much lesser extent this is also true for migratory waterfowl. Most other resources sought by subsistence harvesters are available year round. In addition to seasonal availability of the resource and periodic fluctuations in resource abundance, the seasonal round is affected by the subsistence user's available time, availability of competing subsistence resources, ability to afford fuel for transportation, and regulatory restrictions.

c) Federal Subsistence Use Areas

Residents of the planning area use all of the blocks of unencumbered BLM land as well as most of the planning area for subsistence purposes. The discussion by block in the wildlife section provides the details of use.

Maps 3.51 – 3.70 are historic subsistence use area maps, recorded by ADF&G in the 1980s and early 1990s (Wolfe et al. 1984; Wright et al. 1985; Morris 1983, 1985, 1986; Endter-Wada and Levine 1992; Fall et al. 1986; Schichnes and Chythlook 1985, 1989, and 1991).

Regulations implementing amendments to the Migratory Bird Act written in 2000 relate to subsistence taking of migratory birds, primarily ducks and geese, but also all water birds and other migratory fowl. These regulations are currently being finalized and implemented.

d) Condition of the Resource

The topic of subsistence has not been addressed previously in any BLM land use planning effort for the planning area. All lands in the planning area that meet the ANILCA section 102(3) definition of Federal public land in Alaska have been managed since 1991 under the Federal Subsistence Program.

Fish and wildlife populations and the habitats upon which they rely in the planning area are in good condition overall, with the exception of the Northern Alaska Peninsula Caribou Herd. Some areas of caribou habitat in the Iliamna blocks of BLM land may be degraded due to overgrazing by caribou (ADF&G 2002c; Valkenburg and Keech 2002). However, no habitat condition surveys have been carried out.

Regional environmental change may alter the quantity and distribution of subsistence resources in the planning area. The potential for extensive and/or intensive mineral resource exploration, extraction, and development as well as development of infrastructure in the region could significantly alter availability, access to, abundance of, distribution of and movement patterns of subsistence resources. Using data from a sample of 98 communities in Alaska, Wolfe and Walker (1987) identified that certain types of economic development can create conditions which diminish subsistence productivity. Construction of roads and settlement entry into roaded areas produce changes associated with lower subsistence harvests, including increased competition for wild resources, increased habitat alteration, and changing community economic orientations away from mixed, subsistence-market adaptations.

As demonstrated by their meaningful participation in the initial scoping process for the Bay RMP/EIS and as reflected in the many substantive subsistence-related comments received, local communities will be in the forefront in addressing potential conflicts, land use actions and issues that may affect the quality, quantity, distribution, access to, and uses of renewable natural resources.

Chapter IV: Environmental Consequences

Chapter IV: Environmental Consequences

A. Introduction

This chapter describes the anticipated consequences or potential effects on the physical, biological, and human environment from implementation of the Alternatives described in Chapter II. An analysis of the environmental impacts associated with each of the Alternatives is required by BLM planning regulations and by the National Environmental Policy Act (NEPA). The analyses presented in this chapter provide an estimate of the environmental impacts associated with each plan alternative. As required by NEPA, direct, indirect, and cumulative effects are examined. The chapter first provides a summary of the methods and the approach used in the effects assessment, describes the type of effects analyzed, and summarizes the assumptions used during the analysis.

Effects are defined as modifications to the environment that are brought about by external actions or events. Effects may be beneficial or adverse, and may be a direct, indirect or cumulative causal effect of a Federal action. Effects are categorized by magnitude (measure of change), extent (size of change), and duration (length of time; e.g. temporary, short-tem or long-term) to ascertain their affect on the environment. Generally, an effect that persists more than a few years is considered long-term. Effects that allow a resource to revert back to a pre-disturbance condition within a few years of the end of disturbance are considered short-term. The magnitude or extent of an effect depends on the current condition of the resource.

Chapter IV is organized into the following main sections:

- Introduction
- Assumptions and Methods
- Direct and Indirect Effects
- Cumulative Effects
- Irreversible and Irretrievable Commitment of Resources
- Unavoidable Adverse Impacts

The Resources, Resource Uses, Special Designations, and Social and Economic sections of this chapter contain analyses of impacts by plan alternative. The order of these sections does not reflect their level of importance.

The sub-section under each heading entitled “Effects Common to All Alternatives” describes impacts that do not vary by alternative. This information is presented to avoid repetition in the Impacts by Alternative sections. Some sections may also include a sub-section entitled “Effects Common to All Action Alternatives (Alternatives B, C, and D);” this section is also intended to avoid repetition. Impacts discussed in either of these two sections will not be repeated. In some instances, the environmental consequences associated with a particular subject may be completely addressed in a discussion under “Effects Common to All Alternatives" – in this case the discussion will not be repeated and the subject may not be addressed again. Impacts that vary between alternatives are addressed under each alternative. Only impacts that arise under an alternative are discussed; conversely, if there are no impacts to a given resource under an alternative, there is no heading or discussion of the resource. Where the resulting impacts from several programs are very similar, they may be grouped under a single subheading (e.g., the Air Quality and Soil and Water Resources section).

Each resource specialist considered the following in their impact analyses: Air, Soil, Water, Vegetation, Fish and Wildlife, Special Status Species, Fire Management and Ecology, Cultural Resources, Paleontological Resources, Visual Resources, Wilderness Characteristics, Forest Products, Livestock Grazing, Minerals, Recreation, Travel Management, Renewable Energy, Lands and Realty Actions, Special Designations (including Areas of Critical Environmental Concern and Wild and Scenic Rivers), Public Safety, Social and Economic Conditions, and Subsistence. If no impacts were identified either by a resource specialist or by the public during scoping, the programs or topics are not discussed further. In cases where impacts may potentially occur, the impacted resource or impacting resource use is discussed in more detail.

Standard operating procedures developed from Federal laws, regulations, and policies are applicable under all alternatives. Standard operating procedures implement policy or management directives, and may result in projects being redesigned or dropped from consideration. Program limitations (e.g., staffing, increased processing times or costs) are not considered impacts and are not discussed in this document. ROPs and Oil and Gas Leasing Stips have been included in Alternatives B, C, and D as plan features in an attempt to eliminate or reduce anticipated impacts.

B. Assumptions and Methods

Information from Chapter III, Affected Environment, was used to identify the effects under each plan alternative. The direct, indirect, and cumulative effects of each and the interplay of those effects with the effects of reasonably foreseeable use and development are analyzed and evaluated in this chapter. The analyses presented are influenced by institutional knowledge of the planning area's resources, information provided by staff and other agency experts, and relevant literature. There are no proposed project developments at the time of this writing.

1. Analytical Assumptions

Assumptions and estimates were made to facilitate analysis. These assumptions establish analytical guidelines and include a reasonably foreseeable (20-year) development model. Assumptions should not be interpreted as constraining or redefining management objectives and actions under the plan alternatives. If no assumptions were made regarding a resource, it is not discussed in the following sections.

- Sufficient funding and personnel would be available for implementation of the final decision.
- Implementation of actions under each plan alternative would be in compliance with State and Federal statutes and regulations, bureau policy, and other guidance and directives.
- The discussion of effects is based on the best available data.

  limited.
- Changing climatic conditions may affect resources in the planning area. Appreciation of climate change may affect future resource management.
- Acreage figures and other numbers used in the analysis are estimates made for comparison and analytic purposes only.
- State and Native entitlements will be met within the next five to ten years. Satisfaction of entitlements will allow for identification of the remaining Federal estate. Resource management of the remaining Federal estate is the focus of this plan.
- State- and Native-selected lands are segregated from mineral entry, 43 *Code of Federal Regulations* (CFR) § 2627.4 (b) and 43 U.S.C. § 1610(a)(1).

- Once land is conveyed out of Federal ownership, resource management on the conveyed land is a prerogative of the new landowner, except fish and wildlife resources management. Per the Alaska Constitution, fish and wildlife management is retained by the State for the common good of all residents.
- Selected but unconveyed land will be managed under this plan, provided the selection is terminated and the land remains in Federal ownership.
- It is currently impossible to identify the location of selected lands that will remain in Federal ownership.
- Interim management (management between selection and conveyance or selection and termination of a selection) is custodial, 43 U.S.C. 1635 (k)(1) and 43 CFR § 2650.1.
- Discontiguous blocks of land present land and resource management challenges. Isolated parcels and parcels identified under the plan alternatives may be considered for exchange or disposal in an effort to consolidate the Federal estate into contiguous blocks of land.

2. Resource Assumptions

a) Air Quality, Soil, and Water Resources

(1) Air Quality

- The air in the planning area is believed to be relatively pristine. Increases in human population, consumption, recreation, tourism and development may affect air quality.
- The most likely causes of deterioration in air quality in the Bay planning area will be smoke and gases from wildland fire, dust from travel on unpaved roads, and dust and exhaust from new construction and development.

(2) Soils

- The majority of the soils present in the planning area are inceptisol (a soil so young that horizons have just begun to form: especially prevalent in tundra areas). Histosol (a worldwide soil type rich in organic matter, as peat, especially prevalent in wet, poorly drained areas) makes up a small percentage of the soils in the planning area. There is very little soil formation with either type, which may present erosion and reclamation challenges.
- Permafrost is found intermittently throughout the planning area. The warming trend is fostering major changes in soil moisture, organic matter, vegetation patterns, and weathering patterns. Changes will affect carbon and nitrogen cycles and gaseous emissions.
- Frost heave and slumping may affect soils.

(3) Water Resources

- Demand for clean water will increase in proportion to increases in population, recreation, and development. Water quality will be managed through implementation of Required Operating Procedures and compliance with applicable Federal and State laws and regulations.

b) Vegetation

- Demand for healthy fish and wildlife habitat, particularly riparian; and wet and dry tundra habitats, will continue and may increase. Subsistence use of various vegetation types present in the planning area will also continue and may increase. Vegetation provides a rich habitat for fish and wildlife. Human use of vegetation includes the gathering of firewood and logs for home use and light construction, and subsistence gathering of berries and a variety of plants for food and crafts.
- Natural and human-caused fire events are expected to increase should the current drying trend and bark beetle infestation continue. In the past, this region had few fires due to the well-watered

nature of the area and the marine influence. Fire suppression efforts will continue in areas near villages and where wildland fire would produce undesirable resource effects.

c) Wetland-Riparian

- It is preferred that wetlands and riparian zones be maintained in a proper functioning condition. Increases in human population, consumption, recreation, tourism and development may stress riparian zones and wetlands. Projects that pose a threat to the proper functioning condition of watersheds, riparian zones or wetlands will be subject to constraints developed through project-specific NEPA analysis. Placer mining will affect the proper functioning condition of watersheds, riparian zones and wetlands.

d) Invasive Plant Management

- Vegetation in the planning area is predominantly pristine and free of invasive non-native plants. Inventory efforts will continue to identify specific occurrences of invasive plant species. Invasive plant species reduce habitat quality and quantity.

e) Wildlife, Fisheries and Aquatic Habitats

(1) Wildlife

- BLM lands provide seasonal and year round habitats that help to sustain the diversity, abundance, productivity and distribution of wildlife populations in the planning area.
- Actions taken to benefit the habitat of a particular species of fish or wildlife may have beneficial or adverse affects on other species that are dependant on the same habitat.
- Demand for a sufficient amount of wildlife habitat, particularly game species habitat, may increase during the life of the plan.
- Wildlife populations will fluctuate in natural cycles during the life of the plan.
- Since wildlife moves freely, it is susceptible to impacts from actions taken by other landowners.
- Habitat disturbance may result in wildlife displacement.
- Climate change may stress some wildlife species. Changes in vegetative regimes will likely result in the displacement of some species while allowing for the immigration of others.

(2) Fisheries and Aquatic Habitats

- Increases in human population and consumption will result in increased pressure on fisheries.
- International and national trends to protect and manage wild fish stocks will continue.
- Increases in human population, consumption and development raise the potential of adverse impacts to aquatic habitat.
- BLM will continue to manage and protect important spawning, rearing, over wintering, and migratory fish habitat.
- BLM will cooperate with the Alaska Department of Fish and Game to preserve the genetic integrity of Alaska's wildstock of resident and anadromous fish populations.

f) Special Status Plant and Animal Species

- Continuing current monitoring programs and adding new wildlife inventories and monitoring may identify additional Special Status Species on BLM lands, or may document the expansion of known ranges of species currently on the BLM Alaska's Special Status Species list.
- Nationally, there will be a continuing need to afford wildlife protection under the Endangered Species Act.

- There are two endangered species, one threatened species, one candidate species, and numerous sensitive species present in the planning area. One plant on BLM-Alaska's Special Status Species list has been documented on BLM lands in the planning area. The need to protect these species will increase as land use and resource development increases.

g) Wildland Fires and Fuels Management

- Fire is an essential renewing force in interior forest (taiga) ecosystems. 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 forest communities from late successional species such as spruce, 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 interior forests (taiga).
- Fire is not a usual or consistent change agent in the coastal temperate forest. However, with increasing temperature and drying, the fire regime in the planning area may change. Wildland fire frequency may increase as a result of climate change, human population growth and development.

h) Cultural Resources

- Undertakings on BLM lands have the potential to damage cultural resources. Cultural resources are considered before any undertakings are authorized (Section 106 of the National Historic Preservation Act) and damage is avoided or mitigated before an undertaking is begun.
- All cultural resources are treated as potentially eligible to the National Register of Historic Places.
- Inventory efforts to identify cultural resources on BLM lands will continue, and cultural resources are evaluated for eligibility to the National Register of Historic Places.
- Uses of cultural resources include scientific research, interpretation, preservation for future research, and traditional cultural uses. These uses will continue into the future.

i) Paleontological Resources

- Undertakings on BLM lands have the potential to damage paleontological resources (fossils). Significant paleontological resources will be avoided or otherwise mitigated whenever possible.
- Authorized use of fossils includes scientific research, interpretation and educational outreach and limited collection of non-vertebrate fossils by the general public.

j) Visual Resources

- Scenic resources will remain in demand from local residents who want to maintain scenic quality, local businesses that depend on tourism and an increasing level of recreational users over the life of the plan. Increasing tourism will increase the value of scenic views, undeveloped landscapes and open spaces.

3. Resource Use Assumptions

a) Forest Products

There are few opportunities to utilize forest products for anything other than personal use, as there are few forests on BLM lands in the planning area, and the trees are not considered to be of commercial value. While forests are reportedly expanding due to the warming and drying climate

trend, the bark beetle infestation and other insect invasions are also spreading. The current situation for forestry is not expected to change during the life of the plan.

b) Livestock Grazing

- No livestock grazing currently occurs under permit, nor has any interest been expressed in livestock grazing. The only anticipated grazing uses might be incidental use associated with recreational and commercial use of pack animals for hunting, fishing, and other back country recreation. Authorizations for grazing by pack animals will be examined on a case-by-case basis.
- No requests for reindeer grazing permits are anticipated. There are no current reindeer grazing authorizations within the planning area.

c) Minerals

(1) Leasable Minerals

- No leasable mineral development on BLM lands, with the exception of natural gas development, is anticipated to occur within the life of the plan.
- Oil and gas exploration would occur as described in the Reasonably Foreseeable Development (RFD) Scenario. The RFD predicts activity based on geologic potential as well as past exploration, accessibility, and lack of existing infrastructure. The following is reasonably foreseeable to occur within the planning area:
    - One seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected over the next 20 years. Short term disturbance would average one acre per mile; however, long term disturbance will be minimal. The seismic surveys would begin by collecting 2-D seismic lines through the use of shot-hole or Vibroseis. The crew size for this operation would be 20-50 (35-65 for 3-D seismic), and the job would be completed in 2-4 weeks. Support equipment would be barged either to Dillingham, Naknek, or Pederson Point. A central “base” would not be established, as individual staging areas (164’ x 164’ or 650’ x 650’) would be used. The entire operation would be accomplished during the winter months if conditions were favorable. The acquisition of 3-D seismic data is a key step in the exploration process. It is used to identify and map the prospects of interest. Successful and accurate interpretation results in more efficient drilling with fewer dry holes, better drill pad positioning and higher petroleum recoveries. For the purposes of analysis, it is assumed that the drilling of holes (shot holes) by off-road, track-mounted drills and the detonation of explosives (shots) placed in the shot holes would account for approximately 46% of the source points total. Heli-portable drill rigs would access approximately 44% of the source points on steeper terrain (slopes in excess of 20%). The vibroseis-mounted vehicles would access about 10% of the source points on off-road, less steep trails (less than or equal to 15% slopes). It is assumed that significant portions of the contract area are inaccessible for locating source and receiver points due to the steep topography.
    - Two exploratory gas wells would be drilled during the first five years of the plan. If possible, the operator will use nearby existing facilities for housing and feeding its crew. If the facilities are not available, a temporary camp of trailers may be placed on the pad. One of the two wells would have an appreciable gas show, resulting in drilling one field delineation well. The delineation/confirmation well is likely to be required before a commitment is made to develop the project and a contract is signed with the local utility company. It is assumed that the discovery field will comprise 1,280 acres and will produce from two wells located on two drill sites, one mile apart. Typically, after analyses of the data and subsequent geotechnical description of the reservoir, exploration wells are not used for production purposes. Under this scenario, however, both the exploration well and delineation well are used for production of natural gas since pipeline construction costs and additional well drilling costs render the project sub-economical.

- Given a 20-year plan life, it is assumed that a total of six exploration wells would be drilled. Low ground pressure vehicles in conjunction with helicopters would transport equipment and crews to the drill sites.
- One gravel staging area (six acres) would be developed to receive and store equipment for the winter exploration program.
- One gas field likely would be developed in the Koggiling Creek planning block (this planning block was picked due to its proximity to the Dillingham market). It is assumed that the field would contain 18 bcf of gas reserves. Production from this field would come from the discovery well and delineation well, spaced one mile apart. The drilling of each well would disturb six acres. There would be up to six gas exploration wells plus one additional gas delineation well.
- The gravel pads would be joined by a 35-foot wide, 5-foot thick gravel road (40,000 cubic yards per mile). The road would only link the drilling pads and one section would also serve as an airstrip. Gravel required for construction would likely be mined during winter months to reduce impacts. The source would likely come from the closest feasible gravel source to the gas field, using one or two separate gravel deposits (10-20 acres in size).
- A typical life of a producing gas well is 10 to 12 years. Therefore, one or both gas production wells may be plugged after the planning period. Field abandonment may take from 2 – 5 years after production ends.
- Natural reservoir pressure would be adequate to push the gas through the 3-inch transmission pipeline 40 miles to the Dillingham market. No compression facility would be needed. The pipeline would be constructed during the winter months to reduce impacts, dependent upon the presence of sufficient snow cover and sufficiently cold temperatures to freeze the ground.
- One of the production wells would serve as an in-field underground injection well (annular injection) to dispose of drilling waste, wastewater, spent fluids, chemicals and the produced water. The ability to dispose of fluid downhole is dependent on the existence of suitable subsurface formations, the formation fluid content, proximity to any hydrocarbon bearing zones and the availability of an annulus between the casing strings set in the well.
- When there is insufficient snow cover for oil and gas related operations, low ground pressure vehicles will be used in conjunction with air support.

- This level of development is assumed for the purposes of impact analysis in the EIS. Actual exploration, development, and production may vary considerably based on exploration results, price of oil and gas, and marketability. Additionally, to market the gas in Dillingham, the current diesel plant would need to be converted to gas. For this to be economical, funding would need to come from energy subsidies derived from the State of Alaska or the Federal Government.
- An ongoing joint State/Federal program to determine the feasibility of developing coal bed natural gas (CBNG) for the benefit of rural communities does not plan to explore the Bristol Bay area at this time. If CBNG were available close to a rural community, the development would occur on non-BLM lands. BLM lands in the planning area are not in proximity to the three largest communities – Dillingham, Naknek and King Salmon. Transportation costs associated with building a gas pipeline would render CBNG development uneconomical.

(2) Locatable Minerals

- Chapter III summarizes the activity levels in the planning area based on surface disturbance tabulated from mining plans and notices of mining operations submitted through the Annual Placer Mining Application and Permit process for both placer and hard rock operations. The RFD for locatable minerals (BLM 2006) summarizes the historic data characterizing mineral occurrences by commodity and genetic ore deposit modeling, as well as differentiating between placer and lode mining methods. Based on this information, a placer mine scenario was developed around a medium-scale (250 cubic yards per day) placer mine as the most likely mining activity to occur in the planning area in the reasonable future. The typical placer mine would result in a maximum of 1-5 acres of surface disturbance at any given point in time. Two similar lode mining scenarios have been dropped from further consideration as it was determined that due to the length of time needed to bring a lode deposit to production and the undeveloped

nature of the potential lode deposits, there would be no lode mining development, particularly on BLM lands, during the life of the plan.

- Placer Mining - Placer mining for gold and platinum is the most common type of mining that occurs in the planning area. Placer platinum is the most likely development target while placer gold is the most likely target for exploration and development. Mineral resource development in the planning area is occurring primarily on State, Native, and private lands. This can be attributed to the patenting of large numbers of Federal mining claims staked during the gold rush era and to the State and Native Corporations targeting mineral resources for selection under their respective entitlement statutes.

- Additional exploration should prove that development of placer properties in the Bonanza Creek, Goodnews Bay/Snow Gulch, Iliamna/Fog, Kijik Lake, Platinum, and Shotgun Hills areas within the planning area are feasible. These deposits would probably be developed either as a small surface open-cut sluice box operation or as a bucket-line dredge operation (Goodnews Bay Platinum Mine).

- Placer mining activity in the planning area is expected to occur in the Snow Gulch part of the Goodnews Bay/Snow Gulch area on BLM lands. There are expected to be 1 to 3 small scale placer operations employing 3 to 5 people at each location. Activity would most likely occur on Barnum Creek, Domingo Creek, Faro Creek, or on Jacksmith Creek. Table 4.1 provides information on anticipated new placer mines under each Alternative.

Table 4.1 Anticipated New Placer Mines

	Alternative A	Alternative B	Alternative C	Alternative D
Anticipated new placer mines on BLM Lands	0	1-3	0	1-3

- Hard Rock Exploration and Development - Historic producers of hard rock for mercury operated on a small scale in the early part of the twentieth century. Today, development projects involve gold and copper from developing new and old prospects. Most of these are located on State and Native lands in the Iliamna/Kvichak area. Hard rock exploration is up in the region, generated by the increasing price of gold and increased interest in mineral occurrences on State and Native lands.

- Elsewhere around the State, exploration has focused on deposits of rare metals (nickel and platinum group metals [PGM]) that have occurred in the Broxson Gulch area north of the Denali Highway, East Central Alaska Range. Exploration results in this area indicate that there is potential for a significant discovery of these metals. This interest, coupled with the rising price of platinum, has sparked recent exploration efforts in Goodnews Bay along the Salmon River where platinum has historically been mined by placer methods.

- Additional exploration should prove that development of lode properties in the Bonanza Creek, Goodnews Bay/Snow Gulch, Iliamna/Fog, Iliamna/Kvichak, Kasna Creek, Kemuk Mountain, Kijik Lake, Pebble Copper, Platinum, Shotgun Hills, and Sleitat Mountain areas in the planning area are feasible. These deposits would probably be developed either as open pit or as cut and fill underground mines. Surface disturbance will vary depending on the mine design, construction of roads, power line corridors, selection of tailing disposal method, and other factors. An order of magnitude estimate would be in the range of 1,300-3,400 acres. Road building, airstrips, and associated material sites account for the largest surface disturbance followed by mine, mill, tailings disposal site,

and camp facilities. While most of these disturbances would occur on State or Native lands, some road construction or power lines could cross BLM land.

- The Pebble property, on State lands near Lake Iliamna, is currently in the pre-production phase of exploration and development. This plan is a hard rock, combination open pit and underground mine with a mill that combines free milling processes with floatation and vat chemical leach circuits to recover gold and copper. This mill could include ore from locations situated close by, such as the Pebble South and the Big Chunk (BC) properties. More than 100 employees would contribute to the Iliamna area economy and the mine mill complex could draw power from the Homer utility grid.

- Table 4.2 provides information about anticipated new locatable lode exploration projects under each Alternative. Anticipated locatable lode exploration activity in the planning area is expected to occur in the Snow Gulch part of the Goodnews Bay/Snow Gulch and Iliamna/Kvichak areas on BLM lands. There is expected to be 1 to 2 small scale open pit operations employing up to 275 people at each location. Open pit operations would most likely occur in the Faro Creek area on Figure Four and Island mountains. There is expected to be 1 to 2 small scale underground operations employing up to 300 people at each location. Underground operations would most likely occur in the Iliamna/Kvichak area in the vicinity of the Nushagak River and Klutuk Creek.

Table 4.2 Anticipated New Locatable Lode Exploration Projects

	Alternative A	Alternative B	Alternative C	Alternative D
Anticipated locatable lode mines on BLM lands	1	2-4	0	2-4

(3) Salable Minerals (Mineral Materials)

- Salable and industrial minerals including sand and gravel, building stone, pumice, clay, and limestone are common throughout the planning area.

- Active rock quarries are located on Native land near Dillingham, Platinum, and Goodnews Bay. Numerous sand and gravel pits exist near Dillingham and King Salmon, mostly located on private land. Most communities in the planning area have a small gravel pit for local use.

- No active mineral material contracts, community pits, or free-use permits issued by BLM exist within the planning area. Most of the sites in the planning area are roadside material sites owned by villages, the State, or private individuals.

- Mineral material sales would occur under Alternatives B and D in association with oil and gas development. These impacts are discussed under leasable minerals.

- Future sand and gravel needs for the planning area will be well supplied by the existing sources on private land.

- Expected future needs will be project driven, related to the development of mines, oil and gas exploration and production, roads, airstrips/airports, village improvements, and other infrastructure needs.

d) Recreation

- Because much of the BLM land within the planning area consists of isolated parcels that are not accessible by road, recreational activity increases, if any, will be focused on hunting and fishing, recreational OHV use (including snowmachines), hiking, canoeing, and rafting.

- Currently, BLM manages six Special Recreation Permits (SRPs) within the planning area, with the majority operating on State- and Native-selected lands. Commercial recreation applications are predicted to increase from the current six to as many as ten applications in the next five years. These are anticipated to be for large game guided hunting operations in the Iliamna Lake area in the eastern planning area region.

- Local communities and businesses appreciate an economic benefit from professional guide service activities.

- A comprehensive trails and travel management plan is proposed to further assess potential impacts, conflicts, and use levels for SRPs and air transporters, to be completed within five years from plan approval.

- Public health and safety issues for visitors will receive priority consideration in the management of public lands. Demand for safe visits will increase with increasing numbers of public land users.

- Wilderness characteristics of naturalness, solitude, primitive and unconfined recreation are expected to remain in demand from local residents and those visitors who want to experience the primitive and unspoiled nature of the local landscape. Businesses that depend on natural landscapes for their excursions, such as ecotourism, guided hunting, and guided sport fishing, will favor an area that possesses wilderness characteristics. Recreationists who favor a backcountry experience for their activities will also seek lands that have wilderness characteristics (BLM 2005b).

e) Travel Management

- The use of Off-Highway Vehicles (OHVs) for hunting and subsistence activities will remain stable or increase slightly. Recreational use of OHVs is expected to remain stable or increase slightly.

- Changes in OHV design and technology will continue, potentially contributing to reductions in resource impairment although enabling OHV users to range into areas that were once inaccessible.

- Future demand for roads to support mineral exploration and development or other resource developments on or across BLM lands may increase in proximity to villages and communities. Current demand for road development is limited due to the nature and location of the lands within the planning area.

- It is generally accepted practice that OHV designation starts at the “limited” classification.

- No transportation or utility corridors have been identified in this plan. BLM will entertain transportation and utility corridor requests through project-specific NEPA analyses.

- From public scoping input, there is community support to manage off-highway vehicle use while providing access to public lands.

- The amount and patterns of OHV use in the planning area is unknown. A comprehensive trails and travel management plan is proposed for completion within five years of approval of the Bay plan.

- The use of OHVs within the planning area is centered around existing villages and communities such as Dillingham, Goodnews Bay, and King Salmon.

- The need for access to public lands may increase slightly as Native corporation entitlements are met, and if restrictions on use of those private lands are implemented by the Native Corporations. The public easements reserved through Section 17(b) of ANCSA will become more important during the life of the plan. The need to identify and maintain these easements will increase.

- For the purposes of this document, OHVs include snowmachines. However, most impacts described in this analysis result from OHVs used during snow-free months. Where impacts are specific to snowmachines, they are described as such.

f) Renewable Energy

- As the cost of fossil fuels rises, Federal, State, and local governments, private concerns and individuals in the planning area may seek alternative sources of renewable energy. However, BLM lands are not located in proximity to villages, and the probability of receiving applications for use of BLM land for renewable energy development is low.

g) Lands and Realty Actions

- Disposal or Land Exchange – Land conveyance to the State and Native corporations will be completed within the life of the plan. BLM may consider land exchanges to resolve split estate issues. Land exchanges will not be pursued until State and Native entitlements are resolved. Isolated parcels of land in the Iliamna East and Iliamna West Blocks and two sections east of Aleknagik are identified in this RMP/EIS for potential exchange. Isolated parcels that remain in Federal ownership after all land conveyance is completed may also be considered for future exchange. Land exchange identified under Section 206 of the Federal Land Policy and Management Act (FLPMA)(1976) is the preferred method of land ownership adjustment, and will be used to consolidate the larger, discontiguous tracts of BLM lands. Disposals of land through sales will be considered on a case-by-case basis.

- Land Ownership Adjustment – State and Native corporation land entitlements will be met within the life of the plan. BLM may retain management of approximately 14% of lands currently selected by the State and Native corporations. Once land entitlements are resolved, there may be a need, both internally and externally, for land ownership adjustments to improve the manageability of Federal and non-Federal lands.

- ANCSA 17(d)(1) Withdrawals – Revocation of ANCSA 17(d)(1) withdrawals will open the affected lands to mineral entry. Recommendations for revocation of ANCSA 17(d)(1) withdrawals would be implemented as described in each Alternative. Should new withdrawals be proposed to take their place, existing withdrawals will be retained until new withdrawals are in place.

- Agency Withdrawals, (other than ANCSA 17(d)(1)(FLPMA Section 204)) – Other withdrawals identified in the planning area are for administrative sites, power sites, and military purposes. Two water power withdrawals, seven military withdrawals, and nine administrative site withdrawals, comprise approximately 38,500 acres within the planning area. Creating, modifying, renewing or revoking withdrawals for other Federal agencies is an ongoing function of BLM. As populations grow throughout the region, pressures placed on resources will continue to escalate, which may impact the number of requests from Federal agencies for withdrawals. Demands for

withdrawal review may increase from the state and local governments. As part of the land planning process, BLM will review existing withdrawals.

- ANILCA 906(e) "TOP FILINGS" by the State of Alaska would fall into place. Presently, State of Alaska “Top Filings” are BLM lands since the State selection is a future interest that has yet to attach. Upon revocation of ANSCA 17(d)(1) withdrawals, a State “Top Filing” will attach, the lands will become State-selected and subject to conveyance out of Federal ownership.

- Land Use Authorizations and Rights-of-Way. As the State and Native land entitlements are met, there will be a decreasing demand for land use authorizations under 43 CFR §2920 and 43 CFR §2800. The remaining Federal estate will require land use authorizations for permitted activities, rights-of-way, R&PP leases, and other realty actions. Demand will fluctuate with the degree of economic growth and infrastructure development occurring within and adjacent to the planning area.

- Energy Development – There may be a future demand for energy related rights-of way such as pipelines, electric power lines, energy development and distribution facilities, roads, and water facilities.

- ANCSA 17(b) Easements - BLM would continue to manage ANCSA Section 17(b) easements.

- ANCSA 17(b) easement management will be transferred to the National Park Service or the U.S. Fish and Wildlife Service for those easements that access lands administered by those agencies or those easements that are wholly within the boundaries of a park, preserve, Wild and Scenic River corridor, or refuge.

- BLM will continue to mark and verify ANCSA 17(b) easement locations as staffing and budgets allow.

- BLM reserves easements as ANCSA conveyances occur. BLM would continue to identify, sign, map, monitor use, and realign 17(b) easements, with priority based on:

    - Easements accessing lands that are permanently managed by BLM or are important to BLM programs.
    - Easements receiving high public use.
    - Easements required in implementing an activity or implementation plan.
    - Easements where landowners have made a request to work cooperatively (Often support of the landowner is essential to resolving signing issues, realignment, mitigating damage, and addressing other issues).
    - Easements where signing or education would mitigate environmental degradation.

- Access – BLM will continue to manage ANCSA 17(b) easements that access public lands. An effort will be made to transfer ANCSA 17(b) easements to other Federal agencies and consider agreements to transfer management to State and local entities on a case-by-case basis.

- ANCSA 17(b) access needs are not expected to diminish. BLM is able to transfer jurisdiction of a 17(b) easement to the State of Alaska or to a political subdivision if the State agrees to it.

4. Special Designation Assumptions

a) Areas of Critical Environmental Concern

Areas designated as Areas of Critical Environmental Concern (ACECs) will be managed to maintain the values for which they were designated.

b) Wild and Scenic Rivers

Recreational use of the river corridors being considered for proposed Wild and Scenic River (WSR) designation would increase. If the proposed corridors were designated, prescribed management would protect the Outstandingly Remarkable Value (ORV) for which the rivers were designated, requiring a mix of education and regulatory measures.

Rivers found to be suitable for addition to the National Wild and Scenic Rivers System with the publication of the Record of Decision will be managed to protect water quality, free-flowing nature, and Outstandingly Remarkable Values until such time as Congress acts on proposed designation legislation.

5. Social and Economic Assumptions

a) Public Safety

Public health and safety issues will receive priority consideration in the management of public lands. Demand for safe visits will increase with increasing numbers of public land users.

b) Social and Economic Conditions

While the population in some villages may decrease, overall the population in the Bay planning area is expected to increase during the life of this plan.

c) Tribal Treaty Rights

As a government agency, BLM will maintain a government-to-government relationship with federally-recognized Indian Tribes. Residents of these areas utilize Native lands as well as BLM lands for traditional subsistence activities, and will continue to do so. Through this planning process, BLM has initiated consultation with different village entities. This consultation will continue throughout the life of the plan.

6. Subsistence Assumptions

BLM will continue to play a role in the management of subsistence resources on Federal public lands. Based on current trends, the demand for subsistence resources will stay the same or will increase during the life of the plan.

C. Direct and Indirect Effects to Resources

1. Introduction

Direct, indirect, and cumulative impacts are considered in effects analyses, consistent with direction provided in 40 CFR 1502.16.

- ***Direct effects*** are caused by an action or by implementation of an Alternative and occur at the same time and place as that action or implementation.
- ***Indirect effects*** also result from an action or implementation of an Alternative, but usually occur later in time or are removed in distance from the action or implementation, but are still reasonably foreseeable.
- ***Cumulative effects*** result from individually minor but collectively significant actions over time. A cumulative impact is an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency, entity (Federal or non-Federal), or individual undertakes such other actions (40 CFR 1508.7 and 1508.8).

Actions anticipated during the life of the plan on all lands in the planning area, including private, State, Native corporation, and Federal (FWS and NPS) lands, have been considered in the analysis to the extent reasonable and possible. Decisions about other actions occurring within the planning area could be made by many public and private entities, though the location, timing, and magnitude of these actions are not well known. Assumptions about actions outside of BLM's jurisdiction that are considered in the cumulative effects analysis include:

- ANCSA and State land entitlements will be fulfilled within the life of this plan.
- BLM will retain approximately 14% of the lands currently selected by the State or Native corporations, while approximately 86% will be conveyed.
- Land sales (settlement and remote settlement areas) will continue on State lands consistent with the Alaska Department of Natural Resources area plans.
- Mineral exploration and development will increase on State and Native lands.
- Mineral exploration and development will remain minimal in National Parks and Preserves within the planning area, and in the Wildlife Refuges.
- National Parks, Preserves, and Wild and Scenic Rivers within and adjacent to the planning area will continue to manage for remote, primitive recreation experiences. Access into parks will continue to be primarily by air and boat.
- National Wildlife Refuges within or adjacent to the planning area will continue to be managed for wildlife and compatible remote, primitive recreation experiences. Access into refuges will continue to be primarily by air and by boat.
- Road construction will increase on State and Native corporate lands in support of local communities, and mineral exploration and development.
- Communication site development will increase.

Irreversible or irretrievable commitment of resources and unavoidable adverse impacts are discussed after the Cumulative Impacts section.

- *Irreversible commitment of resources* results from actions in which resources are considered permanently changed.
- *Irretrievable commitment of resources* results from actions in which resources are considered permanently lost.

- *Unavoidable adverse impacts* are those that remain following the implementation of mitigation measures, and include impacts for which there is no mitigation.

Treatment of BLM Critical Elements

BLM's National Environmental Policy Act (NEPA) Handbook, as supplemented with BLM Instruction Memorandum No. 99-178, identifies 14 "Critical Elements of the Human Environment" that must be addressed during environmental analysis (BLM 1988b; BLM 1999):

1. Air Quality (The Clean Air Act of 1955, as amended)
2. Areas of Critical Environmental Concern (ACECs) [Federal Land Policy and Management Act (FLPMA) of 1976]
3. Cultural Resources (National Historic Preservation Act of 1966, as amended)
4. Environmental Justice [Executive Order (E.O.) 12898]
5. Farm Lands, Prime or Unique (Surface Mining Control and Reclamation Act of 1977)
6. Floodplains (E.O. 11988, as amended)
7. Invasive, Non-native Species (Lacey Act, as amended, Federal Noxious Weed Act of 1974, as amended; Endangered Species Act of 1973, as amended; and E.O. 13112, Invasive Species, 02/03/99)
8. Native American Religious Concerns (American Indian Religious Freedom Act of 1978)
9. Subsistence [Alaska National Interest Lands Conservation Act (ANILCA) of 1980]
10. Threatened or Endangered Species (Endangered Species Act of 1973, as amended)
11. Wastes, Hazardous or Solid (Resource Conservation and Recovery Act of 1976, and Comprehensive Environmental Response, Compensation, and Liability Act of 1980)
12. Water Quality, Surface & Ground (Clean Water Act of 1987; Safe Drinking Water Act Amendments of 1996; E.O. 12088 amended by E.O. 12580, and E.O. 12372)
13. Wetlands/Riparian Zones (E.O. 11990)
14. Wild and Scenic Rivers (Wild and Scenic Rivers Act of 1968, as amended)
15. Wilderness (FLPMA of 1976 and Wilderness Act of 1964)

All of the above but one is addressed in this environmental impact statement. The missing element is Farm Lands. There are no Farm Lands, Prime or Unique, within the planning area.

No Prime or Unique Farmlands, designated Wild and Scenic Rivers, designated ACECs, or designated Wilderness currently exist on BLM lands in the planning area (NRCS 2006). Impacts related to proposed designations or findings are described. The remaining elements are identified and addressed in the relevant sections of Chapters III and IV.

Availability of Data and Complete Information

The best available information relevant to the decisions to be made was used in development of the RMP. Considerable effort over a two-year period has been made to acquire and convert resource data into digital format for use in the plan. Data has been acquired from BLM sources and from outside sources such as the State of Alaska, U.S. Fish and Wildlife Service, and National Park Service.

Some information was unavailable for use in developing this plan, usually because inventories have not been conducted or are not complete. Specific data unavailable included:

- Inventory and assessment of trails
- Detailed soil surveys
- Recreation use information for waterways
- Definitive Special Status Species and habitat occurrence (plant and animal); delineation of identification and conservation measures
- Riparian assessments

- Certain key wildlife seasonal and life function habitat occurrences; use/concentration area identification and delineation
- Watershed assessments
- Cultural Resource inventories of uplands and smaller drainages

Because of these deficiencies, some impacts cannot be quantified. Impacts are projected in qualitative terms or in some cases are described as unknown. Subsequent project-level analysis will provide the opportunity to collect and examine site-specific inventory data necessary to determine the appropriate application of the RMP level guidance. In addition, inventory efforts identified in Chapter II will continue to update and refine the information used to implement this plan.

2. Resources with Effects Common to All Alternatives

a) Air Resources

Much of the planning area is designated as unclassifiable with regard to Air Resources (USEPA 2004a). Regardless of the selected Alternative, air resources in the Bay planning area will be affected. Although there will be varying degrees of effects throughout the planning area, it is expected that Alternative B may result in a greater magnitude of impacts due to potential mineral development or OHV activity. Due to the scattered nature of BLM lands and the low potential for reasonably foreseeable mineral development, the impacts on air resources would be minimal under all Alternatives. Impacts from OHV activity will be localized and would be expected to dissipate quickly.

b) Climate, Physiography, and Geology

The proposed Alternatives would have little direct or indirect effect on climate in the planning area. There is a moderate likelihood of development associated with locatable and salable minerals, and a low to moderate likelihood of development associated with leasable minerals on BLM lands in the planning area. There is a small amount of OHV use on BLM lands in the eastern part of the planning area, but effects on the physiographic and geologic resources are expected to be negligible.

c) Floodplains

The land management actions proposed under any Alternative would have minimal effects to floodplains. Alternative B has the potential to impact more areas due to mineral development and OHV activity. Impacts on floodplains under Alternative B would be greater in magnitude than under any of the other Alternatives. However, the scattered nature of BLM lands and low potential for reasonably foreseeable mineral development indicate that effects on floodplains would be minimal under all Alternatives.

The potential impacts from exploration and mining for locatable (metalliferous minerals) in floodplains under any of the Alternatives could include the destruction of the structure and stability of the floodplain. Impacts under all Alternatives would be reduced with the implementation of Required Operating Procedures and mitigation measures developed through project-specific NEPA analysis.

d) Wildlife and Special Status Species

Some sensitive migratory bird species are subject to subsistence hunting by Alaska Natives. Recent changes in the Migratory Bird Treaty Act relative to subsistence taking of migratory birds refers to all migratory birds including waterfowl, shorebirds, and other species groups. These populations are monitored by the US Fish and Wildlife Service (USFWS). Spring and summer migratory bird harvests are managed under regulations implementing the Migratory Bird Treaty Act Amendments. BLM provides input as necessary to the USFWS regarding decisions on harvest regulations but has no direct role in managing the take of these species. BLM is involved indirectly in allowing access across its lands, but

these transportation routes and historic trails serve a multitude of purposes in addition to access for hunting. Activities on BLM lands that require permits are reviewed for consistency with applicable wildlife conservation laws such as the Bald Eagle Protection Act, Migratory Bird Treaty Act, and the Marine Mammal Protection Act.

Mitigation measures are developed through project-specific NEPA analysis to avoid listing BLM sensitive species under the Endangered Species Act.

Some Special Status Species are subject to subsistence hunts by Alaska Natives (e.g., Steller's eider, Steller sea lions), but the annual take is managed under provisions of the Marine Mammal Protection Act, and the Endangered Species Act (ESA), which provide exemptions for certain qualifying Alaska Native subsistence harvests. Because many marine species are susceptible to oil pollution, any activities on BLM lands that have the potential for accidental release of oil or other harmful materials into the marine and coastal environments receive careful scrutiny for prevention and mitigation during the permitting process under all Alternatives. These measures would protect T&E species from potential mortality as well as decreased reproductive rates. Other protective measures for T&E species and their habitats would also be considered under all Alternatives during the permitting process for other types of activities such as mineral and road development.

BLM is required by law and by its own policies to cooperate and coordinate with the USFWS and National Marine Fisheries Service (NMF) to develop and implement appropriate conservation measures for T&E species on BLM lands. This applies to all the Alternatives and all regions of the planning area. The policy common to all Alternatives is to be consistent with the ESA.

Critical habitats for Steller sea lions and Steller's eiders have been established, and critical habitat for other listed species has been designated by the USFWS and NMFS (no critical habitat has been identified on BLM lands in the planning area). Recovery plans have been established for Steller sea lions by the NMF and for Steller's eiders by the USFWS. BLM has not undertaken any specific monitoring or surveys for Special Status Species on its lands.

e) Visual Resources

This analysis considers a range of alternatives for Visual Resource Management (VRM) Classification, as presented in Chapter II. All VRM class assignments are within classes III and IV. Assignment of these VRM classes does not preclude resource development, but assigns VRM objectives for protection of visual resources.

3. Direct and Indirect Effects to Air Quality, Soils, Vegetation, and Water Resources

Air quality, soils, vegetation, and water resources have been grouped together within this analysis because impact to one resource is typically linked to impact to another resource. For example, vegetative removal results in the loss of protective cover for the soil, subsequently causing erosion by wind and water, resulting in impacts to air and water resources.

a) Effects Common to all Alternatives

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to air quality, soils, vegetation, or water resources: Cultural Resources, Paleontological Resources, Visual Resources, Renewable Energy, Social and Economic Conditions, and Subsistence.

(1) Effects to Soils, Vegetation, and Air from Climate Change (Common to All Alternatives)

One aspect of environmental studies is to anticipate how soils will change with regional environmental warming. Changes will affect carbon and nitrogen cycles and gaseous emissions, including the release of greenhouse gases (Birkeland 1999; Lal et al., 1995) and the increased uptake of carbon dioxide and the production of oxygen. Major changes include: (1) changes in soil moisture, with wetter soils experiencing greater leaching, and drier soils accumulating salts, (2) changes in organic matter, which will reach equilibrium at new levels as a function of changing climate-vegetation patterns, and (3) greater weathering will release more nutrients, which could influence biomass production, impacts which will vary from place to place.

Climate change has the potential to impact air quality as soils may become drier resulting in increased erosion potential by wind, thus increasing dust and particulates. The warmer, drier climate may cause increased tree mortality resulting in increased fire frequency (USDA 2004; Juday 1996; Fleming and Volney 1995) in areas that to date have seen few fires (USDA 2004; UAF 1999). Smoke impacts local air quality with potential to provide regional impacts. Fire degrades or eliminates vegetation resulting in increased erosion potential of soil by wind.

(2) Effects to Soils, Water, Vegetation and Air from Vegetation Management (Common to All)

Effective vegetation management will limit disturbance and thermokarst subsidence to permafrost soils, blowing dust and airborne particulates, and control sediment runoff into waterbodies.

(3) Effects to Soils, Water, Vegetation and Air Quality from Fire and Fire Management (Common to All Alternatives)

Fire is recognized as an essential ecological process and natural agent of change in ecosystems. At the same time, it has impacts to air quality, soil, and water resources as described in detail in the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004d). Soils can be affected by fire in several ways. Fire can be beneficial in stimulating new vegetative growth, in helping maintain a mixture of vegetation types and age classes that provide soil stability, and in providing essential nutrients to the soil matrix. Implementation of various fire management options (Critical, Full, Modified, or Limited) in wildland fires and the level at which fire would be used to manipulate vegetation would directly affect the diversity of the habitats present in the planning area and the successional stages of the plant communities throughout. Fire can also strip soils completely of vegetation and make them vulnerable to erosion if heavy rains occur before vegetative re-growth takes place. Species such as willow and alder sprout quickly after a fire and bring soil stabilization. If the fire is sufficiently hot, it can sterilize the earth, precluding regeneration of the plant species that were present before the fire, and allowing introduction of new species. Wildland fires have not occurred in the planning area due to the marine influence on the region's climate and the wet tundra environment. Should the current warming and drying trend continue, the fire regime may change.

(4) Effects to Soils, Water, Vegetation and Air from Hazardous Materials Management (Common to All Alternatives)

The BLM management actions under all Alternatives for hazardous or solid wastes may beneficially affect soil, water and air quality by ensuring adequate protection against pollution of soil, water and air by hazardous or solid wastes at current and future permitted sites. Clean-up of soils and water that have become polluted will be conducted, as those sites are discovered.

(5) Effects to Soils, Water, Vegetation, and Air from Forestry Management (Common to All Alternatives)

There is no commercial use of timber and no associated road construction activity on BLM lands within the planning area. No commercial use of timber is anticipated due to the lack of commercial-grade timber

resources. A small amount of household use of timber takes place in the form of gathering firewood and house logs. Effects to soil, water, vegetation and air are expected to be minimal to nonexistent should the current pattern of use continue.

(6) Effects to Soils, Water, Vegetation and Air from Locatable Minerals (Common to All Alternatives)

Some mineral exploration and development could occur on BLM ands in the planning area, and on existing Federal claims under any Alternative. Where mining occurs, potential effects include disturbance and redistribution of gravel, overburden, and soils. Existing and future locatable mineral activities could unfavorably impact wetlands, stream, riparian and tundra vegetation by stripping away the vegetative mat as part of mining operations. This could increase the potential for the introduction and spread of invasive plant species. The structure of the soil profile and the stability of floodplains are destroyed on a temporary basis and can result in long-term, permanent changes. Removal of soil could also cause an increase in stream sedimentation and turbidity and a decrease in stream channel stability. Required Operating Procedures include separating organic overburden from mined gravels for future reclamation, backfilling all mining pits with tailings as mining progresses and spreading the remaining vegetation and overburden piles on the ground surface. Current soil storage handling stipulations do not prevent damage to soil health and viability and this reduces the soil's capability to support re-vegetation.

Impacts to water resources may be both short and long-term depending on the location of claims in relation to water resources and the activities performed. Short-term impacts to water resources may include drawdown of lakes and streams during active operations. Long-term impacts include alteration of instream flow regimes due to changes in stream channel geometry, compaction of soils, or removal of surrounding vegetation. Water quality may also be impacted by mining operations. The impact to water quality is highly dependant on several factors, including the type of operation, geology, soils, and use of chemicals on site. The duration of impacts may be short-term increases in turbidity during active mining operation or long-term impacts from persistent soil erosion or weathering of geologic materials (acid mine drainage).

The prevention of unnecessary or undue degradation of resources is addressed within 43 CFR 3809. In addition, ROPs have been developed to assist with the mitigation of impacts to resources that may result from locatable mineral activities.

(7) Effects to Soils, Water, Vegetation and Air from Mineral Materials (Common to All Alternatives)

Few mineral materials requests are anticipated due to the generally isolated and remote location of BLM lands and the activities that are anticipated during the life of the plan. Mineral materials would be needed to support oil and gas development. Oil and gas development on BLM lands may only be economically feasible in the Koggiling Creek planning block. Mineral material extraction can unfavorably impact vegetation by destroying vegetation growing on the site and by compacting and removing soils, hindering plant re-growth. Mineral materials extraction may degrade soil resources. Because soil development and vegetative growth is slow in this region, some sites may recover to the original vegetative cover very slowly or not at all. Soils removed of vegetation may be more easily eroded by wind resulting in minor localized degradation of air quality. Increased emissions from vehicle traffic and facilities may further result in localized impacts to air quality. Water quality may be impacted by increased siltation potential to local water bodies resulting from runoff or atmospheric deposition of soil particles. Increased vehicle traffic and facilities construction may also contribute to degradation of water quality. Impacts would be reduced under all action Alternatives with implementation of Required Operating Procedures. Additional mitigation measures, if necessary, could be developed during NEPA analysis of specific material site disposal actions.

(8) Effects to Soils, Water, Vegetation and Air from Recreation and Travel Management (Common to All Alternatives)

Recreational use of the land occurs throughout the planning area. Most of it is focused on guided and unguided sport hunting and fishing, which tends to make use of different areas in different months and

years as influenced by the movements and abundance of wildlife. Effects include impacts to vegetation and soils from temporary campsites, development of social trails, and aircraft landings. These may result in erosion should the vegetative cover be degraded, and/or through compaction of soils. Repeated scrambling up and down river and stream banks can degrade riparian vegetation, create bank erosion, and affect water quality.

Off-Highway Vehicles (OHVs) are used in proximity to villages. Under all Alternatives there would be some impacts to soils by OHV use, since no areas would be completely closed to OHV use. Impacts to wetlands would include the potential for loss of vegetative cover, soil erosion, soil compaction, thermokarst subsidence, water diversions, and ponding. Commercial and non-commercial recreational activities could cause effects to wetlands, stream, riparian and tundra vegetation. Temporary and repeated use of campsites and aircraft landings at remote sites are two common activities on BLM lands in the planning area that may have direct effects to riparian and tundra vegetation. Impacts could include trampled and broken vegetation, compacted and disturbed soil, and an increased potential for wildland fires. There would be a slight possibility of localized soil and water contamination from hydrocarbons or from lead-acid batteries. Where trails cross streams, riparian soil and vegetation may be altered or destroyed, increasing soil loss and sedimentation into aquatic habitats resulting in diminished water quality. Given the relatively low level of recreational use on the remote BLM lands, these impacts would be minimal overall and degradation of air quality, soil and water resources should not increase in the foreseeable future.

Off Highway Vehicle use in the planning area typically originates from population centers. Where invasive non-native plants occur, seeds can be carried in soil or mud in the tire tread. The potential exists for the spread of invasive non-native plant species from OHV travel across BLM lands.

(9) Effects to Soils, Water, Vegetation and Air from Lands and Realty Management (Common to All Alternatives)

There are minor impacts to air quality, soil, and water resources from lands and realty actions under all Alternatives. An exception would be a right-of-way that authorized road construction.

Access (Rights-of-Way and Easements). Construction of access roads, railroads, bridges, culverts, and gravel pads in easements may adversely affect soil in the region. Construction of roads has a major local impact, removing soils. Construction of bridges and culverts may create diversion of water and subsequent soil erosion at the site. Development of borrow pits for road construction impact soils through soil removal. Currently there are no development proposals. Should BLM receive proposals for road or gravel pad construction, impacts would be reduced under all action Alternatives by implementing Required Operating Procedures. Additional mitigation measures could be developed during project-specific NEPA analysis.

Disposals and Acquisitions. Disposal of BLM lands results in removal of the land from the public domain. Should lands be acquired by BLM, they would then be subject to BLM management directives.

Withdrawals. Impacts to soils due to Agency Withdrawals would be the same for all Alternatives. In the planning area these withdrawals include use by the Federal Energy Regulatory Commission or military. Impacts to soils may include localized compaction due to construction of facilities or minor erosion by wind or water due to localized removal of vegetation.

b) Effects to Soils, Water, Vegetation and Air Quality for Alternative A

(1) Effects to Soils, Water, Vegetation and Air from Lands and Realty: ANCSA 17(d)(1) Withdrawals (Alternative A)

In Alternative A, existing ANCSA 17(d)(1) withdrawals would be retained. Consequently, mineral development would remain at current levels and there would be fewer impacts to soils, water, vegetation, and air than under Alternatives B, C, or D.

(2) Effects to Soils, Water, and Air from Leasable, Locatable, and Salable Minerals (Alternative A)

Leasable Minerals. Under Alternative A, BLM lands would be closed to fluid mineral leasing; however, BLM has the authority to lease lands where oil and gas are subject to drainage, this activity would have an impact to soils, water, vegetation or air on BLM lands.

Locatable Minerals. Under Alternative A, 138,627 acres of BLM lands within the planning area, acreage currently not withdrawn under ANCSA 17(d)(1), would be open to hard rock mineral exploration. Within the planning area, approximately acres would remain withdrawn from mineral entry due to Federal withdrawal.

Hard rock mineral exploration and development activities could adversely affect soils, water, vegetation, and air quality as described under Effects Common to All Alternatives. Effects of locatable mineral development could also include impacts to air quality from wind-blown particulates, smoke and exhaust. However, the impacts described are less likely to occur under Alternative A than under Alternatives B, C, or D because there would be less potential for mineral development.

Salable Mineral Materials. Due to the remote locations of most BLM lands, development of salable minerals is not expected to occur.

(3) Effects to Soils, Water, Vegetation, and Air from Travel Management (Alternative A)

Under Alternative A, the planning area would remain undesignated and cross-country use of OHVs would be allowed throughout. This would result in impacts to soil, water, vegetation, and air as described under Effects Common to All Alternatives. These impacts would be greater than in Alternatives C and D. Sensitive habitat areas would not receive additional protection from OHV impacts.

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Recreation management under Alternative A would result in localized impacts as described under Effects Common to All Alternatives. These impacts would be expected to be greater under Alternative A than under Alternatives C or D due to less restrictive OHV use in the planning area.

(5) Effects to Soils, Water, Vegetation, and Air from ACEC Designations (Alternative A)

Under Alternative A, there would be no ACEC designations. Because of the maintenance of ANCSA 17(d)(1) withdrawals in this alternative, there would be no effect to soils, water, vegetation, and air.

(6) Effects to Soils, Water, Vegetation, and Air from Wild and Scenic River Designations (Alternative A)

Under Alternative A, there would be no Wild and Scenic River designations recommended. Because of the maintenance of ANCSA 17(d)(1) withdrawals in this alternative, there would be no effect to soils, water, vegetation, and air.

c) Effects to Soils, Water, Vegetation and Air Quality for Alternative B

(1) Effects to Soils, Water, Vegetation and Air Quality from Lands & Realty Actions, ANCSA 17(d)(1) withdrawals (Alternative B)

Impacts to air, soil, vegetation, and water resources for other lands and realty actions would be similar to those discussed under Effects Common to All Alternatives. Implementation of Required Operating Procedures would reduce the potential for impacts compared to Alternative A.

(2) Effects to Soils, Water, Air, and Vegetation from Leasable Minerals (Alternative B)

Under Alternative B, all unencumbered lands (1,103,138 acres) would be open for fluid mineral leasing. Based on the Reasonably Foreseeable Development scenario, there is a low leasable mineral development potential for most of the planning area. There is however a medium potential for oil and gas development on the Alaska Peninsula and in the Bristol Bay Nushagak Basin. The Reasonably Foreseeable Development Scenario assumes exploration for gas in the Koggiling Creek planning block on BLM lands in the planning area. There has been no oil or gas exploration in the Bristol Bay Nushagak Basin. The region is remote and lacks infrastructure to deliver the product to market.

Resource Assumptions for Leasable Minerals were formulated using the Reasonably Foreseeable Development Scenario for the planning area. Based on that Scenario, the following effects could occur.

Long-term impacts to soil resources would not be widespread due to modern oil and gas construction and operation practices. Long-term impacts to soil resources include sterilization and contamination which would inhabit vegetative growth, ultimately leading to soil erosion. Modern operations have substantially decreased the footprint of drill pads, which now affect approximately two to four acres, from which the topsoil is removed and stockpiled. However, current soil storage handling stipulations do not prevent damage to soil health and viability and this reduces the soil's capability to support re-vegetation. An oil spill or natural gas blowout may adversely affect soil in the immediate areas by contamination; should compacted soil also be present, the amount of compacted soil could increase the affected area. Post-production oil and gas remediation measures include the removal of structures, including drill pads, redistribution of stockpiled topsoil over the disturbed area, and subsequent re-seeding, re-contouring, and drainage control (see Stipulations, Appendix A). The full magnitude of production effects is dependent upon the location, depth, size, and soil composition of the project area. No oil extraction is expected within the life of the plan, though development associated with gas extraction is expected in the Koggiling Creek planning block.

Coal Bed Natural Gas. This analysis assumes no coal bed natural gas development on BLM lands.

Seismic Exploration. Seismic surveys involve seasonal occupation and transport of seismic equipment and camps using sledge-drawn trailers at locations chosen for best transport, preferably at times when the snow cover accumulation is sufficient to insulate the tundra and after the ground, lakes, and rivers are frozen. In the planning area during the past 20 years, snow accumulations in some years have been insufficient to drive snowmachines across, and the timing of freeze-up has been uncertain with the regional warming trend.

Historically, the principal effect of seismic activities on soil and water resources has been diversions of shallow water tracks and ponding in places where track depression compresses the organic mat sufficiently to alter the thermal regime, melt surface ground ice, and alter the native vegetation (Emers and Jorgenson 1997). More recently, modern seismic lines, with newer low-ground pressure equipment have less impact on the tundra than older, outdated types, and impacts to the tundra are more likely to occur during camp moves (WesternGeco 2003). While extensive thermokarst erosion along recent winter seismic trails is seldom observed, impacts to vegetation and surficial compaction are still in evidence (Jorgenson et al. 2003). Adequate protection of the tundra requires a uniformly distributed snow pack with a hard surface crust. Often, less than ideal snow conditions exist in the planning area. Varying

levels of disturbance elsewhere have been documented even where the snow depth exceeded two feet (Felix et al. 1989).

Observations by BLM and others (NRC 2003) indicate that short-term transitory impacts, such as surficial compaction, diversions of shallow water tracks and limited ponding are estimated at about one percent of the proposed seismic lines per season, though newer, low ground pressure equipment could reduce this significantly. Since tundra vegetative mat has been shown to recover in 7 to 10 years where damage is not severe (Abele et al., 1984; Jorgenson et al. 2003), the long term impacts due to thermokarst erosion, such as permanent diversions of shallow water tracks and limited ponding, are estimated at only about 1% of the short-term impacts. These impacts are strongly influenced by snow depth and distribution and may only happen when seismic activities occur under less than ideal snow conditions (NRC 2003). Where disturbance does occur, it could take from several years to several decades for the effects to be ameliorated (Walker et al., 1987).

These types of impacts would be reduced by implementation of ROPs (Appendix A, ROP Veg-2d, e, f and g), including limiting most seismic exploration to those times during the winter when the ground is frozen and snow cover is adequate, or, those conditions lacking, utilization of alternative means of travel and transport, such as helicopter.

Exploratory Drilling and Field Development. Exploratory drilling in Alaska typically occurs in the winter when snow pack and frozen ground help minimize impacts from surface disturbing activities. Surface disturbance directly impacts plant communities through vegetation removal and mechanical damage to plants. Indirect impacts of surface disturbance on vegetation include soil compaction, erosion, changes in hydrology, and encroachment by invasive plant species. These indirect impacts can limit recovery or rehabilitation of vegetative communities following disturbance. Construction of gravel pads and in-field roads, and overland travel by low-ground-pressure vehicles would temporarily impact various vegetation regimes by soil compaction, damage or destruction of tussocks, disturbance to tundra wetlands, and acceleration of stream bank or lake shore erosion.

Most allowable uses have the potential to affect soil resources to some degree. Surface-disturbing actions would result in removal of vegetative cover, loosening the surface soil, formation of compacted layers, reduced infiltration, changes in physical and biological properties, reduction in organic matter content, and increased potential for accelerated erosion by exposing soil particles to wind and water. There also would be a loss of soil productivity through disruption of natural soil horizons and removal of vegetation for use by roads, well pads, and other facilities. Operating vehicles on moist soils, especially heavy equipment, is likely to cause compaction of the surface layer, decreased infiltration and aeration, and reduction of soil productivity by making it more difficult for plant roots to grow and obtain soil moisture and nutrients. Indirect impacts caused by disrupting soil stability, increased compaction, and reducing productivity include: (1) sedimentation of drainages and perennial water bodies primarily by wind or water erosion, (2) particulate matter affecting air quality through wind erosion, (3) reduced infiltration, (4) an increase in surface water runoff that could cause higher peak streamflows and possibly downstream flooding, and (5) changes in surface water quality caused by exposing soils or bedrock with undesirable chemical characteristics.

The extent of the impacts to water resources would depend on the location and the nature of the exploration area. Possible impacts include drainage disruption, sedimentation, water removal, gravel removal, and thermokarsting in areas where permafrost is present. An impact to riparian and wetland areas alters the physical, chemical, and biological components of an ecosystem. Activities that contribute to the decline in abundance, distribution, or functionality of riparian and wetland communities are considered adverse impacts. Direct impacts to riparian and wetland communities result from disturbing vegetation or ground surfaces. Indirect impacts to riparian and wetland communities result from actions within a watershed that cause a change in riparian and wetland functionality (e.g., increased rates of sediment loading into streams or increased surface runoff to streams), a change in water chemistry, or spread of invasive non-native plants. Changes in water chemistry, for example, can affect riparian and wetland areas primarily through changes in plant species composition, which could impact use of the area by wildlife. The extent of these impacts would depend on location of anticipated exploratory drilling

activities. This analysis assumes six exploratory wells over the 20-year life of the plan, each disturbing approximately six acres. Application of ROPs and Stipulations (Appendix A, ROP Water-1 Sequence and ROP Water-3i) would further minimize the extent of these impacts through riparian and wetland avoidance.

Inadequate design or placement of structures or culverts in association with gravel pads or associated roads can alter natural sediment transport and deposition, creating scour holes or channel bars. Improper placement or sizing of gravel fill can result in erosion from pads or roadbeds adjacent to streams or lakes. Natural drainage patterns can be disrupted when activities or structures divert, impede, or block flow in stream channels, lake currents, or shallow-water tracks. Blockages or diversions to areas with insufficient flow capacity can result in seasonal or permanent impoundments. Diverting stream flow or lake currents also can result in increased bank or shoreline erosion and sedimentation that degrades water quality. Proper location and adequate design capacity of culverts, pipelines, and other control structures would minimize drainage problems. Winter or low-water construction and transport activities and adequate armoring of fill would minimize erosion and sedimentation problems.

Short-term air quality impacts from leasable minerals development and production would occur from two primary sources: (1) combustive emissions (vehicle tailpipe and exhaust stack emissions) due to the operation of mobile and stationary source construction equipment, and (2) fugitive dust emissions (particulate matter less than 10 microns in diameter [PM10]) due to earth moving activities and the operation of vehicles on unpaved surfaces. Minerals production would generate long-term combustive and fugitive dust emissions from two sources: (1) stationary sources, such as natural gas flaring, natural gas-fired compressors, and storage and handling of equipment; and (2) mobile sources that access and service oil and gas facilities. The planning area is a large region with a maximum east-west extent of 280 miles and a north-south extent of about 150 miles. Given the good air quality that currently exists in the region and the expected separation of sources within the planning area, it is unlikely emissions from Alternative B activities would exceed national or State ambient air quality standards. There could be localized air quality impacts depending on the locations and emissions levels of proposed sources in the area, the surrounding topographical characteristics, and the site-specific meteorology.

Sources of hazardous air pollutants within the planning area would include fossil fuel combustion, fugitive volatile organic compounds, and emissions due to oil and gas production. The accidental release of sour natural gas rich in hydrogen sulfide (H_2S) poses the main risk under Alternative B. Another source of H_2S release is at oil and gas fields where secondary recovery operations are occurring. To mitigate H_2S impacts, applications for permits to drill (APDs) in sour gas areas would include a contingency plan that may include requirements to monitor wind speed, wind direction, and atmospheric stability and to conduct dispersion modeling analyses. These requirements would apply to areas where public health and safety or important resource values are a concern, such as proposed well sites in proximity to residences. If the BLM determines after review of a contingency plan that additional data or safety precautions are needed, BLM would require these items as conditions of approval (COAs). The potential release of H_2S during production operations in sour gas areas may be mitigated by health and safety plans.

The preferred and normal means of disposing of drilling wastes, including muds and cuttings, is re-injection into wells. Cuttings may be stored temporarily to facilitate re-injection and/or backhaul operations. Use of mud pits may be allowed by the Authorized Officer. If muds and cuttings are stored on the surface, sediments and other contaminants could be flushed into the watershed. However, requirements that wastes be stored in lined and bermed areas and disposed of before spring break-up would reduce the potential of sediments and other contaminants being flushed into the watershed. Adherence to the Required Operating Procedures, Stipulations (Appendix A, ROP OG-1b) and other preventative measures determined as project-specific requirements by all permitted operations would help prevent pollution to any stream or lake.

Consumptive water use in the summer seldom is a problem on the coastal Bristol Bay Plain, as water generally is abundant. Exceptions would be in small lakes and ponds, smaller coastal streams or most foothill streams during early summer when flow is low, and recently in summer if conditions are hot and dry. In these instances shallow pools might be pumped dry. Depending on the areas leased and number

of development wells drilled, annual water usage for development activities under Alternative B would vary considerably. Annual water use during development could be similar to that for exploration (i.e., use for dust abatement). Projects that require water extraction will be required to adhere to the Required Operating Procedures and Stipulations which will prevent unlimited drawdown while maintaining the health and availability of a natural fresh water resource. Water withdrawal and de-watering regimes are subject to constraints developed through project-specific NEPA analysis. Adherence to the Required Operating Procedures and Stipulations and project-specific stipulations for all permitted operations would prevent the unlimited drawdown of any stream or lake (Appendix A, ROP Water-2a).

While some of the gravel used for the construction of permanent facilities may be obtained from non-BLM lands, some of the material sites would probably be located on BLM lands in the planning area. Improper location of gravel-removal operations can result in alteration or destruction of soils, stream channel or lake configurations, stream-flow hydraulics or lake dynamics, erosion and sedimentation, and ice damming and aufeis formation. Locating gravel pits far enough away from streams and lakes to avoid break-up or storm flooding would greatly minimize these effects to water resources.

Under the potential development activities, spills and spill cleanup would involve both crude oil and refined petroleum products, probably from fuel-storage areas or handling operations. Storage of fuel in lined and bermed areas and the onsite availability of absorbents and removal equipment would help ensure that the size of any area affected by a spill and cleanup efforts is kept to a minimum. Small crude or diesel spills (<1 bbl and smaller) are projected to occur onshore. It is likely that all small fuel spills would occur on or near pads or roadbeds, though some fuel may possibly reach adjacent waters. In the case of a complete freeze up of the ground during the winter at the location of a spill, spill response likely would remove almost the entire spill from the frozen tundra prior to snowmelt. During that part of the year when the soil and vegetation are unfrozen, late May through around October 15, spills could reach and adversely impact tundra waters before oil spill response is initiated or completed. Storage of fuel in lined and bermed areas and the onsite availability of absorbents and removal equipment would help ensure that the size of any area affected by a spill and cleanup effort is kept to a minimum. Since most oil exploration and development activities, as well as pipeline and facilities construction, would occur during winter when the ground is frozen, it is likely that most anticipated small fuel spills would be largely contained and removed prior to reaching tundra waters. Application of hazardous material contract provisions (Appendix A, “Hazardous Material Use and Waste Management”) would minimize the potential and the extent of spills occurring from anticipated gas exploration and development activities.

Spills of chemicals and saline waters would be rapidly diluted in a large lake or river. In small lakes, tundra ponds, and shallow water tracks, the impacts would be greater. Waters may remain toxic to sensitive species for several years. These spills could be pumped out of the water body, if confined or neutralized, and then diluted with uncontaminated fresh water. Seppi’s (2006) work on lake water chemistry and productivity indicate that many Bristol Bay lakes are chemically sensitive; spills, dilution or neutralization may be detrimental or may create unwanted changes.

Air quality impacts may result from the emissions of hydrocarbons and gaseous byproducts of combustion (Hydrogen sulfide) or wind-borne particulates. Ambient air quality on the North Slope of Alaska, however, is relatively pristine even though oil and gas exploration, development, and production have been under way for more than 30 years. In the planning area, prevailing winds may blow these emissions and particulates to other areas of Alaska, where they might affect air quality. Arctic haze is a phenomenon resulting from elevated concentrations of fine particulate matter found over the Arctic, primarily in winter and spring. Scientists believe that most of the pollutants contributing to Arctic haze are from combustion sources in Europe and Asia. It is not known to what extent local sources in Alaska contribute to Arctic haze. However, the Arctic haze phenomenon was first observed in the 1950s, long before oil development started on the North Slope. Emissions from development resulting from Alternative B would be small compared to the emissions from North Slope oil production.

(3) Effects to Soils, Water, Air, and Vegetation Resources from Locatable Minerals and Salable Minerals (Alternative B)

Locatable Minerals. Mining exploration could occur on existing Federal or State claims under any Alternative. However, under Alternative B, ANCSA 17(d)(1) withdrawals would be revoked, and BLM lands would be open to mineral entry. Additionally, mineral development on State- or Native-selected lands could occur where existing Federal claims are located. The type of mining most likely to occur is placer mining. Under Alternative B, this analysis anticipates 1 – 3 new placer mines and 2 – 4 new locatable lode exploration projects, all on State- or Native-selected lands. Overall, 115 acres of disturbance from mining are projected on BLM-managed lands. This development is projected to occur within the Goodnews Bay/Snow Gulch, Iliamna/Fog, Kasna Creek, Kijik Lake, and Platinum high locatable mineral occurrence potential areas (BLM 2006). Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. In addition to the effects described under Effects Common to All Alternatives, the range of potential impacts to soil resources includes disturbance and redistribution of gravel, overburden, and soils. The structure of the soil profile could be destroyed and may require decades to recover. Soil development in the Arctic is a slow process. Removal of vegetative cover and soil could cause an increase in erosion, stream sedimentation, and turbidity as well as a decrease in stream channel stability. Water could be contaminated by toxic materials introduced by the mining process. Denuded soil and contaminated soil particulates could become airborne. Some effects may be mitigated by utilizing Required Operating Procedures including separating vegetative cover and soil from mine tailings for future recovery, backfilling and replacing topsoil appropriately as mining progresses, and returning the stored soil to the ground surface upon completion of the mining project. Because of anticipated new development, the effects described here are more likely to occur and would occur to a greater extent under Alternative B than under any other Alternative.

Salable Minerals. Salable materials activities may degrade soil resources, and may cause erosion and an increase in stream sedimentation and turbidity. Sites may never passively recover native vegetative cover due to loss of soil from the site. Construction of access roads to the site may add to the impacts in terms of soil loss, soil compaction, and erosion. The degree of impact would depend on the type of soil present, the type of road, the terrain, and the presence or absence of permafrost. Because of the anticipated levels of locatable mineral development and leasable mineral development, this Alternative anticipates more mineral materials development, along with associated impacts, than any other alternative. However, the Reasonably Foreseeable Development Scenario for locatable minerals assumes little to no mineral material development on BLM lands, based on the assumption that most existing gravel pits are located on much more accessible, privately owned land.

(4) Effects to Soils, Water, Air, and Vegetation Resources from Recreation Management (Alternative B)

Alternative B would manage recreation at the Roaded Natural Recreation Opportunity Spectrum (ROS) class. Roaded natural areas are characterized by a generally natural environment. However, this ROS class allows for primitive facility development. This facility development may result in some vegetation clearing. Consequently, impacts to air quality, soil, vegetation and water resources from recreation management as described under Effects Common to All Alternatives would be greater under Alternative B than under any other Alternative.

(5) Effects to Soils, Water, Air, and Vegetation Resources from Travel Management (Alternative B)

Because all lands would be designated as “open” for OHVs, impacts to air quality, soil, vegetation, and water resources from OHV use and Travel Management would be similar to those discussed under Alternative A and more than those anticipated for Alternatives C and D.

(6) Effects to Soils, Water, Air and Vegetation Resources from ACEC Designations (Alternative B)

Under Alternative B, there would be no ACEC designations. Consequently, there would be fewer constraints on development activities.

(7) Effects to Soils, Water, Vegetation, and Air from Wild and Scenic River designations (Alternative B)

Under Alternative A, there would be no recommended national system Wild and Scenic River designations. Consequently, these areas would be open for mineral leasing or location, subject to ROPs and Stipulations.

d) Effects to Soils, Water, Vegetation and Air Quality for Alternative C

(1) Effects to Soils, Water, Vegetation and Air Resources from Lands and Realty (Alternative C)

In Alternative C, existing ANCSA 17(d)(1) withdrawals would be recommended for revocation. Those lands currently closed to mineral entry would be opened with the exception that ANCSA 17(d)(1) withdrawals would be retained at locations where Wild and Scenic Rivers are proposed and within the Carter Spit ACEC. Impacts to soils, air, vegetation and water from mineral entry would be greater than in Alternative A but slightly less than in Alternatives B and D.

Delineating Rights-of-Way avoidance areas within the two proposed ACECs would have a positive impact on soils because road or pipeline construction would likely not occur.

(2) Effects to Soils, Water, Vegetation and Air from Leasable, Locatable, and Salable Minerals (Alternative C)

Leasable Minerals. Under Alternative C, 1,063,129 acres of BLM lands would be open to fluid mineral leasing. This alternative anticipates similar levels of gas development as described under Alternative B (development of one gas field in the Koggiling Creek planning block). Impacts to soils, vegetation, water and air would be similar to impacts discussed under Alternative B though fewer acres would be available for leasable mineral activities under Alternative C. Comparatively, the magnitude of impacts could be greater under Alternative C than Alternative A, but less than Alternative B.

Alternative C implements a No Surface Occupancy 300-foot buffer on either side of the South East and South Fork Arolik, Faro Creek, South Fork Goodnews River and Klutuk Creek. Although this analysis does not anticipate leasable mineral activities at any of these locations, this buffer would protect riparian areas and soils adjacent to these sensitive riparian habitats. Additionally, no mineral leasing would occur on 12,210 acres of eligible/suitable Wild and Scenic River segments along BLM-managed portions of the Alagnak, Goodnews and Goodnews Middle Fork Rivers and within the Carter Spit ACEC (61,251 acres) due to retention of ANSCA 17(d)(1) withdrawals.

Soils, vegetation, water and air resources would benefit from Required Operating Procedures, Stipulations, and project-specific requirements. Because of the additional constraints described above, long term effects from leasable mineral activities would not be expected outside of the Koggiling Creek planning block during the life of this plan. Overall, less unencumbered BLM land is available for mineral leasing under Alternative C than under Alternatives B or D.

Locatable Minerals. Under Alternative C, 1,063,129 acres of unencumbered BLM lands within the planning area would be open to mineral entry. Within the planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals, and ANCSA 17(d)(1) withdrawals would be retained on 12,210 acres of proposed Wild and Scenic Rivers, until Congress had an opportunity to act, and within the proposed Carter Spit ACEC (61,251acres). Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The

lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Additionally, Required Operating Procedures provide a 300 foot buffer on either side of the East and South Fork Arolik River, Faro Creek, South Fork Goodnews River and Klutuk River (Appendix A, ROP FW-6a). This analysis anticipates no new placer or lode mining operations on BLM lands, due to retention of ANSCA 17(d)(1) withdrawals within the Carter Spit ACEC and ANILCA 906(e) Top Filed land occurring in an area of high mineral potential. Consequently, the amount of anticipated mining would be more than Alternative A, but less than Alternatives B or D due to the reduced acreage open to mineral entry.

Salable Minerals. Development of salable minerals on BLM-managed lands is not expected to occur during the life of this plan. Salable mineral exploration and development will not be permitted within the proposed Carter Spit or Bristol Bay ACECs.

(3) Effects to Soils, Water, Vegetation, and Air Resources from Recreation Management (Alternative C)

Because BLM lands would be managed for a semi-primitive motorized experience, impacts to soil, water, vegetation, and air quality resources would be similar to those discussed within the "Common to All Alternatives" section. The scale of impacts would be similar to Alternatives A and D.

(4) Effects to Soils, Water, Vegetation, and Air Resources from Travel Management (Alternative C)

Under Alternative C, impacts from OHV use and Travel Management would be less than in Alternatives A and B. The planning area would be designated as limited to existing trails by OHVs weighing 2,000 pounds or less Gross Vehicle Weight Rating (GVWR). Implementation of the Required Operating Procedures contained in Appendix A will prevent unnecessary or undue degradation resulting from OHV use associated with permitted activities. The fewest impacts from OHV use to soil, water, vegetation, and air resources would occur under Alternatives C and D.

(5) Effects to Soils, Water, Air , and Vegetation Resources from ACEC Designations (Alternative C)

Under Alternative C, there would be two ACEC designations. Within the Carter Spit ACEC, ANSCA 17(d)(1) withdrawals would be retained prohibiting leasable and locatable mineral activities. Delineating Right-of-Way avoidance areas within the two proposed ACECs would have a positive impact on soils because road or pipeline construction would be subject to greater management constraints. ANSCA 17(d)(1) withdrawals would not be retained in the Bristol Bay ACEC, thereby allowing leasable mineral development to occur within the Koggiling Creek planning block. Impacts to soils, water, vegetation, and air resources would be less compared to impacts discussed in Alternative B because the Bristol Bay ACEC would be designated a right-of-way avoidance area and salable mineral activities would be prohibited. This would greatly reduce impacts attributable to road and salable mineral development.

(6) Effects to Soils, Water, Air, Vegetation Resources from Wild and Scenic River Designations (Alternative C)

ANCSA 17(d)(1) withdrawals would be retained at locations where Wild and Scenic Rivers are proposed until Congress has had an opportunity to act. These areas would be closed to all mineral development.

e) Effects to Soils, Water, Vegetation and Air Quality for Alternative D

(1) Effects to Soils, Water, Vegetation and Air Resources from Lands and Realty (Alternative D)

In Alternative D, existing ANCSA 17(d)(1) withdrawals would be recommended for revocation. Once withdrawals are revoked, those lands currently closed to mineral entry would be open. As a result, degradation to soils, water, vegetation and air resources may occur from mineral exploration and

development. A more detailed description of impact to soils, water, vegetation and air resources resulting from mineral exploration and development is contained in the discussion on effects from leasable, locatable, and salable minerals. The amount of lands open to entry would be slightly less than under Alternative B but greater than under Alternatives A and C.

Delineating Right-of-Way avoidance areas within the proposed Carter Spit ACEC would prevent widespread impact to soils, water, vegetation, and air quality because road or pipeline construction would likely not occur. Prevented impacts, resulting from road or pipeline construction, include soil compaction, increased siltation of water bodies, vegetative removal, and degraded localized air quality resulting from dust and vehicle emissions.

(2) Effects to Soils, Vegetation, Water, and Air from Leasable, Locatable, and Salable Minerals (Alternative D)

Leasable Minerals. Under Alternative D, 1,101,304 acres of BLM lands would be open to fluid mineral leasing due to lifting of ANCSA 17(d)(1) withdrawals, including the withdrawals on the proposed Carter Spit ACEC. This Alternative anticipates the development of one gas field in the Koggiling Creek planning block, six exploratory wells over the 20-year life of the plan, each disturbing approximately six acres, and one seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected over the next 20 years. Impacts from that development would be the same as described under Alternative B. Soils, water, vegetation, and air resources would benefit from implementation of the Required Operating Procedures, and Oil and Gas Lease Stipulations contained in Appendix A and additional mitigation or preventative requirements as identified through project-specific NEPA analysis.

Locatable Minerals. Under Alternative D, 1,102,489 acres of BLM lands within the planning area would be open to mineral entry due to lifting of ANCSA 17(d)(1) withdrawals. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA Within the planning area, approximately 3,968 acres would remain withdrawn from mineral entry due to Agency withdrawals. Anticipated levels of mining and associated impacts to soils, water, air, and vegetation resources would be expected to be slightly less than those discussed under Alternative B. All proposed new load or placer mining would occur on State- or Native-selected lands due to ANILCA 906(e) Top Filings. Fewer impacts are expected because of the application of Required Operating Procedures under this Alternative, including 300-foot buffers on either side of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River and Klutuk Creek.

Salable Minerals. The development of salable minerals on BLM-managed lands is expected to occur in conjunction with leasable mineral activities within the Koggiling Creek planning block, with effects similar to those described under Alternative B. Salable mineral exploration and development will not be permitted within the proposed Carter Spit ACEC (36,220 acres).

(3) Effects to Soils, Water, Vegetation, and Air Resources from Recreation Management (Alternative D)

Because BLM lands would be managed for a semi-primitive motorized recreation experience, impacts to air quality, soils, vegetation, and water resources would be similar to Alternatives A and C.

(4) Effects to Soils, Water, Vegetation, and Air Resources from Travel Management (Alternative D)

Under Alternative D, impacts from OHV use and Travel Management would be less than in Alternatives A and B. The planning area would be designated as limited to existing trails by OHVs weighing 2,000 pounds or less Gross Vehicle Weight Rating (GVWR). Implementation of the Required Operating Procedures contained in Appendix A will prevent unnecessary or undue degradation resulting from OHV use associated with permitted activities. The fewest impacts from OHV use to soil, water, vegetation, and air resources would occur under Alternatives C and D.

(5) Effects to Soils, Water, Air, and Vegetation Resources from ACEC Designations (Alternative D)

Under Alternative D, there would be one ACEC designation (Carter Spit ACEC). The use of ROPs and Stipulations will reduce impacts to soils, water, vegetation and air resources due to mineral development and exploration resulting from revocation of ANSCA 17(d)(1) withdrawals. A more detailed description of impact to soils, water, vegetation and air resources resulting from mineral exploration and development is contained in the discussion on effects from leasable, locatable, and salable minerals. In addition, a Plane of Operation will be required for locatable mineral activities occurring in the ACEC, per 43 CFR 3809.11(c)(3), requiring detailed disturbance and rehabilitating planning.

Delineating Right-of-Way avoidance areas within the proposed ACEC would have a positive impact on soils because road or pipeline construction would likely not occur. Potential impacts, resulting from road or pipeline construction include; soil compaction, increased siltation of water bodies, vegetative removal, and degraded localized air quality resulting from dust and vehicle emissions. Avoiding Rights-of-way authorization will prevent degradation to Special Status Species habitat by preventing degradation to soils, water, vegetation and air resources in the ACEC.

(6) Effects to Soils, Water, Air, Vegetation Resources from Wild and Scenic River Designations (Alternative D)

Under this alternative, no WSR would be recommended for designation under the National System. Consequently, these areas would be open to mineral entry.

4. Direct and Indirect Effects to Fisheries and Aquatic Habitats

a) Effects Common to All Alternatives

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to fisheries and aquatic habitats: Cultural Resources, Paleontological Resources, Visual Resources, Renewable Energy, and Subsistence.

(1) Effects to Fisheries and Aquatic Habitat from Recreation and Travel Management (Common to All Alternatives)

Recreation use of BLM lands occurs throughout the planning area. Most of it is focused on guided and unguided sport hunting and fishing, which tends to make use of different areas in different months and years, influenced by the movements and abundance of fish and wildlife. Effects to aquatic habitat may occur from temporary campsites or development of social trails resulting in degradation of riparian vegetation leading to increased erosion and sedimentation. Repeated scrambling up and down river and stream banks can destroy riparian vegetation and create bank erosion.

Off-Highway Vehicles (OHVs) are mostly used in proximity to villages. Under all Alternatives, there would be some impacts to aquatic habitat resulting from OHV use as no areas would be completely closed to OHV use. Where trails cross streams, riparian soil and vegetation may be altered or destroyed, increasing soil loss, and sedimentation into aquatic habitats and resulting in diminished water quality. General effects of sedimentation on fish and fish habitat are described on page 4-33 below. Given the relatively low level of recreational use on remote BLM lands, these impacts would be minimal overall and degradation of aquatic habitats should not increase in the foreseeable future.

(2) Effects to Fisheries and Aquatic Habitat from Hazardous or Solid Waste Management (Common to All Alternatives)

The BLM management actions under all Alternatives for hazardous or solid wastes may have localized, beneficial effects on fish habitat through risk management stipulations and mitigation/reclamation of contaminated sites.

(3) Effects to Fisheries and Aquatic Habitat from Soil, Water, Vegetation and Air Quality Management (Common to All Alternatives)

Beneficial effects to Fisheries and Aquatic Habitat from application of ROPs, Stipulations, and proper management of soils, water, and vegetation resources would occur. Implementation of ROPs and Stipulations to protect soil, water, and vegetation on a project-specific basis, particularly in riparian zones and watersheds, would reduce disturbance to fish habitats and would aid in the recovery of aquatic habitat from permitted uses. Improper management of soil, water, and vegetation resources can reduce the quality of the waters and the productive value of aquatic habitat.

(4) Effects to Fisheries and Aquatic Habitat from Fire and Fire Management (Common to All Alternatives)

Fire effects which directly impact fish populations include increased siltation, altered water quality (dissolved oxygen, pH, suspended and dissolved solids, total hardness, turbidity), and water temperature changes. Indirectly, any alteration of the nutrient flow that adversely affects aquatic organisms or results in a reduction in emergent insect production would also affect fish populations, at least temporarily.

Fish species and aquatic fauna have been exposed to indirect effects of wildland fire for thousands of years. Fire can indirectly influence fish populations or their prey through the factors mentioned previously as well as changes in nutrient input to water systems and changes in permafrost status that can lead to altered hydrology. The extent of surface erosion after a fire largely depends on the topography and soil types of the immediate area, and the amount of ice-rich frozen ground within the active layer. Stream siltation is usually negligible from surface erosion on burned sites in interior Alaska due to its gentle topographical features. Siltation may be a factor where severe burns occur on steep slopes or even shallow slopes with ice-rich active layers, where fire has severely damaged riparian protection of bank soil's integrity or where heavy equipment is used in suppression activities. Lakes are also potentially vulnerable to fire effects of nutrient concentrations, sedimentation, and erosion of riparian protected shorelines from wave and wind action. Response of deciduous riparian foliage after a fire is related to already existing riparian vegetation. The impact of a fire is a change in age structure and short-term productivity.

Data on how fires affect stream temperatures and productivity are currently inadequate to accurately assess the effects of fire on anadromous or resident fish habitats. Much of the published work has focused on changes in lake systems (McEachern et al. 2000, St-Onge and Magnan 2000). Analyses of long-term fire effects on stream ecology are currently under way as part of Frostfire, a landscape-scale prescribed research burn in the boreal forest of Interior Alaska conducted in July 1999.

Fish populations have generally shown a positive response during the initial five-year period after wildland fire, where populations exhibit good connectivity with key refugia throughout the watershed (Gresswell 1999; Minshall et al. 1989). Fish will generally re-invade fire-affected areas rapidly where movement is not limited by barriers. These new colonists generally come from areas upstream of the affected area, from surrounding watersheds and from main stem rivers where migration is not limited. Fish population recovery generally tracks the increase in primary and secondary production that occurs in the early post-fire period. Where sediment is continually delivered into the stream, there could be short-term negative effects on fish and macro-invertebrate communities.

Fuels projects are designed and implemented in a “non-emergency” manner that minimizes impacts to aquatic resources. Although wildland fires may still occur in areas where hazardous fuel loads have been reduced, fires which may occur are expected to be predominately ground fires rather than crown fires. Ground fires are easier to control with lower-impact suppression methods (such as hand-built fire line) that are less likely to adversely affect aquatic resources. In contrast, the crown fires associated with heavier fuel loads often require suppression techniques likely to have greater adverse impacts to aquatic habitats and species.

Competent planning and implementation will minimize the adverse effects of fuels treatments. Some projects involve multiple treatments of the same area. Prescribed fires conducted in the spring (when drainage-bottoms are still snow covered) help to protect riparian vegetation and soils. The primary goal of these projects is to reduce the occurrence, risk, and impacts of wildland fires, not to restore the natural capacity of aquatic species to withstand the effects of natural fires.

Removal of vegetation to reduce future fuel loading may be accomplished with minimal impacts in some areas, but in others, sensitivity to ground disturbance from loss of vegetation can cause increased erosion, compacted soils, and a loss of nutrients (FS 2000, Beschta et al. 1995). To protect water quality and the diversity of habitats for fish, amphibians and other aquatic organisms, standard operating procedures are in place to protect the proper functioning condition of riparian area and stream characteristics.

Impacts to fisheries from fire and fuels management would be the same under all Alternatives. Most of the area within the planning region is in a Limited fire management option designation, which means that the standard response is to monitor fires and to only initiate suppression actions if necessary to protect identified values. In a worst case scenario, there may be some episodic events related to fire suppression that may affect fish and fish habitat. These effects would be from increased erosion and ground-based control, and alterations of water chemistry from aerial applications of fire retardant. Erosion impacts would likely be small in scale and localized, and could be minimized by rapid rehabilitation after the fire is under control, although improperly located bulldozer line firebreaks could greatly increase local stream sediment loads. The use of fire retardant in or near fish bearing streams is a serious threat to these aquatic ecosystems. The by-products of certain retardants are toxic to fish and will result in fish kills. To decrease the potential of affecting fish habitats and stream conditions, it is a standard operating procedure of the suppression agencies to avoid dropping retardant near or in water bodies.

(5) Effects to Fisheries and Aquatic Habitat from Locatable, and Salable Minerals (Common to All Alternatives)

Currently there are no new proposed projects for mineral activities on BLM lands in the planning area. However, under all Alternatives, some BLM lands open to mineral entry. In general, surface mining activities increase erosion and accelerated sediment production and input into nearby streams and lakes. Mining operations may also alter the natural input rate of organic matter and nutrients to aquatic systems. Mine sites can include open pits, heap and dump leaches, waste rock and overburden piles, tailings piles and dams, haul roads and access roads, ore stockpiles, vehicle and equipment maintenance areas, and exploration and reclamation areas. These areas are all major sources of erosion and sediment.

Surface mining operations may also disrupt surface and ground water flow patterns. Mining operations also have the potential to release pollutants to surface waters and ground water, deposition of contaminants into soils, and the eventual incorporation of pollutants into plant tissue. Both water and soil contamination may be harmful to riparian-wetland vegetation.

Naturally occurring substances in the ore may create a major source of pollutants. Mined ore not only contains the mineral being extracted but varying concentrations of a wide range of other minerals. Frequently, other minerals may be present at much higher concentrations and can be much more mobile than the target mineral. Depending on the local geology, the ore (and the surrounding waste rock and overburden) can include trace levels of aluminum, arsenic, asbestos, cadmium, chromium, copper, iron,

lead, manganese, mercury, nickel, silver, selenium, and zinc, as well as naturally occurring radioactive materials.

As with many surface disturbing activities, one of the most detrimental impacts associated with mining is increased sediment yield. Because of the potentially large area of land disturbed by mineral activities and the large quantities of earthen materials exposed at sites, erosion can be a major concern. Erosion may cause significant loadings of sediments to nearby water bodies and associated riparian-wetland areas, especially during severe storm events and high snow melt periods. Removing the vegetative cover, altering the natural topsoil, or changing the shape of the slope can increase the potential for erosion, increased runoff, and can create additional sediment in water bodies.

The main factors influencing erosion rate include the volume and velocity of runoff from precipitation, the rate of precipitation infiltration through the soil, the amount of plant cover, the slope length or the distance from the point of origin of overland flow to the point of deposition, and operational erosion control structures (EPA 1997). Accelerated erosion occurs whenever the soil surface is disturbed. Sediments created by accelerated erosion clog streams and fill lakes and impair their water-holding capacity. Erosion decreases the productive value of the soil; additionally, it reduces the quality of the waters that receive the sediment.

Significant increases in sediment yield can lead to alteration of stream channel morphology, substrate composition, and surface-ground water interaction; decreased survival of fish in the egg and young-of-the-year stages; changes in macro invertebrate community structure; and decreased primary production (Madison 1981, Van Nieuwenhuyse 1983, Weber and Post 1985, Bjerklie and LaPerriere 1985, Lloyd et al. 1987, Reynolds et al. 1989, Buhl and Hamilton 1990).

Stream channel instability occurs when excessive sediment deposition leads to destructive lateral erosion of stream banks and progressively wider and shallower stream channels (Elmore and Leonard 1998).

Accelerated runoff can trigger down cutting, which lowers the streambed, alters the water table, dries out the riparian area, destabilizes stream banks, increases erosion, and further accelerates runoff. Unless stopped by some form of intervention or a hard geologic formation, down cutting will migrate upstream and eventually disrupt the hydrologic functioning of the entire watershed (Chaney and others 1993).

These changes can lead to decreased survival of fish in the egg and alevin stages; decreased density, biomass, and diversity of aquatic insects the fish depend on for food; and decreased primary fish production (Cordone and Kelley 1961; Cooper 1965; Van Nieuwenhuyse 1983; Webber and Post 1985; Lloyd and others 1987; Buhl and Hamiltion 1990).

Increased turbidity and sedimentation from erosion can inhibit feeding and spawning success. All members of the biotic community have the potential to be affected. Potential effects of sedimentation on benthic macro-invertebrates (which are prey species for fish) include interference with respiration, and interruption of filter-feeding insects' capability to secure food. A more important impact to benthic invertebrates would be smothering of the physical habitat by increased sediment loads. A loss of interstitial space in the substrate would be highly detrimental to burrowing species. A decrease in abundance could be expected in these situations. In Arctic environments, where fish depend on summer food sources to grow and reproduce, a reduced prey base may preclude fish from directing energy towards spawning.

Direct threats to fish from sediment include changes to physical habitat, subsequent decreased reproductive success, and loss of rearing habitat. Physical habitat changes from sediments are most often attributed to finer size particles. Developing eggs can be smothered and newly hatched fry can be killed by deposited sediment that prevents emergence from spawning gravels and interferes with respiration. Developing fish eggs and larvae need a constant supply of cold, oxygen rich water which flows through the interstitial spaces in stream gravels. Embedded sediments fill these interstitial spaces and also limit essential winter habitat used by juvenile fish for cover from predators, ice scour, and high-

velocity stream flows. The filling of pools with sediment further limits overwintering sites for juvenile and adult fish.

Placer mining inherently degrades or completely destroys channel features and riparian habitat, resulting in increased erosion and sedimentation.

During placer mining, streams are often diverted into bypass channels while the original channel is mined and then returned to a newly built channel once mining is complete. It has been common practice to construct stream bypasses and new channels with different geometry and physical characteristics (e.g. flood prone and bankfull widths, bankfull depth, sinuosity, slope, entrenchment, and substrate size) than that of the natural channel. This difference is often necessary because of the removal of streamside vegetation and other hard structural elements that help define the natural channel morphology. As a result, new channels are often straighter, have a higher gradient, and consequently have more energy than the natural channel. In addition, new channels often lack the diversity of habitats (pools, glides, riffles) and cover components (undercut bank, overhanging vegetation, and large woody debris) that enhance the quality of habitat in natural channels.

Mining activities, placer operations in particular, may lead to a loss of riparian-wetland vegetation. All vegetation within the active mining area is removed before and during mine development and operation. Vegetation immediately adjacent may be affected by the roads, water diversions or other development. Riparian-wetland vegetation has a significant influence on the stability of uplands and certain stream types. Changes in the composition, vigor, and density of riparian vegetation can result in changes in sediment input from uplands, stream shade, and protection from in-stream erosional processes, terrestrial insect habitat, and the contribution of detritus and structural components to the stream channel. Water quality and esthetic values are also affected by disturbance to riparian-wetlands (Rosgen 1996).

The altering of surface hydrology often results in stream conditions that are no longer suitable to species or life stages of fish and other aquatic organisms that occurred before disturbance. For example, increased stream flow may result in water velocities that: (1) cause involuntary downstream displacement and mortality of juveniles, (2) result in scour-related mortality of eggs and alevins, (3) accelerate stream bank erosion, and (4) over the long term, deplete large woody debris and organic material. The enlargement of stream channels may result in a shallow, slow water environment during periods of low flow. This new environment could result in crowding, loss of spawning habitat, reduced primary and secondary productivity, increased vulnerability to predation, and increased sedimentation (Swanston 1991; Hicks and others 1991; National Research Council 1992; Strouder and others 1997).

The removal of streamside riparian-wetland vegetation during mining would result in loss or degradation of aquatic habitat until proper functioning condition could be re-established. In general, the time required for riparian-wetland areas to attain proper functioning condition would be dictated by natural processes and may require decades to centuries before it approximates the structure and function of the original aquatic habitat (NCSU 1998; BLM and Montana Dept. of Environ. Quality 1996; BLM 1988).

The current state of knowledge about suction dredging and its impacts on aquatic resources suggests that the practice could be either detrimental or beneficial, depending on site-specific use by aquatic organisms and physical habitat limitations. In either case, evaluation of the location and timing of suction dredging activities would benefit aquatic resources.

Suction dredging has been shown to locally reduce benthic (bottom dwelling) invertebrates (Thomas 1985; Harvey 1986) and cause mortality to early life stages of fish due to entrainment by the dredging equipment (Griffith and Andrews 1981). Suction dredging may also destabilize spawning and incubation habitat, remove large roughness elements such as boulders and woody debris that are important for forming pool habitat and that can govern the location and deposition of spawning gravels (Harvey and Lisle 1998). Suction dredging may also increase suspended sediment, decreasing the feeding efficiency of sight-feeding fish (Barrett and others 1992); reducing living space by depositing fine sediment (Harvey 1986); and cause fish to avoid certain habitats because of their response to divers (Roelofs 1983).

On the other hand, suction dredging may temporarily improve fish habitat by creating deep pools or by creating more living space by stacking large unembedded substrate (Harvey and Lisle 1998). In general, invertebrates and periphyton all rapidly re-colonize small patches of new or disturbed substrate in streams as long as the area of disturbance is not so widespread as to limit the number of organisms to re-colonize (Griffith and Andrews 1981; Thomas 1985; Harvey 1986). In addition, dredge tailings may increase spawning sites in streams lacking spawning gravel or streams that are armored by substrate too large to be moved by fish (Kondolf and others 1991). In some cases the reduction in the feeding efficiency of fish may be offset by reduced visibility and the corresponding reduced risk of predation at moderate levels of suspended sediment (Gregory 1993).

Bridges, culverts, and low-flow crossings are integral features to road development associated with surface mining. These features can also interfere with stream bedload (substrate) movement, migrations to spawning, feeding, rearing, and overwintering sites if improperly designed. Current concerns related to surface mining and road placement include diverting or eliminating flow from small tributaries that connect lakes or connect lakes and rivers. Fish species found in the planning area that move between these habitat types are vulnerable to impact. Potential loss of migratory capacity could stress or kill these fish if they are unable to migrate to food-rich habitat in the summer, reach spawning areas, or move into overwintering habitat. Proper placement of these structures is critical in minimizing impacts to fish.

(6) Effects to Fisheries and Aquatic Habitats from Forestry (Common to All Alternatives)

Some minimal forestry activity generally occurs within the planning area each year, consisting of small-scale localized timber removal for personal use, including gathering firewood and house logs. While it is unlikely that any type of road construction will occur in conjunction with this activity, it is conceivable that short spur or temporary roads may be constructed to access parcels of timber in the future. Current concerns related to road placement include diverting or eliminating flow from small tributaries that connect lakes or connect lakes and rivers. Fish species found in the planning area that move between these habitat types are vulnerable to impact. Potential loss of migratory capacity could stress or kill these fish if they are unable to migrate to food-rich habitat in the summer, reach spawning areas, or move into overwintering habitat. Proper placement of these structures is critical in minimizing impacts to fish. Because of the application of ROPs and the low likelihood of road development in association with limited forestry activities, there would be no significant impacts to fisheries.

b) Effects to Fisheries and Aquatic Habitat for Alternative A

(1) Effects to Fisheries and Aquatic Habitat from Lands and Realty (Alternative A)

ANCSA 17(d)(1) Withdrawals. Under Alternative A, no withdrawal review would take place and all ANCSA 17 (d)(1) withdrawals would remain in place. These withdrawals would protect fish habitat by excluding mineral leasing, and in some cases, mineral entry.

Rights-of-Way. Right-of-Way grants and easements may promote the construction of paved or unpaved access roads, gravel pads, railways, all of which may adversely affect fish habitat through runoff that may introduce sediment and contaminants into the water. Under Alternative A, avoidance or exclusion areas would be identified on a case-by-case basis.

Because of a low anticipated level of mineral development, Alternative A anticipates fewer Right-of-Way grants and easements than Alternatives B, C, and D.

(2) Effects to Fisheries and Aquatic Habitat from Leasable, Locatable, and Salable Minerals (Alternative A)

Leasable Minerals. Under Alternative A, no lands would be identified as open for fluid mineral leasing. This analysis anticipates no oil or gas development on BLM lands. Under this Alternative, impacts to fisheries and aquatic habitat would be minimal to non-existent.

Locatable Minerals. Alternative A anticipates continuance of mining operations on pre-ANSCA era Federal mining claims. According to the Reasonable Forseeable Development Scenario for Locatable Minerals, a total surface disturbance of 23 acres (BLM 2006), mostly from placer mining activity is expected under Alternative A. Impacts to fish would be similar to those discussed under "Effects Common to All Alternatives" for mining activities, but would occur to a lesser degree than under Alternatives B, C, or D.

Salable Minerals. Due to the remote location of BLM land, salable mineral development is not expected to occur.

(3) Effects to Fisheries and Aquatic Habitat from Recreation (Alternative A)

Under Alternative A, recreation management is custodial and impacts would be similar to those discussed under "Effects Common to All Alternatives". There are no SRMAs that would set recreation objectives or develop visitor use limits. Unmanaged trail proliferation would continue with no guidance for proper construction and placement of new trails. Impacts from recreation would be similar to those anticipated to occur under Alternatives C and D, and less than anticipated impacts under Alternative B.

(4) Effects to Fisheries and Aquatic Habitat from Travel Management (Alternative A)

Under Alternative A, BLM lands would remain undesignated and impacts would be similar to those discussed under "Effects Common to All Alternatives". Areas of high OHV use and any correlations to areas that may include important fish habitat have not been identified. Unauthorized proliferation of trails would potentially increase under this Alternative with corresponding increase in erosion and sediment impacts. It has been documented in Alaska that multiple stream crossings by OHVs can cause alterations of stream bank structure and function, and may cause the introduction of sediment into the waterway (Weidmer 2002).

(5) Effects to Fisheries and Aquatic Habitat from ACEC designations (Alternative A)

Under Alternative A, there would be no ACEC designations. ANSCA 17(d) (1) withdrawals would be retained under this Alternative.

(6) Effects to Fisheries and Aquatic Habitats from Wild and Scenic River Nominations (Alternative A)

Under Alternative A, there would be no Wild and Scenic Rivers recommended for designation under the National System. ANSCA 17(d)(1) withdrawals would be retained under this Alternative. Consequently, there could be little likelihood of development and associated impacts on BLM lands.

c) Effects to Fisheries and Aquatic Habitat for Alternative B

(1) Effects to Fisheries and Aquatic Habitat from Lands and Realty Actions (Alternative B)

Alternative B would revoke all ANCSA 17(d)(1) withdrawals which could result in increased mineral exploration and development. Potential effects of mineral development on fish habitat under this Alternative are described under impacts "Common to All Alternatives".

Disposal or exchange of BLM lands results in transfer of land out of Federal ownership. Alternative B identifies two parcels in the Iliamna East planning Block and one parcel in the Iliamna West planning Block for disposal or land exchange. Under Alternative B, the lands that are considered for disposal do not provide key fisheries habitat, and have a small influence on fishery resources. Should other BLM lands currently selected by the State or Native Corporations remain in Federal ownership, those lands may be considered for future exchange. Land disposal could result in impacts to valuable fish habitat, if subsequent development were to occur. Should BLM lands be transferred to or exchanged with other

Federal agencies (e.g., NPS or USFWS), fish resources would be managed under that agency's guidelines.

Right-of-Way grants and easements may promote the construction of paved or unpaved roads, gravel pads, or railways, all of which may adversely affect fish habitat through runoff that may introduce sediment and contaminants into water. An increase in Right-of-Way requests would be expected under this Alternative as a result of a greater opportunity for development.

(2) Effects to Fisheries and Aquatic Habitat from Leasable, Locatable, and Salable Minerals (Alternative B)

Fluid Leasable Minerals. Alternative B advocates revocation of all ANCSA 17(d)(1) withdrawals and opening the land to mineral leasing. Under Alternative B, one gas field is anticipated within the Koggiling Creek planning block, six exploratory wells over the 20-year life of the plan, each disturbing approximately six acres, and one seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected over the next 20 years. Oil and gas operations could affect fisheries resources in several ways, as described below. ROPs and Stipulations (Appendix A) have been developed to minimize impacts associated with mineral development.

Effects from Seismic Surveys. Potential threats to overwintering fish from seismic surveys in the planning area would primarily stem from: 1) stress associated with acoustic energy pulses transmitted into the ground directly over overwintering pools, and 2) physical damage to overwintering habitat caused by seismic vehicles. Large overwintering pools might allow fish to flee the immediate area of intense stress whereas fish occupying small pools might not have that option. Depending on proximity, adult fish could suffer no more than temporary discomfort whereas intense acoustical pulses could be lethal to juveniles. Given that overwintering habitat represents a small percentage of the planning area, it is unlikely that seismic transmissions would occur directly over overwintering sites with any degree of regularity. Furthermore, seismic crews could avoid known overwintering areas. Overall, any affects to overwintering fish caused by winter seismic surveys would be localized and would likely to have little effect on fish populations within the planning area.

Effects from Water Demand. Overwintering areas are limited to deep-water pools and channels in rivers and streams and to lakes deep enough to provide sufficient under-ice free water during winter. ROP Water 6a requires that water withdrawals be designed to maintain sufficient quantities of surface water, and contributing groundwater to support fish and wildlife and other beneficial uses.

Under Alternatives B, C, and D, greater levels of water withdrawal would be expected in correlation with the increased land available for exploration and development activities as compared to Alternative A.

Effects from Exploratory Drilling. Drilling operations require large amounts of water for blending into drilling muds. Operations also produce large amounts of rock cuttings. If an exploratory well were to be plugged and abandoned, drilling muds and cuttings would be re-injected into the bore hole. If the well were to go into production, muds and cuttings would be removed to an approved disposal site. Any chemical leaching into surrounding waters by cuttings temporarily being stored at the drill site could affect nearby fish habitat. Even though the anticipated development under Alternatives B, C and D would be greater than the development under Alternative A, the prevention of drilling in rivers and streams would provide fish with adequate protection (Appendix A*,* ROP FW-2f and Oil and Gas Stip-1). In general, it is not expected that exploratory drilling would have a measurable effect on fish populations in and adjacent to the planning area under this Alternative.

Effects from Pad, Road, and Pipeline Construction. Development of one gas field in the Koggiling Block would require the construction of a gravel road system linking the six exploration wells. Impacts from pad, road, and pipeline construction are mainly increased erosion and sedimentation, subsurface and surface flow disruption, and increased pollution in runoff.

Effects of Spills. Oil spills can have a range of effects on fish (Malins 1977; Hamilton et al. 1979; Starr et al. 1981). The specific effects depend on the concentration of petroleum present, the length of exposure, and the stage of fish development involved (eggs, larva, and juveniles are most sensitive). If lethal concentrations are encountered (or sub-lethal concentrations over a long enough period), fish mortality is likely to occur. Alternative B assumes the development of one gas field in the Koggiling Creek planning block. Some small-scale spills can be anticipated associated with fueling or storage, but these would be less than one barrel. Transport of crude oil (via pipelines or other modes of transport) would not occur associated with this development, nor is oil development and extraction expected to occur within the life of the plan.

Locatable Minerals. This Alternative allows for the greatest amount of exploration and development for locatable minerals through the revocation of all ANCSA 17(d)(1) withdrawals. According to the Reasonable Forseeable Development Scenario for Locatable Minerals, development of both lode and placer mines may not occur on BLM lands because of the ANILCA 906(e) Top Filings in the Goodnews planning block. Surface disturbance of 115 acres (BLM 2006) is anticipated to occur on State- and Native-selected lands with 18 acres of disturbance on Federal mining claims. Roads or infrastructure in support of mineral development could affect BLM land. For general mining impacts to fisheries, see "Effects Common to All Alternatives." These impacts would occur to a greater degree under this Alternative than under Alternatives A or C and would be similar under Alternative D.

The ROPs (Appendix A) common to Alternatives B, C, and D are designed to minimize or prevent impacts from erosion, altered stream flow, stream crossings, and riparian impacts. Strict adherence to the ROPs would minimize effects to fish and fish habitat within the planning area. The protection provided to fish and fish habitat under Alternatives B, C, and D would be superior to that provided under Alternative A. ROP FW-6a, which applies a 300-foot buffer to specific rivers and streams on BLM lands, would not apply under this alternative.

Salable Minerals. Under Alternative B, salable mineral activities may occur. Under this Alternative and Alternatives C and D, Required Operating Procedures would minimize the effects of gravel extraction on fish by avoiding gravel extraction from active channels and anadromous streams. The protection provided to fish and fish habitat under Alternatives B, C, and D would be superior to that provided under Alternative A.

Gravel extraction from fish-bearing streams or tributaries can block and reroute stream channels and increase silt concentrations resulting in reduced primary production, loss of invertebrate prey species, and disruption of feeding patterns for sight dependent feeders (Branson and Batch 1971, Cooper 1965). This plan assumes little or no salable mineral activities will occur on BLM lands, except within the Koggiling Creek planning block in support of leasable mineral activities (BLM 2006). This assumption is based on the fact that most existing gravel pits are located on private land and are much closer to existing infrastructure than BLM lands.

(3) Effects to Fisheries and Aquatic Habitat from Recreation (Alternative B)

This Alternative would allow areas currently managed for primitive or semi-primitive recreation opportunities to trend towards a Roaded natural recreation opportunity. A Roaded natural ROS class includes more roads and development though a generally natural setting is still provided. Development of recreation facilities and increased recreation use associated with a Roaded natural recreation setting would result in potentially greater impacts to fisheries and aquatic habitat. This Alternative has more potential for impacts to fisheries and aquatic habitat than Alternatives A, C, or D.

(4) Effects to Fisheries and Aquatic Habitat from Travel Management (Alternative B)

Under Alternative B, BLM-managed lands would be designated as "open" to OHV use, resulting in some continued localized impacts from erosion due mainly to unauthorized stream crossings. Locations that may include important fish habitat have not been identified. Inventoried OHV trails have authorized anadromous stream crossings with a permit from the State Department of Natural Resources. The

unauthorized and unmanaged proliferation of trails could increase under this Alternative with a resulting increase in erosion and sediment impacts. Potentially adverse effects to fish habitat from OHV use are discussed under "Effects Common to All Alternatives."

(5) Effects to Fisheries and Aquatic Habitat from ACEC designations (Alternative B)

Under Alternative B, there would be no ACEC designations. Without ACECs, there would be fewer area-wide constraints on resource development and less resource-specific protective measures applied.

(6) Effects to Fisheries and Aquatic Habitat from Wild and Scenic River Nominations (Alternative B)

Under Alternative B, there would be no Wild and Scenic Rivers recommended for designation under the National System. Additional protections of fish habitat would be limited to those outlined in the ROPs and Stipulations and constraints developed through project-specific NEPA analysis.

d) Effects to Fisheries and Aquatic Habitat for Alternative C

(1) Effects to Fisheries and Aquatic Habitats from Lands and Realty (Alternative C)

Disposal or Land Exchange. Impacts are the same as those discussed under Alternative B.

Withdrawals. Alternative C would retain 17(d)(1) withdrawals for the proposed Wild River segments of Alagnak, Goodnews mainstem, and Goodnews Middle Fork (12,210 acres) and the Carter Spit ACEC (61,251acres). The potential level of withdrawal retention would be greater under Alternatives A and C compared to Alternatives B and D. The protection provided to fish and fish habitat under Alternatives A and C would be superior to that provided under Alternative B and D.

Rights-of-Way. Under Alternative C, the proposed Bristol Bay ACEC (974,970 acres) and the proposed Carter Spit ACEC (61,251acres) would be identified as avoidance areas for Rights-of-Way. The potential level of avoidance for Rights-of-Way would be greater under Alternatives C and D than under Alternatives A and B. The protection provided to fish and fish habitat under Alternative C would be superior to that provided under Alternative A, B, or D.

(2) Effects to Fisheries and Aquatic Habitats from Leasable, Locatable, and Salable Minerals (Alternative C)

Fluid Leasable Minerals. Alternative C would retain ANSCA 17(d)(1) withdrawals for proposed Wild River segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork (12,210 acres) as an interim measure to provide an opportunity for Congressional action. Additionally, ANCSA 17d(1) withdrawals would be retained within the Carter Spit ACEC (61,25 acres). Retention of these ANSCA 17(d)(1) withdrawals would further minimize impacts to fish from what limited leasable mineral activity that might occur. There would also be a 300-foot area of No Surface Occupancy on either side of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River and Klutuk Creek (Appendix A, Stipulation 8). These constraints and protective measures would result in less land being available for mineral leasing than under Alternatives B and D. However, this Alternative still anticipates development of one gas field in the Koggiling Creek planning block. Potential effects to fisheries and aquatic habitats in the Koggling Creek planning block would be similar to those described under Alternative B. The Koggiling Creek planning block is located within the proposed Bristol Bay ACEC which would be designated a rights-of-way avoidance area, resulting in limited road development in support of leasable mineral development. This avoidance area would reduce adverse impacts to Fisheries and Aquatic Habitats associated with road development.

Locatable Minerals. ANSCA 17(d)(1) withdrawals would be revoked and 1,064,313 acres of BLM land would be open to mineral entry. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral

entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA.

The anticipated level of locatable mineral activity under Alternative C would be similar to that identified under Alternative A. ANSCA 17(d)(1) withdrawals would be retained for proposed Wild River segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork (12,210 acres) as an interim measure to provide an opportunity for Congressional action. The potential level of locatable mineral development could be slightly greater under Alternatives B and D than under Alternative C, but the protection provided to fish and fish habitat under Alternatives B and C would be superior to that provided under Alternative A due to the implementation of Required Operating Procedures.

Salable Minerals. Under Alternative C, the proposed Carter Spit ACEC (61,251acres), the proposed Bristol Bay ACEC (974,970 acres); and the proposed Wild River segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork (12,210 acres) would be closed to salable mineral development. Under Alternatives B, C, and D, Required Operating Procedures would minimize the effects of gravel extraction on fish by avoiding gravel extraction within active channels and anadromous streams. This alternative anticipates no development of salable minerals.

(3) Effects to Fisheries and Aquatic Habitat from Recreation (Alternative C)

Because BLM-managed lands would be managed for a semi-primitive motorized recreation experience, effects to fisheries from recreation would be similar to those described under Alternative A.

(4) Effects to Fisheries and Aquatic Habitat from Travel Management (Alternative C)

Off-Highway Vehicles. Under Alternative C, OHV use would be limited to existing roads and trails, providing less opportunity for potential impact to fisheries and aquatic habitat compared to Alternatives A or B. Under this Alternative, OHV trails would be managed with the objective of minimizing the proliferation of trails. Locations that may include important fish habitat have not been identified. OHV trails crossing anadromous streams will by authorized by permit from the State Department of Natural Resource. Potentially adverse effects to fish habitat from OHV use are discussed under “Effects Common to All Alternatives.” These effects would occur to a lesser degree under Alternatives C and D than Alternatives A or B. Alternative C includes a vehicle weight restriction of 2,000 pounds gross vehicle weight rating (GVWR includes load capacity).

(5) Effects to Fisheries and Aquatic Habitat from ACEC designations (Alternative C)

Alternative C would designate two ACECs, Carter Spit (61,251 acres) and the Bristol Bay (974,970 acres). Within the Carter Spit ACEC, ANCSA (d)(1) withdrawals would be maintained, thus prohibiting new leasing or locatable mineral development, providing continued protection to fisheries and aquatic habitat within the proposed ACEC.

Both ACECs will restrict salable mineral activities and be designated as right-of-way avoidance areas providing additional protection to fisheries and aquatic habitat. Designating Right-of-Way avoidance areas within the proposed ACECs would provide protection to natural resources because road or pipeline construction would likely not occur. Potential impacts to fisheries and aquatic resources, resulting from road or pipeline construction include; vegetative removal leading to increased siltation of water bodies.

The use of ROPs and Stipulations will reduce impacts to fisheries and aquatic habitat due to mineral development and exploration resulting from revocation of ANSCA 17(d)(1) withdrawals in the proposed Bristol Bay ACEC. A more detailed description of impact to fisheries and aquatic habitat resulting from mineral exploration and development is contained in the discussion on effects from leasable, locatable, and salable minerals. In addition, a Plane of Operation will be required for locatable mineral activities occurring in the ACEC, per 43 CFR 3809.11(c)(3), requiring detailed disturbance and rehabilitating planning.

(6) Effects to Fisheries and Aquatic Habitat from Wild and Scenic Rivers (Alternative C)

Under Alternative C, BLM would propose Wild and Scenic River designation for the Alagnak River, Goodnews River mainstem, and Goodnews River Middle Fork river segments.

This proposal would provide protections from development and would provide a mechanism for management of the river's resources. Wild Rivers would allow unobtrusive development and activities, but typically do not allow motorized use. Because of the maintenance of ANSCA 17(d)(1) withdrawals, new mineral entry or leasing would not be permitted; only existing valid claims could be developed. Impacts to fisheries and aquatic habitat from recreation activities may be greater than Alternative A due to the anticipated increase in visitation due to WSR designation. Impacts from mining activities would be similar to Alternative A but less than Alternatives B and D.

e) Effects to Fisheries and Aquatic Habitat for Alternative D

(1) Effects on Fisheries and Aquatic Habitat from Lands and Realty (Alternative D)

ANCSA 17(d)(1) withdrawals. Same as Alternative B. ANCSA 17(d)(1) withdrawals would be recommended for revocation. This would open BLM lands to potential leasable and locatable mineral development. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands, selected under ANILCA 906(e), would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under ANILCA 906(e) of ANILCA. Fisheries and aquatic habitat on Top Filed lands would be afforded similar protection upon revocation of ANCSA 17(d)(1) withdrawals. Impacts to fisheries and aquatic habitat on BLM lands not Top Filed would be mitigated through the use of ROPs and Stipulations (Appendix A).

Rights-of-Way. Under Alternative D, the Carter Spit ACEC (36,220 acres) would be managed as a right-of-way avoidance area. In most cases, rights-of-way for roads, pipelines, or other developments would not be approved for this area, thus providing a degree of protection for fish and aquatic habitat in the area. Outside of the ACEC, applications for rights-of-way would be handled on a case-by-case basis but appropriate ROPs for protection of fish and aquatic habitat would be applied. Alternative D anticipates a higher level of development than Alternatives A or C and slightly less than B.

(2) Effects to Fisheries and Aquatic Habitat from Leasable, Locatable, and Salable Minerals (Alternative D)

Fluid Leasable Minerals. Under Alternative D, ANCSA 17(d)(1) withdrawals would be recommended for revocation, thus making 1,101,304 acres of BLM land available for mineral leasing. This alternative designates an area of No Surface Occupancy 300 feet on either side of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River and Klutuk Creek (Appendix A, ROP FW-6a and Stipulation 8). However, this alternative still anticipates development of one gas field in the Koggiling Creek planning block, six exploratory wells (each disturbing approximately six acres) and one seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected, over the next 20 years. Potential effects to fisheries and aquatic habitats would be similar to those described under Alternative B.

Locatable Minerals. Under Alternative D, the anticipated level of locatable mineral development would be the same as identified under Alternative B, 115 acres, all on BLM, State- or Native-selected or Native (Federal Mining Claim) lands. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. All BLM lands would be subject to Required Operating Procedures (Appendix A). The potential for locatable mineral development is greater under Alternatives B and D compared to Alternatives A and C. Effects would be similar to those described under Alternative B.

Salable Minerals. The anticipated level of exploration and development for salable minerals under Alternative D would be similar to that described under Alternative B, but the proposed Carter Spit ACEC (36,220 acres) would be closed. This analysis assumes that there would be little to no mineral material development on BLM lands under this alternative (BLM 2006). According to the RFD for Leasable Mineral, gravel may be required to support gas development operations within the Koggiling Creek planning block.

(3) Effects to Fisheries and Aquatic Habitat from Recreation (Alternative D)

Because BLM-managed lands would be managed for a semi-primitive motorized recreation experience, effects to fisheries from recreation would be similar to those described under Alternative A.

(4) Effects to Fisheries and Aquatic Habitat from Travel Management (Alternative D)

Alternative D includes a limited designation and vehicle weight limit of 2,000 pounds gross vehicle weight rating (GVWR includes load capacity) for all BLM lands. OHV use under Alternative D would be restricted to existing roads and trails, resulting in fewer potential impacts to fish and fish habitat from stream crossings. Additionally, a Travel Management plan would be created (within 5 years of RMP acceptance) for BLM lands, including Carter Spit ACEC, which would designate specific trails for OHV use. This would minimize the proliferation of trails and unauthorized stream crossings in that area. Because of these proposed constraints, this Alternative is expected to result in fewer impacts from OHVs than Alternatives A or B but similar impacts compared the Alternative C.

(5) Effects to Fisheries and Aquatic Habitat from ACEC Designations (Alternative D)

Alternative D would designate the Carter Spit ACEC (36,220 acres). Management within the ACEC would provide stronger protection to fisheries and aquatic habitat through the following measures:

- Requiring Plans of Operations for any mining operation.
- Managing the area as a right-of-way avoidance area, thus avoiding potential impacts from road or pipeline construction.
- Developing a transportation plan that identifies specific designated trails for OHV use.

The ACEC will restrict salable mineral activities and be designated rights-of-way avoidance areas providing additional protection to fisheries and aquatic habitat. Designating Right-of-Way avoidance areas within the proposed ACECs would provide protection to natural resources because road or pipeline construction would likely not occur. Potential impacts to fisheries and aquatic resources, resulting from road or pipeline construction include; vegetative removal leading to increased siltation of water bodies.

The use of ROPs and Stipulations will reduce impacts to fisheries and aquatic habitat due to mineral development and exploration resulting from revocation of ANSCA 17(d)(1) withdrawals in the proposed ACEC. A more detailed description of impact to fisheries and aquatic habitat resulting from mineral exploration and development is contained in the discussion on effects from leasable, locatable, and salable minerals. In addition, a Plane of Operation will be required for locatable mineral activities occurring in the ACEC, per 43 CFR 3809.11(c)(3), requiring detailed disturbance and rehabilitating planning.

(6) Effects to Fisheries and Aquatic Habitat from Wild and Scenic Rivers (Alternative D)

This Alternative would not recommend any rivers for inclusion in the National Wild and Scenic River system. ANCSA 17(d)(1) withdrawals would be recommended for revocation allowing for mineral entry.

f) Essential Fish Habitat

Although there are no Federally-managed fisheries on BLM land in the planning area, the ranges of the five species of Pacific salmon found within the plan boundaries are under the jurisdiction of the North Pacific Fisheries Management Council. The Magnuson-Stevens Act calls for direct action to stop or reverse the continued loss of fish habitats for species that are under this jurisdiction. Essential Fish Habitat (EFH) is a specific classification term that only applies to the habitat of Pacific salmon and not to any other species in the planning area. EFH is defined as those waters and substrate necessary to salmon for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of EFH, "waters" include aquatic areas that are used by fish and their associated physical, chemical, and biological properties and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' entire life cycle (National Marine Fisheries Service 2005).

For Alaska, freshwater EFH includes all streams, lakes, ponds, wetlands, and other waterbodies that have been historically accessible to salmon. A significant body of information exists on the life histories and general distribution of salmon in Alaska. The locations of many freshwater waterbodies used by salmon are described in documents organized and maintained by the Alaska Department of Fish and Game. Alaska Statute 16.05.870 requires ADF&G to identify the various streams that are important for spawning, rearing, or migration of anadromous fish. The agency met its statutory obligation with publication of the *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes* (ADF&G 1998a) and the *Atlas to the Catalog of Waters Important for Spawning, Returning or Migration of Anadromous Fishes* (ADF&G 1998b). The catalog lists waterbodies documented to be used by anadromous fish. The atlas shows locations of these waters and the species and life stages that use them Maps 3.13 a-d show the location of these streams in the planning area.

Potential impacts to the salmon that inhabit the planning area would be the same as described for other fish. Consequently, impacts to salmon as part of EFH, have been evaluated in the general fish analysis above. For the reasons described under Alternatives B and D and through adherence to protective ROPs and Stips, EFH is likely to be largely unaffected under the proposed development activities probable during the life of this plan.

5. Direct and Indirect Effects to Wildlife and Wildlife Habitat

a) Direct and Indirect Effects to Wildlife Common for All Alternatives

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to wildlife management: Air Quality, Fisheries Management, Special Status Species, Cultural Resources, Paleontological Resources, Visual Resources, Forestry, and Subsistence.

(1) Effects to Wildlife from Soil, Water, and Vegetation and Air Management (Common to All Alternatives)

There would be beneficial effects to wildlife and wildlife habitat from proper management of soils, vegetation, and water resources. Implementation of ROPs and Stipulations to protect soil, water, vegetation, and air would reduce habitat disturbance and aid in the recovery of habitat from permitted uses.

(2) Effects to Wildlife from Fire and Fuels Management (Common to All Alternatives)

A large percentage of the planning area is comprised of herbaceous or shrub habitats. Fire is less prevalent in these vegetation types compared to boreal forests; therefore, effects of fire on wildlife and habitats are lower in the planning area than for Interior Alaska.

Fire has both direct and indirect effects on wildlife and their habitats. These effects are described in detail in the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska (BLM 2004). Generally, the effects on habitat are much greater than the effects on resident animals. Short-term negative impacts from fire on resident wildlife include displacement, disruption of reproductive activities, and occasional mortalities. However, populations of certain species can recover quickly if suitable habitat is available. Adverse effects to current individuals are generally offset by the advantages of beneficial habitat changes for future generations.

Fire helps maintain a mixture of vegetation types and age classes that provide habitat and forage for a variety of wildlife. Fire alters habitats and may improve habitat components for some species while degrading habitat for other species. Over time, as vegetation recovers from fire disturbance, various species of wildlife will benefit from various successional stages of vegetation. Herbivores are directly affected by the changes in vegetative cover and forage associated with fire, whereas predators respond to both changes in cover and abundance of prey.

Wildlife has evolved in the presence of fire and has adapted to it. Overall, a natural fire regime has a beneficial effect on maintaining a diversity of wildlife and wildlife habitats. Grasses, sedges and herbaceous plants that quickly re-sprout after fire, provide forage and cover for small mammals, wet and alpine tundra birds, and grazing species. Browsers such as moose, hares, and ptarmigan benefit from fire when trees and shrubs re-establish themselves. If fires are not too severe, sprouting of some shrub species will occur soon after burning.

Moose generally benefit from fire due to increased production of high quality browse for 23-30 years after fire (McCracken and Viereck 1990). Prescribed fires are a management tool used to increase moose habitat. Moose populations generally react in a strongly positive manner to areas with increased browse. The level of effect is variable, depending upon the health of the moose population prior to the fire and the amount of browse available. If browse is not a limiting factor on moose populations, then fire will have little impact on populations over the short-term (BLM 2004b).

The short-term effects of fire on caribou winter range are negative, and vary depending upon the severity of the burn. Lichens, which are primary winter forage for caribou, are highly susceptible to wildland fire. Impacts to habitat include reduced availability of forage lichens for up to 80 years after a fire (Klein 1982, Joly et al. 2003). On caribou summer ranges, forage quality of vascular plants is improved by fire. Fire also affects caribou movement patterns. Research has shown that caribou actively avoid burned areas for 35-50 years after a fire (Joly et al. 2003). Over the long-term, fire is likely beneficial to caribou as it helps maintain the ecological diversity of the habitat and may prevent mosses from out-competing forage lichens. Light fires may rejuvenate stands of lichen and replace old forest stands where lichen has been replaced by moss. Periodic fires create a mosaic of fuel types and fire conditions that naturally preclude large, extensive fires (BLM 2004b).

Fire is very rare in subalpine habitats used by Dall sheep. Fire may enhance sheep habitat by reducing encroachment of shrubs and spruce into subalpine habitats. Fire can also increase the amount or quality of herbaceous and graminoid forage available, and reduce cover used by bears and wolves when hunting sheep.

Fire has both beneficial and negative effects on bears. Beneficial effects include increasing the availability of forage plants such as berries, grasses and forbs. On the negative side, some forage species may be reduced or temporarily eliminated by fire. Moose calves are an important prey item for both black and grizzly bears. Early stages of plant succession due to fire tend to increase moose

production, resulting in more calves available for prey (BLM 2004b). Fire has little direct effect on grizzly bears as it is infrequent in tundra habitats, and tundra fires tend to be small.

The effects of fire on furbearers are variable, depending on the species. Carnivorous furbearers (e.g., coyote, fox, wolf, wolverine, lynx) respond to fire in a manner similar to their prey species, though there tends to be a lag period. If prey species benefit from fire, predators do as well. Snowshoe hares, voles, and other small mammals tend to respond positively to vigorous re-growth triggered by wild fires. Species such as marten and lynx tend to increase as well, tracking these prey species (Johnson et al. 1990). Fire is not common in the coastal habitats favored by Arctic foxes, and so they are minimally affected. Herbivorous furbearers (such as muskrats) may benefit from fire due to rejuvenation of forage plants and maintenance of open water. Beavers may be negatively affected by severe fires until forage species re-colonize the area.

Fire near wetlands can consume dead grass and sedges, opening up dense marsh vegetation to maintain habitat for waterfowl. Burning also stimulates new shoots that have greater forage value. Under the right conditions, fire may create new ponds or prevent old ponds from filling in with vegetation. Fire can have short-term negative effects on waterfowl when it occurs during nesting or molting periods, or when it eliminates woody vegetative cover (BLM 2004b).

(3) Effects to Wildlife from Hazardous Materials (Common to All Alternatives)

Hazardous materials in the planning area have the potential to enter the food chain and contaminate wildlife species that are consumed by humans, causing negative health effects. This could occur in sport hunted species, and particularly in subsistence species where human consumption levels are higher. Hazardous materials may also directly and indirectly affect wildlife by causing direct mortality, reduced survival, and reduced productivity, thereby reducing species abundance.

The hazardous materials program could have a beneficial effect on wildlife by identifying and rehabilitating hazardous sites.

(4) Effects to Wildlife from Mineral Development (Common to All Alternatives)

Locatable Minerals. Locatable mineral exploration and development may occur under every Alternative. Potential impacts to wildlife would include temporary displacement in localized areas, temporary and long term loss of habitat, long-term degradation of habitat, and possible direct mortality of small mammals or nestlings and brooding birds. Both direct and indirect impacts may be reduced under all Alternatives with implementation of the Required Operating Procedures (Appendix A).

Salable Minerals. Salable mineral activities have both direct and indirect impacts on wildlife and their habitat. Habitat is degraded or destroyed, depending upon the location of the material site. Some sites may recover to the original vegetation cover within a relatively short time frame. Other sites may never passively recover to the original vegetative cover due to loss of soil from the site. In some cases, disturbance to the site by mining of mineral materials may result in improved habitat for species which depend upon habitats in a low seral stage. Temporary displacement and disturbance impacts would occur to larger and more mobile animals. Direct mortality may result to smaller and less mobile animals such as lemmings, voles, or nestling birds. Both direct and indirect impacts may be reduced under all Alternatives with implementation of mitigation measures developed through project-specific NEPA analysis.

Impacts to wildlife from mineral materials mining on BLM lands would be minimal under all Alternatives. Sufficient material sources exist on private lands to meet the needs of most communities within the planning area (BLM 2006).

(5) Effects to Wildlife from Recreation Management (Common to All Alternatives)

There may be impacts to wildlife from both commercial and non-commercial recreation activities. The primary impacts may be temporary stress, displacement, or habitat abandonment of wildlife due to recreational activities, or to recreation associated access (aircraft overflight and landing in remote areas). In areas that are repeatedly used for camping sites, there may be minor, site-specific degradation of habitat. Special recreation permits for guiding and outfitting may result in population effects on caribou, moose, and bears.

(6) Effects to Wildlife from Travel Management (Common to All Alternatives)

The noise and activity associated with OHV use (including snowmachines) can adversely affect wildlife both directly and indirectly. Direct effects include stress and displacement of animals, possibly to less suitable habitats, especially in important seasonal habitats. Stress and displacement may result in reduced productivity (ADF&G 1990). Changes to traditional movement patterns and distribution and behavior of wildlife can result from exposure to OHVs. Wildlife are particularly vulnerable to disturbance at periods of time and in areas of concentration such as caribou calving grounds, or during stressful periods during their life cycle (i.e. caribou and moose calving, post calving aggregations, winter habitats, bear natal dens and foraging concentrations, bird nesting and staging areas). OHV use may result in habitat abandonment or changes in density or species population, age, and sex composition in the vicinity of trails.

Indirect effects include habitat degradation and alteration, and increased access into habitats. Remote areas will become more accessible over time as OHVs become more powerful and as the human population in the planning area increases. Improved technology and increased demand for resources may lead to increased harvest of wildlife. Snowmachine use compacts snow and may inhibit movement under the snow by small rodents. Fragile habitats such as wetlands and riparian areas may be degraded seasonally by OHV use.

(7) Effects to Wildlife from Renewable Energy (Common to All Alternatives)

Renewable energy sources such as wind could be developed on BLM lands within the planning area under all Alternatives. Should such development take place, there would be both direct and indirect impacts on wildlife. Direct impacts would include disturbance during construction and maintenance activities, mortality due to bird strikes on wind towers, and mortality of small, less mobile animals such as small mammals or nestling birds during construction and maintenance. Indirect impacts would include minor loss of habitat due to facility construction. Higher mortality may be expected if wind towers are sighted in bird movement corridors. To be most useful, these types of development need to be located near population centers. However, most land near villages is private. Due to the remoteness of BLM lands, little renewable energy development is anticipated. Actual impacts would be minimal and would not have population level effects. The increasing cost of fuel may make wind energy more cost effective in the future, including power for mineral development. At this time, solar energy technology options do not appear to have the potential for impact on wildlife on BLM lands. Limited opportunity for using available geothermal energy, and local, small scale opportunity for use of solar energy would result in insignificant impacts.

(8) Effects to Wildlife from Climate Change (Common to All Alternatives)

The climate within the Bay planning area is described as maritime near the coasts, and more transitional farther inland. Current scientific evidence suggests that climate warming in Alaska can be linked to changes occurring in the structure and function of terrestrial ecosystems throughout the state. These changes include the thawing of permafrost, the conversion of tundra to more shrub habitats, and the drying and decrease in areas of closed basin lakes, causing alteration and conversion of wildlife habitats. Climate change has also been linked to changes in disturbance regimes such as fire potential and insect outbreaks, further affecting ecosystem processes and causing habitat changes in some areas. Warming climates may be instrumental in the introduction of disease and parasites previously unknown in the

planning area. Current research suggests that these trends will continue, and will likely occur to a greater extent and magnitude at higher latitudes first. These climatic changes and subsequent habitat changes will impact wildlife by expanding habitats for some species, and limiting habitat for other species, thereby altering the distribution and abundance of some species, particularly those dependent on wetlands, tundra, shrub or closed forest habitats. BLM lands in the planning area will be subjected to these climate and habitat changes.

(9) Effects to Wildlife from Lands and Realty Actions (Common to All Alternatives)

There would be both direct and indirect impacts to wildlife from lands and realty actions under all Alternatives. Wildlife may be temporarily displaced or disturbed or movement patterns disrupted during activities authorized under this program. There may be direct mortality and/or habitat abandonment by wildlife species from activities authorized under permits or leases. Wildlife habitat may be destroyed, fragmented, or degraded. Acquisitions and exchanges may benefit wildlife by consolidating land ownership patterns and protecting important wildlife habitats. Disposal action may fragment Blocks of land, remove protections for wildlife habitats, and make them available for other uses detrimental to wildlife.

(10) Effects to Wildlife from Forestry (Common to All Alternatives)

Some minimal forestry activity generally occurs within the planning area each year, consisting of small-scale localized timber removal for personal use, including gathering firewood and house logs. While it is unlikely that any type of road construction will occur in conjunction with this activity, it is conceivable that short spurs or temporary roads may be constructed to access parcels of timber in the future. If roads were constructed, there could be localized impacts to habitat, migratory patterns, and wildlife abundance and distribution. Direct habitat loss may lead to wildlife displacement and habitat fragmentation. Surface disturbing activities may displace animals into lower quality habitat and increase competition for available resources with other species. Because of the application of ROPs and the low likelihood of road development in association with limited forestry activities, there would be no significant impacts to wildlife or wildlife habitat from forestry activities under any Alternative.

b) Effects to Wildlife for Alternative A

Under the current management system, Alternative A, compliance, monitoring, and mitigation requirements for wildlife are determined on a case-by-case basis during the permitting process.

(1) Effects to Wildlife from Reality and Lands Actions (Alternative A)

Impacts to wildlife would be the same as discussed under those Common to All Alternatives. Under this Alternative, no lands would be identified for disposal or land exchange and ANCSA 17(d)(1) withdrawals would be retained. The degree of impacts that would occur to wildlife and wildlife habitat under this Alternative would be less than under Alternatives B, C, or D. Avoidance or exclusion areas and specific mitigation requirements would be identified on a case-by-case basis for Rights-of-Way, including access and utility corridors and ancillary facilities.

(2) Effects to Wildlife from Leasable, Locatable, and Salable Minerals (Alternative A)

Leasable Minerals. Alternative A would retain all ANCSA 17(d)(1) withdrawals, thus preventing mineral leasing on most BLM lands. This analysis assumes no leasable mineral activities on BLM lands for the life of the plan.

Locatable Minerals. Under Alternative A, most BLM lands within the planning area would remain closed to mineral entry due to existing ANCSA 17(d)(1) withdrawals. However, some pre-ANSCA claims exist on BLM lands where some mining may take place or continue. These operations and any future proposals for locatable mineral exploration and development would be subject to review through Notice Level

Administration or administration of Plans of Operations. Measures to maintain the integrity of wildlife habitat in these areas would be developed through project-specific NEPA analysis. This analysis assumes disturbance of 23 acres of BLM and Native (Federal claims) lands under this Alternative, mostly from placer mining operations (BLM 2006). Effects from mining as described under "Effects Common to All Alternatives". are less likely to occur than under any other Alternative.

Salable Minerals. Potential impacts to wildlife would be the same as under "Effects Common to All Alternatives." No impacts would be expected in areas withdrawn from mineral entry and this analysis assumes no salable mineral activities on BLM lands (BLM 2006) due to the remote location of BLM lands in the planning area.

(3) Effects to Wildlife from Recreation Management (Alternative A)

Under Alternative A, both commercial and non-commercial recreation would continue to be managed on a case-by-case basis. No areas would be identified for commercial or non-commercial use limits. No recreation facility construction would be considered. There may be localized habitat degradation at heavily-used and dispersed campsites. Impacts to wildlife would be the same as discussed under "Effects Common to All Alternatives."

(4) Effects to Wildlife from Travel Management (Alternative A)

Under Alternative A, there would be no OHV designations within the Bay planning area. No vehicle weight limit would be imposed, and there would be no route restrictions. Cross country travel would not be restricted. Impacts would be similar to those discussed in "Effects Common to All Alternatives." The degree of potential impacts to wildlife and wildlife habitat from travel management would be greater than in Alternatives C or D.

(5) Effects to Wildlife from ACEC Designations (Alternative A)

Under Alternative A, no Areas of Critical Environmental Concern would be recommended in the planning area. BLM would manage wildlife habitat and would address concerns on a case-by-case basis during the review of permits. ANCSA 17(d)(1) withdrawals would be retained resulting in little impact differential from that which would occur under an ACEC designation.

(6) Effects to Wildlife from Wild and Scenic River Nominations (Alternative A)

Under Alternative A, no Wild and Scenic Rivers would be recommended in the planning area. These areas would be open to all multiple use activities permitted on BLM lands except mineral entry due to retention of ANCSA 17(d)(1) withdrawals.

c) Effects to Wildlife for Alternative B

(1) Effects to Wildlife from Lands and Realty Actions (Alternative B)

Land Exchanges. Large blocks of BLM lands would be retained in Federal ownership, reducing the potential for habitat fragmentation. Small isolated parcels identified in Alternative B for disposal could result in privatization of some tracts and could increase levels of access and human activity in wildlife habitat. Wildlife may be displaced from preferred habitats, and habitat may be destroyed or degraded. Exchanges could result in larger, contiguous blocks of BLM lands that are of high wildlife value.

Withdrawals. ANCSA 17(d)(1) withdrawals would be recommended for revocation under this Alternative. Because of the constraints currently in place under these withdrawals, revocation of the withdrawals could increase potential resource development and wildlife and habitat disturbing activities. Associated impacts to wildlife and wildlife habitat would be expected from minerals activities. Activity level proposals

would be handled on a case-by-case basis, and would be subject to Required Operating Procedures and Stipulations (Appendix A) and constraints developed through project-specific NEPA analysis.

Rights-of-Way. This Alternative anticipates the most applications for rights-of-way associated with resource development activities. These would include roads or pipelines associated with mineral development. Effects to wildlife from these activities are described under "Effects Common to All Alternatives". More effects to wildlife from rights-of-way would be expected under this Alternative than under Alternatives A, C, or D.

(2) Effects to Wildlife from Leasable, Locatable, and Salable Minerals (Alternative B)

Fluid Leasable Minerals

Under Alternative B, ANCSA 17(d)(1) withdrawals would be revoked. Because of the constraints currently in place under these withdrawals, removal of the withdrawals could increase resource development and wildlife and habitat disturbing activities. This analysis assumes the development of one gas field in the Koggiling Block, six exploratory wells (each disturbing approximately six acres) and one seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected, over the next 20 years. Impacts to wildlife from leasable minerals development could come from several activities:

Seismic Exploration. Seismic exploration would have direct impacts on wildlife, including temporary disturbance or stress on wildlife. In one study, seismic activities within 1.15 miles of a grizzly bear den caused changes in heart rate and movement of the female bear and cubs (Reynolds et al. 1986). The investigators suggest that seismic testing activities within approximately 600 feet of the den may cause abandonment of the den.

For approximately the past 15 years, the Mulchatna Caribou Herd has been inconsistent and unpredictable in its choice of overwintering and calving areas within the larger herd range (Hinkes et al. 2005). In spring 2006, there were two large calving groups, one located near Lime Village and the other located south of Koliganek in a generalized area that includes BLM lands. Planning for seismic exploration on BLM lands in the planning area for a time when caribou are not present could prove challenging with such unpredictable behavior (Appendix A, ROP FW-3b).

The National Research Council's report, Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope (2003), suggests that the optimum time to conduct seismic activities in caribou winter range and primary calving areas is in summer when caribou are not present. However, even in winter on winter range, the Committee believed that direct effects on caribou in the National Petroleum Reserve – Alaska in the 1970s and 1980s from low intensity two-dimensional (2-D) surveys with low seismic line density were temporary and minor (NRC 2003). Wintering bands of caribou tend to be small and often widely dispersed, so few caribou would have come in contact with seismic activities at the same time. Additionally, Roby (1978, NRC 2003) suggests that caribou appear least sensitive to human induced disturbance during winter.

Dyer and others (2001) suggest that avoidance of seismic lines and the attendant human activity could reduce caribou's ability to avoid areas of deep snow. Bradshaw and others (1998) propose that the energy costs of multiple encounters with seismic disturbance could increase winter weight loss and reduce calf production and survival (NRC 2003). Under Alternative B, Oil and Gas Lease Stipulations 5 and 6 (Appendix A) would not apply. These Stipulations provide for timing constraints on oil and gas exploration and development activities, including seismic work. Without the application of these timing constraints, the effects described above could be more pronounced under this Alternative.

Information about the effects of noise on moose was gathered for the Mackenzie Gas Project in Canada (AMEC 2005). In a 1974 study recording the response of moose in the Richardson Mountains to fixed-wing aircraft, McCourt and others found that of 46 observations, moose reacted visibly to aircraft overflights of less than 60 meters of altitude 55% of the time, and to overflights of 60 meters to 180

meters 37.5% of the time. Moose are known to avoid roads, pipelines and seismic lines (Horesji 1979, Rolley and Keith 1980, Morgantini 1984, Rudd and Irwin 1985, Singer and Beattie 1986, Jalkotzy et al. 1997). Horesji (1979) also reported that moose were less likely to be found within 1 km of seismic lines while seismic operations were underway.

Based on data from prior studies, caribou, moose, and bears can all be hazed away from their habitats by seismic testing. The following factors would be essential in the degree of effects:

- The timing and location of tests and whether caribou, moose, or bears are present or absent.
- The number of seismic lines involved, the amount of temporary infrastructure developed, and the amount of ancillary human activity accompanying the testing, including helicopter activities.
- The total duration and intensity of the project or cumulative projects in a specific area.
- The type of testing, subsurface or above ground; 2-D or 3-D procedures.

Seismic camps may provide additional food sources for foxes and bears at dumpster sites near the galley and dining halls and at dump sites (Eberhardt et al. 1982, Rodrigues et al. 1994). However, seismic crews are required by to incinerate and remove waste materials from BLM lands (Appendix A, Section D). This activity is not expected to enhance the survival of foxes. Bears would generally be hibernating during seismic exploration because it is carried out in winter, and would not be expected to be affected by human sources of food. Testing by helicopter-supported ground crews could easily be done in summer months (which has been the case in the past) and so would also be expected not to be a source of impacts.

Small mammals (lemmings, voles) and their predators would be affected locally at camps and along seismic lines by direct mortality and loss of habitat. The numbers lost would be insignificant in the greater population.

Should seismic surveys occur during winter months, many birds are absent from the region. Overwintering birds, including ravens, ptarmigan, and gyrfalcons, could be temporarily displaced by seismic activities. In the unlikely event that a seismic operation extended into May, disturbance of early breeding season activities of some species could occur. Because the campsites and survey areas are occupied for relatively brief periods and most of the birds are dispersed in relatively low numbers over a large area, the duration of disturbance incidents is likely to be brief and infrequent. Stipulations, Required Operating Procedures, and project-specific requirements such as those describing seasonal activities and buffers would minimize potential impacts.

Indirect impacts to wildlife from seismic operation may include degradation of habitat (impacts to soil and vegetation) due to seismic exploration. These types of impacts would be reduced by implementation of the Required Operating Procedures (Appendix A), including limiting seismic surveys to the winter when the ground is frozen and covered with snow.

Exploratory Drilling. Effects to wildlife from exploratory drilling for oil and gas would be similar to those discussed under seismic exploration. As exploratory drilling should occur during winter, potential disturbance would come primarily from aircraft, surface traffic, and activities associated with road and drill pad construction. Numerous studies show that wildlife such as caribou react to low flying aircraft by exhibiting various behaviors from panic to strong escape responses (Calef et al. 1976). Disturbance reactions to each incident with aircraft would be brief, lasting only minutes to less than one hour; however, effects of cumulative incidents must also be considered. Wildlife may be temporarily disturbed from ground traffic and activities associated with ice road construction. Wildlife may temporarily avoid the local area but would reoccupy the area after exploration activities were complete. Small and less mobile animals such as lemmings and voles may suffer direct mortality during ice road or pad construction. This analysis anticipates the drilling of six exploration wells over a 20 year period, each disturbing approximately six acres. Given the small scale of this development and small area of disturbance, the described impacts should not result in population level effects for any species.

Development. Under the Reasonably Foreseeable Development Scenario, one site in the Koggiling Creek planning block of BLM lands is explored and potentially developed for natural gas, and a pipeline is constructed to Dillingham. Using this scenario, the following effects could occur.

Although initial construction could occur primarily during winter, development of leasable mineral resources would bring year-round facilities and activities to wildlife habitat on BLM lands in the southern part of the Nushagak – Kvichak drainages. Potential effects of development activities include direct habitat loss for bears, caribou, moose, waterfowl, small mammals and their predators, and other animals from gravel extraction and oil field facilities. Indirect habitat loss may occur through (habitat fragmentation) reduced access caused by physical or behavioral barriers created by roads, pipelines, and other ancillary facilities, and by road and air traffic. Depending on location and season, leasable mineral activities could result in increased disturbance and mortality to individual animals from routine aircraft operations, gravel-extraction operations, presence of gravel pads and facilities, and associated improved human access for vehicle and foot traffic from both workers and the general public.

For example, the National Research Council (2003) found that intensive oil and gas development on the North Slope has altered the distribution of female caribou during the summer insect season, and that elsewhere a network of roads, pipelines, and facilities has interfered with caribou movements between coastal insect relief and inland feeding areas. Radio-collared female caribou west of the Sagavanirktok River shifted their calving concentration area from developed areas near the coast to undeveloped areas inland, to an area of lower green-plant biomass. During a six year period, parturition rates of radio-collared females in regular contact with oil-field infrastructure were lower than those of undisturbed females, exacerbated by intense insect harassment during the period. Possible consequences of these disturbances include reduced nutrient acquisition and retention throughout the calving and midsummer periods, poorer condition in autumn, and a lowered probability of producing a calf the following spring (NRC 2003). While these impacts have occurred on more intensive oil and gas development, this level of development is not predicted for BLM lands in this area, based on findings presented in the Reasonably Foreseeable Development Scenario for Fluid Minerals (BLM 2006).

Disturbance and stress impacts would be similar to those discussed under Seismic Exploration, but would be more extensive and long term due to yearlong exposure. Various species could be affected to some extent by disturbance events such as passage of aircraft, although most incidents are expected to result in negligible effects from which individuals would recover within hours to a day. However, the cumulative effect of repeated disturbance could extend for longer periods and potentially may adversely affect physiological condition, reproductive success, productivity, and the use of key seasonal and life function habitats.

Disturbance impacts to grizzly bears would be similar to those discussed under seismic impacts. A similar effect could occur from construction activities within 600 feet of dens. The National Research Council (2003) found that oil and gas activities on Alaska's North Slope had changed the demographics of the grizzly bear population. Harding and Nagy (1980) found that grizzly bears initially avoid human settlements because of the noise and disturbance, but if the area includes an important food source, some bears are likely to habituate to the noise and human presence, leading to an increase in encounters and mortalities.

Fox populations also increase, primarily because of the availability of human food sources. One concern is that increasing fox populations could affect regional populations of some bird species.

Development of infrastructure in the region may introduce injury or mortality factors such as vehicle collisions. Contaminated food, hydrogen sulfide gas poisoning, and other oil-development related sources could contribute to increased wildlife mortality. Defense of life and property mortality for brown bears could increase with increase in human residence and increased presence of human food.

Other effects on birds observed at other oil and gas sites in Alaska include shifts in nesting distribution of shorebirds and artificially high densities of ravens and gulls (NRC 2003).

Locatable Minerals. Under Alternative B, ANCSA 17(d)(1) withdrawals would be revoked and 1,102,489 acres of BLM land would be open to mineral entry. Dependent on gold prices, existing locatable mining operations may continue and a moderate increase in small placer operations on BLM lands could occur during the life of this plan. This analysis predicts a total of 115 acres of surface disturbance on BLM lands from locatable mineral activities for Alternative B (BLM 2006). Large operations could be possible, but would most likely occur on State or Native lands (BLM 2006). Roads or infrastructure necessary for those operations, however, could cross BLM lands.

Approximately 3,968 acres would remain withdrawn due to Agency withdrawals. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Existing mining operations and any future proposals for locatable mineral exploration and development would be subject to review and Required Operating Procedures (Appendix A). Measures to maintain the integrity of wildlife habitat in these areas would be implemented..

The Required Operating Procedures common to Alternatives B, C, and D are designed to minimize or prevent impacts to wildlife and wildlife habitats. Strict adherence to the ROPs would minimize effects to wildlife and wildlife habitat within the planning area. Effects described under "Effects Common to All Alternatives" would have a greater potential to occur under this Alternative than under Alternatives A and C.

Salable Minerals. If mineral material development occurred in support of leasable mineral activity, the effects would be similar to those described under "Effects Common to All Alternatives." This analysis anticipates little to no development of mineral material sites on BLM lands (BLM 2006).

(3) Effects to Wildlife from Recreation (Alternative B)

Under Alternative B, lands would be managed as Roaded Natural under the Recreation Opportunity Spectrum. This ROS setting is characterized by a generally natural environment with moderate evidence of sights and sounds from humans. Resource modification and utilization practices are evident and concentration of users can be moderate. Consequently, the effects to wildlife described under "Effects Common to All Alternatives" would occur to a greater degree than under Alternatives A, C, or D.

(4) Effects to Wildlife from Off-highway Vehicles (Alternative B)

Under Alternative B, all lands would be open to OHV use and there would be no route restrictions. Lack of restrictions in this Alternative would mean that cross country travel would be allowed everywhere on BLM lands within the planning area. An increase in habitat degradation would continue at the current rate due to unrestricted OHV access. Adverse impacts to fisheries resulting from OHVs crossings streambeds may impact terrestrial predators and scavengers by altering availability, seasonal abundance, and distribution of important fish-related food resources.

(5) Effects to Wildlife from Designations of Areas of Critical Environmental Concern (Alternative B)

There would be no ACECs designated under this Alternative. This would result in fewer constraints to resource development and more lands available to resource development.

(6) Effects to Wildlife from Wild and Scenic River Nominations (Alternative B)

Under Alternative B, there would be no Wild and Scenic River nominations and any ANCSA 17(d)(1) withdrawals associated with the rivers would be recommended for revocation. This would result in fewer constraints to resource development and more lands available to resource development.

d) Effects to Wildlife for Alternative C

(1) Effects to Wildlife from Reality and Lands Actions (Alternative C)

Land Exchanges. Impacts to wildlife from land exchanges and acquisitions would be the same as described for Alternative A.

Withdrawals. Under this alternative, ANCSA 17(d)(1) withdrawals would be maintained on proposed wild river segments on the Alagnak, Goodnews mainstem and Goodnews Middle Fork (12,210 acres) and within the Carter Spit ACEC (61,251acres). This would be beneficial for wildlife habitat because it would prohibit mineral entry or leasing and potential mineral development.

Rights-of-Way. Impacts to wildlife from Rights-of-Way would be the same as described under "Effects Common to All Alternatives." However, the proposed Bristol Bay and Carter Spit ACECs would be identified as avoidance areas. This would provide additional protection to wildlife habitats by restricting Right-of-Way development which may degrade or fragment habitat.

(2) Effects to Wildlife from Leasable, Locatable, and Salable Minerals (Alternative C)

Leasable Minerals. Under Alternative C, ANCSA 17(d)(1) withdrawals would be revoked, opening 1,063,129 acres of BLM lands within the planning area to mineral entry. ANCSA 17(d)(1) withdrawals would be retained on eligible/suitable Wild Rivers (12,210 acres) including the Alagnak, Goodnews and Goodnews Middle Fork Rivers and within the proposed Carter Spit ACEC (61,251 acres). The retention of these withdrawals would prohibit mineral leasing within these areas. There would be No Surface Occupancy within 300 feet of the East and South Fork Arolik River, Faro Creek, South Fork Goodnews River and Klutuk Creek. This analysis predicts the development of one gas field in the Koggiling Creek planning block, six exploratory wells (each disturbing approximately six acres) and one seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected, over the next 20 years. Potential impacts to wildlife from such a development are the same as those discussed under Alternative B. However, under this alternative there is less land available for mineral leasing compared to Alternatives B or D.

Locatable Minerals. The effects to wildlife from locatable mineral activities would be the same as those in Alternative B, except segments of eligible/suitable Wild Rivers (12,210 acres) including the Alagnak, Goodnews and Goodnews Middle Fork Rivers of the Alagnak River, the mainstem of the Goodnews River, and the Goodnews Middle Fork, and the proposed Carter Spit ACEC, (61,251acres) would retain ANSCA 17(d)(1) withdrawals precluding mineral entry in these areas. Conservation of these areas would benefit by protecting important habitats. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Under Alternative C, there is less land available for mineral leasing compared to Alternatives B or D.

Salable Minerals. Impacts to wildlife would be similar to those in Alternative B except the proposed Carter Spit ACEC, the proposed Bristol Bay ACEC, and segments of the Alagnak, Goodnews mainstem and Goodnews Middle Fork River proposed for Wild and Scenic River designation would be closed to salable mineral activities. The closure of the Bristol Bay ACEC would restrict salable mineral activities in conjunction with leasable mineral activities in the Koggiling Creek planning block. This Alternative would provide the highest protection to wildlife populations and habitat from salable mineral activities because less acreage would be available.

(3) Effects to Wildlife from Recreation (Alternative C)

Under Alternative C, the entire recreation area setting would be managed for ROS classes semi-primitive motorized. No facilities would be constructed and vegetation and soils are predominantly natural but

localized areas of disturbance may exist (Table 2.9). Impacts to wildlife would be the same as those described under Alternative A.

(4) Effects to Wildlife from Off-highway Vehicles (Alternative C)

Under Alternative C, all lands would receive a "limited" designation for OHV use, which would require vehicles to stay on existing trails whenever possible. A vehicle weight limit of 2000 pounds would be proposed. These restrictions would benefit wildlife by reducing the proliferation of trails and degradation of habitats, and would reduce the indirect impacts to wildlife created by noise and disturbance.

(5) Effects to Wildlife from Wild and Scenic Rivers (Alternative C)

Under Alternative C, segments of the Alagnak, Goodnews mainstem and Middle Fork Goodnews Rivers would be proposed . ANSCA 17(d)(1) withdrawals would be These actions would be beneficial to wildlife by protecting riparian habitats from disturbance, from resource development activities, and by providing undisturbed wildlife habitats to riparian species. A Wild and Scenic River nomination or subsequent designation could have the effect of increasing visitation on the river. This could increase recreation impacts such as bank trampling, campsite impacts, and litter. Impacts to associated wildlife habitat would be very limited.

(6) Effects to Wildlife from designation of Areas of Critical Environmental Concern (Alternative C)

Under Alternative C, the Carter Spit ACEC (61,251acres) and the Bristol Bay ACEC (acres) would be proposed. These designations would benefit wildlife habitat

- Requiring Plans of Operations for any mining operation, even those less than five acres.
- Managing the area as a rights-of-way avoidance area, thus avoiding potential impacts from road or pipeline construction.
- Seasonal constraints to protect the Steller's eider would be developed in the Carter Spit ACEC (Appendix A, ROP SS-1a).

Both ACECs will restrict salable mineral activities and be designated as rights-of-way avoidance areas providing additional protection to fisheries and aquatic habitat. Designating Right-of-Way avoidance areas in the proposed ACECs would provide protection to natural resources because road or pipeline construction would likely not occur. Potential impacts to wildlife, resulting from road or pipeline construction may include; removal of vegetative leading to habitat degradation, increased stress to wildlife from increased human presence, or habitat abandonment.

e) Effects to Wildlife for Alternative D

(1) Effects to Wildlife from Reality and Lands Actions (Alternative D)

Land Exchanges. Impacts to wildlife habitat would be the same as those discussed for Alternative B.

Withdrawals. Impacts to wildlife habitats from removing ANCSA 17(d)(1) withdrawals would be the same as those in Alternative B.

Rights-of-Way. Impacts to wildlife from Rights-of-Way would be the same as those for Alternative B; however, the proposed Carter Spit ACEC would be identified as a right-of-way avoidance area. This would benefit wildlife habitat by reducing the potential for road or pipeline development in the area.

(2) Effects to Wildlife from Mineral Development (Alternative D)

Leasable Minerals. Under Alternative D, ANCSA 17(d)(1) withdrawals would be 101,304

Locatable Minerals

Salable Materials (Mineral Materials). Impacts to wildlife would be the same as for Alternative B, except the Carter Spit ACEC ( ) would be closed to mineral This Alternative would benefit wildlife populations by protecting important

discussed in Alternative B.

(3) Effects to Wildlife from Recreation (Alternative D)

would be the same as those discussed in Alternative A.

(4) Effects to Wildlife from Off-highway Vehicles (Alternative D)

Alternative C.

(5) Effects to Wildlife from Wild and Scenic River Nominations (Alternative D)

There would be no Wild and Scenic River nominations under this alternative. This would result in more

(6) Effects to Wildlife from designation of Areas of Critical Environmental Concern (Alternative D)

Under Alternative D, the Carter Spit ACEC (36, 220 acres) would be designated. This would benefit wildlife habitat in this area by the following measures:

- Requiring Plans of Operations for any mining operation, even those less than five acres.
- Managing the area as a right-of-way avoidance area, thus avoiding potential impacts from road or pipeline construction.
- Seasonal constraints to protect federally-listed migratory bird species would be developed. (Appendix A, ROP SS-1a and 1b).

Under Alternative D, there would be one ACEC designation (Carter Spit ACEC). The use of ROPs and Stipulations will reduce impacts to wildlife due to mineral development and exploration resulting from revocation of ANSCA 17(d)(1) withdrawals. A more detailed description of impact to wildlife resulting from mineral exploration and development is contained in the discussion on effects from leasable, locatable, and salable minerals. In addition, a Plane of Operation will be required for locatable mineral activities occurring in the ACEC, per 43 CFR 3809.11(c)(3), requiring detailed disturbance and rehabilitating planning.

6. Direct and Indirect Effects for Special Status Species: Fish, Wildlife, and Vegetation Species

Direct and Indirect Effects for Special Status Fish Species

There are no known Special Status fish species in the Bay planning area.

Direct and Indirect Effects for Special Status Wildlife Species

Proposed management of the following resources, resource uses or programs would have no anticipated effects on Special Status Animal Species: Cultural Resources, Paleontological Resources, Visual Resources, Forest Products, Fisheries Management, Wild and Scenic Rivers, and Social and Economic Conditions.

a) Direct and Indirect Effects to Special Status Wildlife Species Common to All Alternatives

(1) Listed Species (Common to All Alternatives)

There are four special status species present or potentially present in or adjacent to the planning area. The Eskimo curlew (*Numenius borealis*), listed as endangered under the Threatened and Endangered Species Act, historically nested in the bay planning area, but is currently thought to be extinct in Alaska. The Steller sea lion (*Eumetopias jubatus*), listed as threatened under the Act, is found near shore waters in Bristol Bay and Kuskokwim Bay areas. It may come ashore on the coastal fringes of BLM lands in those areas, alone or in small numbers. The Steller's eider (*Polysticta stelleri*), listed as threatened under the Act, is a sea duck that is found staging during spring and fall migration and molting during the breeding season in coastal tide flats adjacent to BLM lands in the Goodnews Block. The Carter Spit area and the adjacent spits and coastal mudflats are an important spring staging area for Steller's eiders, as birds move to breeding areas on the North Slope (Larned 1998). They provide important molting area for non-breeding birds in summer (Seppi 1997, Shaw et al. 2005). Kittlitz's murrelets (Brachyrhamphus brevirostris), a candidate species, have been observed on BLM lands in the Carter Spit area. Kittlitz's murrelets likely breed on talus slopes found in the coastal mountains of the Carter Spit area (Day et al 198x).

(2) Effects to Special Status Wildlife Species from Soils, Water, Air, and Vegetation (Common to All Alternatives)

Wildlife Special Status Species would benefit from proper management of soil, water, air and vegetation resources in the planning area. Implementation of mitigation measures to protect these resources on a project-specific basis would reduce disturbance to habitat of special status wildlife and would facilitate the recovery of habitat from permitted uses.

(3) Effects to Special Status Wildlife Species from Fire and Fire Management (Common to All Alternatives)

Listed Species. Effects on Steller's eiders are described in more detail in the Land Use Plan Amendment for Wildland Fire and Fuels Management for Alaska Environmental Assessment (BLM 2004). Steller's eiders are federally-listed as threatened. This species migrates and stages on coastal mudflats and uses near shore waters, but does not breed on BLM lands.

Fire within the breeding habitat of eider species could have negative effects on the breeding population. However, fire frequency in the wet tundra habitat of the coastal planning area is very low, and the threat of wildland fires to the breeding population of Steller's eider and it's habitat is negligible. Since fire frequency is so low in these habitats, no fire suppression activity would be likely to occur on BLM lands and there would be no impacts from suppression activities to eiders or their habitat. There is no designated critical habitat within the planning area.

Candidate Species. Fire within the breeding habitat of Kittlitz's murrelet, which uses talus slopes of high mountain habitats for nesting, could have negative effects on the breeding populations. However, fire is rare in these mountainous habitats, and there is rarely adequate vegetation to burn on unstable rock falls and talus slopes. The threat of wildland fire to breeding Kittlitz's murrelet is negligible. Since fire frequency is so low in these habitats, no fire suppression activity would be likely to occur and there would be no impacts from suppression activities. Other than nesting, this bird inhabits ocean waters and bays, and so would not otherwise be impacted by fire or fire suppression activities.

BLM Sensitive Species. Some sensitive species would benefit from fire suppression that minimizes loss of individuals, populations, or habitats. However, fire suppression activities can also affect sensitive species through mortality, disturbance, displacement, and damage or alteration of key habitat components (BLM 2004b).

It is difficult to generalize impacts of fire on passerine birds due to the great variety of habitat requirements. Shrub communities often support the greatest number and diversity of passerine birds (Spindler and Kessel 1980, Kessel 1989). Shrub communities are maintained by periodic fires. Within forested areas, fire creates openings in the forest and provides snags used for nesting, perching, and foraging. Fire may cause direct impacts to birds when it occurs during the nesting season, killing nestlings and destroying nests. Raptors may benefit from fire due to increased populations of small mammals and birds in response to vegetative changes after fire. The timing of the benefit varies, depending upon the type of prey favored by the raptor. Over the short-term, fires reduce cover available for prey species, making them more visible to hunting raptors and other predators.

Fire suppression activities also cause both direct and indirect impacts to wildlife. Wildlife habitat may be destroyed, fragmented, or degraded due to construction of fire breaks or use of OHVs. Small mammals may be killed by the use of mechanized equipment. Mitigation measures designed to reduce the impacts of suppression activities include limitations on the use of tracked, or off-road vehicles; measures to prevent the introduction of invasive or noxious plant species; establishment of riparian buffer zones; and rehabilitation of fire and dozer lines. These types of impacts are expected to be minimal within the planning area as most BLM lands are well removed from the road system, minimizing the potential for the use of mechanized equipment.

Potential direct and indirect effects from fire management include:

- Mortality or injury of adult birds, young, or eggs from smoke inhalation, or crushing by vehicles or equipment used during fire management activities.
- Disturbance or displacement of individuals from smoke, noise, and other human activities associated with fire management operations. This disturbance or displacement may affect foraging, roosting, or reproductive behavior.
- Nest abandonment or mortality of young, resulting in the loss of one year's recruitment.
- Loss or conversion of key habitat components needed for nesting, foraging, roosting, or cover.
- Creation of key habitat components.
- Increased risk of predation associated with removal of cover.
- Changes in the quantity or quality of available forage and prey species.
- Long-term changes in habitat quality or quantity for nesting, roosting, foraging, or cover that affects the ability of a species continuing to occupy an area or facilitating the return of a species to its historic range.

(4) Effects to Special Status Wildlife Species from Livestock Grazing (Common to all Alternatives)

Special status wildlife species that are found or that have the potential to be found in the planning area are birds, which are present during spring and fall migration for feeding or molting and brooding, generally in the Goodnews Block of BLM lands. Currently there are no livestock grazing or reindeer herding operations in the planning area, and no interest has been expressed or is anticipated within the life of the plan. Requests for grazing permits will be analyzed on a case-by-case basis. Should such activities take place, potential impacts might include trampling of vegetation, cratering and exposure of mineral soils by grazing animals, potential direct mortality of nestling birds or eggs of ground nesting species due to trampling by grazing animals, or by OHVs used in association with herding activities.

(5) Effects to Special Status Wildlife Species from Minerals (Common to all Alternatives)

Locatable Minerals. Some mining exploration and development activity could occur under any Alternative. Potential impacts to special status wildlife would include temporary disturbance or displacement in localized areas, temporary loss of habitat, long-term degradation and loss of habitat, and possible direct mortality of nestling birds or eggs. These impacts would be minimal due to the low level of activity anticipated.

Salable Materials. Impacts from salable material acquisition and disposal to special status wildlife would include temporary disturbance or displacement in localized areas, temporary loss of habitat, long-term degradation of habitat, and possible direct mortality of nestling birds or eggs. These impacts would be minimal due to the low level of activity anticipated.

Sufficient salable material sources exist on State and private lands located nearer to most communities than BLM lands.

(6) Effects to Special Status Wildlife Species from Travel Management (Common to all Alternatives)

The noise and activity associated with OHV use can adversely affect special status wildlife both directly and indirectly. Direct effects include stress and displacement of animals, possibly to less suitable habitats. Stress and displacement may result in reduced productivity (ADF&G 1990). Changes to traditional movement patterns and distribution and behavior of special status wildlife can result from exposure to OHVs. OHV use may result in habitat abandonment or changes in density or species population, age, and sex composition in the vicinity of the trail. Air traffic has the potential for aircraft strikes, resulting in serious injury or mortality to individual special status birds.

Indirect effects include habitat degradation and alteration, and increased access into habitats. Remote areas will become more accessible over time as OHVs become more powerful and as the human

population in the planning area increases. Snowmachine use compacts snow and may inhibit movement under the snow resulting in habitat abandonment or increased mortality of small rodents, used as a food source by special status bird species. Fragile habitats such as wetlands and riparian areas may be degraded seasonally by OHV use.

Impacts to special status wildlife from travel management should not result in population level implication under any Alternative.

(7) Effects to Special Status Wildlife Species from Recreation (Common to All Alternatives)

Minor impacts to special status wildlife could occur from both commercial and non-commercial recreation activities under all Alternatives. The primary impacts would be temporary stress and displacement of individual animals due to recreational activities, or to recreation associated access such as aircraft overflight and landing in remote areas. In areas that are repeatedly used for camping sites, there may be minor, site-specific degradation of habitat. OHV use associated with commercial recreational activities could occasionally result in mortality of nestlings and the eggs of ground nesting birds. Given the low to moderate level of recreational use on most BLM lands within the planning area, these impacts would be minimal and would not have population level effects.

(8) Effects to Special Status Wildlife Species from Renewable Energy (Common to All Alternatives)

Impacts to special status wildlife would be the same as those described under wildlife, common to all Alternatives. There is a potential for bird mortality due to collisions with wind turbines. Some of the avian mortality could involve Special Status Species, particularly if wind-generating facilities were located within breeding habitats for these species. Since BLM lands in the planning area are fairly remote from villages, use of BLM lands for development of such projects is unlikely during the life of this plan.

(9) Effects to Special Status Wildlife Species from Lands and Realty Actions (Common to All Alternatives)

Upon completion of conveying BLM-selected lands to the State and Native Corporations, anticipated by 2010, only approximately 5% of lands in the planning area will remain in Federal ownership. These lands are generally remote, and the numbers and kinds of Realty actions that will be required would be limited under any Alternative. While there would be both direct and indirect impacts to Special Status Wildlife under all Alternatives, including temporary displacement and disturbance during activities authorized under this program, those impacts would be expected to be low, and to affect a very small percentage of BLM land in the planning area. Impacts would vary among species depending on the proposal, the species' range, life history, and habitat preferences.

(10) Effects to Special Status Wildlife Species from Subsistence activities (Common to All Alternatives)

Some Special Status Species are subject to subsistence hunts by Alaska Natives (e.g. Steller's eider, Stellar sea lions), but the numbers killed each year are managed under the terms of the Marine Mammal Protection Act, and the Endangered Species Act, which provide exemptions for certain qualifying Alaska Native subsistence harvests. Harvests are closely monitored so that species populations are sustained.

b) Effects to Special Status Wildlife Species for Alternative A

(1) Effects to Special Status Wildlife Species from Minerals (Alternative A)

Leasable Minerals. No impacts to special status wildlife under this Alternative would occur because all BLM lands in the planning area would remain withdrawn from Leasable Mineral entry under ANCSA 17(d)(1).

Locatable Minerals: Though most of the BLM lands in the planning area would remain withdrawn from locatable mineral entry under ANCSA 17(d)(1) some pre-ANSCA claims exist allowing for mineral development. According to the RFD for locatable minerals, under Alternative A 23 acres of disturbance is expected to occur on State-selected or Native (Federal mining claim) lands. On these 23 acres, impacts to special status species would be similar to those described in Effects Common to All Alternatives. This alternative anticipates less locatable mineral development and consequently fewer impacts to special status species than alternatives B or D.

Salable Minerals. No salable mineral activities are expected due to the location of BLM lands away from population centers and the retention of ANSCA 17(d)(1) withdrawals precluding salable mineral activities. Under this Alternative, impacts to special status wildlife from salable minerals activities is expected to be less than Alternatives B, C, and D.

(3) Effects to Special Status Wildlife Species from Recreation Management (Alternative A)

Under Alternative A, effects to special status wildlife from Recreation Management would be the same as that described in effects Common to All Alternatives. This is attributed to the remote location of BLM lands within the planning area. Effects to special status wildlife from Recreation Management are expected to be similar to Alternatives C and D.

(4) Effects to Special Status Wildlife Species from Travel Management (Alternative A)

The planning area would remain undesignated with regard to OHV use, and so the impacts would remain similar to current conditions, with some possible increase in intensity should the population increase. Currently, impacts from OHV use on BLM land, is limited to areas immediately adjacent to villages, areas between the Alagnak River and Lake Iliamna, and to portions of the Goodnews Block. Most access to BLM land is by aircraft or by boat. No vehicle weight limits would be recommended which may provide a greater level of impact to special status wildlife habitat in some areas compared to Alternatives B, C, or D. However, effects under Alternative A to special status wildlife from Travel Management are presumed to be less than all other Alternatives. This assumption is made because the retention of ANSCA 17(d)(1) withdrawals could reduce aircraft traffic associated mineral activities. This includes low level flights, associated with take-off and landing, which may impact special status bird species due to increased noise and potential aircraft strikes.

(5) Effects to Special Status Wildlife from Wild and Scenic River Nominations (Alternative A)

There would be no Wild and Scenic River (WSR) nominations under this alternative. Impacts associated with no WSR nominations on special status wildlife is minimal due to retention of ANSCA 17 (d)(1) withdrawals.

(6) Effects to Special Status Wildlife from designation of Areas of Critical Environmental Concern (Alternative A)

There would be no ACEC nominations under this alternative. Impacts associated with no ACEC designations on special status wildlife is minimal due to retention of ANSCA 17 (d)(1) withdrawals.

c) Effects to Special Status Wildlife Species for Alternative B

(1) Effects to Special Status Wildlife Species from Minerals (Alternative B)

Leasable Minerals. Under this Alternative, ANCSA 17(d)(1) withdrawals would be removed, and all BLM lands and any land released from State or Native-selection would be open for mineral leasing. Potential impacts include:

Seismic Exploration. Seismic exploration would only occur in the Koggiling Creek planning block, in the south central portion of the planning area, during the life of this plan based on the Reasonable Foreseeable Development Scenario. This area includes habitat for the trumpeter swan, gray-cheeked thrush, olive-sided flycatcher and blackpoll warbler. In the event that seismic exploration occurs during the winter months, there would be no effect on these species, as they are not present in the planning area at this time.

However, summer geophysical work including field sampling, would involve helicopter support and could have negative effects on these species, depending on the location of the work in relation to their habitat. Summer seismic work, including aircraft overflights, would have temporary and non-lethal effects on special status wildlife, the effects probably lasting less than an hour (BLM 2003b). Elevated activity and air traffic in the vicinity of large summer camps could result in minor impacts on both local and regional populations of these species. The Steller's eider and trumpeter swan are ground nesters in tundra habitats. The eggs and the nestlings could be susceptible to trampling or crushing. Depending on the nature of the effects and the nature and duration of behavioral changes caused by disturbance, such effects could be considered a "taking" under the Endangered Species Act for the listed species.

It is not known if lynx, a sensitive species, inhabit the Koggiling Creek planning block, which is largely a tundra environment. Isolated patches of forest along drainages may provide sufficient habitat for lynx, who seek boreal forest settings. Lynx have been observed at Brooks River in Katmai National Park, for example. Lynx may be temporarily disturbed or displaced by seismic activities, with reoccupation of the area after the exploration activities are complete.

Indirect impacts to special status wildlife, from seismic operations may include degradation of habitat through impacts to soil and vegetation. These types of impacts would be minimized by implementation of the Stipulations and Required Operating Procedures (Appendix A). Under Alternative B, effects to special status wildlife, from foreseeable seismic exploration for leasable minerals would be greater than Alternative A but equal to Alternatives C and D.

Exploratory Drilling. Based on the Reasonable Foreseeable Development Scenario for oil and gas, exploratory drilling would only be expected to occur in the Koggiling Creek planning block, which may be utilized seasonally by migratory waterfowl, and by a number of sensitive migratory waterfowl species, including the trumpeter swan, the king eider, the long-tailed duck, the black scoter, the surf scoter, and the red-throated loon. Other migratory waterfowl on the sensitive species list would be considered to be rare or accidental visitors to the Koggiling Creek planning block. Sensitive species of land birds that may be found in the Koggiling Creek planning block include the rusty blackbird, the gray-cheeked thrush, the olive-sided flycatcher, and the blackpoll warbler. The American peregrine falcon and the Arctic peregrine falcon, two sensitive species, might also be present in the Koggiling Creek planning block. All of these birds, if present, are in this area during spring through fall. Exploratory drilling if carried out in the winter would not affect these species. Under Alternative B, effects to special status wildlife from foreseeable exploratory drilling for leasable minerals would be greater than Alternative A but similar to that discussed in Alternatives C and D.

Leasable Mineral Development. Although construction would occur primarily during winter, development would bring year-round facilities and activities to the Koggiling Creek planning block, which includes seasonal habitat for migratory waterfowl, including trumpeter swans (whose summer concentrations tend to be northeast of Koggiling Creek planning block), the king eider, the long-tailed duck, the black scoter, the surf scoter, and the red-throated loon. Other migratory waterfowl on the sensitive species list would be considered to be rare or accidental visitors to the Koggiling Creek planning block. Sensitive species of land birds that may be found in the Koggiling Creek planning block include the

gray-cheeked thrush, the olive-sided flycatcher, and the blackpoll warbler. The American peregrine falcon and the Arctic peregrine falcon, two sensitive species, might also be present. All of these birds, if present, are in this area during spring through fall. Natural gas development would have the potential to affect these species directly and indirectly. Potential sources of disturbance would be ground vehicles, humans on foot, and low-flying aircraft associated with leasable mineral development. Potential effects would include direct and indirect habitat loss. Direct loss of habitat would result from gravel mining and gravel deposition on the tundra for roads, pads, and airstrips. Under the development scenario used for this analysis, this habitat loss would be limited to 36 acres for the gas wells, plus acreage associated with gravel roads. Indirect habitat loss could occur through reduced access caused by physical or behavioral barriers created by roads, pipelines, and other facilities.

The gravel mining and placement, activities associated with leasable mineral activities, would provide the greatest potential for causing loss of habitat (BLM 2005b). Roads and pads are constructed using gravel, and tundra covered by gravel would no longer be available for nesting, brood-rearing, or foraging for those tundra-nesting threatened and sensitive migratory waterfowl species listed above and others that use this habitat. This loss of habitat would continue for as long as the proposed development was in operation. If abandonment plans called for allowing gravel pads and roads to "bed" naturally, loss of habitat might extend considerably longer than the end of the operational life of the field. Under this Alternative, approximately 20 acres of habitat would be lost to gravel roads. Because of the density of migratory waterfowl use of this area, this potential loss of breeding, feeding and staging habitat for most species would be unlikely to result in some population effects. Under Alternative B, effects to Special Status Wildlife Species from foreseeable leasable mineral development would be greater than Alternative A but similar to that discussed in Alternatives C and D.

Locatable Minerals. Impacts would be similar to those discussed under Effects Common to All Alternatives. However, under Alternative B, ANCSA 17(d)(1) withdrawals would be removed and 1,102,489 acres of BLM lands would be open to locatable mineral activities. Based on the Reasonable Foreseeable Development Scenario for Locatable Minerals (RFD), two types of mining activity could take place in the planning area, lode mineral exploration and development and placer mining. Should locatable mineral activity occur on every existing operation, an estimated total of 115 acres could potentially be disturbed on BLM lands in the planning area. Potential impacts to special status wildlife on these acres would include temporary disturbance or displacement in localized areas, temporary loss of habitat, long-term degradation and loss of habitat, and possible direct mortality of nestling birds or eggs. All 115 acres would occur on State-selected or Native (Federal mining claim) lands due ANILCA 906(e) Top Filings. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA.

While removal of the ANCSA 17(d)(1) withdrawals would open BLM lands to potential mineral exploration and development, it is most likely that should any placer mining projects occur they would occur at sites of existing operations, at locations where mineral deposits are already known to exist. According to the RFD for locatable minerals, much of the Goodnews Bay/Snow Gulch area is considered to have high mineral potential including the Arolik River, Barnum Creek, Butte Creek, Domingo Creek, Faro Creek, Fox Gulch, and Jacksmith Creek tributaries. Though currently unencumbered BLM lands, a large portion of this area becomes priority State-selected lands once the ANSCA 17(d)(1) withdrawal is revoked (top-filed) which then precludes these lands from mineral entry. Under Alternative B, effects to special status species from locatable mineral activities would potentially be greater than Alternative A and C and equal in potential effects to Alternative D because more lands would be made available for activities.

Lode Mineral Activities. Lode mineral activities in the Goodnews Bay area are projected to occur at Tatlignagpeke Mountain and at Mitlak Mountain within the life of this plan. The RFD suggests that the platinum group elements (PGE) content of Tatlignagpeke Mountain might be explored during the life of this plan. Though currently unencumbered BLM lands, a large portion of this area becomes priority State-selected lands once the ANSCA 17(d)(1) withdrawal is revoked due to ANILCA 906(e) Top Filings which then precludes these lands from mineral entry.

Additionally, lode activities could occur on Native-selected lands at the Wattamuse-Granite Lode property, in the Kasna Creek area at South Current Creek and Upper South Current Creek properties, in the Kijik Lake area at the Dicks Lode, Gull, and Kijik Mountain properties, and in the Pebble Copper area at Hill 1759. On State-selected lands, lode operations could occur in the Iliamna/Fog area at the Dutton, Easy, Karen, and Meadow properties.

While migratory waterfowl move through the Goodnews Bay corridor in very large numbers during migratory seasons, and many of the species listed above can be found nesting on BLM lands in the Goodnews Block, they are unlikely to be found in these mountainous areas. However, BLM sensitive species that might seek out this kind of habitat during breeding and nesting season are the rare Kittlitz's murrelet, the marbled murrelet and the harlequin duck, all of which are sea birds that nest inland at higher elevations. The sensitive American peregrine falcon and the arctic peregrine falcon might also be found in these areas.

Overall, the majority of projected new lode mineral activities on BLM lands in the Goodnews Bay area are not likely to occur due to the lifting of ANSCA 17(d)(1) withdrawals and the subsequent conversion of unencumbered BLM land status to State-selected. Under Alternative B, effects to special status species from lode mineral activities would potentially be greater than Alternative A and C and equal in potential to Alternative D because more lands would be made available for activities.

Placer Mineral Activities. According to the RFD for locatable minerals, placer mineral activities in the Goodnews Bay area could occur at the Barnum Creek, Domingo Creek, Faro Creek, and Jacksmith Creek Tributary which could result in surface disturbance to a total of 14 acres. Though currently unencumbered BLM lands, a large portion of this area becomes priority State-selected lands, due to ANILCA 906(e) Top Filings once the ANSCA 17(d)(1) withdrawal are revoked which then precludes these lands from mineral entry. Portions of Jacksmith Creek are not included in this Top Filing and would remain unencumbered BLM lands and would be open to locatable mineral activities. Placer activities on selected lands include Slate Creek, which could result in disturbance to a total of 36 acres on selected land. Placer activities on the Arolik River, Malaria Creek, Snow Gulch, Tyrone Creek, and Wattamuse Creek in the Goodnews area, and lands in the Iliamna/Fog area and unnamed property west of Chekok on selected land could impact up to 47 acres of selected land. An additional 18 acres of active Federal claims on Native land could be disturbed on the Salmon River.

All locatable mineral related activities occurring on BLM land are subject to current BLM surface regulations as outlined in 43 CFR 3809. Operators are required to have an approved Plan of Operations or Notice of Operations. All operations are required to meet applicable Federal and State air and water quality standards for permitting. Placer mineral activities are not expected to have population-level effects on any BLM Special Status animal species during the life of this plan.

Under Alternative B, effects to special status species from placer mineral activities would potentially be greater than Alternative A ,C and, D because more lands would be made available for activities including the Jacksmith Creek which is located near the coastal area used by migratory birds, including Steller's eiders.

Salable Minerals (Mineral Materials). Salable material activities on BLM lands are available unless specifically closed by Public Land Order.

As discussed in a previous section, sand and gravel would be needed for the construction of access roads and gravel pads should leasable mineral activities proceed in the Koggiling Creek planning block. With the exception of these activities, extraction of salable materials is more likely to occur on State or Native lands due to the closer proximity of these lands to villages compared to BLM lands.

Should they occur, mineral materials projects would require an approved permit containing Required Operating Procedures based on site-specific resource concerns and would be subject to all State and Federal laws and regulations.

Under Alternative B, effects to special status species from salable mineral activities would be similar to those discussed in "Effects Common to All Alternatives." These impacts may potentially be more widespread compared to Alternative A ,C and, D because more lands would be made available, though expectations of development are low for the life of the plan.

(3) Effects to Special Status Wildlife Species from Recreation Management (Alternative B)

Under this Alternative recreation within the planning area would be managed as Roaded Natural. Though not expected within the life of the plan, increased rustic development to provide convenience and safety for recreational users, and improved road maintenance may occur. These improvements may provide greater access and result in more frequent human and wildlife encounters, including Special Status Wildlife. The potentially increased recreation may result in greater stress to special status wildlife and prey, possibly leading to habitat abandonment in excessive situations. Under Alternative B, effects to special status wildlife may be greater than Alternatives A, C and D.

(4) Effects to Special Status Wildlife Species from Travel Management (Alternative B)

Travel Management would be designated as open on BLM lands within the entire planning area, providing access to all areas by OHVs. No OHV weight restrictions would be established allowing any and all vehicles types to access lands. Impacts to special status wildlife include temporary displacement from habitat and short-term degradation of habitat. In areas of high OHV use, long term habitat degradation and abandonment may occur though unlikely due to the remote locations of BLM lands. On unencumbered BLM lands and selected lands in close proximity to unencumbered lands, due to lifting of ANSCA 17(d)(1) withdrawals, the potential for increased air travel may be experienced due to increased mineral exploration, development, inspection, and monitoring activities. Noise from low flying aircraft, predominantly take-off and landing aircraft, may disturb special status wildlife. The potential for aircraft strikes may impact special status bird species. These effects would be greater than Alternative A and less than Alternatives C and D. The potential impacts from increased air traffic under Alternative B would be greater than Alternative A and similar to Alternatives C and D.

(5) Effects to Wildlife from Wild and Scenic River Nominations (Alternative B)

There would be no Wild and Scenic River (WSR) nominations under this alternative.

(6) Effects to Wildlife Effects to Wildlife from designation of Areas of Critical Environmental Concern (Alternative B)

There would be no ACECs proposed under this alternative.

d) Effects to Special Status Wildlife Species for Alternative C

(1) Effects to Special Status Wildlife Species from Minerals (Alternative C)

Leasable Minerals. Under Alternative B, 1,103,138 acres of BLM lands would be open to leasable mineral activities. Based on the Reasonable Foreseeable Development Scenario, leasable mineral activities would consist of one gas field in the Koggiling Creek planning block, six exploratory wells (each disturbing approximately six acres) and one seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected, over the next 20 years. Impacts to special status wildlife from leasable mineral activities would be similar to those in Alternative B though fewer acres would be available for leasable mineral activities.

ANSCA 17(d)(1) withdrawals would be lifted except 12,210 acres of proposed Wild and Scenic Rivers, until Congress has had an opportunity to act, and within the proposed Carter Spit ACEC (61,251acres). Within the Bay area, approximately 3,968 acres would remain withdrawn from mineral entry due to

Agency withdrawals. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA.

Under Alternative C, less acreage would be available for leasable mineral development compared to Alternative B or D.

Locatable Minerals. Under Alternative C, 1,064,313 acres of BLM lands within the planning area would be open to locatable mineral activities. Because of constraints associated with ACECs, Wild and Scenic River suitability, and ANILCA 906(e) top-filings, this analysis assumes no new lode or placer mining activities. Consequently, impacts as described under Effects Common to All Alternatives would only occur on existing mining claims. ANCSA 17(d)(1) withdrawals would be removed and BLM lands would be open to locatable mineral activities. ANCSA 17(d)(1) withdrawals would be retained for proposed WSR segments (12,210 acres)which may provide protection to special status wildlife within the established WSR corridors and the proposed Carter Spit.

According to the RFD for locatable minerals, much of the Snow Gulch area is considered to have high mineral potential including the Arolik River, Barnum Creek, Butte Creek, Domingo Creek, Faro Creek, Fox Gulch, and Jacksmith Creek tributaries. Though currently unencumbered BLM lands, a large portion of this area becomes priority State-selected lands once the ANSCA 17(d)(1) withdrawals are revoked due to ANILCA 906(e) Top Filings, precluding these lands from mineral entry.

Under Alternative C, effects to special status wildlife from locatable mineral activities would be less than Alternatives B and D and greater than Alternative A. ROPs have been developed to protect special status wildlife (Appendix A, ROPs part 4, Special Status Species).

Salable Materials. Impacts would be similar to those discussed under Effects Common to All Alternatives, but very limited salable mineral activity is anticipated under this alternative. The Carter Spit ACEC, Bristol Bay ACEC, and proposed WSR corridors would be closed to salable minerals activities. . The closure of the Bristol Bay ACEC would restrict salable mineral activities in conjunction with leasable mineral activities in the Koggiling Creek planning block.

Under Alternative C, impacts to special status wildlife from salable material activities would be greater compared to Alternatives A but less than Alternatives B and D due to the reduced amount of land available for salable material activities.

(3) Effects to Special Status Wildlife Species from Recreation Management (Alternative C)

Under Alternative C, impacts to special status wildlife would be the same as discussed under effects Common to All Alternatives. An increase of recreational visitors may be expected in the planning area due to designation of “Wild” rivers. Increased air traffic due to increased tourism, guides and outfitters may cause short-term stress to special status wildlife from noise, temporary displacement from landing areas, and possible mortality due to aircraft strikes. Overall, increased visitation may cause seasonal stress to special status wildlife felt throughout the WSR corridor. These effects are expected to be short-term and not felt throughout the population of any special status wildlife within the planning area.

(4) Effects to Special Status Wildlife Species from Travel Management (Alternative C)

Under Alternative C, BLM lands would be designated as limited, which requires OHVs to stay on existing trails. Vehicle weight limits for OHVs of 2,000 pounds gross vehicle weight rating (GVWR) would be enforced.

Travel management restrictions within the planning area, including eligible/suitable WSRs and the proposed Bristol Bay and Carter Spit ACECs, would be defined through the development of a comprehensive trails and travel management plan within five years of signing the ROD.

Under Alternative C, impacts to special status wildlife from travel management use would be similar to that discussed in "Effects Common to All Alternatives" but because the planning area would be designated as "limited" to designated roads and trails the intensity and total anticipated area of impacts would be reduced.

(5) Effects to Wildlife from Wild and Scenic River Nominations (Alternative C)

Determining three river segments as suitable for inclusion into the National System may potentially attract more visitors to the area for recreation activities. This may include increased boating, camping, air traffic, and increased special recreation permits for various outfitters and guides. Boating noise may provide short-term impacts to special status wildlife that inhabit cliffs along river cutbanks or riparian areas. Increased air traffic due to increased eco-tourism, guides and outfitters may cause short-term stress to special status wildlife from noise, temporary displacement from landing areas, and possible mortality due to aircraft strikes. Overall, increased visitation may cause seasonal stress to special status wildlife felt throughout the WSR corridor. These effects are expected to be short-term and not felt throughout the population of any special status wildlife within the planning area.

Under Alternative C, effects to special status wildlife from WSR designation would be mostly beneficial because potentially large surface disturbing activities associated with leasable and locatable mineral activities would be prohibited. Increased recreation from WSR designation would have localized short-term negative impacts to special status wildlife.

(6) Effects to Wildlife Effects to Wildlife from designation of Areas of Critical Environmental Concern (Alternative C)

Designation of two ACECs would provide additional protection to special status wildlife from certain surface disturbing activities. The Carter Spit ACEC would retain ANSCA 17(d)(1) withdrawals, preventing new leasable and locatable mineral activities within this area to protect federally-listed migratory birds. In addition, the Carter Spit and Bristol Bay ACECs would be an avoidance areas for rights-of-ways. This would reduce stress described in Alternative B for leasable and locatable mineral activities to special status wildlife within these areas. ANSCA 17(d)(1) withdrawals would be lifted within the Bristol Bay ACEC but salable mineral activities would be prohibited and resources utilized by Special Status Wildlife would be protected during leasable and locatable activities by ROPs and Stipulations (Appendix A, ROPs, Part 4. Special Status Species).

e) Effects to Special Status Wildlife Species for Alternative D

(1) Effects to Special Status Wildlife Species from Minerals (Alternative D)

Leasable Minerals. Impacts to special status wildlife from leasable mineral activities would be the same as discussed under Alternative B, except NSO would be authorized within 300-feet of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River, and Klutuk Creek to protect riparian areas and soils adjacent to sensitive habitat for salmon and freshwater fish (Appendix A, ROP FW-6a and Oil and Gas Lease Stipulation 8). No Bristol Bay ACEC would be proposed. No WSRs would be found suitable, and ANSCA 17(d)(1) withdrawals would be lifted from the proposed Carter Spit ACEC (36,220 acres), opening the area to leasable mineral activities. This analysis anticipates the development of one gas field in the Koggiling block. Impacts to Special Status Wildlife species from that activity are discussed under Alternative B.

Locatable Minerals. Impacts to special status wildlife from locatable mineral activities would be the same as discussed under Alternative B. No Bristol Bay ACEC would be proposed. No WSRs would be found suitable, and ANSCA 17(d)(1) withdrawals would be lifted from the proposed Carter Spit ACEC (36,220 acres), opening the area to locatable mineral activities. ROPs would be used to provide added protection to special status wildlife (Appendix A, ROPs Part 4. Special Status Species).

Salable Minerals. Impacts to special status wildlife from salable mineral activities would be the same as discussed under Alternative B, except the proposed Carter Spit ACEC would be closed to salable mineral activities. No Bristol Bay ACEC would be proposed, opening the area to salable mineral activities, including the Koggiling Creek planning block, subject to Required Operating Procedures (Appendix A).

(2) Effects to Special Status Wildlife Species from Recreation Management (Alternative D)

Impacts to special status wildlife from Recreation Management would be the same as discussed in Alternative A. No Bristol Bay ACEC or WSR segments would be proposed, ROPs (Appendix A) would apply to all permittable activities.

(3) Effects to Special Status Wildlife Species from Travel Management (Alternative D)

Impacts to special status wildlife from Travel Management would be the same as discussed in Alternative C. ROPs (Appendix A) would apply to all permittable activities.

(4) Effects to Wildlife from Wild and Scenic River Nominations (Alternative D)

No river segments would be found suitable for inclusion into the National system. Negative impacts associated with increased recreational visitors may be avoided but eligible river segments would not have protection from development other than ROPs and Stipulations (Appendix A).

(5) Effects to Special Status Wildlife Species from designation of Areas of Critical Environmental Concern (Alternative D)

Alternative D would designate the Carter Spit ACEC (36,220 acres). Management within the ACEC would provide stronger protection to special status wildlife species through the following measures:

- Requiring Plans of Operations for any mining operation, even those less than five acres (CFR 43 CFR 3809.11).
- Managing the area as a right-of-way avoidance area, thus avoiding potential impacts from road or pipeline construction.
- Developing a transportation plan that identifies specific designated trails for OHV use, thus preventing unauthorized stream crossings and associated negative impacts.
- The area would be closed to salable mineral development, thus eliminating any potential for negative impacts associated with gravel extraction.

Under Alternative D, there would be one ACEC designation (Carter Spit ACEC). The use of ROPs and Stipulations will reduce impacts to special status wildlife species due to mineral development and exploration resulting from revocation of ANSCA 17(d)(1) withdrawals. A more detailed description of impact to special status wildlife species resulting from mineral exploration and development is contained in the discussion on effects from leasable, locatable, and salable minerals. In addition, a Plane of Operation will be required for locatable mineral activities occurring in the ACEC, per 43 CFR 3809.11(c)(3), requiring detailed disturbance and rehabilitating planning.

Delineating Right-of-Way avoidance areas within the proposed ACEC would have a positive impact on special status species because road or pipeline construction would likely not occur. Potential impacts, resulting from road or pipeline construction include; degradation or alternations of habitat and disturbance. Avoiding Rights-of-way authorization will prevent degradation to Special Status Species habitat by preventing degradation to soils, water, vegetation and air resources in the ACEC.

Direct and Indirect Effects for Special Status Vegetation and Rare Vegetation Species

Proposed management of the following resources, resource uses or programs would have no anticipated effects on Special Status Plants: Cultural Resources, Paleontological Resources, Visual Resources, Forest Products, Renewable Energy, Lands and Realty Actions, Wildlife and Wildlife Habitat, Fisheries Management, Wild and Scenic Rivers, Social and Economic Conditions, and Subsistence.

a) Direct and Indirect Effects to Special Status Vegetation Species Common to All Alternatives

One BLM Sensitive Species of plant is located within the planning area, the pear-fruited smelowskia (*Smelowskia pyriformis).* It has been located in the western Alaska Range north of the planning area and in the southernmost Kuskokwim Mountains in the Goodnews Bay region (Drury and Rollins 1952; Hultén 1968; Murray 1981; Murray and Lipkin 1987; Parker 1994; Rollins 1993; Welsh 1974).

(1) Effects to Special Status Vegetation Species from Soils, Water, Air, and Vegetation Management (Common to All Alternatives)

Special status vegetation species would benefit from proper management of soil, water, air and vegetation resources in the planning area. Project requests in habitat of special status vegetation found within the planning area are unlikely during the life of the plan because of the undesirable terrain. Identification of special status vegetation habitat and implementation of protection measures would be addressed through project-specific NEPA analysis.

(2) Effects to Special Status Vegetation Species from Leasable and Salable Minerals Activities (Common to All Alternatives)

Leasable Minerals. Oil, gas, and coalbed natural gas activities are not expected to impact special status vegetation on BLM lands within the planning area during the life of this plan. Under all alternatives leaseable mineral activities is either restricted or not expected to occur in areas having special status vegetation.

Locatable Minerals. Existing and future locatable mineral activities have the potential to unfavorably impact special status plants and their habitat by stripping away the vegetation as part of mine site overburden, trampling vegetation, and compacting soils throughout the mine site. This is done by the development of trails, roads, camp buildings, airstrips, and other temporary or semi-permanent mine associated infrastructure. Site-specific mitigation measures would be identified through project-specific NEPA analysis. Only one area of BLM lands, Tatlignagpeke Mountain in the Goodnews Bay region, has both habitat for the smelowskia and known lode mineral occurrences, with elevations at or above 2,500 feet. Other locations in the Goodnews Bay region with potential habitat but no known mineral resources include Twin Mountain and Figure Four Mountain in the proposed Carter Spit ACEC, and the southern half of Figure Four Mountain, located just south of the proposed ACEC. An area of BLM lands in the northeast Bristol Bay region with potential habitat but no known mineral resources, is the Chekok Creek area, with elevations to 4,000 feet.

Salable Minerals. In a region of glacial deposits, large quantities of materials, including sand and gravel, are available throughout the planning area at low elevations. Due to the remote location of BLM lands, it is doubtful salable materials would be sought from BLM lands within the planning area throughout the life of the plan, especially from locations in the difficult terrain where the smelowskia would be located.

3) Effects to Special Status Vegetation Species from Fire and Fire Management (Common to All Alternatives)

It is unlikely that fire would have an effect on the smelowskia. The known plants' habitat consists of isolated, steep, sparsely vegetated, unstable alpine screes from 2,000 to 5,500 feet in elevation. Wildland fires are uncommon in the planning area, and fire is not likely to burn well on this type of unvegetated scree.

(4) Effects to Special Status Vegetation Species from Livestock Grazing (Common to All Alternatives)

Although there is currently no form of livestock grazing in the planning area, livestock grazing could be permitted on a case-by-case basis under all Alternatives. It is unlikely that livestock grazing would have any impact to the smelowskia, considering it is found on isolated, steep, sparsely vegetated, unstable alpine screes from 2,000 to 5,500 feet in elevation. These areas are typically unsuitable for grazing.

(5) Effects to Special Status Vegetation Species from Recreation Management (Common to All Alternatives)

The sources of impacts to vegetation from commercial and non-commercial recreation activities would include hiking, aircraft landings at remote sites, occasional or repeated use of remote camp sites and associated social trails. Potential effects might include trampling and crushing of plants and disturbance or compaction of the soil. Potential impacts to the smelowskia are likely to occur from hiking activities only. However, the potential location of the plant on steep unconsolidated scree-covered slopes would present a hazard to hikers, who might elect other more favorable areas. These plants also appear to inhabit areas as isolated, scattered individual plants. The likelihood of impacts from recreational activities in this lightly-populated, lightly-used region would be low, and would not have population level effects.

(6) Effects to Special Status Vegetation Species from Travel Management (Common to All

Direct and indirect impacts to vegetation could occur from Travel Management and OHV use, including the potential to destroy the vegetation mat, compact soils, accelerate permafrost melt, and contribute to soil erosion. Higher, rockier terrain in remote areas, where the smelowskia and its habitat might be located, are becoming more accessible over time as OHVs become more sophisticated and powerful. However, the population and visitation in the planning area in the more mountainous regions is low.

(7) Effects to Special Status Vegetation Species from Locatable Minerals

a) Effects to Special Status Vegetation from Locatable Minerals (Alternative A)

Under Alternative A, most BLM lands in the planning area would be withdrawn from exploration and development under ANCSA 17 (d)(1). No pre-ANSCA claims exist in the Tatlignagpeke Mountain area. Under Alternative A, effects to special status vegetation from locatable minerals would be less compared to Alternatives B, C, and D because of the reduced acreage available for development.

b) Effects to Special Status Vegetation from Locatable Minerals (All Action Alternatives B, C and D)

Under Alternative B, ANSCA 17(d)(1) withdrawals would be lifted and BLM lands would be open to locatable mineral activities. Upon lifting of ANCSA 17(d)(1) withdrawals, ANILCA 906(e) Top Filings land would become State-selected and new locatable mineral activities would not be authorized through Federal mining claims. These top-filed lands include the high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, including the Tatlignagpeke Mountain area. If this area is relinquished from State-selection, then locatable mineral development may occur. This may potentially impact special

status vegetation. Under Alternatives B, C and D, impacts to special status vegetation from locatable minerals would be similar to that discussed in effects Common to All Alternatives. Impacts to special status vegetation under Alternatives B may potentially be more wide-spread compared to Alternatives A, C, and D because of the increased acreage available for development.

7. Direct and Indirect Effects for Cultural and Paleontological Resources

a) Direct and Indirect Effects to Cultural and Paleontological Resources Common to All Alternatives

Proposed management of the following resources, resource uses or programs would have no anticipated effects on Cultural Resources: Soils, Water, Air, and Vegetation Management. Visual Resources, Forest Products, Renewable Energy, Wildlife and Wildlife Habitat, Fisheries Management, Wild and Scenic Rivers, Social and Economic Conditions, and Subsistence.

Both Federal undertakings and unauthorized uses have the potential to cause irreversible harm to cultural and Paleontological resources. Impacts may include trampling, breakage, or unearthing by livestock, foot traffic, or mechanized equipment from fire suppression activities, mining activities, recreation activities, and OHV use. These BLM authorized undertakings will avoid impacts to cultural and Paleontological resources through project re-design or alternative siting. Unavoidable impacts from undertakings will be mitigated through data recovery investigations in accordance with the National Cultural Programmatic Agreement and the Alaska Protocol for Managing Cultural Resources. Unauthorized impacts will be addressed as feasible through monitoring, law enforcement investigation, and public education efforts.

All undertakings occurring on BLM land are evaluated by a qualified cultural resource specialist. Because of budget, personnel, and seasonal constraints, Level I inventories (literature searches) are a common practice. Level III (Class III) inventory (intensive on the ground survey) occurs when the potential for cultural resources are considered to be high or surface disturbance is likely. This is due to funding and accessibility issues as well as low resource development in this area. Therefore, the exact number, kind, and variability of cultural resources within the planning area are unknown. New cultural resources will continue to be found and evaluated for eligibility to the National Register of Historic Places as future inventories are completed. If significant sites are found, they will be appropriately mitigated under Federal law and policy

(1) Effects to Cultural and Paleontological Resources from Minerals Activities (Common to All Alternatives)

Leasable. Mineral leasing has the potential to affect cultural resources through exploration and development related activities. Access to areas open to leasing for exploration purposes may impact cultural resources through overland travel by OHVs as well as through ground disturbance associated with the drilling of exploration wells. Development of oil or gas production wells would require the additional construction of logistic support facilities such as roads and camps, which could affect cultural resources through their construction. The additional construction of associated transmission pipelines and compression/gas plants would also have the potential to affect cultural resources. Any ground disturbing activity has the potential for eroding or excavating buried archaeological resources and for damaging surface resources. The stipulations contained in the standard lease would minimize impacts and ensure pre-construction cultural compliance with the National Historic Preservation Act.

Locatable. Some lode or placer mining is predicted for each alternative. Mining could affect cultural resources through both exploration and development by eroding or excavating buried archaeological resources, damaging surface resources, or by causing adverse effects to places that have religious or

cultural importance to indigenous peoples. Additional impacts to cultural resources and necessary mitigation measures will be evaluated through the NEPA process for each specific Plan of Operation.

(2) Effects to Cultural and Paleontological Resources from Recreation (Common to All Alternatives)

Under all alternatives, the predominant recreation use is dispersed. No alternative proposes development of recreation facilities. Impacts to cultural and paleontological resources associated with dispersed recreation are mostly related to access (e.g. use of OHVs or aircraft to access recreation opportunities). Impacts from OHV use are discussed under Travel Management. Other impacts associated with dispersed recreation use include trampling and compaction of soil and vegetation associated with social trails or campsites. At the level of recreation use in the planning area, any impacts to cultural or paleontological resources from casual recreation use is insignificant. Any commercial recreation activity is handled through issuance of a Special Recreation Permit, subject to site-specific NEPA analysis and stipulations to protect cultural or paleontological resources.

(3) Effects to Cultural and Paleontological Resources from Fire (Common to All Alternatives)

Surface historic structures are subject to severe effects from fire itself. Organic materials used in construction are likely to be damaged or destroyed as a result of burning. Subsurface resources are much less likely to be significantly affected by fire. In a severe fire, organic material such as bone, ivory, and wood that is present in the soil matrix will be destroyed.

Intense heat is also likely to fracture and otherwise damage non-organic material such as ceramics and chipped stone. Because of well-developed vegetation mats and generally moist soils, fire in this region does not usually burn extensive areas to mineral soil. Therefore, severe impacts to subsurface cultural resources are very unlikely.

Effects of Fire Suppression. The possibility of damage to surface cultural resources from fire suppression activities is relatively slight. This is particularly true of standing historic structures which can be easily observed, even by untrained individuals. Consequently it is likely that most suppression activities such as fireline and camp construction can be located so as to prevent impacts to surface cultural resources. Surface sites such as lithic scatters will be disturbed by fireline construction and similar ground disturbing activities.

Subsurface cultural resources are more likely to be damaged by suppression activities, particularly fireline construction. Such resources are difficult to observe, particularly where well-developed vegetation mats obscure them, increasing the likelihood that such sites will not be discovered until after they have been disturbed.

(4) Effects to Cultural and Paleontological Resources from Livestock Grazing (Common to All Alternatives)

Currently there is no livestock grazing nor is any expected in the planning area within the life of the plan. Livestock grazing could be permitted on a case-by-case basis under all Alternatives. Livestock grazing at high stocking rates can result in removal of protective vegetation, compaction of soil, damage to historic sites (through rubbing or trampling), and breakage of scattered surface lithics. However, livestock grazing at these intensities will not occur on BLM lands in the planning area.

(5) Effects to Cultural and Paleontological Resources from Lands and Realty Actions (Common to All Alternatives)

ANCSA 17(d)(1) withdrawal review. The three action alternatives recommend revocation of ANCSA 17(d)(1) withdrawals to varying degrees. These actions affect cultural and paleontological resources indirectly by opening some lands to mineral leasing and location and potential mineral development.

Direct effects to cultural and paleontological resources from mineral development are described elsewhere in this section.

Use authorizations. The issuance of rights-of-way, particularly those related to road or pipeline construction, would have the most potential for ground-disturbance and potential negative impacts to cultural resources. Alternatives B and D anticipate more rights-of-way in support of mineral development than Alternatives A and C. All permitted activities and use authorizations (including rights-of-way) are subject to site-specific stipulations and cultural clearance to comply with the National Historic Preservation Act.

(6) Effects to Cultural and Paleontological Resources from Travel Management (Common to All Alternatives)

Off Highway Vehicle use can result in vegetation compaction and removal and soil compaction and erosion. On areas underlain by permafrost, removal of the vegetative mat will result in melting of the permafrost and soil subsidence, resulting in boggy and wet areas. Trails often braid around these areas, sometimes becoming wide. These impacts to soils and vegetation can also impact cultural resources, if they are present. Erosion or compaction of soils can expose buried pre-historic sites and expose them to breakage or vandalism. Increased unmanaged access can result in damage or vandalism at historic sites.

b) Direct and Indirect Effects to Cultural Resources for Alternative A

(1) Effects to Cultural Resources from Minerals Activities (Alternative A)

Leasable. ANSCA 17(d)(1) withdrawals would prevent leasable mineral activities from occurring on BLM lands within the planning area.

Locatable. Under Alternative A, effects to cultural and paleontological resources from locatable mineral activities would be similar to "Effects Common to All Alternative." Under this alternative, these effects are only anticipated to occur on 23 acres of BLM lands. Existing mining activities have the potential to unfavorably impact cultural and paleontological resources. Existing pre-ANSCA mining claims are located on BLM lands within the planning area. According to the RFD for Locatable Minerals, no surface disturbance is expected to occur on claims that currently have no mining activity within the life of the plan, under Alternative A. ANSCA 17(d)(1) withdrawals would prevent new mining claims from being staked. Potential impacts to cultural resources and necessary mitigation measures will be evaluated through the NEPA process and Plans of Operations for each specific activity. Effects to cultural and paleontological resources from locatable mineral activities would be less than that under Alternatives B, C, and D.

Salable. ANSCA 17(d)(1) withdrawals would prevent salable mineral activities from occurring on BLM lands within the planning area.

(2) Effects to Cultural and Paleontological Resources from Travel Management (Alternative A)

Under Alternative A, effects to cultural and paleontological resources from locatable mineral activities would be similar to "Effects Common to All Alternative". BLM lands would be undesignated to OHV use with no weight restrictions, and as a result, negative impacts to cultural resources may be more common and severe compared to Alternatives B, C, and D.

c) Direct and Indirect Effects to Cultural Resources for Alternative B

(1) Effects to Cultural Resources from Minerals Activities (Alternative B)

Leasable. Under Alternative B, ANSCA 17(d)(1) withdrawals would be lifted and leasable mineral activities would occur on BLM lands. Effects to cultural and paleontological resources from leasable

mineral activities would include trampling or unearthing of cultural resources leading to breakage or decomposition. Though only exploration activities are expected within the life of the plan, likely leasable mineral development could occur within the Koggiling Creek Planning Block, with impacts as described above under Effects Common to All Alternatives. Potential impacts to cultural and paleontological resources and necessary mitigation measures will be evaluated through the NEPA process for each specific activity. Negative impacts to cultural resources from leasable mineral activities may be greater under Alternative B compared to Alternatives A and C but similar to impacts of Alternative D.

Locatable. Under Alternative B, effects to cultural and paleontological resources from locatable mineral activities would be similar to "Effects Common to All Alternative" but effects would have the potential to be more widespread compared to Alternatives A, C, and D. ANSCA 17(d)(1) withdrawals would be lifted and increased locatable mineral activities would occur, according to the RFD for Locatable Minerals. Existing pre-ANSCA mining claims would be able to increase in size, and new claims could be staked on BLM lands. Potential impacts to cultural and paleontological resources and necessary mitigation measures will be evaluated through the NEPA process and Plans of Operations for each specific activity.

Salable. ANSCA 17(d)(1) withdrawals would be lifted and salable mineral activities could occur on BLM lands. Due to the remote location of BLM lands within the planning area, it is unlikely that salable mineral activities would occur, except in conjunction with leasable mineral activities within the Koggiling Creek Planning Block. Impacts to cultural and paleontological resources from salable mineral extraction are similar to those described for locatable minerals. The impact occurs from excavation and destruction of cultural sites. Negative impacts to cultural resources from salable mineral activities may be greater under Alternative B, due to the larger acreages available for salable mineral activities, compared to Alternatives A, C, and D.

(2) Effects to Cultural and Paleontological Resources from Travel Management (Alternatives B)

Impacts to cultural and paleontological resources from Travel Management would be similar to that discussed in Alternative A.

d) Direct and Indirect Effects to Cultural Resources for Alternative C

(1) Effects to Cultural Resources from Minerals Activities (Alternative C)

Leasable. Under Alternative C ANSCA 17(d)(1) withdrawals would be lifted and leasable mineral activities would occur on unencumbered BLM lands, including exploration and possible resources development within the Koggiling Creek planning block. ANSCA 17(d)(1) withdrawals would be maintained for the Carter Spit ACEC (61,251 acres) and all eligible river segments found suitable for inclusion to the National WSR system, preventing leasable mineral activities. NSO restrictions would further restrict leasable mineral activities within 300 feet of the East and South Fork Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek (Appendix A, ROP FW-6a and Oil and Gas Lease Stipulation 8). Effects to cultural and paleontological resources from leasable mineral activities would include trampling or unearthing of cultural and paleontological resources leading to breakage or decomposition. Potential impacts to cultural resources and necessary mitigation measures will be evaluated through the NEPA process for each specific activity. Under Alternative C, negative impacts to cultural and paleontological resources from leasable mineral activities would be less than Alternatives B and D and greater than Alternative A.

Locatable. Under Alternative C, effects to cultural and paleontological resources from locatable mineral activities would be similar to those described under Effects Common to All Alternatives in the immediate area of disturbance. However, plan wide, less potential would exist due to the reduction of acres available for locatable mineral activities. ANSCA 17(d)(1) withdrawals would be lifted and increased locatable mineral activates would occur, according to the RFD for Locatable Minerals. ANSCA 17(d)(1) withdrawals would be maintained for the Carter Spit ACEC (61,251 acres) and all eligible river segments found suitable for inclusion to the National WSR system, preventing locatable mineral activities. Existing

pre-ANSCA mining claims would be able to increase in size and new claims could be staked on BLM lands. Potential impacts to cultural and paleontological resources and necessary mitigation measures will be evaluated through the NEPA process and Plans of Operations for each specific activity.

Salable. Under Alternative C, effects to cultural and paleontological resources from salable mineral activities would be similar to Alternative B in the immediate area of disturbance. However, plan wide, less potential would exist due to the reduction of acres available for salable mineral activities. ANSCA 17(d)(1) withdrawals would be lifted allowing mineral activities to occur on BLM lands. ANCSA 17(d)(1) withdrawals would be retained in the proposed Carter Spit ACEC (61,251 acres) and all eligible river segments found suitable for inclusion to the National WSR system, restricting salable mineral activities. In addition, salable mineral activities would be restricted from the proposed 974,970 acre Bristol Bay ACEC preventing leasable mineral activities from occurring within the Koggiling Creek planning block in conjunction with leasable mineral activities.

Due to the remote location of BLM lands within the planning area, it is unlikely that salable mineral activities would occur.

(2) Effects to Cultural and Paleontological Resources from Travel Management (Alternatives C)

Under Alternative C, all BLM lands would be designated as “limited” for OHV use and a 2,000-lb GVWR weight restriction would be enforced. Negative impacts to cultural and paleontological resources may be reduced compared to current management practices because OHV use would be restricted to specific trails under a limited designation. OHV weight limitations may reduce the severity of impacts to cultural and paleontological resources should they occur. The intensity of negative impacts as described under Effects Common to All Alternatives from Travel Management under Alternatives C would be less compared to Alternatives A and B.

e) Direct and Indirect Effects to Cultural Resources for Alternative D

(1) Effects to Cultural Resources from Minerals Activities (Alternative D)

Leasable. Under Alternative D, effects to cultural and paleontological resources from leasable mineral activities would be similar to Alternative B in the immediate area of disturbance. However, plan wide, less potential would exist due to the reduction of acres available for leasable mineral activities. ANSCA 17(d)(1) withdrawals would be lifted and leasable mineral activities would occur on BLM lands, including exploration and possible resources development within the Koggiling Creek planning block. ANSCA 17(d)(1) withdrawals would be lifted from the proposed Carter Spit ACEC (36,220 acres), allowing leasable mineral activities subject to ROPs and Stipulations. NSO restrictions would restrict leasable mineral activities within 300 feet of the East and South Fork Arolik River, Faro Creek, South Fork Goodnews River, and Klutuk Creek (Appendix A, ROP FW-6a and Oil and Gas Lease Stipulation 8). Effects to cultural resources from leasable mineral activities would include trampling or unearthing of cultural resources leading to breakage or decomposition. Potential impacts to cultural resources and necessary mitigation measures will be evaluated through the NEPA process for each specific activity. Under Alternative C, negative impacts to cultural and paleontological resources from leasable mineral activities would be less than Alternatives B and D and greater than Alternative A.

Locatable. Under Alternative D, effects to cultural and paleontological resources from locatable mineral activities would be similar to Alternative B. ANSCA 17(d)(1) withdrawals would be lifted and increased locatable mineral activities would occur according to the RFD for Locatable Minerals. ANSCA 17(d)(1) withdrawals would be lifted from the proposed Carter Spit ACEC (36,220 acres).and locatable mineral activities would be permitted upon approval of Plans of Operations. Existing pre-ANSCA mining claims would be able to increase in size and new claims could be staked on BLM lands, subject to ROPs (Appendix A). Potential impacts to cultural and paleontological resources and necessary mitigation measures will be evaluated through the NEPA process and Plans of Operations for each specific activity.

Salable. Under Alternative D, effects to cultural and paleontological resources from salable mineral activities would be similar to Alternative B in the immediate area of disturbance. However, plan wide, less potential would exist due to the reduction of acres available for salable mineral activities. ANSCA 17(d)(1) withdrawals would be lifted and salable mineral activities could occur on BLM lands. Due to the remote location of BLM lands within the planning area, it is unlikely that salable mineral activities would occur, except in conjunction with leasable mineral activities within the Koggiling Creek planning block. Salable mineral activities would be restricted from the proposed Carter Spit ACEC (36,220 acres). Under Alternative D, negative impacts to cultural and paleontological resources from salable mineral activities may be greater than Alternatives A and C but less than Alternative B.

(2) Effects to Cultural and Paleontological Resources from Travel Management (Alternatives D)

Under Alternative C, all BLM lands would be designated as "limited" for OHV use and a 2,000-lb GVWR weight restriction would be enforced. Impacts would be similar to that discussed in Alternative C.

8. Direct and Indirect Effects for Visual Resource Management

Proposed management of the following resources, resource uses or programs would have no anticipated effects on Visual Resource Management (VRM): Cultural Resources, Paleontological Resources, Fisheries Management, Wild and Scenic Rivers, Social and Economic Conditions, and Subsistence.

a) Effects to Visual Resource Management Common to All Alternatives

In order to maintain the scenic values of public lands, BLM has been utilizing a Visual Resources Management (VRM) system that uses adaptive management to manage different levels of scenic values. Determining visual effects can be a subjective process. For this plan, assessments were collected from past VRM inventory reports. The inventory process is described in detail in BLM Handbook 8410-1 (BLM 1984).

(1) Effects to Visual Resources Management from Soils, Water, Air, and Vegetation management (Common to All Alternatives)

Visual resources would benefit from proper management of soil, water, air, and vegetation resources in the planning area. Cumulatively, each of these resources contributes to the scenic quality of the planning area. Identification and implementation of protection measures to prevent unnecessary or undue degradation of these resources would be addressed through project-specific NEPA analysis and through application of ROPs and Stips described in Appendix A.

(2) Effects to Visual Resource Management from Wildlife Management (Common to All Alternatives)

Critical Habitat Areas for listed species across Alaska have been, or are in the process of being determined for USFWS and NFMS T&E species. Critical Habitat Area designation may provide additional protection for visual resources by restricting development, which could obstruct viewing of natural features or degrade soil, water, air, and vegetative resources, ultimately impacting visual resources.

(3) Effects to Visual Resource Management from Fires and Fuels Management (Common to All Alternatives)

Ninety-two percent of Alaska BLM lands statewide are designated as Limited and Modified fire management option areas, meaning that naturally occurring fires are desired, but do have some

constraints. Although direct loss of vegetation would occur from wildland fires, mechanical or manual treatments, and prescribed burns, the change to the existing landscape character would be considered relatively short-term. Wildland fires are uncommon in the planning area and impacts of wildland fire and fuels management will be minimal within the planning area.

(4) Effects to Visual Resource Management from Forestry Management (Common to All Alternatives)

Commercial forestry practices could have long-term impacts to visual resources. No commercial forestry is carried out within the planning area, nor is any activity anticipated within the life of the plan. Therefore, no impacts to Visual Resource Management are anticipated within the foreseeable future.

(5) Effects to Visual Resource Management from Lands and Realty Management (Common to All Alternatives)

Conveyance. BLM is working to complete the conveyance of Native and State-selected lands by 2010. Land conveyance may have negative impacts to VRM should the new land managers allow increased development on lands adjacent to BLM lands. Should BLM lands be relinquished from State or Native-selection, the visual resources of those lands would likely be maintained at the VRM class described in Chapter II of this plan.

Use Authorizations. Issuance of Rights-of-Way could provide minimal to excessive negative impacts to visual resources depending on the scale of the proposed project. Most rights-of-way for activities such as roads or pipelines are linear features that do not necessarily blend with the natural landscape. This analysis anticipates more rights-of-way associated with mineral development for Alternatives B and D.

ANCSA 17(b)(1) withdrawals. The three action alternatives recommend revocation of ANCSA 17(d)(1) withdrawals to varying degrees. These actions affect visual resources indirectly by opening some lands to mineral leasing and location and potential mineral development. Direct effects to visual resources from mineral development are described elsewhere in this section.

(6) Effects to Visual Resource Management from Locatable Minerals Activities (Common to All Alternatives)

Locatable mineral activities may have adverse effects on the visual resources. Denuding of landscape, development of tailing piles, altered water ways and constructed facilities could have long-term impacts to the quality of visual resources in the immediate area of locatable mineral activities. The development of roads associated with locatable mineral activities may provide localized and large scale negative impacts on the visual resources, depending on access requirements.

(7) Effects to Visual Resource Management from Renewable Energy (Common to All Alternatives)

Under all Alternatives, lands available for potential renewable energy program sites would be evaluated on a case-by-case basis. Effects to visual resources associated with renewable energy programs are generally less severe in magnitude and extent relative to other development activities.

Wind, hydroelectric, and solar power projects would affect visual resources by obstructing views, vegetative removal, soil erosion, or altering waterbodies. These effects would largely result from construction activities, such as the creation of new utility corridors, access roads, and transmission lines, creating access opportunities to new visual resources, or modifying the existing landscape character. The magnitude and extent of these effects would vary for each project. Due to the remote locations of most BLM lands, large scale renewable energy projects are not expected to occur within the life of the plan.

(8) Effects to Visual Resource Management from Socioeconomics (Common to All Alternatives)

The lives of many Alaskan residents are tied to the natural environment. While many of the BLM lands within the planning area are difficult to access and not located in proximity to communities, visual resources are utilized and valued in varying degrees by residents within the planning area, as well as tourists. As the population within the planning area continues to increase, there would be increasing pressure on the ability to maintain visual resources that can be closely tied to regional economies, recreational opportunities, employment, and quality of life issues for residents. In addition, maintenance of a natural, visual quality condition would be expected to sustain a high quality habitat for subsistence wildlife and plant species. This ability to acquire subsistence resources may be the greatest factor in socioeconomics plan wide. It is expected that the current condition of socioeconomics within the planning area would have a positive impact on visual resources.

b) Effects to Visual Resources for Alternative A

No VRM classes are established under this Alternative.

(1) Effects to Visual Resources from Lands and Realty (Alternative A)

Access (Rights of Way). There are no avoidance or exclusion areas identified within the planning area under this Alternative. Rights-of-Way (ROW) are typically used for communication sites, utility corridors, or for access to mining claims and usually remain under BLM management. As growth and development continues in the planning area, the need for ROWs for transportation and utility corridors would increase. Potentially new access routes may change the existing form, line, color, and texture of the visual landscape. However, few annual ROW applications for the planning area have been received. This alternative anticipates the least amount of mineral development and consequently would expect few ROW applications.

Withdrawals. ANSCA 17(d)(1) withdrawals would be retained under this Alternative. Because of the constraints in place under these withdrawals, there would be less potential for resource development and activities that would alter the visual landscape.

(2) Effects to Visual Resources from Leasable, Locatable, and Salable Minerals (Alternative A)

Leasable Minerals. 17(d)(1) withdrawals would be retained on BLM lands within the planning area, prohibiting leasable mineral activities.

Locatable Minerals. Impacts to visual resources from locatable mineral activities would be similar to that discussed under Effects Common to All Alternatives. BLM lands in the planning area may be subject to localized adverse effects on visual resources from existing mineral claims. Under this Alternative, 23 acres of disturbance may occur from pre-ANSCA mining claims on BLM and Native (Federal mining claim) lands in the Goodnews Bay/Snow Gulch area (Arolik River, Barnum Creek, Butte Creek, Domingo Creek, Faro Creek, Fox Gulch, and Jacksmith Creek tributaries).

Salable Minerals. 17(d)(1) withdrawals would be retained on BLM lands within the planning area, prohibiting salable mineral activities.

(3) Effects to Visual Resources from Travel Management (Alternative A)

All lands within the Bay planning area would remain open for OHV use. The number of OHV trails throughout the planning area may stay the same or increase slightly within the life of the plan. These trails fragment the natural landscape, creating varying degrees of change to the existing visual character of the area. Braided trail sections more than 200 feet wide have been documented in Alaska (Meyer 2004). Important viewpoints and visual resources that may have been previously inaccessible may

become part of an expanding network of OHV trails, especially in areas of established moderate use, such as in the north and east Goodnews Bay area.

(4) Effects to Visual Resources from Wild and Scenic Rivers (Alternative A)

There is no Wild and Scenic Rivers recommended for designation to the National System under Alternative B. Thus, the scenic quality of river segments within the planning area would not be afforded additional protections.

(6) Effects to Visual Resources from designation of Areas of Critical Environmental Concern (Alternative A)

Under Alternative A, there are no ACECs proposed.

c) Effects to Visual Resource Management for Alternative B

All lands under Alternative B would be managed as VRM Class IV, which would allow actions that make major modifications to the existing character of the landscape.

(1) Effects to Visual Resources from Lands and Realty (Alternative B)

Exchanges. Several parcels have been identified for exchange under this Alternative. Impacts to visual resources would depend on specific projects authorized by the new land manager. However, due to the small, scattered nature of these parcels, any development or alterations in the visual landscape resulting from their sale would be minimal.

Acquisitions. Under Alternative B, the acquisition of lands and easements from willing landowners would be considered on a case-by-case basis. Easements provide access to lands managed by the NPS, USFS, or USFWS, and once lands are conveyed, the easement is managed by the respective agency. The visual quality of these easements would likely be maintained.

Access (Rights of Way). There are no avoidance or exclusion areas identified within the planning area under this Alternative. Rights-of-Way (ROW) are typically used for communication sites, utility corridors, or for access to mining claims, and usually remain under BLM management. As growth and development continue in the planning area, the need for ROWs for transportation and utility corridors would increase. Potentially new access routes may change the existing form, line, color, and texture of the visual landscape. This alternative anticipates more Rights-of-way application in association with mineral exploration and development than any other alternative.

(2) Effects to Visual Resources from Leasable, Locatable, and Salable Minerals (Alternative B)

Leasable Minerals. ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area, opening 1,103,138 acres to potential leasable mineral activities. Impacts to visual resources from leasable mineral activities may include, removal of vegetation and facilities construction, resulting in impacts to color, line, and texture of developed areas, with the removal of vegetative cover creating color contrast between the greens of vegetation and the browns of soils. Gas production wells, pads, and associated roads would create linear features that would not blend with the natural landscape. These impacts may be long-term but small in scale, isolated to the Koggiling Creek planning block. Impacts to visual resources from leasable mineral activities under Alternative B would be similar in scale to the impacts discussed under Alternative D and less in scale compared to Alternatives A and C because fewer lands would be available for leasable mineral activities.

Locatable Minerals. Where mining occurs, impacts to visual resources would be similar to those discussed under Effects Common to All Alternatives. ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area. These lands may be subjected to localized adverse effects on visual

resources from existing and increased locatable mineral claims. According to the Reasonable Forseeable Development Scenario for the plan, expected locatable mineral development is to occur on 115 acres within the entire planning area under Alternative B. Upon lifting of ANCSA 17(d)(1) withdrawals, Top Filed land would become State-selected and new locatable mineral activities would not be authorized through Federal mining claims. These Top Filed lands include the high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch. Impacts to visual resources from locatable mineral activities under Alternative B would be similar in scale to the impacts discussed under Alternative D and greater in scale compared to Alternatives A and C.

Salable Minerals. ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area, opening these lands to potential salable mineral activities. Impacts to visual resources from salable mineral activities may be long-term but small in scale, isolated to the Koggiling Creek planning block, in support of leasable mineral activities. Impacts to visual resources from salable mineral activities under Alternative B would be greater than Alternatives A, C, and D because fewer lands would be available for salable mineral activities.

(3) Effects to Visual Resources from Travel Management (Alternative B)

All lands within the planning area would be designated as "Open" under Alternative B. Because OHV use on BLM lands is currently unrestricted, this management action would have similar effects to Alternative A. Increasing OHV trail creation and widening causes change to the existing form, line, color, and texture of the visual landscape. Important viewpoints and visual resources that may have been previously inaccessible may become part of an expanding network of OHV trails, especially in areas of established moderate use such as Goodnews Bay. Under Alternative B, impacts to visual resources from travel management may be greater in scale compared to Alternatives A, C, and D because the potential increase in mineral development may contribute to more vehicle traffic in remote areas.

(4) Effects to Visual Resources from Wild and Scenic Rivers (Alternative B)

There would be no Wild and Scenic Rivers recommended for designation to the National System under Alternative B. Thus, the scenic quality of river segments within the planning area would not be afforded additional protections, other than those outlined in the Stipulations and Required Operating Procedures (Appendix A).

(5) Effects to Visual Resources from designation of Areas of Critical Environmental Concern (Alternative B)

Under Alternative A, there are no ACECs proposed. With less area-wide constraints, more resource development might occur in these areas, with impacts to visual resources as described above.

d) Effects to Visual Resources from Alternative C

(1) Effects to Visual Resources from Lands and Realty (Alternative C)

Access (Rights of Way) – The proposed Carter Spit ACEC and Bristol Bay ACEC would be identified as avoidance areas for ROWs. Authorization of ROWs within these areas would be limited in scale. Impacts to visual resource management from ROW authorization include changes to the existing form, line, color, and texture of the visual landscape. However, few annual ROW applications for the planning area have been received. Under Alternative C, impacts to visual resources from ROW authorizations would be less in scale compared to Alternatives B and D because of ROW avoidance areas.

(2) Effects to Visual Resources from Leasable, Locatable, and Salable Minerals (Alternative C)

Leasable Minerals. ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area, opening these lands to potential leasable mineral activities. Impacts to visual resources from

leasable mineral activities may be long-term but small in scale, isolated to the Koggiling Creek planning block. Impacts to visual resources from leasable mineral activities under Alternative C would be similar in scale to the impacts discussed under Alternatives B and D and greater in scale compared to Alternative A.

Locatable Minerals. Where mining occurs, impacts to visual resources from locatable mineral activities would be similar to those discussed under Effects Common to All Alternatives. Under this alternative, ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area, except in the Carter Spit ACEC (61,251 acres) and river segments recommended for inclusion to the National WSR system (12,210 acres). Lands open to locatable mineral activities may be subjected to localized adverse effects on visual resources from existing and increased locatable mineral claims. According to the Reasonable Forseeable Development Scenario for the plan, expected locatable mineral development is to occur on 43 acres of BLM State-selected and Native (Federal mining claims) lands due to ANILCA 906(e) Top Filings. Impacts to visual resources from locatable mineral activities under Alternative C would be similar in scale to the impacts discussed under Alternative A and reduced in scale compared to Alternatives B and D.

Salable Minerals. ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area, opening these lands to potential salable mineral activities. Impacts to visual resources from salable mineral activities may be long-term but small in scale. Salable mineral activities would be restricted from occurring within the boundaries of the proposed Bristol Bay and Carter Spit ACECs. This would prevent salable mineral activities from occurring within the Koggiling Creek planning block in support of leasable mineral activities. Impacts to visual resources from salable mineral activities under Alternative C would be greater than Alternative A but less than Alternatives B and D because fewer lands would be available for salable mineral activities.

(3) Effects to Visual Resources from Travel Management (Alternative C)

BLM lands would be designated as limited to OHV use and a 2,000-lb GVWR restriction would be enforced. Limiting use within the planning area may reduce adverse effects to visual resources relative to the current level of effects. An area of low to moderate OHV use, the Goodnews Bay area may feel the highest level of beneficial effects towards changing the existing landscape character. Impacts to visual resources from Travel Management would be less than Alternatives A and B and similar to Alternative D.

(4) Effects to Visual Resources from Wild and Scenic Rivers (Alternative C)

Under Alternative C, BLM would recommend three river segments for Wild and Scenic River designation (Alagnak River, Goodnews River mainstem and Middle Fork Goodnews River). These river segments would be designated a VRM class III within five miles of the full visible foreground of main river travel routes. Alternative C would provide greater protection to visual resources within the immediate areas of designated Wild and Scenic Rivers by restricting development and surface disturbance within the WSR corridors and the five mile buffer of VRM III. Under Alternative C, visual resources would be provided greater protection, due to increased acreage of VRM III, compared to Alternatives B and D. Under Alternative C, the retention of ANSCA 17(d)(1) withdrawals in these areas may provide greater protection to visual resources, though VRM designation would not be applied.

(5) Effects to Visual Resources from designation of Areas of Critical Environmental Concern (Alternative C)

Under Alternative C, the Bristol Bay (974,970 acres) and Carter Spit (61,251acres) ACECs would be proposed. Each of these areas would be managed at VRM Class III, applying additional mitigating measures to development activities to protect visual resources. Under Alternative C, visual resources would be provided greater protection, due to increased acreage of VRM III , compared to Alternatives B and D. Under Alternative A, the retention of ANSCA 17(d)(1) withdrawals in these areas may provide greater protection to visual resources, though VRM designation would not be applied.

e) Effects to Visual Resources for Alternative D

(1) Effects to Visual Resources from Lands and Realty (Alternative D)

Access (Rights-of-Way). The proposed Carter Spit ACEC (36,220) would be identified as an avoidance area for Rights-of-Way. Projects within the ACEC boundary would be designed to reduce impacts to biological resources. Impacts to the current visual landscape in this area would be minimized through Stipulations and Required Operating Procedures (Appendix A).Other areas requiring avoidance on a local level for impacts on visual resource management would be identified on a case-by-case basis.

(2) Effects to Visual Resources from Leasable, Locatable, and Salable Minerals (Alternative D)

Under Alternative D, effects would be the same as discussed under Alternative B, except the Carter Spit ACEC (36,220 acres) would not be available for salable mineral activities. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Any effects to visual resources occurring on those lands would continue at or slightly above current levels.

(3) Effects to Visual Resources from Travel Management (Alternative D)

Under Alternative D, OHV use on BLM lands would be managed as described under Alternative C, designated as “limited” and a 2,000-lb GVWR restriction would be enforced on OHV use on all BLM lands within the planning area. Because OHV use on BLM managed lands is currently unrestricted (open), this management action would likely reduce OHV effects to the existing landscape.

(4) Effects to Visual Resources from Wild and Scenic Rivers (Alternative D)

There would be no Wild and Scenic Rivers recommended for designation to the National System under Alternative D. Protection of scenic resources associated with the Alagnak River, Goodnews River mainstem, and Goodnews River Middle Fork River segments would be accomplished through Stipulations and Required Operating Procedures (Appendix A, ROPs Part 8).

(5) Effects to Visual Resources from designation of Areas of Critical Environmental Concern (Alternative D)

Under Alternative D, the Carter Spit (61,251acres) ACECs would be proposed. This area would be managed at VRM Class III, applying additional mitigating measures to development activities to protect visual resources.

D. Resource Uses

1. Resources Use Assumptions

Climate Change

Activities occurring on BLM-managed lands may contribute to climate change by emitting greenhouse gases. Though greenhouse gases are vital to maintaining global ambient temperatures suitable for life on earth excess greenhouse gas in the atmosphere may contribute to global climate change (DOE, 2003). Activities that may occur on BLM-managed lands with the potential to emit greenhouse gases include some leasable mineral activities described in Chapter III, section B.C.3.a, recreation activities using motor vehicles, or prescribed burning.

2. Forest Products

Currently, there are no forest product programs on BLM lands in the planning area. Due to a lack of available timber suitable for commercial use or sale, no forest product projects are anticipated within the life of this plan. Commercial logging is not likely to occur in the reasonably foreseeable future in the planning area due to low timber volume, low productivity, unsuitability of the timber for commercial use or sale, scattered locations of timber stands, and long distances involved in timber transport. Consequently, proposed management of other resources or resource uses would have little to no impact on forest products.

3. Livestock and Reindeer Grazing

There are no authorized livestock grazing operations within the planning area. There have been no requests for permits nor are any expected within the life of the plan. Livestock, reindeer, or pack animal grazing, if requested, would occur by permit only. Requests would be carefully considered, and grazing would not be permitted where it is incompatible with wildlife populations, habitats, and where landscape conditions would become less stable, (i.e. high erosion areas). Effects to livestock and reindeer grazing would be the same under all Alternatives.

4. Direct and Indirect Effects for Recreation Management

Proposed management of the following resources, resource uses or programs would have no anticipated effects on Recreation: Visual Resources, Forest Products, Renewable Energy, Economic Conditions, and Subsistence.

a) Effects to Recreation (Common to All Alternatives)

(1) Effects to Recreation from Soils, Water, Air, and Vegetation Management (Common to All Alternatives)

Soil, water, air, and vegetation management may provide restriction to recreation if these resources become excessively degraded by recreation uses. Though uncommon within the planning area due to the remote location of BLM lands, restriction would be short-term and apply only to localized areas.

(2) Effects to Recreation from Fish and Wildlife Management (Common to All Alternatives)

Management of fish and wildlife habitats to provide environments to support viable populations of fish and wildlife will have a direct impact on recreation. By enhancing or altering wildlife habitats, the animals used for recreational hunting, fishing, and trapping would be either increased or decreased. Viewing opportunities of wildlife may be increased or decreased as well. Recreation could be enhanced through the introduction of sought after big game animals if habitat would support such introduction.

(3) Effects to Recreation from Fire and Fire Management (Common to All Alternatives)

Fire promotes vegetation and wildlife diversity, which can enhance recreation opportunities in both the short- and long-term. Vegetative diversity provides variation in vegetation types, providing variation in form, texture, and color and enhancing scenic qualities. Long-term opportunities for wildlife viewing or hunting may be enhanced by new vegetation growth (willow moose browse) and improved habitat quality. Wildland or prescribed fire may be used to improve wildlife habitat thereby increasing wildlife numbers to the benefit of recreational users. Negative effects of fire on recreation are generally short-term and are directly related to fire's effects on specific resources used in recreation, such as recreation facilities.

Effects on visual and cultural resources, wildlife, and vegetation would have immediate and direct effects on use of these resources for camping, sightseeing, hunting, and other activities. Recreation users are generally mobile, thus, if recreation is precluded by fire in one area, they generally can find an alternate area in which a similar recreational activity can be pursued. However, smoke thick enough to limit aircraft flights could result in impacts on recreational and commercial activities. Existing and future BLM structures and facilities will be protected to the benefit of recreational users.

(4) Effects to Recreation from Lands and Realty Management (Common to All Alternatives)

BLM is working to complete the conveyance of Native and State-selected lands by 2010. Land conveyance may have negative impacts to recreation should the new land managers allow increased development or greater restrictions on recreational uses on lands adjacent to BLM lands.

(5) Impacts to Recreation from Cultural and Paleontological Resources (Common to All Alternatives)

Protection and possible interpretation of these resources would enhance recreation opportunities and experiences for those seeking these types of experiences.

(6) Effects to Recreation from Locatable Minerals (Common to All Alternatives)

Existing mining operations have provided secondary access to recreational opportunities. Often these operations provide remote air landing strips and localized trails. Large-scale mining operations with associated infrastructure (such as roads and powerlines) are not anticipated within the life of the plan.

Mineral development has the potential to create impacts to recreation, particularly if development occurs in areas that provide primitive or semi-primitive recreation experiences. Mineral development has the potential to impact the viewshed. Public access into areas of development would have secondary effects on adjacent areas by increasing visitor use and may lead to the development of additional dispersed campsites and trails.

(7) Effects to Recreation from Recreation Management (Common to All Alternatives)

Currently, only four special recreation permits (SRP) are issued on BLM lands within the planning area. Within the life of the plan 10 SRPs are expected to be issued at any one time. This is attributed to the remote location of most BLM land. In response to the anticipated low number of SRPs and the dispersed

nature of recreational activities in the planning area, no Special Recreation Management Areas (SRMA) would be designated on BLM lands within the planning area.

b) Direct and Indirect Effects to Recreation from Alternative A

(1) Effects to Recreation from Lands and Realty (Alternative A)

Access (Rights of Way). There are no avoidance or exclusion areas identified within the planning area under this Alternative. Rights-of-Way are typically used for communication sites, utility corridors, or for access to mining claims, and usually remain under BLM management. Because of the retention of most ANCSA 17(d)(1) withdrawals, this alternative anticipates very little new resource development and associated applications for rights-of-way.

Withdrawals. ANSCA 17(d)(1) withdrawals would be retained under this Alternative. Most BLM lands would continue to be closed to mineral entry. Because of the lack of resource development expected under this alternative, recreation opportunities would remain as described under current conditions: primitive, semi-primitive, and semi-primitive motorized.

Disposal and Acquisition. No lands have been identified for disposal under this alternative. There would be no impact to recreation if land disposal does not occur.

Under Alternative A, acquisitions would continue to be considered on a case-by-case basis as opportunities arise. Where acquisitions of private inholdings occur, particularly in heavy use recreation areas, there would be a benefit to the recreation program by eliminating the potential for private development or limitations on access.

(2) Effects to Recreation from Minerals (Alternative A)

Leasable. ANCSA 17(d)(1) withdrawals would be maintained under this alternative and no mineral leasing is anticipated.

Locatable. Because of the retention of ANCSA 17(d)(1) withdrawals, no new mining activity is anticipated and development on existing claims would be limited to 23 acres on BLM lands. In the immediate area of the mineral development, recreation opportunities may be enhanced by the access provided (either through roads, trails, or remote airstrips). However, the development would detract from recreation opportunities through alteration of the natural landscape and degradation of the scenic quality. Increased access can also mean increased visitation and motorized use, with recreation experiences trending from primitive, semi-primitive, or semi-primitive motorized towards roaded natural.

Salable. No activity is anticipated under this alternative.

(3) Impacts to Recreation from Recreation Management (Alternative A)

The Recreation Opportunity Spectrum (ROS) classification will continue as Semi-Primitive Motorized. No SRMAs would be designated under Alternative A. No facilities enhancement (such as the addition of public use cabins, trails or interpretive panels) would be added to the range of recreational experiences currently available. This would have negative impacts on recreational users preferring some rustic facilities. Recreational opportunities would be primarily limited to independent remote backcountry experiences and through guided tours.

(4) Impacts to Recreation from Travel Management (Alternative A)

All BLM lands in the planning area are designated as open and no weight restrictions apply to OHV use. Under this Alternative recreational use of OHV would have the least restrictions but may result in short and long term degradation to resources because of the potential wide-spread use of OHVs. Unmanaged

OHV use can result in proliferation of OHV trails, with recreation experiences trending from primitive or semi-primitive towards semi-primitive motorized or roaded natural.

(5) Impacts to Recreation from Areas of Critical Environmental Concern (Alternative A)

No ACECs which provide measures for the protection of specific resource values, would be designated under this alternative. In general, resource values would be afforded less protection and wildlife viewing, hunting and fishing opportunities and other recreational use may decrease without the protective measures offered by these designations.

(6) Impacts to Recreation from Wild and Scenic River designation

No Wild and Scenic River segments would be recommended under this Alternative. With the retention of ANCSA 17(d)(1) withdrawals, this would have little effect on recreation. No resource development would be expected in these river areas.

c) Effects to Recreation from Alternative B

(1) Effects to Recreation from Lands and Realty (Alternative B)

Access (Rights of Way). This alternative anticipates the most resource development and associated rights-of-way applications than any other alternative. Rights-of-way, particularly those use for roads, can provide access to recreation opportunities. However, increased access will alter existing recreation opportunities by increasing the level of visitor use and by detracting from the natural setting, trending from primitive or semi-primitive towards semi-primitive motorized or roaded natural.

Withdrawals. ANSCA 17(d)(1) withdrawals would be revoked. This would indirectly effect recreation by allowing resource development. Direct effects of development are discussed elsewhere in this section.

Disposal and Acquisition. Some parcels would be identified for land exchange. If disposal was to occur, development on private lands may bring a heavy concentration of recreational users which may negatively impact adjacent BLM land or recreational users on adjacent BLM lands. Private landowners may limit access for recreational users to adjacent BLM lands.

(2) Impacts to Recreation from Minerals (Alternative B)

Leasable. This alternative recommends revocation of all ANCSA 17(d)(1) withdrawals and makes more lands available for mineral leasing than any other alternative. However, because of low potential and inaccessibility, this analysis anticipates the development of only one natural gas field, in the Koggiling block. In the immediate vicinity of the development, access would be increased for recreational users. However, the production wells, gravel pads, gravel roads, and maintenance traffic would detract from the primitive and semi-primitive setting that currently exists. Some recreational users may be displaced. Outside of the Koggiling block, no mineral leasing is anticipated and no effects to recreation would occur.

Locatable. Because of the revocation of ANCSA 17(d)(1) withdrawals and the lack of any area-wide constraints, this alternative anticipates some level of new mineral development (115 acres). Increased infrastructure providing access to these developments could provide access for recreation users that does not currently exist. In the immediate area of the mining development, most users would be displaced because of the activity, noise, and alteration of the natural setting.

Salable. This alternative anticipates more development of salable minerals, particularly gravel, than any other alternative. Because these developments would mostly be connected to leasable or locatable mineral development, effects to recreation would be the same as described above under Leasable and Locatable.

(3) Impacts to Recreation from Recreation Management (Alternative B)

The Recreation Opportunity Spectrum (ROS) classification will be Roaded Natural under this alternative. Facilities enhancement (such as the addition of public use cabins, trails or interpretive panels) may be added to the range of recreational experiences currently available. The construction of rustic facilities may appeal to some recreation users. Recreational opportunities would be primarily limited to independent remote backcountry experiences and through guided tours.

(4) Impacts to Recreation from Travel Management (Alternative B)

All BLM lands in the planning area would be designated as open and no weight restrictions would apply to OHV use. Impacts would be similar to those discussed in Alternative A.

(5) Impacts to Recreation from Areas of Critical Environmental Concern (ACEC) (Alternative B)

No ACECs would be designated under this alternative. Consequently, ACEC resource protection constraints would not apply and more resource development is anticipated. Effects of increased development on recreation under this alternative are discussed under Impacts to Recreation from Minerals and Impacts to Recreation from Travel Management.

(6) Impacts to Recreation from Wild and Scenic River designation (Alternative B)

No Wild and Scenic River segments would be recommended under this Alternative. Several effects to recreation might take place. On one hand, the protective constraints associated with Wild and Scenic river suitability would not occur, thus making these river areas open for potential mineral development and associated impacts to recreation. On the other hand, based on experience with other Alaskan rivers, Wild and Scenic river designation comes with increased visitation and associated impacts to the existing recreation experience. Under this alternative, that would not occur.

d) Effects to Recreation from Alternative C

(1) Effects to Recreation from Lands and Realty (Alternative C)

Access (Rights of Way). This alternative would designate two ACECs (Carter Spit and Bristol Bay). Those ACECs are identified as avoidance areas for rights-of-way. Consequently, because of the constraints identified, very little resource development and associated rights-of-way applications are anticipated under this alternative.

Withdrawals. Most ANSCA 17(d)(1) withdrawals would be revoked. However, ANCSA 17(d)(1) withdrawals would be retained in the Carter Spit ACEC and in river corridors considered as suitable for inclusion as Wild and Scenic Rivers. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Consequently, very little mineral development (43 acres) is expected on BLM lands.

Disposal and Acquisition. No parcels have been identified for exchange. Impact would be similar to Alternative A.

(2) Effects to Recreation from Minerals (Alternative C)

Leasing. This alternative would revoke most existing ANCSA 17(d)(1) withdrawals but retain them in the Carter Spit ACEC and in river corridors considered as suitable for inclusion as Wild and Scenic Rivers. Consequently, less acreage would be available for leasing under this alternative than under alternatives B and D, but more than under A. However, this analysis anticipates the development of one natural gas

field in the Koggiling block. Effects of that development on recreation are the same as described under Alternative B.

Locatable. Because of constraints associated with ACECs and Wild and Scenic River suitability and the effect of Top Filings, this alternative anticipates only 43 acres of mineral development. Effects to recreation in the immediate area of those 43 acres are as described under alternatives A and B. Because of the limited amount of development, changes to the overall recreation opportunity spectrum would be insignificant on BLM lands.

Salable. Very limited salable mineral development is anticipated under this alternative. Any development would be associated with leasable or locatable mineral development, with effects as described above.

(3) Impacts to Recreation from Recreation Management (Alternative C)
The Recreation Opportunity Spectrum (ROS) classification will continue as Semi-Primitive Motorized. Impacts would be similar to Alternative A.

(4) Impacts to Recreation from Travel Management (Alternative C)

BLM lands would be designated as limited to OHV use and a 2,000-lb GVWR restriction would be enforced. Limiting OHV use within the planning area may reduce recreation opportunities for some groups, while the added protection to renewable resources may reduce the potential for area closures to OHV/recreation use. Limiting unmanaged proliferation of OHV use would have the effect of maintaining primitive and semi-primitive recreation experiences, rather than those experiences trending towards semi-primitive motorized.

(5) Effects to Recreation from Wild and Scenic Rivers (Alternative C)

Under Alternative C, BLM would recommend three river segments for Wild and Scenic River designation (Alagnak River, Goodnews River mainstem and Middle Fork Goodnews River). Under Alternative C, increased opportunities for recreation may result from WSR designation. This may include increased access opportunities by air travel and increased opportunity for fishing, float trips, and camping. Increased visitation on these rivers could result in increased impacts associated with recreation use along rivers, including campsite impacts, litter, human waste, and development of social trails. These effects over time will move a primitive experience to semi-primitive.

(6) Effects to Recreation from designation of Areas of Critical Environmental Concern (Alternative C)

Under Alternative C, the Bristol Bay (974,970 acres) and Carter Spit (61,251acres) ACECs would be proposed. These areas would not benefit recreation because designation is for added protection of wildlife and habitat rather than for recreational purposes. Constraints associated with these ACECs could limit some resource development and associated impacts on recreation.

e) Effects to Recreation from Alternative D

(1) Effects to Recreation from Lands and Realty (Alternative D)

Access (Rights of Way). An avoidance area is recommended for the Carter Spit ACEC (36,220 acres). This may reduce access to this area for recreation but will also maintain the area in a mostly undeveloped and natural setting.

Withdrawals. ANSCA 17(d)(1) withdrawals would be revoked. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral

occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA.

Disposal and Acquisition. No parcels have been identified for exchange. Impact would be similar to Alternative A.

(2) Effects to Recreation from Minerals (Alternative D)

Leasable. Effects to recreation would be the same as those described for Alternative B.

Locatable. Effects to recreation would be the same as those described for Alternative B.

Salable. Effects to recreation would be the same as those described for Alternative B.

(3) Impacts to Recreation from Recreation Management (Alternative D)

The Recreation Opportunity Spectrum (ROS) classification will continue as Semi-Primitive Motorized. Impact would be similar to Alternative A.

(4) Impacts to Recreation from Travel Management (Alternative D)

BLM lands would be designated as limited to OHV use and a 2,000-lb GVWR restriction would be enforced. Limiting OHV use within the planning area may reduce recreation opportunities for some groups, while the added protection to renewable resources may reduce the potential for area closures to OHV/recreation use. Impacts to recreation would be similar to that discussed in Alternative C.

(5) Effects to Recreation from Wild and Scenic Rivers (Alternative D)

No river segments for Wild and Scenic River designation would be recommended under Alternative D. Impacts to recreation would be similar to that discussed in Alternative B.

(6) Effects to Recreation from designation of Areas of Critical Environmental Concern (Alternative D)

Under Alternative D, the Carter Spit ACEC (36,220 acres) would be proposed. This would be designated a right-of-way avoidance area, possibly reducing access for recreation purposes. These areas would not benefit recreation because designation is for added protection of wildlife and habitat rather than for recreational purposes. However, constraints associated with these ACECs could limit some resource development and associated impacts on recreation.

5. Direct and Indirect Effects for Travel Management

Proposed management of the following resources, resource uses or programs would have no anticipated effects on Travel Management: Visual Resources, Forest Products, Renewable Energy, Wildlife and Wildlife Habitat, Fisheries Management, Wild and Scenic Rivers, Leasable, Locatable, and Salable Minerals, Social and Economic Conditions, and Subsistence.

a) Direct and Indirect Effects for Travel Management (Common to all Alternatives)

(1) Effects to Travel Management from Soils, Water, Air, and Vegetation Management (Common to All Alternatives)

Soil, water, air, and vegetation management may result in travel restrictions if these resources become excessively degraded. Rehabilitation efforts may close portions of trails. Though uncommon within the planning area due to the remote location of BLM lands, restriction would be short-term and apply only to localized areas.

(2) Impacts to Travel Management from Mineral Activities (Common to All Alternatives)

Locatable Minerals. Pre-ANSCA mining claims exist on BLM lands in planning area. If development continues on these claims increased OHV access and increased air traffic and resulting infrastructure may occur.

Salable Minerals. Some BLM lands are available for salable mineral development, though activities are not expected to occur due to the remote location of BLM lands and the availability of materials on State and private lands. If salable mineral activities were to occur, increased OHV access may be created resulting from the mine area and associated infrastructure necessary to transport mined materials.

(3) Impacts to Travel Management from Special Status Species (Common to All Alternatives)

Travel can be impacted through specific limits on OHV use or on trail development within areas that contain Special Status Species. Proposed or permitted uses such as trail construction or designation would be analyzed and mitigation measures would be developed to minimize impacts. If it is determined that OHV use or trail construction may negatively affect a Special Status Species, the use may be limited to seasons when the species is not present, or the trail relocated to areas where the species is unlikely to be encountered.

(4) Impacts to Travel Management from Travel Management (Common to All Alternatives)

Fixed wing and helicopter access will remain largely unregulated on all BLM lands.

Consistent with ANCSA, the BLM would continue to administer 17(b) easements that access public lands across Native lands. Where 17(b) easements access non-BLM-managed public lands, BLM would attempt to transfer management responsibility of the easement to the appropriate agency. Easement relocation and/or termination would be subject to public involvement. To ensure maintenance of access to public lands as ANCSA conveyances take place 17(b) easements would be extended or new easements reserved as needed. There would be little to no decrease in access currently provided by 17(b) easements under any alternative.

There is no foreseeable road construction unless economically viable resource development (minerals primarily) takes place or the State proposes specific roads for public access in the planning area across BLM lands. A request for road proposal would be acted upon on a case by case basis. If roads were developed, access opportunities for OHV users would increase.

b) Direct and Indirect Effects for Travel Management for Alternative A

Under Alternative A, BLM lands would be designated as “open” for OHV use. No travel restrictions would exist and no weight restrictions would be placed on OHVs.

(1) Effects to Travel Management from Lands and Realty (Alternative A)

Access (Rights of Way). Rights-of-Way are typically used for communication sites, utility corridors, or for access to mining claims, timber resources, and conservation areas, and usually remain under BLM management. Because of retention of ANCSA 17(d)(1) withdrawals, this alternative anticipates very little resource development and associated applications for rights-of-way. Under this Alternative travel management and the amount of travel is expected to remain at current levels.

Withdrawals. ANSCA 17(d)(1) withdrawals would be retained under this Alternative. Most BLM lands would continue to be closed to mineral entry. Travel requirements and infrastructure to support air travel across and to BLM lands is expected to maintain at current levels due to reduced development.

Disposal and Acquisition. No lands have been identified for disposal under this alternative. There would be no impact to travel and travel management. Under Alternative A, acquisitions would continue to be considered on a case-by-case basis as opportunities arise.

(2) Effects to Travel Management from Mineral Activities (Alternative A)

Leasable minerals. ANSCA 17(d)(1) withdrawals would be retained on BLM lands precluding leaseable mineral activities. Travel by OHV and aircraft support of leasable mineral activities would not increase under Alternative A.

Locatable Minerals. ANSCA 17(d)(1) withdrawals would be retained on BLM lands precluding new locatable mineral activities. Impacts to travel management would be similar to that discussed in Effects Common to All Alternatives.

Salable Minerals. ANSCA 17(d)(1) withdrawals would be retained on BLM lands precluding new salable mineral activities. There would be no impacts to travel management.

(3) Effects to Travel Management from Travel Management (Alternative A)

All BLM lands in the planning area are designated as open and no weight restrictions apply to OHV use. Under this Alternative recreational use of OHV would have the least restrictions but may result in short and long term degradation to resources because of the potential wide-spread use of OHVs. This degradation could lead to area closures to OHV use, allowing natural rehabilitation of the landscape.

(4) Effects to Travel Management from Recreation Management (Alternative A)

The Recreation Opportunity Spectrum (ROS) classification will continue as Semi-Primitive Motorized. No facilities enhancement (such as the addition of public use cabins, trails or interpretive panels) would be added to support OHV use. This may inhibit increased OHV use by groups or individuals requiring these facilities. Air traffic in support of recreational uses in not expected to increase under this Alternative.

(5) Effects to Travel Management from Areas of Critical Environmental Concern (ACEC) (Alternative A)

No ACECs would be designated under this alternative. No access would be restricted.

(6) Effects to Travel Management from Wild and Scenic River designation (Alternative A)

No Wild and Scenic River segments would be recommended under this Alternative. No access would be restricted.

c) Direct and Indirect Effects for Travel Management for Alternative B

Under Alternative B, BLM lands would be designated as "open" for OHV use.

(1) Effects to Travel Management from Lands and Realty (Alternative B)

Access (Rights of Way). There are no avoidance or exclusion areas identified within the planning area under this Alternative. Rights-of-Way are typically used for communication sites, utility corridors, or for access to mining claims, and usually remain under BLM management. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Under this Alternative, the use of OHVs and aircraft could increase slightly due to increased development and associated rights-of-way..

Withdrawals. ANSCA 17(d)(1) withdrawals would be revoked under this Alternative. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Some BLM lands would continue to be closed to mineral entry due to Agency withdrawals. However, this alternative anticipates more resource development than any other alternative. Travel requirements and infrastructure to support air travel across and to BLM lands is expected to increase due to increased development.

Disposal and Acquisition. Parcels of land have been identified for disposal under this alternative. Impact to travel and travel management would be dependant on access restrictions by the new land manager. Disposals may create discontiguous routes for OHV users.

(2) Effects to Travel Management from Mineral Activities (Alternative B)

Leasable minerals. Under Alternative B, ANSCA 17(d)(1) withdrawals would be revoked and 1,103,138 acres of BLM lands within the planning area would be open to leasable mineral activities. Travel by OHV and aircraft in support of leasable mineral activities would increase primarily in the Koggiling Creek planning block. Leasable mineral activity has the potential to create impacts to travel management and OHV use, particularly if development occurs in areas that may provide access created by improved infrastructure. Increased air traffic may result from leasable mineral activities. Construction of winter roads, pipelines, powerlines, and other necessary infrastructure would create improved access. Public access into areas of development would have secondary effects on adjacent areas by increasing visitor use and may lead to other developments. Required Operating Procedures have been developed regarding altitude restrictions for aircraft flights to protect wildlife and special status species wildlife (Appendix A).

Locatable Minerals. ANSCA 17(d)(1) withdrawals would be revoked opening 1,102,489 acres of BLM lands to locatable mineral activities. Roads or infrastructure necessary for those operations may cross BLM land. Increased air traffic may result from locatable mineral activities. Increased trails and remote airstrip development would be likely under this alternative. Road development is likely if mineral development takes place. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Though ANCSA 17(d)(1) withdrawals would be lifted, impacts to travel management under Alternative B may increase slightly due to ANILCA 906(e) Top Filings. Required Operating Procedures have been developed regarding altitude restrictions for aircraft flights to protect wildlife and special status species wildlife (Appendix A).

Salable Minerals. ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area, opening these lands to potential salable mineral activities. Impacts to travel management from salable mineral activities would be similar to that discussed in Effects Common to All Alternatives. These impacts may be long-term but small in scale, isolated to the Koggiling Creek planning block, in support of leasable mineral activities. Impacts to travel management from salable mineral activities under Alternative B could be greater than Alternatives A, C, and D because more lands would be available for salable mineral activities.

(3) Effects to Travel Management from Travel Management (Alternative B)

All BLM lands in the planning area would be designated as open and no weight restrictions would apply to OHV use. Under this Alternative recreational use of OHVs would have the least restrictions but may result in short and long term degradation to resources because of the potential wide-spread use of OHVs. This degradation could lead to area closures to OHV use, allowing natural rehabilitation of the landscape.

(4) Effects to Travel Management from Recreation Management (Alternative B)

The Recreation Opportunity Spectrum (ROS) classification would be designated as Roaded Natural. Facilities enhancement (such as the addition of public use cabins, trails or interpretive panels) may be added to the range of recreational experiences currently available. The construction of rustic facilities may appeal to some recreation users, while maintenance of roads may provide for improved access to areas within the planning area. The improvements made as Roaded Natural ROS classification may provide for increased OHV use. Air travel is not expected to increase due to recreation management.

(5) Effects to Travel Management from Area of Critical Environmental Concern (ACEC) (Alternative B)

No ACECs would be designated under this alternative. There would be no limitations to OHV use.

(6) Effects to Travel Management from Wild and Scenic River designation (Alternative B)

No Wild and Scenic River segments would be recommended under this Alternative. There would be no access restrictions in these river areas.

d) Direct and Indirect Effects for Travel Management for Alternative C

Under Alternative C, BLM lands would be designated as “limited” for OHV use. OHV access would be by designated trails only. A 2,000-lb GVWR weight restriction would be placed on OHVs.

(1) Effects to Travel Management from Lands and Realty (Alternative C)

Access (Rights-of-Way). The Carter Spit and Bristol Bay ACECs would be proposed. These areas would be designated as Right-of-Way avoidance areas, which could restrict OHV access across these lands.

Withdrawals. ANSCA 17(d)(1) withdrawals would be revoked under this Alternative. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Some BLM lands would continue to be closed to mineral entry due to Agency withdrawals.

Disposal and Acquisition. No lands are identified for disposal or land exchange. Impacts would be similar to that discussed under Alternative A.

(2) Effects to Travel Management from Mineral Activities (Alternative C)

Leasable minerals. Under Alternative B, ANSCA 17(d)(1) withdrawals would be revoked and 1,063,129acres of BLM lands within the planning area would be open to leasable mineral activities. Travel by OHV and aircraft in support of leasable mineral activities would increase primarily in the Koggiling Creek planning block. Leasable mineral activities have the potential to create impacts to travel management and OHV use, particularly if development occurs in areas that may provide access created by improved infrastructure. Construction of winter roads, pipelines, powerlines, and other necessary infrastructure would create improved access. Public access into areas of development would have secondary effects on adjacent areas by increasing visitor use and may lead to other developments.

Locatable Minerals. ANSCA 17(d)(1) withdrawals would be revoked opening 1,102,489 acres of BLM lands to locatable mineral activities. Impacts to travel management would be similar to that discussed in Effects Common to All Alternatives. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Impacts to travel management under Alternative C may increase slightly due to lifting of ANSCA 17 (d)(1) withdrawals.

Salable Minerals. ANSCA 17(d)(1) withdrawals would be lifted from BLM lands within the planning area, opening these lands to potential salable mineral activities. Impacts to travel management from salable mineral activities would be similar to that discussed in Effects Common to All Alternatives. These impacts may be long-term but small in scale, isolated to the Koggiling Creek planning block, in support of leasable mineral activities. Impacts to travel management from salable mineral activities under Alternative B could be greater than Alternatives A, C, and D because more lands would be available for salable mineral activities.

(3) Effects to Travel Management from Travel Management (Alternative C)

Under this alternative, all BLM lands would be classified as limited to OHVs and there would be a 2,000 lb. GVWR applied to OHVs. OHVs would be limited to existing trails and in some areas (such as ACECs) trails would be designated. These measures, while not limiting access on existing routes, would prevent unlimited access and cross-country travel.

(4) Effects to Travel Management from Recreation Management (Alternative C)

The Recreation Opportunity Spectrum (ROS) classification will continue as Semi-Primitive Motorized. No facilities enhancement (such as the addition of public use cabins, trails or interpretive panels) would be added to support OHV use. Impacts would be similar to that discussed under Alternative A.

(5) Effects to Travel Management from Areas of Critical Environmental Concern (ACEC) (Alternative C)

Under Alternative C, the Bristol Bay (974,970 acres) and Carter Spit (61,251 acres) ACEC would be proposed. This area would be designated as a right-of-way avoidance area which may prevent or restrict access through the use of special stipulations. A travel management plan would be done for these ACECs, identifying existing routes and designating OHV trails in order to protect relevant resource values. These measures, while not limiting access on existing routes, would prevent unlimited access and cross-country travel.

(6) Effects to Travel Management from Wild and Scenic River designation (Alternative C)

Under Alternative C, BLM would recommend three river segments for Wild and Scenic River designation (Alagnak River, Goodnews River mainstem and Middle Fork Goodnews River). Under Alternative C, increased opportunities for recreation may result from WSR designation. This may include increased

access opportunities by air travel. Required Operating Procedures have been developed regarding altitude restrictions for aircraft flights to protect wildlife and special status species wildlife (Appendix A).

e) Direct and Indirect Effects for Travel Management for Alternative D

Under Alternative D, BLM lands would be designated as "limited" for OHV use. OHV access would be by

(1) Effects to Travel Management from Lands and Realty (Alternative D)

Access (Rights-of-Way). The Carter Spit ACECs would be proposed. This area would be designated

Withdrawals. ANSCA 17(d)(1) withdrawals would be revoked under this Alternative. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Some BLM lands would continue to be closed to mineral entry due to Agency withdrawals. Travel requirements and infrastructure to support air travel across and to BLM lands is expected to increase due to increased development opportunities.

Disposal and Acquisition. No lands are identified for disposal or land exchange. Impacts would be similar to those discussed under Alternative A.

(2) Effects to Travel Management from Mineral Activities (Alternative D)

Leasable minerals. Under Alternative D, ANSCA 17(d)(1) withdrawals would be revoked and 101,304 acres of BLM lands within the planning area would be open to leasable mineral activities.

Leasable mineral activities have the potential to create impacts to travel management and OHV use, particularly if development occurs in areas that may provide access created by improved infrastructure. Construction of winter roads, pipelines, powerlines, and other necessary infrastructure would create improved access. Public access into areas of development would have secondary effects on adjacent areas by increasing visitor use and may lead to other developments.

Locatable Minerals. ANSCA 17(d)(1) withdrawals would be revoked opening 1,102,489 acres of BLM lands to locatable mineral activities. Impacts to travel management would be similar to that discussed in Effects Common to All Alternatives. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Impacts to travel management under Alternative D may increase slightly due to lifting of ANSCA 17 (d)(1) withdrawals.

mineral activities.

(3) Effects to Travel Management from Travel Management (Alternative D)

Under this alternative, all BLM lands would be classified as limited to OHVs and there would be a 2,000-lb GVWR applied to OHVs. OHVs would be limited to existing trails and in some areas (such as ACECs) trails would be designated. These measures, while not limiting access on existing routes, would prevent unlimited access and cross-country travel.

(4) Effects to Travel Management from Recreation Management (Alternative D)

The Recreation Opportunity Spectrum (ROS) classification will continue as Semi-Primitive Motorized. No facilities enhancement (such as the addition of public use cabins, trails or interpretive panels) would be added to support OHV use. Impacts would be similar to that discussed under Alternative A.

(5) Effects to Travel Management from Areas of Critical Environmental Concern (ACEC) (Alternative D)

Under Alternative D, the Carter Spit (36,220 acres) ACEC would be proposed. This area would be designated as a right-of-way avoidance area which may prevent or restrict access through the use of special stipulations. Few impacts to travel management would result from ACEC designation compared to the current condition.

(6) Effects to Travel Management from Wild and Scenic River designation (Alternative D)

No Wild and Scenic River segments would be recommended under this Alternative. There would be no restrictions to access in these river areas other than the limited OHV classification and the 2,000 lb. weight limit.

6. Direct and Indirect Effects to Minerals

Leasable Minerals

a) Effects to Leasable Minerals for all Action Alternatives

- Oil and gas exploration would occur as described in the Reasonably Foreseeable Development (RFD) Scenario. The following is reasonably foreseeable to occur within the planning area:
    - One seismic survey would occur every five years covering 63 linear miles with a total of 250 miles collected over the next 20 years.
    - Two exploratory gas wells would be drilled during the first five years of the plan. One of the two wells would have an appreciable gas show, resulting in drilling one field delineation well. It is assumed that the discovery field will comprise 1,280 acres and will produce from two wells located on two drill sites, one mile apart.
    - Given a 20-year plan life, it is assumed that a total of six exploration wells would be drilled.
    - One gravel staging area (six acres) would be developed to receive and store equipment for the winter exploration program.
    - One gas field likely would be developed in the Koggiling Creek planning block (this planning block was picked due to its proximity to the Dillingham market). Production from this field would come from the discovery well and delineation well, spaced one mile apart. The drilling of each well would disturb six acres. There would be up to six gas exploration wells plus one additional gas delineation well.
    - The gravel pads would be joined by a 35-foot wide, 5-foot thick gravel road (40,000 cubic yards per mile). The road would only link the drilling pads and one section would also serve as an airstrip. Gravel required for construction would likely be mined during winter months to reduce impacts. The source would likely come from the closest feasible gravel source to the gas field, using one or two separate gravel deposits (10-20 acres in size).
    - A typical life of a producing gas well is 10 to 12 years. Therefore, one or both gas production wells may be plugged after the planning period. Field abandonment may take from 2 – 5 years after production ends.
    - Natural reservoir pressure would be adequate to push the gas through the 3-inch transmission pipeline 40 miles to the Dillingham market. No compression facility would

be needed. The pipeline would be constructed during the winter months to reduce impacts, dependent upon the presence of sufficient snow cover and sufficiently cold temperatures to freeze the ground.
    - One of the production wells would serve as an in-field underground injection well (annular injection) to dispose of drilling waste, wastewater, spent fluids, chemicals and the produced water.
    - When there is insufficient snow cover for oil and gas related operations, low ground pressure vehicles will be used in conjunction with air support.

- This level of development is assumed for the purposes of impact analysis in the EIS. Actual exploration, development, and production may vary considerably based on exploration results, price of oil and gas, and marketability. Additionally, to market the gas in Dillingham, the current diesel plant would need to be converted to gas. For this to be economical, funding would need to come from energy subsidies derived from the State of Alaska or the Federal Government.
- An ongoing joint State/Federal program to determine the feasibility of developing coal bed natural gas (CBNG) for the benefit of rural communities does not plan to explore the Bristol Bay area at this time. If CBNG were available close to a rural community, the development would occur on non-BLM lands. BLM lands in the planning area are not in proximity to the three largest communities – Dillingham, Naknek and King Salmon. Transportation costs associated with building a gas pipeline would render CBNG development uneconomical.

b) Effects to Leasable Minerals for Alternative A

There are no active oil and gas leases in the planning area and no oil and gas leasing would occur under Alternative A. BLM lands within the planning area would remain closed to leasable mineral activities due to current withdrawals described in ANSCA 17(d)(1). Leasing may take place in the event of drainage of oil and gas resources from adjacent development. Therefore, under this Alternative, no oil and gas exploration and development would occur, rendering these resources unavailable during the life of the plan. The RFD for leasable minerals anticipates leasable miner development to occur only in the Koggiling Creek planning block. Alternative A would provide the most restriction to leasable mineral activities, compared to Alternatives B, C, and D, because leasable mineral activities are restricted in the Koggiling Creek planning block.

c) Effects to Leasable Minerals for Alternative B

Under Alternative B, all existing ANCSA 17(d)(1) withdrawals would be revoked. Approximately 1,103,138 acres of BLM lands and any State-selected or Native-selected lands whose selection is relinquished or revoked, would be open to mineral entry subject to Stipulations and ROPs (Appendix A). There would be no restriction under this Alternative for seasonal closures or no surface occupancy. Additionally, Oil and Gas Lease Stipulations #5, #6, and #8 would not be applicable under this Alternative. Agency withdrawals would close approximately 3,318 acres to leasing, as described within specific PLOs. Closing this acreage would preclude oil and gas exploration and development, rendering these resources unavailable during the life of the plan. Alternative B would provide fewer restrictions to leasable mineral activities compared to Alternatives A, C, and D. Other than provided in ROPs and Stipulations, Alternative B provides no restrictions to leasable mineral development in the Koggiling Creek planning block. Because leasable mineral development is anticipated in the Koggiling Creek planning block only, impacts to leasable mineral activities resulting from Alternative B would be similar to that discussed in the Effects Common to All Action Alternatives section.

d) Effects to Leasable Minerals for Alternative C

Approximately 1,063,129 acres of BLM lands and any State or Native-selected lands (785,341 acres) whose selection is relinquished or revoked, would be open to leasable mineral activities subject to ROPs and Stipulations (Appendix A).

Two ACECs (Carter Spit 61,251acres and Bristol Bay 974,970 acres) would be proposed. ANSCA 17(d)(1) withdrawals would only be retained within the proposed Carter Spit ACEC to provide added protection to federally-listed migratory bird species. Leasable mineral activities are not expected to occur in the Goodnews Bay planning block according to the Reasonable Forseeable Development scenario. The Bristol Bay ACEC would be open to leasable mineral activities subject to seasonal constraints to protect caribou habitat on identified aggregation areas. As a result leasable mineral activities will be closed from May 20 through August 15 (Appendix A, Oil and Gas Lease Stipulation 6). An additional closure to protect calving caribou will restrict exploration and development activities from May 1 through June 15 (Appendix A, Oil and Gas Lease Stipulation 5). Lands under seasonal closure will be dependant upon the location of the caribou aggregations.

Existing ANCSA 17(d)(1) withdrawals totaling 12,210 acres would be retained on proposed Wild River segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork until Congressional action could be completed. None of these river segments are located in the Koggiling Creek Planning block where leasable mineral activities are projected to occur. Additional Agency withdrawals (3,318 acres) would exclude leasable mining development. The acreage closed to leasable mineral activities would render these resources unavailable during the life of the plan.

Approximately 1,910 acres of the planning area would be open to leasing, subject to major No Surface Occupancy (NSO) constraints. Areas subject to NSO include a 300 foot buffer on either side of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River, and Klutuk Creek (Appendix A, ROP FW-6a and Oil and Gas Lease Stipulation 8). These rivers are located within the Goodnews and Klutuk Creek planning blocks. According to the RFD for Leasable Minerals, neither the Goodnews nor Klutuk Creek planning blocks are expected to have leasable mineral development. Oil and gas development in an NSO area could require directional drilling to extract hydrocarbon resources. Should areas with major constraints occur beyond the technically feasible reach for directional drilling, some hydrocarbon resources may be rendered unrecoverable. Product price fluctuations may require premature abandonment that would decrease the recoverability of the leasable resource. An NSO buffer of any width could potentially limit exploration and development. For example, if an exploration target was determined to be within the NSO zone, the added cost of directional drilling could render the project uneconomical, and therefore miss the discovery. Additionally, if a shallow target pool were previously defined through geophysical exploration, it could be technically unfeasible for an operator to directionally drill such a reservoir. Consequently, these resources would be unavailable during the life of the plan. Alternative C would provide more restrictions to leasable mineral activities compared to Alternatives B and D but fewer restrictions compared to Alternative A. Other than provided in ROPs and Stipulations, Alternative C provides no restrictions to leasable mineral development in the Koggiling Creek planning block. Because leasable mineral development is anticipated in the Koggiling Creek planning block only, impacts to leasable mineral activities resulting from Alternative C would be similar to that discussed in the Effects Common to All Action Alternatives section.

e) Effects to Leasable Minerals for Alternative D

Approximately 1,101,304 acres of BLM lands and any State- or Native-selected lands (817,464 acres selected) whose selection is relinquished or revoked would be open to mineral entry subject to Stipulations and Required Operating Procedures (ROPs).

Existing ANCSA 17(d)(1) withdrawals would be revoked, including lands within the one proposed ACEC (Carter Spit, 36,220 acres). These lands would be open to leasable activities, managed by adaptable management and would be subject to ROPs and Stipulations that include seasonal restrictions to protect Federally listed migratory bird species and caribou (Appendix A).

Acreage available and subject to minor (seasonal) constraints is roughly 36,220 acres. To protect caribou habitat on identified aggregation areas, oil and gas exploration and development activities would be closed from May 20 through August 15. An additional closure to protect calving caribou would restrict exploration and development activities from May 1 through June 15. These closures would be dependant upon the actual location of caribou aggregation (Appendix A, ROP FW-3b and Oil and Gas Stipulations 5 and 6). These constraints would limit exploration and development during specific time periods and increase recovery costs.

Approximately 1,910 acres of the planning area would be open to leasing, subject to major No Surface Occupancy (NSO) constraints. Areas subject to NSO include a 300 foot buffer on either side of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River, and Klutuk Creek (Appendix A, Stipulation 8). These rivers are located within the Goodnews or Klutuk Creek planning blocks. According to the RFD for Leasable Minerals, neither the Goodnews nor Klutuk Creek planning blocks are expected to have leasable mineral development.

Approximately 3,318 acres of existing Agency withdrawals would be closed to leaseable mineral activities as described within specific PLOs.

Leasable oil and gas potential does exist on BLM lands. Exploration and development would proceed at the level described in the Reasonably Foreseeable Development Scenario under the *Analysis Assumptions and Guidelines* for leasable minerals. Other than provided in ROPs and Stipulations, Alternative D provides no restrictions to leasable mineral development in the Koggiling Creek planning block. Because leasable mineral development is anticipated in the Koggiling Creek planning block only, impacts to leasable mineral activities resulting from Alternative D would be similar to that discussed in Effects Common to All Action Alternatives section. Should Federal leasing take place, the BLM Alaska State Office would assume lease administration responsibilities and oversight of field operations.

Locatable Minerals

a) Effects to Locatable Minerals for All Alternatives

- Placer Mining - Placer mining for gold and platinum is the most common type of mining that occurs in the planning area. Placer platinum is the most likely development target while placer gold is the most likely target for exploration and development. Mineral resource development in the planning area is occurring primarily on State, Native, and private lands. This can be attributed to the patenting of large numbers of Federal mining claims staked during the gold rush era and to the State and Native Corporations targeting mineral resources for selection under their respective entitlement statutes.

- Additional exploration should prove that development of placer properties in the Bonanza Creek, Goodnews Bay/Snow Gulch, Iliamna/Fog, Kijik Lake, Platinum, and Shotgun Hills areas within the planning area are feasible. These deposits would probably be developed either as a small surface open-cut sluice box operation or as a bucket-line dredge operation (Goodnews Bay Platinum Mine).

- Placer mining activity in the planning area is expected to occur in the Snow Gulch part of the Goodnews Bay/Snow Gulch area on BLM lands. There are expected to be 1 to 3 small scale placer operations employing 3 to 5 people at each location. Activity would most likely occur on Barnum Creek, Domingo Creek, Faro Creek, or on Jacksmith Creek.

- Hard Rock Exploration and Development - Historic producers of hard rock for mercury operated on a small scale in the early part of the twentieth century. Today, development projects involve gold and copper from developing new and old prospects. Most of these are located on State and Native lands in the Iliamna/Kvichak area. Hard rock exploration is up in the region, generated by the increasing price of gold and increased interest in mineral occurrences on State and Native lands.

- Elsewhere around the State, exploration has focused on deposits of rare metals (nickel and platinum group metals [PGM]). Exploration results indicate that there is potential for a significant discovery of these metals. This interest, coupled with the rising price of platinum, has sparked recent exploration efforts in Goodnews Bay along the Salmon River where platinum has historically been mined by placer methods.

- Additional exploration should prove that development of lode properties in the Bonanza Creek, Goodnews Bay/Snow Gulch, Iliamna/Fog, Iliamna/Kvichak, Kasna Creek, Kemuk Mountain, Kijik Lake, Pebble Copper, Platinum, Shotgun Hills, and Sleitat Mountain areas in the planning area are feasible. These deposits would probably be developed either as open pit or as cut and fill underground mines. Surface disturbance will vary depending on the mine design, construction of roads, power line corridors, selection of tailing disposal method, and other factors. An order of magnitude estimate would be in the range of 1,300-3,400 acres. Road building, airstrips, and associated material sites account for the largest surface disturbance followed by mine, mill, tailings disposal site, and camp facilities. While most of these disturbances would occur on State or Native lands, some road construction or power lines could cross BLM land.

- The Pebble property, on State lands near Lake Iliamna, is a proposed hard rock, combination open pit and underground mine with a mill that combines free milling processes with floatation and vat chemical leach circuits to recover gold and copper. This mill could include ore from locations situated close by, such as the Pebble South and the Big Chunk (BC) properties. More than 100 employees would contribute to the Iliamna area economy and the mine mill complex could draw power from the Homer utility grid.

a) Effects to Locatable Minerals for Alternative A

Under the No Action Alternative, 963,862 acres of BLM land in the planning area are currently closed to mineral entry by ANCSA 17 (d)(1) withdrawals and Agency withdrawals. Approximately 138,627 acres are currently open for mineral entry. If current State- or Native-selected lands are not conveyed and returned to BLM management, they would be opened for mineral entry. Pre-ANSCA mining claims exist on BLM lands. Locatable lode mineral activity is occurring at the Iliamna Project, D Block and Iliamna Project, and H Block locations on State-selected land. Placer activity is conducted on the Arolik River on Native-selected land and the Salmon River (Federal mining claims) on Native land. All currently active Federal and State mining claims and 2005 APMAs are in the Bonanza Creek, Goodnews Bay/Snow Gulch, Iliamna/Kvichak, Kemuk, Pebble Copper, Platinum, and Shotgun Hills areas. Current mineral activities would occur in the Iliamna/Kvichak and Platinum areas.

If locatable mineral activity were to occur on every active Federal mining claim on BLM land, an estimated total of 23 acres (5 lode and 18 placer) could potentially be disturbed in the planning area. No disturbance would occur on State- or Native-selected lands. Under this Alternative no further disturbance would be anticipated until the conveyance process is completed. Future mineral activities could be expected to occur on those lands returning to BLM management.

All mineral related activities occurring on BLM land are subject to current BLM surface regulations as outlined in 43 CFR 3809. Operators are required to submit Plan of Operations or Notice of Operations which contains stipulations based on site-specific resource concerns. All operations are required to meet applicable Federal and State air and water quality standards for permitting.

b) Effects to Locatable Minerals for Alternative B

Under Alternative B, ANCSA 17(d)(1) withdrawals would be revoked and 1,102,489 acres of BLM lands would be open to mineral entry. Any State- or Native-selected lands would be made available for locatable mineral entry if the selection is revoked or relinquished. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. An additional 3,968 acres are closed to material entry due to Agency withdrawals. If all reasonable foreseeable future mineral activities were to occur in the planning area on BLM land, activities would occur in the Goodnews Bay/Snow Gulch, Iliamna/Fog, Iliamna/Kvichak, Kasna Creek, Kijik Lake, and Pebble Copper areas.

Lode mineral activities in the Goodnews Bay/Snow Gulch area would occur at the Tatlignagpeke Mountain and Mitlak Mountain properties on State-selected lands (due to Top Filing) and Wattamuse-Granite Lode property on Native-selected land. Lode activities in the Iliamna/Fog area would occur at the Dutton, Easy, Karen, and Meadow properties on State-selected land and the Duryea and Ground Hog properties on Native-selected land. Lode activities in the Iliamna/Kvichak area would occur on the Iliamna Project, D Block; Iliamna Project, H Block; and LSS 1-3 properties on State-selected land. Lode activities in the Kasna Creek area would occur at the South Current Creek and Upper South Current Creek properties on Native-selected land. Lode activities in the Kijik Lake area would occur at the Dicks Lode, Gull, and Kijik Mountain properties on Native-selected land. Lode activities in the Pebble Copper area would occur at the Hill 1759 property on Native-selected land.

Placer activities in the Goodnews Bay/Snow Gulch area would occur at the Barnum Creek, Domingo Creek, Faro Creek, and Jacksmith Creek Tributary on State-selected lands (due to Top Filing); the Slate Creek property on State-selected land; and the Arolik River, Malaria Creek, Snow Gulch, Tyrone Creek, and Wattamuse Creek properties on Native-selected land. Placer activities in the Iliamna/Fog area would occur at the Unnamed (west of Chetok) property on Native-selected land. Placer activities in the Kijik Lake area would occur at the Bertha M. property on Native-selected land.

If locatable mineral activity were to occur on every existing operation, as allowable by present BLM authority on BLM land, an estimated total of 115 acres could potentially be disturbed in the planning area. Total includes surface disturbance of 0 acres on BLM land, 50 acres on State-selected land, 47 acres on Native-selected land, and 18 acres on Native land (active Federal claims). Depending upon the results of conveyances, some of this locatable mineral activity may occur on land owned by the State and Native Corporations. Due to the small size of the existing operations as well as the short period of operation there would be a minor impact on the local air and water quality.

All locatable mineral related activities occurring on BLM land are subject to current BLM surface regulations as outlined in 43 CFR 3809. Operators are required to submit Plan of Operations or Notice of Operations which contains stipulations based on site-specific resource concerns. All operations are required to meet applicable Federal and State air and water quality standards for permitting.

c) Effects to Locatable Minerals for Alternative C

Under Alternative C, 1,064,313 acres of BLM lands would be open to locatable mineral activities due to lifting of ANSCA 17(d)(1) withdrawals. 3,968 acres are closed to material entry due to Agency withdrawals other than ANCSA 17(d)(1). Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. The Carter Spit (61,251 acres) and the Bristol Bay (974,970 acres) ACECs would be proposed under Alternative C, Of these two areas, only the Carter Spit ACEC would retain ANSCA 17(d)(1) withdrawal, closing this area to mineral entry. Proposed Wild River segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork Rivers (12,210 acres) would be closed to locatable mineral entry due to retention of ANSCA 17(d)(1) withdrawals.

Locatable mineral activity would still be allowed on existing pre-ANSCA mining claims within the Bay planning area. Active Federal lode mining claims occur at the Iliamna Project, H Block property in the Iliamna/Kvichak area on BLM and State-selected land. Active Federal placer mining claims occur on the Salmon River in the Platinum area on Native land. Locatable mineral activity may also occur on lands within the planning area that are conveyed to the State and Native Corporations.

If locatable mineral activity were to occur an estimated total of 43 acres could potentially be disturbed in the planning area on BLM, State- and Native-selected land. No disturbance would occur on BLM lands due to retention of ANSCA 17(d)(1) withdrawals in the Carter Spit ACEC and ANILCA 906(e) Top Filings.

All locatable mineral related activities occurring on BLM land are subject to current BLM surface regulations as outlined in 43CFR 3809. Operators are required to have an approved Plan of Operations which contains site-specific guidelines. All operations are required to meet applicable Federal and State air and water quality standards for permitting. Required Operating Procedures (Appendix A) would be applied to locatable mineral activities occurring on BLM lands.

d) Effects to Locatable Minerals of Alternative D

Under Alternative D, ANCSA 17(d)(1) withdrawals would be revoked and all segregated lands returning to BLM-management would be open for mineral entry. Approximately 1,102,489 acres of unencumbered BLM lands would be available for locatable mineral entry. The Carter Spit ACEC (36,220 acres) would be recommended under Alternative D and ANSCA 17(d)(1) withdrawals would be lifted, opening this area to mineral entry. Agency withdrawals (3,968 acres), would be closed to mineral entry due to withdrawals other than ANCSA 17(d)(1). If all Reasonable Foreseeable Future mineral activities were to occur in the planning area on BLM land, activities would occur in the Goodnews Bay/Snow Gulch, Iliamna/Fog, Iliamna/Kvichak, Kasna Creek, Kijik Lake, and Pebble Copper areas.

Lode and placer mineral activities on BLM land are the same as discussed in Alternative B.

If locatable mineral activity were to occur on every existing operation, as allowable by present BLM authority on BLM land, an estimated total of 115 acres could potentially be disturbed in the planning area. Total surface disturbance includes: 50 acres on State-selected land, 47 acres on Native-selected land, and 18 acres on Native land (active Federal claims), no disturbance on BLM land. Depending upon the results of conveyances, some of this locatable mineral activity may occur on land owned by the State and Native Corporations. Due to the small size of the existing operations as well as the short period of operation, there would be a minor impact on the local air and water quality.

All locatable mineral related activities occurring on BLM land are subject to current BLM surface regulations as outlined in 43 CFR 3809 Operators are required to submit Plan of Operations or Notice of

Operations which contains stipulations based on site-specific resource concerns. All operations are required to meet applicable Federal and State air and water quality standards for permitting.

Salable Minerals (Mineral Materials)

a) Effects to Salable Minerals for Alternative A

Approximately 1,163,594 acres of BLM lands are available for salable mineral activities. State- and Native-selected lands would be made available if their selections are revoked or relinquished. An additional 3,968 acres are closed to salable mineral activities due to Agency withdrawals. Large reserves of salable material exist on State and Native land and no disturbance of BLM land is anticipated due to the remote location of BLM lands. Activities would require approved mining and reclamation plans and compliance with constraints developed through project-specific NEPA analysis, and are subject to all Federal and State laws and regulations.

b) Effects to Salable Minerals for Alternative B

Approximately 1,102,488 acres of BLM lands are available for salable mineral activities. State- and Native-selected lands would be made available if their selections are revoked or relinquished. Upon lifting of ANCSA 17(d)(1) withdrawals, ANILCA 906(e) Top Filed land (61,105 acres) would become State-selected, closing this land to salable mineral activities. An additional 3,968 acres are closed to material sales due to Agency withdrawals. Large reserves of salable material exist on State and Native land and no disturbance of BLM land is anticipated. Activities would require approved mining and reclamation plans, compliance with Required Operating Procedures (Appendix A), and compliance with constraints developed through project-specific NEPA analysis, and are subject to all Federal and State laws and regulations.

c) Effects to Salable Mineral for Alternative C

Approximately 115,163 acres of BLM lands are available for the salable mineral activities. State- and Native-selected lands may be made available if their selections are revoked or relinquished. However, two areas, the proposed Carter Spit (61,251 acres) and Bristol Bay (974,970 acres) are recommended as ACECs and the proposed Wild River segments of the Alagnak, Goodnews mainstem, and Goodnews Middle Fork Rivers (12,210 acres) would be closed to salable mineral activities. An additional 3,968 acres are closed to salable mineral activities due to Agency withdrawals. Large reserves of salable material exist on State and Native land, and no disturbance of BLM land is anticipated except in the Koggiling Creek planning block to support leasable mineral activities. Salable mineral activities would require approved mining and reclamation plans, compliance with Required Operating Procedures (Appendix A), and compliance with constraints developed through project-specific NEPA analysis, and are subject to all Federal and State laws and regulations.

d) Effects to Salable Mineral of Alternative D

Approximately 1,100,654 acres of unencumbered BLM lands are available for salable mineral activities. State- and Native-selected lands would be made available if their selections are revoked or relinquished. The Carter Spit ACEC (36,220 acres) would be proposed and closed to salable mineral activities. An additional 3,968 acres area would be closed to salable mineral activities due to Agency withdrawals other than ANCSA 17(d)(1). No disturbance of unencumbered BLM land is anticipated from salable mineral activities due to the remote location of BLM lands and the more easily available locations of salable material on State and Native land. Activities occurring on unencumbered BLM lands would require

approved mining and reclamation plans, compliance with Required Operating Procedures (Appendix A), and compliance with constraints developed through project-specific NEPA analysis, and are subject to all Federal and State laws and regulations

7. Direct and Indirect Effects to Special Designations

a) Areas of Critical Environmental Concern

(1) Effects to Areas of Critical Environmental Concern for Alternative A

There are currently no ACECs in the planning area. Under this Alternative, no ACECs would be proposed. Because of the retention of ANCSA 17(d)(1) withdrawals on most BLM, very little resource development activity is anticipated under this Alternative. Consequently, there would be little effect to the resource values identified for the Bristol Bay and Carter Spit areas.

(2) Effects to Areas of Critical Environmental Concern for Alternative B

Under this Alternative, no ACECs would be proposed. Additionally, most ANCSA 17(d)(1) withdrawals would be recommended for revocation, thus opening most BLM lands to mineral leasing and location. The direct effects of resource development on the resource values associated with the Bristol Bay and Carter Spit areas are discussed in previous sections, particularly those discussing effects to Fish, Wildlife and Special Status Species.

(3) Effects to Areas of Critical Environmental Concern for Alternative C

Under Alternative C, the Carter Spit ACEC (61,251 acres) and the Bristol Bay ACEC (974,970 acres) would be proposed. In addition, Stipulations, ROPs, and additional requirements, determined through project-specific NEPA analysis, would provide protection of relevant and important values of these ACECs.

These two potential ACECs would be designated, based on relative and important resources values (43 CFR §1610.7-2). The values for each area are discussed in Chapter III and Appendix B. Management would result in limitations or restrictions placed on other resource uses and activities in order to prevent irreparable damage to the identified values. Management objectives of both ACECs, if proposed within the preferred alternative, would be described within the Bay RMP. Should the selected lands immediately adjacent to these proposed ACECs revert to BLM, they may be incorporated into the ACEC. This would be accomplished by a plan amendment following relative and important criteria in 43 CFR §1610.7-2.

Carter Spit ACEC

Impacts to fish, wildlife, vegetation, special status species, and cultural resources under Alternative C are discussed in this chapter under each topic heading. Under Alternative C, ANSCA 17(d)(1) withdrawals would be retained for the Carter Spit ACEC (61,251 acres). This ACEC would remain closed to all mineral activities. The Carter Spit ACEC would be designated as a right-of-way avoidance area, OHV travel would be limited to designated roads and trails, closed to FLPMA leases, and would be unavailable for disposal. Applications for livestock grazing would be analyzed on a case-by-case basis, though no applications for grazing have been received nor does BLM expect to receive applications for grazing within the life of the Bay RMP.

Impacts to resources in the Carter Spit ACEC would be similar to Alternative A due to retention of ANSCA 17(d)(1) withdrawals and designation of a right-of-way avoidance area. The retention of ANSCA 17(d)(1) withdrawals would preclude mineral exploration and development, while designation of a right-of-way avoidance area would preclude road and pipeline construction. Precluding this type of development would prevent impacts to the natural environment, including; soil compaction, increased siltation of water

bodies, vegetative removal, degraded localized air quality resulting from dust and vehicle emissions, and disturbance to wildlife and special status species wildlife.

Bristol Bay ACEC

Impacts to fish, wildlife, vegetation, special status species, and cultural resources under Alternative C, are discussed in this chapter under each topic heading. This ACEC would remain open for leasable and locatable mineral activities. It would be closed to salable minerals and designated as a right-of-way avoidance area. OHV travel would be limited to designated roads and trails, closed to FLPMA leases, and would be unavailable for disposal. Applications for livestock grazing would be analyzed on a case-by-case basis, though no applications for grazing have been received nor does BLM expect to receive applications for grazing within the life of the Bay RMP. A fire management plan developed to protect lichen range for caribou would be developed for this ACEC.

The use of ROPs and Stipulations will reduce impacts to the natural environment caused by mineral exploration and development, resulting from revocation of ANSCA 17(d)(1) withdrawals, in the proposed Bristol Bay ACEC. A more detailed description of impacts to natural resources resulting from mineral exploration and development is contained in the discussion on effects from leasable and locatable minerals. In addition, a Plane of Operation will be required for locatable mineral activities occurring in the ACEC, per 43 CFR 3809.11(c)(3), requiring detailed disturbance and rehabilitating planning.

(4) Effects to Areas of Critical Environmental Concern for Alternative D

Only the Carter Spit ACEC (36,220 acre) would be designated to provide protection of relevant and important values. Upon lifting of ANCSA 17(d)(1) withdrawals, ANILCA 906(e) Top Filed land (61,105 acres) would become State-selected. These Top Filed lands include Goodnews Bay/Snow Gulch area. These lands are immediately adjacent to the proposed Carter Spit ACEC . Should the selected lands immediately adjacent to the proposed ACEC revert to BLM, they may be incorporated into the ACEC. This would be accomplished by a plan amendment following relative and important criteria in 43 CFR §1610.7-2. The following site would be designated under this Alternative:

Carter Spit ACEC

This ACEC would be designated to provide protection to federally-listed migratory bird species. Additional impacts to fish, wildlife, vegetation, Special Status Species, and cultural resources under Alternative D are discussed in this chapter under each topic heading. ANSCA 17(d)(1) withdrawals would be revoked from the lands within the proposed ACEC boundary. This ACEC would be open to leasable and locatable mineral activities, closed to salable minerals, and designated as a right-of-way avoidance area. Lands within the Carter Spit ACEC would be closed to FLPMA leases, unavailable for disposal, and OHV travel would be limited to designated roads and trails. Applications for livestock grazing would be analyzed on a case-by-case basis, though no applications for grazing have been received nor does BLM expect to receive applications for grazing within the life of the Bay RMP.

b) Wild and Scenic Rivers

Wild and Scenic River areas are not essentially natural resources or resource uses, but represent statutory decisions to protect certain resources or uses over a long period of time. For this reason, impacts of various Alternatives to proposed Wild and Scenic River areas should be examined by looking at the impacts to resources and uses described elsewhere in this chapter.

The most basic characteristics of a Wild and Scenic River are its free-flowing nature. Impacts of the various Alternatives on the quality and free-flow of water are described in the Soils, Water, Air, and Vegetation Resources section of this chapter.

Seven outstandingly remarkable values were identified for the eligible river areas: free-flowing nature and water quality, scenery, subsistence use, prehistory and history, recreational use, fish habitat, and wildlife habitat. Each of these values has a corresponding section in this chapter where an assessment of potential impacts may be found. Appendix B provides the Wild and Scenic River matrix used to determine the river segments' eligibility and suitability.

(1) Effects to Wild and Scenic Rivers for Alternative A

There is currently no Wild and Scenic River designation on BLM lands in the planning area. Under this Alternative, no rivers would be nominated. Because of the retention of ANCSA 17(d)(1) withdrawals under this alternative, resource development activities are anticipated to be limited.

(2) Effects to Wild and Scenic Rivers for Alternative B

Under this Alternative, no eligible rivers would be found suitable for designation.

(3) Effects to Wild and Scenic Rivers for Alternative C

Under Alternative C, all eligible rivers (Alagnak River (Wild/Recreational), the Goodnews River Mainstem (Wild), and the Goodnews River Middle Fork (Wild)) would be found suitable for designation (12,210 acres). This would provide maximum protection to the free-flowing characteristic of these rivers. The BLM would gain additional authority to review Federal authorizations for water resources projects, and would be mandated to protect the outstandingly remarkable values of designated rivers. ANCSA 17(d)(1) withdrawals would be retained until Congress had an opportunity to act on the proposal.

(4) Effects to Wild and Scenic Rivers for Alternative D

Under Alternative D, no eligible rivers would be found suitable for designation.

8. Social and Economic Conditions

a) Effects to Social and Economic Conditions Common to All Alternatives

Proposed management of the following resources, resource uses or programs would have no anticipated effects on Social and Economic Conditions: Soil, Water, Air, and Vegetation Management, Visual Resources, and Renewable Energy.

(1) Effects to Social and Economic Conditions from Livestock Grazing (Common to All Alternatives)

No livestock grazing currently occurs under permit, nor has any interest been expressed in requesting livestock grazing authorization. Authorizations for grazing will be examined on a case-by-case basis. No requests for reindeer grazing permits are anticipated. There are no current reindeer grazing authorizations within the planning area. Therefore, no effect on the regional economy is expected under any alternative.

(2) Effects to Social and Economic Conditions from Forest Products (Common to All Alternatives)

Individual and subsistence use of forest products is typical in the planning area. There is no commercial demand, few permits for individual use, and no expectation of change in the current pattern of use. The demand for forest products on BLM land within the plan area is not expected to change in the foreseeable future. Therefore, the effect on the regional economy is very low for all Alternatives.

(3) Effects to Social and Economic Conditions from Recreation and Travel Management (Common to All Alternatives)

BLM issues approximately 4-6 special recreation use permits annually to commercial guides or outfitters using BLM land within the planning area. Very little visitor use or trip data is available**.** BLM assumes that access to the planning area for commercial or public recreation is largely provided by local businesses.

OHV management will not have economic effects on the area. Although tighter management of OHVs is proposed under Alternatives C and D, reasonable access to subsistence resources will remain unaffected under all Alternatives.

(4) Effects to Social and Economic Conditions from Hazardous Materials Management (Common to All Alternatives)

The BLM management actions proposed under all Alternatives for hazardous or solid wastes may have localized, beneficial effects on socioeconomic resources through prevention measures and mitigation practices as sites become recognized that are near communities.

(5) Effects to Social and Economic Conditions from designation of Areas of Critical Environmental Concern (Common to All Alternatives)

The range of alternatives analyzed consider different ACEC designations, from no designations (Alternatives A and B) to two ACECs (alternative C) to one ACEC (alternative D). These designated areas affect economic conditions indirectly through the constraints that are identified for specific resource protection. These constraints may limit resource development and thus economic development to some extent. The effects to social and economic conditions from these designations are best expressed through their direct effect on mineral development. These effects are described below for each alternative under Effects to Social and Economic Conditions from Minerals.

(6) Effects to Social and Economic Conditions from Fisheries and Wildlife Management (Common to All Alternatives)

Chapter III of this document, in the section on Social and Economic conditions, emphasizes the role and importance of subsistence activities to the local economy. The importance of commercial fishing is also emphasized. These economic opportunities are largely dependent on high-quality fish and wildlife habitat. Within the range of alternatives presented in this analysis, BLM considers a varying range of resource development scenarios. Even under the most aggressive development scenario (Alternative B) there would be only 115 acres of disturbance from mining activity and the development of one gas field in the Koggiling block. The effects of these activities on fish and wildlife habitat and on subsistence are displayed in this Chapter under the respective resource categories. Under no alternative would the direct and indirect effects of development on BLM lands have a significant impact on subsistence opportunities or on the regional commercial fisheries or on the economic benefits derived from these activities.

b) Effects to Social and Economic Conditions for Alternative A

(1) Effects to Social and Economic Conditions from Mineral Activities (Alternative A)

Leasable. The area would be closed to mineral leasing due to ANSCA 17(d)(1) withdrawals. Therefore, management of BLM lands under this Alternative would not result in changes in the regional economy.

Locatable. Mining claims predating ANSCA are available to locatable mineral development. Mining activity is currently taking place only on some of these claims. Under Alternative A, no new mining activity would be likely to occur on BLM land due to ANCSA 17(d)(1) withdrawals. Therefore, management of BLM lands under this Alternative would not result in changes in the regional economy.

Salable. The area would be closed to mineral leasing due to ANSCA 17(d)(1) withdrawals. Therefore, management of BLM lands under this Alternative would not result in changes in the regional economy.

(2) Effects to Social and Economic Conditions from Lands and Realty Actions (Alternative A)

FLPMA permits, leases, and sales would continue to be processed on a case-by-case basis. There is no record of previous FLPMA sales. No disposal or exchange activity would be allowed under this Alternative. Therefore, management under this Alternative would not result in changes to the regional economy.

(3) Effects to Social and Economic Conditions from Wild and Scenic Rivers (Alternative A)

No river segments would be considered for inclusion to the National WSR system. Recreation opportunities and commercial operations associated with any eligible rivers would remain the same.

(4) Effects to Social and Economic Conditions from Recreation Management (Alternative A)

Recreation management would maintain the existing spectrum of opportunities. Only a slight increase in commercial Special Recreation Permits would be expected, consistent with current trends. There would be very little to no economic effect from this management.

c) Effects to Social and Economic Conditions Alternative B

(1) Effects to Social and Economic Conditions from Minerals Activities (Alternative B)

Leasable Minerals

Approximately 1,103,138 acres of BLM lands and any State- or Native-selected lands (820,627 acres) whose selection is relinquished or revoked, would be open to leaseable mineral activities.

Revenues - Long term gas prices must be over $12.45 per Mcf to encourage production where a gas pipeline must be constructed to deliver product to Dillingham (Craig 2004). This is based on current costs. Leases may be offered as early as 2010 and exploration may begin during the period 2010 to 2014. Leases are most likely to be requested within approximately 40 miles east northeast of Dillingham.. Economic effects of a gas field will more likely impact the Dillingham area, and will be less likely to impact the remainder of the planning area.

Bonus bids in the Alaska Peninsula Area wide 2005 oil and gas lease sale of state land, brought the State of Alaska $1,268,121 in revenue. State leases covered about 213,000 acres in this sale. The total area in the Koggiling Creek planning block of unencumbered land is 159,732 acres. Bonus bids are expected to be lower for an offering here. The State of Alaska transfers part of its share of bonus bids to boroughs, such as in 1998 following the NE NPRA lease sale (DOI, 2003). However, the likely location of a lease sale is not within an organized borough in the planning area.

Rent is charged for lease acreage until it produces oil or gas, and thereafter royalty. The Federal government charges $1.50/acre for the first five years and $2.00/acre for the second five years of a typical 10 year lease. Rents are split with the State in the same manner as royalties. 1,404,000 of 5,816,919 acres offered were leased in the 1998 NW NPRA sales, for example.

Royalties will be based on 12.5% of the well head value of gas and be split between the State (90%) and Federal government (10%). The State received a total of approximately $1.755 billion from rents, bonus bids, and royalties statewide during calendar year 2005.

Property tax may be assessed by the State and shared with a borough. The scenario used and analyzed in this EIS predicts development outside of existing boroughs in the planning area. Therefore, even if the State assesses property tax, it will not go directly to a local government.

Employment and Income - Crew estimates presented in BLM's Reasonably Foreseeable Development Scenario (RFD) for Leasable Minerals estimate manpower requirements for gas exploration and related activities. Seismic testing is predicted to begin in the period 2010. Crews will range from 20 to 50 workers. These workers may be based in a central location or in a field camp, as is often the case in other parts of Alaska where remote operations occur.

All other activities would occur in 2014 or later. Drilling would require 17 to 34 workers. Production would require19 to 73 workers. Construction of a 3 inch diameter steel transmission pipeline would require 21 to 34 workers.

It is assumed that development activities would be based from a camp located on one of the gravel pads associated with development and production. Camp operations would require 10-20 additional workers in trades or laborers during set up, and catering services indicated in the following tables during operation.

Direct and indirect impact to the central location during exploration would include an effect on local lodging and catering services, and could be a significant input to Dillingham's economy. Later construction and operations may have a lower effect on lodging and food service in Dillingham, but may increase transportation service requirements for materials barged or flown in from supplier locations outside the planning area. It is possible that all direct and indirect input in the Dillingham area would be new jobs, though temporary and paralleling the project timeline. Tables 4.3 through 4.6 show direct employment under a camp scenario. Direct employment includes catering service at camp facilities, which are not included in the BLM RFD labor requirement. Therefore, the figures in preceding paragraphs will be lower than shown in the tables. Indirect employment would likely occur in Dillingham at hotels and in the transportation sector. This is estimated at 2 to 12 jobs during the life of the project. Personal income derived from the project would be most likely to result in the construction, service, and transportation sectors.

Table 4.3. Potential Seismic Manpower Requirements for Proposed Yukon Flats Oil and Gas Development (Adapted from Doyon 2004)

Position	2D Seismic	3D Seismic
Supervisor and Co. Rep	3	4
Surveyors	8	16
Drilling Crew	15	20
Recording Crew	18	25
Catering	4	6
Total	**48**	**71**

Table 4.4. Potential Drilling Manpower Requirements for the Proposed Activity in This Planning Scenario (adapted from Doyon 2004)

Position	Number
Supervisors/Tool Pushers	2-4
Rig Crews	6-14
Welders, Electricians, Mechanics & Roustabouts	3-6
Drilling Services	6-10
Catering	6
Total	**23-40**

Table 4.5. Potential Production Operations Manpower Requirements for the Proposed Activity in This Planning Scenario (adapted from Doyon 2004)

Position	Number
Production Supervisors	2-4
Production Operations	10-50
Roustabouts	5-12
Support Services such as Mechanics, Electricians	2-7
Catering	6
Total	**25-79**

Table 4.6. Potential Pipeline Construction Manpower Requirements for the Proposed Activity in This Planning Scenario (adapted from Doyon 2004)

Position	Number
Project Management	1-2
Welders & Helpers	10-15
General Laborers	5-7
Support Services such as Mechanics, Electricians	5-10
Catering	6
Total	**25-40**

Bristol Bay area oil and gas industry employment and income will vary from low levels during the exploration phase, increase during development, and drop during production phases. Workers will travel to the gas field from other parts of the United States (27%), other parts of Alaska (58%), and very few workers originating from the planning area (15%), based on comparisons drawn from the North Slope oil industry (Hadland 2005).

In addition, *The Economic Multiplier* shows that in rural areas, the multiplier has a value only a little more than one (ISER 2005). Most goods and services purchased by businesses and households in small towns come directly from larger trade centers outside the local market. In this instance, sources are outside the planning area. The Institute of Social and Economic Research at the University of Alaska in Anchorage estimates that in rural census areas in Alaska, it would take $15 or more of purchasing power flowing into the region to produce $1 of income in a support business within the region itself. According to the report, additional spending would generate more support wages in Dillingham than the same amount of spending in Bristol Bay Borough.

The effect of the employment and income on the United States is negligible.

Locatable Minerals

The revocation of all ANCSA Section 17 (d)(1) withdrawals would allow new mineral entry. Under this Alternative, one to three new placer operations could begin over the life of the plan. Up to 15 new seasonal jobs at mining locations may be created, adding income of $150K to $250K per annum to the regional economy.

Exploration for resources leading to lode mine potential will begin to occur over the life of the plan. From 4 to 40 new seasonal jobs may be created in various stages of exploration. In initial exploration, one or more small crews consisting of two well qualified geologists and two lesser qualified assistants would receive an average of $300 per day for approximately six months work. Work would be conducted from small field camp(s), with all supplies shipped to location using commercial air transport, and all local

transportation by helicopter on contract. Using these assumptions, each crew could receive about $216,000 for 180 days of seasonal employment. This is the most likely scenario for the period 2010-2015.

If potential lode resources are located, additional employment may result as exploration to define a deposit continues. Additional capital and labor will be required to drill, sample, and process findings. This scenario indicates spending may increase by a factor of ten in later stages of exploration or assessment of resources. Primary labor resources will continue to be imported from outside the planning area. Depending upon location of activity, a field camp may still be required, with little use of local lodging.

A large portion of wages will be paid to workers who do not live in the region, and much of the capital investment will occur outside the region. The effect to the regional economy is expected to be low. As development begins, the likelihood of local resource utilization, lodging and air taxi service, and participation by local labor is likely to increase.

Under this scenario Government revenues may increase due to the potential amount of mining claim fees, rental fees, and possible production royalties.

Salable Minerals

Due to the location of BLM lands within the planning area, and the availability of these resources on State or private lands, development of salable mineral materials is expected only in conjunction with leasable mineral activities in the Koggiling Creek planning block. Development of salable minerals and the impacts to social and economic conditions to the region are incorporated into the discussion of leasable minerals.

(2) Effects to Social and Economic Conditions from Lands and Realty Actions (Alternative B)

FLPMA permits, leases, and sales would continue to be processed on a case-by-case basis. Effect of future disposal or land exchange proposals may be assessed when the value of specific parcels is determined. BLM is unlikely to act until land conveyance to the State of Alaska, ANCSA Native Corporations, and Native Allottees is complete. At that time, BLM may attempt to consolidate land management responsibilities.

(3) Effects to Social and Economic Conditions from Wild and Scenic Rivers (Alternative B).

Same as Alternative A.

(4) Effects to Social and Economic Conditions from Recreation management (Alternative B)

This alternative would manage recreation opportunities towards a roaded natural experience. This recreation setting includes some rustic facilities in a largely natural setting. Managing for this experience would imply a higher level of recreational visitor use and consequently a higher level of commercial Special Recreation Permits. More commercial recreation opportunities could provide an economic benefit to local communities or villages in the planning area.

d) Effects to Social and Economic Conditions for Alternative C

(1) Effects to Social and Economic Conditions from Minerals

Leasable Minerals

Under Alternative C, 1,063,129 acres of BLM land within the planning area will be open to leasable mineral activities. ANSCA 17(d)(1) withdrawals will be lifted, with the exception of the proposed Carter Spit ACEC (61,251 acres) and proposed Wild River segments of the Alagnak, Goodnews and Goodnews

Middle Fork Rivers (12,210 acres). Additional Agency withdrawals (3,318 acres) would be closed to leasable mineral activities as described within specific PLOs. A 300 foot NSO buffer would be placed on either side of East and South Fork Arolik, Faro Creek, South Fork Goodnews River, and Klutuk Creek (Appendix A, ROP FW-6a and Oil and Gas Lease Stipulation 8) to protect riparian areas and soils adjacent to sensitive habitat for salmon and resident fish. According to the leasable RFD, gas operations are expected to take place within the Koggiling Creek planning block only. Because the described closures are not within the Koggiling Creek planning block , the effect on the regional economy from leaseable mineral development is expected to be the same as Alternative B.

Locatable Minerals

ANSCA 17(d)(1) withdrawals will be lifted, with the exception of the proposed Carter Spit ACEC (61,105 acres) and proposed Wild River segments of the Alagnak, Goodnews and Goodnews Middle Fork Rivers (12,210 acres). Additional Agency withdrawals (3,968 acres) would be closed to locatable mineral activities as described within specific PLOs. Upon revocation of ANCSA 17(d)(1) withdrawals, Top Filings would attach to lands selected by the State under ANILCA 906(e). The lands would remain closed to mineral entry pursuant to 43 CFR § 2627.4 (b). The high locatable mineral occurrence potential area of Goodnews Bay/Snow Gulch, is Top Filed by the State under 906(e) of ANILCA. Economic opportunities would be slightly greater compared to Alternative A, due to the amount of expected development (43 acres) as discussed within the RFD for locatable minerals.

(2) Effects to Social and Economic Conditions from Lands and Realty Actions (Alternative C)
Impacts would be the same as Alternative B.

(3) Effects to Social and Economic Conditions from Wild and Scenic Rivers (Alternative C)

Under Alternative C, all eligible rivers (Alagnak River (Wild/Recreational), the Goodnews River Mainstem (Wild), and the Goodnews River Middle Fork (Wild)) would be found suitable for designation (12,210 acres). If these rivers were eventually designated as Wild and Scenic, visitor use and commercial recreation opportunities would increase, based on experience with other Alaskan Wild and Scenic Rivers. This could provide some economic opportunities for local communities or villages.

(4) Effects to Social and Economic Conditions from Recreation Management (Alternative C)

Same as Alternative A.

e) Alternative D

(1) Effects to Social and Economic Conditions from Minerals

Leasable Minerals

Most of the planning area (1,101,304 acres) would be open to mineral leasing, including the Carter Spit ACEC, due to lifting of ANSCA 17(d)(1) withdrawals. A 300-foot NSO buffer (Appendix A, ROP FW-6a and Oil and Gas Lease Stipulation 8) would be placed on either side of East and South Fork Arolik, Faro Creek, South Fork Goodnews River and Klutuk Creek. Agency withdrawals (3,318 acres) would be closed to leasable mineral activities. According to the leasable RFD, leasable mineral activities are expected to take place within the Koggiling Creek planning block only. Because the described closures are not within the Koggiling Creek planning block, the effect on the regional economy from leaseable mineral development is expected to be the same as Alternative B.

Locatable Minerals

Economic and social effects would be the same as Alternative B.

(2) Effects to Social and Economic Conditions from Lands and Realty Actions
Impacts would be the same as Alternative B.

(3) Effect to Social and Economic Conditions from Wild and Scenic Rivers

Same as Alternatives A and B.

(4) Effects to Social and Economic Conditions from Recreation Management

Same as Alternatives A and C.

9. Environmental Justice

The Alutiiq, Athabascan, and Central Yup'ik Native people, recognized minorities in the planning area, engage in a particularly subsistence based economy. It is characterized by high unemployment in the cash-based economy, low labor force participation, and relatively low income where the cost of living is very high. Therefore, activities restricting subsistence practices, access, and resources will certainly affect a large segment of the local population. Analysis of the effects to subsistence resources and opportunities is presented in the next section of this Chapter. Arguably, creation of jobs and income provide positive effects on the Native population, based on value perspectives.

Activities not associated with mineral extraction or oil and gas activities likely to occur in the Planning Area would primarily be transitory in nature, of short duration, and highly localized. Under all Alternatives the effects of recreation, and forestry, lands and realty actions, and grazing would be similar. Activities could temporarily divert, deflect, or disturb subsistence species from their normal patterns. These activities could alter the availability of subsistence species in traditional harvest areas, which could in turn affect harvest patterns by requiring hunters to travel further in pursuit of resources. Increased travel distances would result in greater expenditures for fuel and equipment, and increased wear and tear on equipment. Consequently, there could be an effect on the subsistence hunting activities of local minority populations as a result of these activities. The effect would be likely minor, short term, and highly localized.

Alternatives B, C, and D would allow oil and gas activities in areas formerly unavailable for leasing. Year-round activities could increase the amount of area affected, increase the duration of effects, and spread the effects where development occurs in the Planning Area. Disturbances caused by development under Alternatives B, C, and D would be potentially greater or more likely than under the No Action Alternative. Mining of locatable minerals under Alternatives B or D would not be likely to adversely affect local people since small placer operations would be seasonal and of short duration. Mineral exploration will have little effect on the local populations as employees and supplies will originate outside the planning area.

10. Subsistence

Proposed management of the following resources/resource uses/programs would have no anticipated impacts to Subsistence: Cultural Resources, Paleontological Resources, Visual Resources, Renewable Energy, Social and Economic Conditions.

a) Effects to Subsistence Common to All Alternatives

(1) Effects to Subsistence from Climate Change (Common to All Alternatives)

The climate within the Bay planning area is described as maritime near the coasts, and more transitional farther inland. Current scientific evidence suggests that the climate warming in Alaska can be linked to changes occurring in the structure and function of terrestrial ecosystems throughout the state. These

changes include the thawing of permafrost, the conversion of tundra to more shrub habitats, and the drying and decrease in areas of closed basin lakes, causing alteration and conversion of wildlife habitats. Climate change has also been linked to changes in disturbance regimes such as fire potential and insect outbreaks, further affecting ecosystem processes and causing habitat changes in some areas. Warming climates may be instrumental in the introduction of disease and parasites previously unknown in the planning area. Current research suggests that these trends will continue, and will likely occur to a greater extent and magnitude at higher latitudes first. These climatic changes and subsequent habitat changes will impact subsistence uses, by expanding habitats for some species, and limiting habitat for other species, thereby altering the distribution and abundance of these resources, particularly those dependent on wetlands, tundra, shrub or closed forest habitats. Additional impacts may include alterations to caribou migration patterns and alterations in the abundance and timing of spawning anadromous fish species, which could have negative impacts to subsistence users.

(2) Effects to Subsistence from Soils, Water, Vegetation and Air Management (Common to All Alternatives)

Soils, Water, Vegetation and Air resources will be managed per BLM-Statewide Alaska Land Health Standards. In general, subsistence users throughout the planning area would benefit from efforts to protect soil, water, vegetation, and air resources. These resources contribute to a healthy ecosystem, which in turn benefits subsistence users by allowing fish stocks, wildlife populations and other renewable resources to remain healthy and obtain increased productivity.

(3) Effects to Subsistence from Fire and Fire Management (Common to All Alternatives)

Fire management has the potential to impact wildlife or wildlife habitat in a variety of ways which in turn could impact subsistence use if they: 1) depleted a subsistence resource population; 2) altered the range of a subsistence species away from the traditional use area; or 3) resulted in an easier route of access for non-subsistence users into subsistence use areas, increasing the potential for competition of the resource.

Impacts as a result of fire are expected to be minimal within the planning area, as fire has been and continues to be a normal part of the ecosystem. Mitigation measures designed to reduce the impacts of fire suppression activities include limitations on the use of tracked, or off-road vehicles; measures to prevent the introduction of invasive or noxious plant species; establishment of riparian buffer zones; and rehabilitation of fire and dozer lines. Impacts as a result of suppression efforts are expected to be minimal, as most BLM lands are far from the road system, minimizing the use of mechanized equipment.

(4) Effects to Subsistence from Forestry Management (Common to All Alternatives)

Some minimal forestry activity generally occurs within the Bay planning area each year, consisting of small-scale localized timber removal for personal use, including gathering firewood and house logs. While it is unlikely that any type of road construction will occur in conjunction with this activity, it is conceivable that short spurs or temporary roads may be constructed to access parcels of timber in the future. If roads were constructed there could be localized impacts to subsistence due to alterations in habitat, wildlife migratory patterns, wildlife abundance and distribution. Direct habitat loss may also lead to wildlife displacement and habitat fragmentation, overall reducing the abundance of wildlife and plant species available for subsistence use. Currently, there is no commercial use of timber and no associated road construction activity on BLM lands within the planning area.

(5) Effects to Subsistence from Locatable and Salable Mineral Activities (Common to All Alternatives)

Locatable Minerals. Locatable mineral exploration and development may occur under every Alternative. Potential impacts to subsistence wildlife would include temporary displacement in localized areas; temporary and long term loss of habitat; long-term degradation of habitat; and direct mortality of small mammals or nestlings and brooding birds. In addition, mining activity may result in access constraints to

subsistence users, or cause an increase in competition for resources if miners took the opportunity to hunt. Both direct and indirect impacts may be reduced under all Alternatives with the implementation of mitigation measures developed during NEPA analysis of specific locatable mineral actions.

Salable Minerals. Mineral material disposal has both direct and indirect impacts on wildlife and their habitat, and therefore, has an impact on subsistence. In addition, mineral material activity may also result in access constraints to subsistence users, or cause an increase in competition for resources. However, these impacts would be very minimal under most alternatives, as sufficient material sources exist on private lands to meet the needs of most communities within the planning area and few mineral material disposal actions are anticipated.. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations in the timing or location of the proposed activity, would serve to minimize the potential impacts to subsistence users.

(6) Effects to Subsistence from Lands and Realty Management (Common to All Alternatives)

There would be both direct and indirect impacts to subsistence activities and resources from lands and realty actions under all Alternatives. Subsistence fish and wildlife species may be temporarily displaced or disturbed during activities authorized under this program and habitat may be destroyed or degraded. Additional project-specific subsistence stipulations and ROPs created in response to the proposed activity, such as limitations or directions regarding helicopter use, would serve to minimize the potential impacts. Land acquisitions and exchanges may benefit subsistence resources by consolidating land status and protecting important fish and wildlife habitats. Disposal actions may result in removal of habitat protection requirements or make lands unavailable for subsistence uses.

(7) Effects to Subsistence from Recreation Management (Common to All Alternatives)

There may be impacts to subsistence resources from both commercial and non-commercial recreation activities, including aircraft over flights, landing in remote areas, camping, and boating. The primary impacts to subsistence resources from recreation activities may be temporary stress or displacement from authorized activities on BLM-managed lands through a Special Recreation Permit. As stated in Chapter II, under all alternatives, BLM has the discretion to deny an application for a Special Recreation Permit, based on site-specific analysis, including an ANILCA section 810 analysis considering the impacts of the activity on subsistence. BLM has used this discretion in the recent past. In addition habitat degradation may result from trampling or removal of plant species. Under Alternative B, the ROS would be classified as “Roaded Natural” providing for rustic facilities. Impacts to subsistence resources and use within the planning area under this designation would be minimal. Project-specific subsistence stipulations and ROPs created in response the proposed activity, would serve to minimize potential impacts.

(8) Effects to Subsistence from Travel Management (All Action Alternatives B, C, D)

The noise and activity associated with OHV use can adversely affect subsistence wildlife both directly and indirectly. Direct effects include stress and displacement of animals, possibly to less suitable habitats, especially from important seasonal habitats (i.e. calving and insect relief areas). Stress and displacement may result in reduced productivity (ADF&G 1990). In Alternative B, the planning area would be designated as open to OHVs and allow cross country travel. Under Alternatives C, and D, BLM-managed lands would be designated as “limited” restricting OHV travel to designated roads/trails.
In addition, a 2,000-lb GVWR would be enforced on OHV use. ROPs and stipulations created in response to any proposed permitted activity, would serve to minimize potential impacts to subsistence use and resources.

b) Effects to Subsistence for Alternative A

Alternative A would continue present management practices and levels of resource use based on the existing Southwest MFP (BLM 1981), supplemented by direction contained in existing laws, regulation and policy. Few uses would be limited or excluded as long as they were consistent with State and

Federal laws. Activities would be analyzed through the NEPA process, including an ANILCA 810 evaluation, on a case-by-case basis, and any identified impacts from the proposed action to subsistence would be mitigated through appropriate consultation and stipulations.

(1) Effects to Subsistence from Minerals Activities (Alternative A)

Leasable Minerals. Alternative A would retain all ANCSA 17(d)(1) withdrawals, thus preventing mineral leasing on BLM lands.

Locatable Minerals. Under Alternative A, most BLM lands within the planning area would remain closed to locatable mineral entry due to existing ANCSA 17(d)(1) withdrawals. However, some pre-ANSCA claims exist on BLM lands where some mining may take place or continue. These operations and any future proposals for locatable minerals activities would be subject to review through the administration of Plans of Operations. Measures to maintain the integrity of subsistence resources and use would be identified and required as part of the individual mine operating plan. This analysis assumes disturbance of 23 acres of BLM-managed and Native (Federal claims) lands under this alternative, mostly from placer mining operations (BLM, 2006). Effects to subsistence from locatable mineral activities would be as described under "Effects Common to All Alternatives". Under Alternative A, impacts to subsistence would be less than Alternatives B and D, but similar to Alternative C due to the amount of acres estimated to be disturbed.

Salable Minerals No impacts would be expected in areas withdrawn from mineral entry and this analysis assumes no salable mineral activities on BLM lands for this alternative (BLM 2006).

(2) Effects to Subsistence from Recreation Management (Alternative A)

Under Alternative A, the ROS classification would remain classified as Semi-Primitive Motorized and both commercial and non-commercial recreation would continue to be managed to maintain existing conditions.. Consequently, no areas would be identified for commercial or non-commercial use limits, and impacts to subsistence resources and uses associated with these activities would be identified through the NEPA process required for each permit request. Under Alternative A, impacts to subsistence would be the same as discussed under impacts associated with "Effects Common to All Alternatives."

(3) Effects to Subsistence from Travel Management (Alternative A)

Impacts to subsistence resources and uses would be the same as discussed under impacts "Common to All Action Alternatives." Under Alternative A, there would be no travel management restrictions and no OHV weight limits. Cross country travel would be allowed everywhere on BLM lands within the planning area. The degree of potential impacts to subsistence would be both positive and negative. The lack of travel restrictions would allow increased access, but has the potential to cause degradation of habitat, from excessive OHV use.

(4) Effects to Subsistence from Special Designations (Alternative A)

No special designations are proposed under this alternative.

(5) Effects to Subsistence from Lands and Realty Management (Alternative A)

Impacts to subsistence from lands and reality actions (use authorizations and land disposals) would be similar to that discussed in effects "Common to All Alternatives." Alternative A anticipates a low level of resource development and consequently fewer land use authorizations and rights-of-way applications than other alternatives.

ANCSA 17(d)(1) withdrawals. This alternative would retain withdrawals, thus preventing most new mineral leasing or location. Impacts to subsistence associated with mineral development would be minimized.

b) Effects to Subsistence for Alternative B

1) Effects to Subsistence from Lands and Realty Management (Alternative B)

Land Exchanges. Small isolated parcels identified in Alternative B for disposal could result in privatization of some tracts and could increase levels of access and human activity creating greater competition for subsistence resources. Once under private ownership, these lands are not protected by Federal regulations or policy concerning resource or habitat protection. Wildlife may be displaced from preferred habitats, and habitat may be destroyed or degraded. Exchanges could result in larger, contiguous Blocks of BLM lands that are of high wildlife value.

Withdrawals. ANCSA 17(d)(1) withdrawals would be recommended for revocation under this Alternative. Because of the constraints currently in place under these withdrawals, revocation of the withdrawals could increase potential resource development and subsistence wildlife may be disturbed during activities. Associated impacts to subsistence resources would be expected from mineral exploration and development and infrastructure development. Activity level proposals would be handled on a case-by-case basis, and would be subject to Required Operating Procedures and Stipulations.

Rights-of-Way. This alternative anticipates the most applications for rights-of-way associated with resource development activities. These would include roads or pipelines associated with mineral development. Impacts to subsistence from these activities are described under impacts" Common to All Alternatives". More impacts to subsistence from rights-of-way would be expected under this alternative than under alternatives A, C, or D.

(2) Effects to Subsistence from Minerals Activities (Alternative B)

Leasable Minerals. Under Alternative B, ANSCA 17(d)(1) withdrawals would be lifted and leasable mineral activities would be allowed on 1,103,138 acres of BLM lands. Year around subsistence resource distribution, abundance, movement and associated seasonal harvest activities could be affected by leasable mineral activities.

Other activities associated with leasable mineral activities that have the potential to impact subsistence uses are: helicopter-supported activities, access and facilities (pipelines, production water treatment units, separation ponds, electric lines, buildings, storage facilities etc), construction and OHV use. Although these activities can be a hindrance and an annoyance, it does not create a substantial barrier between communities and subsistence resources.

Potential impacts from leasable mineral development and associated infrastructure are greater than for exploration, given the permanent and year-round nature of operations. If a development were to occur in the calving area of the MCH, or if infrastructure was constructed in such a way as to impede movements of the herd to important seasonal aggregation sites (i.e. calving and post calving aggregations, insect-relief habitat, and breeding or winter ranges) then there could be considerable impacts to this important subsistence resource. However, for the purposes of this planning effort, the reasonable foreseeable development scenario indicates six exploratory wells and one developmental gas field could be constructed in the Koggiling Creek planning block under this alternative. Additionally, roads, docks, and even remote airstrips constructed to aid production may serve as potential inroads for additional local subsistence user accessibility to resources as well as non-local hunters and fishermen, which could lead to increased competition for resources in the area. Under Alternative B, impacts to subsistence from leasable mineral activities would be greater compared to Alternative A. Though the Koggiling Creek planning block is available for leasable mineral activities under Alternatives C and D, the use of seasonal restrictions to protect caribou, applied through ROPs would impact subsistence less compared to Alternative B.

Locatable Minerals. Under Alternative B, ANSCA 17(d)(1) withdrawals would be lifted and locatable mineral activities would occur and may potentially increase compared to Alternative A. Potential impacts

to subsistence resources and use would be similar to that discussed within "Common to All Alternatives," though increased acreage would be available for mineral activities. Surface disturbance under this alternative is presumed to be a total of 115 acres from locatable mineral activities (BLM, 2006). Under Alternative B, impacts to subsistence resources and uses would be similar to Alternative D, but less compared to Alternatives A and C due the amount of acreage estimated for locatable mineral activities.

Salable Minerals. Under Alternative B, ANSCA 17(d)(1) withdrawals would be lifted and saleable mineral activities could occur on BLM lands. Impacts to subsistence resources and use would be similar to that discussed within "Common to All Alternatives", Due to the remote locations of BLM lands within the planning area it is presumed salable mineral activities would only occur in support of leasable mineral activities in the Koggiling Creek planning block. Under Alternative B, impacts to subsistence resources and uses would be greater than Alternatives A, C, and D. Though the Koggiling Creek planning block is anticipated to have salable mineral development under Alternatives B, C, and D, the use of seasonal restrictions applied through ROPs, in Alternatives C, and D, would create less impacts on subsistence resources, primarily caribou.

(3) Effects to Subsistence from Recreation Management (Alternative B)

Under Alternative B, the ROS classification would be classified as Roaded Natural and both commercial and non-commercial recreation would continue to be managed on a case-by-case basis. Management for a Roaded Natural recreation experience implies an increase in recreation users over existing levels. Additional recreation use, both casual and commercial, could result in a greater degree of impacts to subsistence resources. No areas would be identified for commercial or non-commercial use limits, and impacts to subsistence resources and uses associated with these activities would be identified through the NEPA process required for each Special Recreation Permit request. Under Alternative B, impacts to subsistence would be the same as discussed under impacts associated with "All Action Alternatives" but would occur to a greater degree than under any other alternative.

(4) Effects to Subsistence from Special Designations (Alternative B)

No special designations would be proposed under this Alternative.

(5) Effects to Subsistence from Travel Management (Alternative B)

Same as Alternative A.

c) Effects to Subsistence from Alternative C

(1) Effects to Subsistence from Reality and Lands Actions (Alternative C)

Land Exchanges. Impacts to wildlife from land exchanges and acquisitions would be the same as described for Alternative A.

Withdrawals. Under this alternative, ANCSA 17(d)(1) withdrawals would be maintained on proposed Wild River segments on the Alagnak, Goodnews mainstem and Goodnews Middle Fork (12,210 acres) and within the Carter Spit ACEC (61,251acres). Conservation of these areas would benefit subsistence resources by protecting important habitats.

Rights-of-Way. Impacts to subsistence resources and uses from Rights-of-Way would be the same as described under impacts "Common to All Alternatives" but would occur to a lesser degree. The proposed Bristol Bay and Carter Spit ACECs would be identified as avoidance areas. Restricting or stipulating Rights-of-Way within these ACEC would minimize impacts to important subsistence wildlife habitats and protect federally-listed migratory bird species, harvested for subsistence purposes, from impacts described in "Common to All Alternatives."

(2) Effects to Subsistence of from Leasable, Locatable, and Salable Minerals (Alternative C)

Leasable Minerals. Under Alternative C, ANCSA 17(d)(1) withdrawals would be revoked, opening 1,063,129 acres of BLM lands to mineral entry. ANCSA 17(d)(1) withdrawals would be retained on eligible/suitable Wild Rivers (12,210 acres) including the Alagnak, Goodnews and Goodnews Middle Fork Rivers and within the proposed Carter Spit ACEC (61,251 acres). The retention of these withdrawals would prohibit mineral leasing within these areas. A NSO would be established within 300 feet of the East and South Fork Arolik River, Faro Creek, South Fork Goodnews River and Klutuk Creek. Consequently, under this alternative there is less land available for mineral leasing compared to Alternatives B or D. However, this analysis predicts the development of one gas field in the Koggiling Creek planning block. Potential impacts to subsistence from such a development are the same as those discussed under Alternative B.

Locatable Minerals. The effects to subsistence from locatable mineral activities would be similar to those discussed in Alternative B but smaller in scope. Twenty-three acres of disturbance is expected from locatable mineral activities under this Alternative on State-selected and Native lands. Segments of eligible/suitable Wild Rivers (12,210 acres) including the Alagnak, Goodnews and Goodnews Middle Fork Rivers of the Alagnak River, the mainstem of the Goodnews River, and the Goodnews Middle Fork, and the proposed Carter Spit ACEC (61,251 acres) would retain ANSCA 17(d)(1) withdrawals precluding these areas from mineral entry while allowing subsistence use. Conservation of these areas would benefit subsistence resources by protecting important habitats.

Salable Minerals. Impacts to subsistence would be similar to those in Alternative B but smaller in scope because the proposed Carter Spit ACEC, the proposed Bristol Bay ACEC, and segments of the Alagnak, Goodnews mainstem and Goodnews Middle Fork rivers proposed for Wild and Scenic River designation would be closed to salable mineral activities. This Alternative would provide protection to subsistence resources by minimizing the amount of acreage available for salable mineral activities.

(3) Effects to Subsistence from Recreation (Alternative C)

Under Alternative C, the entire recreation area setting would be managed as ROS classes primitive, semi-primitive, and semi-primitive motorized. Impacts to subsistence resources would be the same as those described under Alternative A.

(4) Effects to Subsistence from Off-highway Vehicles (Alternative C)

Under Alternative C, all lands would receive a “limited” designation for OHV use, which would require vehicles to stay on existing trails whenever possible. A vehicle weight limit of 2,000 pounds would be proposed. These restrictions would benefit subsistence resources by reducing proliferation of trails resulting in degradation of habitats, and would reduce the indirect impacts to wildlife created by noise and disturbance, which can cause abandonment from preferred habitats.

(5) Effects to Subsistence from Special Designations (Alternative C)

Wild and Scenic Rivers. Under Alternative C, segments of the Alagnak, Goodnews mainstem and Middle Fork Goodnews rivers would be proposed for inclusion to the National WSR system. ANSCA 17(d)(1) withdrawals would be retained, closing these river corridors to mineral activities. These actions would be beneficial to subsistence resources by protecting riparian habitats from disturbance from resource development activities and by providing undisturbed wildlife habitats to riparian species. A Wild and Scenic River nomination or subsequent designation may result in increased visitation on nominated river segments. Increased visitation may stress or displace subsistence resources within riparian corridors due to increased noise from humans and boat and aircraft traffic. Competition for resources may result due to increases in non-subsistence hunting and fishing.

Areas of Critical Environmental Concern. Under Alternative C, the Carter Spit ACEC (61,251acres aces) and the Bristol Bay ACECs (974,970 acres) would be proposed. This would benefit subsistence resources by providing increased protection to wildlife habitat in this area by the following measures:

- Requiring Plans of Operations for any mining operation, even those less than five acres (43 CFR 3809.11).
- Managing the area as a rights-of-way avoidance area, thus avoiding potential impacts from road or pipeline construction.
- Developing a transportation plan that identifies specific designated trails for OHV use, thus preventing unauthorized stream crossings, trail proliferation, and associated negative impacts subsistence resources habitats.
- ANSCA 17(d)(1) withdrawals would be retained and seasonal constraints to protect the Steller's eider would be developed in the Carter Spit ACEC.

d) Effects to Subsistence from Alternative D

(1) Effects to Subsistence from Reality and Lands Actions (Alternative D)

Land Exchanges. Impacts to subsistence resources would be the same as those discussed for Alternative B.

Withdrawals. Impacts to subsistence resources from removing ANCSA 17(d)(1) withdrawals would be the same as those in Alternative B.

Rights-of-Way. Impacts to wildlife from Rights-of-Way would be the same as those for Alternative B; however, the proposed Carter Spit ACEC (36,220 acres) would be identified as an avoidance area for Rights-of-Way. This would benefit subsistence wildlife and habitat by reducing the potential of impacts resulting from road or pipeline development in the area.

(2) Effects to Subsistence from Mineral Development (Alternative D)

Leasable Minerals. Under Alternative D, ANCSA 17(d)(1) withdrawals would be revoked and 1,101,304 acres of BLM lands would be open to leasable mineral activities. A 300-foot “No Surface Occupancy” area on either side of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River, and Klutuk Creek would be proposed. There would be slightly less land available for mineral leasing compared to Alternative B, but more than Alternatives A and C. However, this analysis predicts the development of one gas field in the Koggiling Creek planning block. Potential impacts to subsistence use and resources from leasable mineral activities would be similar to those discussed under Alternative B, with the exception that under Alternative D, Stipulations that contain seasonal constraints for protection of caribou would be applied (Appendix A, Stipulations 5 and 6).

Locatable Minerals. This analysis predicts potential mining development and disturbance on 115 acres from both placer and lode mining (BLM, 2006). This disturbance is expected to occur entirely on State-selected, due to ANILCA 906(e) Top Filings, and Native (Federal mining claim) lands.

Impacts to subsistence and subsistence resources from this level of development would be the same as for Alternative B. At this level of anticipated development and with the application of ROPs in mining Plans of Operations, impacts to subsistence uses and subsistence resources may be significant in the immediate area associated with locatable mineral activities. Within the Carter Spit ACEC, Plans of Operation would be required for any operation (43 CFR 3809.11). This would have the effect of minimizing small-scale exploratory or development activities and would enable BLM to work with the operator in the Plan of Operation to apply ROPs for protection of resources.

Salable Materials. Impacts to subsistence resources would be the similar to Alternative B, except the Carter Spit ACEC (36,220 acres) would be closed to salable mineral activities. This ACEC designation

would benefit subsistence uses and subsistence resources by protecting important riparian and coastal habitats, located within the ACEC boundary.

(3) Effects to Subsistence from Recreation (Alternative D)

Under Alternative D, the entire recreation area setting would be managed as ROS classes primitive, semi-primitive, and semi-primitive motorized. Impacts to subsistence resources would be the same as those described under Alternative A.

(4) Effects to Subsistence from Off-highway Vehicles (Alternative D)

Under Alternative D, all lands would receive a "limited" designation for OHV use, which would require vehicles to stay on existing trails whenever possible. A vehicle weight limit of 2000 pounds would be proposed. Impacts would be similar to that discussed in Alternative C.

(5) Effects to Subsistence from Special Designations (Alternative D)

There would be no Wild and Scenic River nominations under this alternative. This would result in more acres available for resource development. Effects to subsistence resources from anticipated resource development under this alternative are discussed in the topics above.

Under Alternative D, the Carter Spit ACEC (36,220 acres) would be designated. This would benefit subsistence resources by providing increased protection to wildlife habitat in this area by the following measures:

- Requiring Plans of Operations for any mining operation, even those less than five acres (43 CFR 3809.11).
- Managing the area as a rights-of-way avoidance area, thus avoiding potential impacts from road or pipeline construction.
- Developing a transportation plan that identifies specific designated trails for OHV use, thus preventing unauthorized stream crossings, trail proliferation, and associated negative impacts.
- Seasonal constraints to protect federally-listed, subsistence authorized, migratory bird species would be developed (Appendix A, ROP SS 1b).

E. Cumulative Effects

1. Methods

The National Environmental Policy Act (NEPA) and its implementing guidelines require an assessment of the proposed project and other projects that have occurred in the past, are occurring in the present, or are likely to occur in the future, which together may have cumulative impacts that go beyond the impacts of the proposed project itself. According to the Act's implementing regulations (40 CFR Sec. 1508.7 and 1508.25[a][2]):

> A **cumulative impact** is the impact on the environment that results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In addition, to determine the scope of environmental impact statements, agencies shall consider cumulative actions, which when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement.

The analysis of cumulative impacts is a four-step process that follows guidance provided in Considering Cumulative Effects under NEPA (CEQ 1997).

- **Specify the class of actions whose effects are to be analyzed.** Activities allowed under the RMP and advances in technology are considered in the analysis. The assumptions and scenarios used by the resource specialists in the analysis of the cumulative impacts include those identified for the planning area in Analysis Assumptions beginning on page 4-3.

- **Designate the appropriate time and space domain in which the relevant actions occur.** For some resources and uses, the area of which an effect could be felt would be the "footprint," but for others the effect may extend well beyond that area. For example, noise effects to wildlife can extend beyond the footprint of the development. For purposes of this analysis, the spatial domain for past, present, and reasonably foreseeable activities is primarily the planning area. However, this document also considers effects to resources that could occur outside of the planning area, primarily to migratory birds and mammals. Due to the difficulty of predicting advances in technology and the need for oil and gas very far into the future, the analysis period which most of the cumulative effects analysis is 50 years into the future.

- **Identify and characterize the set of receptors to be assessed.** The set of receptors assessed in the cumulative effects analysis are the physical, biological, and human systems discussed in Chapter III.

- **Determine the magnitude of effects on the receptors and whether those effects are accumulating.** The potential extent of the total cumulative effects (e.g., number of animals and habitat affected, jobs and revenues created or lost), and how long the effects might last (e.g., population recovery time, duration of income flows) are estimated to determine the magnitude of effects that could accumulate for each resource. Where possible, the assessment of effects on a resource is based on quantitative analysis (e.g., number of miles of gravel constructed; number of animals killed). However, many effects are difficult to quantify, and a qualitative assessment of effects is made.

2. Activities Considered in the Cumulative Case

The following are past, present, and reasonably foreseeable future actions on Federal lands and non-Federal lands within the planning area or outside of the planning area. Actions outside the planning area include those that could contribute to cumulative effects on resources within the planning area.

a) Past Development

- **History of Oil and Gas Exploration -** To date, oil and gas exploration has been limited to 26 onshore wells and 2 offshore wells in the Bristol Bay region, an area comprising about 40,000 square miles (Magoon et al. 1996). None of the wells were drilled in the planning area, nor has any produced oil or gas in commercial quantities.

- **First Lease Sales -** The State of Alaska first made land available for oil and gas leasing in the Bristol Bay area in the 1960s. Sales #2 and #5 resulted in the leasing of five isolated tracts in Nushagak Bay and on the Alaska Peninsula (State of Alaska 2005). A total of 476,824 acres were leased. In 1961, Pure Oil Company received a contract from the State of Alaska to drill three wells in the Nushagak Bay area. The project was abandoned when Pure Oil Company failed in an attempt to land a drilling rig in the area due to icing conditions (State of Alaska 1961).

- **Historic Wells -** The North Aleutian COST #1 well (1983) and the Amoco Becharof #1 well (1985) were drilled in the Aleutian Islands region. The North Aleutian COST #1 well was drilled offshore by ARCO into the Bear Lake Formation, which exhibited good reservoir properties. Approximately 33 feet of coal was also found (Reifenstuhl and Finzel 2005).

  Becharof #1, the nearest well on the Alaska Peninsula to the planning area boundary, is located approximately 30 miles south of the boundary. It was drilled in 1985 by the Amoco Petroleum Company. Significant gas shows were encountered in Tertiary rocks (Reifenstuhl and Brizzolara 2004).

- **Cook Inlet Basin Oil and Gas –** The Cook Inlet region is generally considered as the birthplace of commercial oil and gas production in Alaska. Oil was discovered in the Swanson River oil field in 1957, which provided an important catalyst for the Alaska statehood in 1959. After statehood, a competitive leasing program was established. Since then, over 5.6 million acres of State land have been leased in 40 State oil and gas lease sales in the Cook Inlet region. Prior to Statehood in 1959, the Federal government conducted non-competitive lease sales. About 67,000 acres of the non-competitive Federal leases remain active in the Cook Inlet basin. One competitive Federal lease has been issued to date: a 400-acre parcel. In 1960, annual production rose to 600,000 bbls, and peaked at 83 million bbls in 1970. Industry-related developments include a Unocal ammonia-urea plant in Nikiski, the first oil refinery developed by Tesoro in 1969 near Kenai, and a liquid natural gas (LNG) plant in Nikiski in 1969.

- **History of Locatable Mineral Production –** Known mineral deposits within the Bay planning area that have seen historical production include one deposit of placer platinum, placer gold, and one small mercury lode deposit. Placer platinum mining has historically occurred on the Salmon River near the Goodnews Mining Camp and associated side drainages including Dowery Creek, Squirrel Creek, and Clara Creek. Between 1928 through 1982, an estimated 646,312 troy ounces of platinum were mined from these drainages. Early open cut mining was conducted by draglines/sluice-boxes in the side drainages. In 1937 a large bucket-line dredge was brought in to mine the Salmon River which operated through 1982.

- Placer gold mineralization has been identified and mined in the past but these operations were small and have been inactive for many years. Placer gold mining has occurred in the headwaters of the Arolik River and the Wattamuse/Slate Creek area, north of Goodnews Bay; at Trail Creek, a tributary

of the Togiak River; at American Creek, north of Naknek Lake; and at Portage Creek and Bonanza Creek, north of Port Alsworth. The largest gold placer operation occurred around Wattamuse Creek and associated drainages, where between 1917 through 1947, an estimated 30,041 troy ounces of gold were mined (BLM, 2005 AMS).

- Mercury was discovered at the Redtop Mercury Mine, located on Marsh Mountain north of Dillingham. Production occurred from 1952 to 1959 with a total of approximately 100 flasks (Hudson, 2001a OFR 01-192). Several abandoned mine projects have been conducted at the Redtop Mercury Mine during the last decade, including hazardous waste removal of the retort and contaminated soil at the Redtop Millsite along the Wood River. Additionally, dynamite demolition, and a closure of the main underground adit have occurred at the associated mine site on top of Marsh Mountain (BLM 2005).

- **Omnibus Roads –** Three Omnibus roads were constructed in the Bay planning area.

b) Present and Reasonably Foreseeable Future Development

- **Commercial Fishing –** Commercial fishing in Bristol Bay continues as the key economic driver in the region. Residents in every village in the region participate in the fishery, with members of every community holding set net and drift net limited entry permits.

- **The Oil Industry –** Oil provides approximately 85% of the State of Alaska income, Permanent Fund Dividends to residents, and has resulted in infrastructure development in the Bristol Bay Region.

- **Oil and Gas in Bristol Bay Basin –** Offshore drilling is currently off limits following a 1996 presidential moratorium; however, directional drilling from onshore is authorized (State of Alaska 2004). The moratorium on offshore drilling is in effect until June 30, 2012, but can be revoked by the President prior to that date (Sherwood et al. 2006).

  On Jan. 9 President Bush lifted the moratorium on oil and gas leasing in the North Aleutian planning area, an area that includes the outer continental shelf of Alaska's Bristol Bay and the southeastern corner of the Bering Sea. The president's action should enable the U.S. Minerals Management Service to include two North Aleutian lease sales in its 2007 to 2012 leasing program. (http://www.gov.state.ak.us/archive.php?id=54&type=1)

- **Alaska Peninsula and Nushagak Peninsula Oil and Gas Leasing Program –** On March 17, 2004, ADNR, Lake and Peninsula Borough, Bristol Bay Borough, and Aleutians East Borough signed a Memorandum of Understanding (MOU) in support of oil and gas lease sales and licensing of State land in the Bristol Bay and Alaska Peninsula regions. Similar MOUs were already in place between the ADNR and the Aleut Corporation and the Bristol Bay Native Corporation (State of Alaska 2004).

- **Oil and Gas Exploration Licensing Near Dillingham –** The multi-agency coordination resulted in the State of Alaska initiating an Exploration Licensing area near Dillingham, which originally totaled 329,113 acres, only applicable for lands owned by the State (State of Alaska 2004). Bristol Shores, LLC, the primary interested licensee, was granted a license but let it lapse. In June 2005, Bristol Shores applied for a new license application for a reduced area consisting of 20,154 acres on the east side of Nushagak Bay, south of Dillingham (Petroleum News 2005), with the intent of conducting initial exploration. Currently there is no proposed or pending license in the Bristol Bay license area. Commercial oil finds are unlikely, but the area may contain up to 1 tcf of natural gas (Loy 2004).

- **Oil and Gas Lease Sales -** ADNR held an oil and gas lease sale October 26, 2005, offering 1,047 tracts of 5.8 million acres within the Alaska and Nushagak peninsulas (Decker 2005). Lands offered within the planning area include the lower Nushagak Peninsula and the southern portion of land extending from south of Ekuk eastward to the Kvichak River delta (State of Alaska 2005). About 510,000 acres lie within the Bay planning area boundary, none of which are BLM-managed lands. At

that time, 213,120 acres were leased, none of which were within the planning area. Interest was limited to Port Moller and vicinity, on the lower Alaska Peninsula approximately 200 miles south of the planning area. According to ADNR the next sale for the Alaska Peninsula is scheduled for February 2007 (State of Alaska 2006).

- **Cook Inlet Basin Leasables –** The Cook Inlet basin is currently the only commercially producing oil and gas region in southern Alaska. Between 1997 and 2001, Cook Inlet natural gas production remained relatively stable at an average of 213 Bcf per year.

- **Locatable Mineral Exploration in the Bay Planning Area –** During 2005, the last complete year of information, seven Annual Placer Mining Applications (APMA) and Annual Hardrock Exploration Application (AHEA) were submitted for Locatable Mineral projects located within the Bay planning area. Four lode exploration applications and three placer mining applications were filed (AK DNR 2005). APMAs are currently being submitted for 2006.

- **Lode and Placer Exploration –** Lode exploration projects include the Big Chunk, Kamishak Project, Pebble Copper, and Shotgun/Mose Projects located on State land. One placer mining project on the Arolik River is located on Native-selected land and one location at Salmon River Bench is located on Native land. One placer mining operation on State land includes the Syneeva Creek (Northern Bonanza). There are no lode or placer mining activities on BLM land at this time.

- **Pebble Mine Project –** State lode mining claims are located on the Big Chunk (BC), FUR, GDH, KAK, Pebble Copper, Pebble South, 25 Gold: Sill, 37 Skarn, and 38 Porphyry properties. The Pebble copper-gold-molybdenum-silver deposit is located in the Lake and Peninsula Borough, just north of Frying Pan Lake and 18 miles northwest of Iliamna. The exploration and planning phase of this project is likely to continue for several years, and provides income for lodge and hotel owners in Iliamna as well as jobs for locals.

  In 2004, Northern Dynasty Minerals, Ltd. began a program to collect engineering, environmental, and socioeconomic data required for completion of a Bankable Feasibility Study and submission of permit applications for the Pebble Copper Mine. New finds in 2005 have delayed the permit application submission timeline. Production is not expected to begin before 2010 (Northern Dynasty Minerals Ltd. 2005).

  In conjunction with the mining project, ADOT&PF is examining the feasibility of constructing a 75 mile road from the Pebble Copper mine site to a port site at Iniskin Bay or Williamsport. Draft reconnaissance engineering started in July 2004, and final reconnaissance engineering was to be completed in 2005 (ADOT&PF 2004).

- **Big Chunk (BC) Project –** Liberty Star Gold Corporation conducted a comprehensive exploration project to evaluate copper-gold deposits on state mining claims adjacent to the Pebble Copper Mine deposit (Alaska Minerals Commission 2005).

- **Locatable Mineral Claim Staking –** Mining claims have been staked throughout the Bay planning area for both lode and placer deposits. Extensive claim staking has historically occurred in the Bonanza Hills, Kemuk, Kvichak, Pebble Copper, Shotgun Hills, Sleitat Mountains, Snow Gulch, and Red Top areas. As of January 2005, there were a total of 257 Federal claims covering approximately 10,280 acres and as of December 2005 there were a total of 5,824 State claims and no State prospecting sites covering a total of approximately 232,960 acres (BLM, 2005).

- **Bonanza Creek Area –** State placer mining claims are located on Bonanza Creek and Syneeva Creek. State lode mining claims are located on the Bonanza Hill and Bonanza property.

- **Goodnews Bay/Snow Gulch Area –** State placer mining claims are located on the Arolik River.

- **Iliamna/Kvichak Area –** Federal and State lode mining claims are located on the Iliamna Project, H Block property. State lode mining claims are located on the Iliamna Project, D Block and LSS properties.

- **Kemuk Mountain Area –** State lode mining claims are located on the Kemuk and NAP properties.

- **Platinum Area –** Federal placer mining claims are located on the Salmon River Bench property.

- **Shotgun Hills Area –** State lode mining claims are located on the Shot, Shotgun/Mose, and Win properties.

- **Exploration and Development Activities Bonanza Creek Area –** There are no identified exploration projects reported in the Bonanza Creek area as of 2004 (Szumigala and Hughes, 2005). One APMA placer mining project was submitted for Syneeva Creek for 2005 (AK DNR, 2005).

- **Exploration and Development Activities Goodnews Bay/Snow Gulch area –** There are no identified exploration projects reported in the Goodnews Bay/Snow Gulch area as of 2004 (Szumigala and Hughes, 2005). One APMA placer mining project was submitted for the Arolik River for 2005 (AK DNR, 2005).

- **Exploration and Development Activities Iliamna/Fog Area –** There are no identified exploration projects reported in the Iliamna/Fog area as of 2004 (Szumigala and Hughes, 2005). No APMA or AHEA exploration projects were submitted for 2005 (AK DNR, 2005).

- **Exploration and Development Activities Iliamna/Kvichak Area –** Detailed geophysical survey and core drilling was completed in 2004 on the Iliamna Project H Block by Geocom Resources Inc. Over 3,303 feet of core drilling was completed at four locations outlining a 2,296 by 4,921 foot gold, copper, and molybdenite mineralized zone. At their Iliamna Project, D Block additional geophysical studies were conducted to delineate drill targets (Szumigala and Hughes, 2005). No APMA or AHEA exploration projects were submitted for 2005 (AK DNR, 2005).

- **Exploration and Development Activities Kasna Creek Area –** There are no identified exploration projects reported in the Kasna Creek area as of 2004 (Szumigala and Hughes, 2005). No APMA or AHEA exploration projects were submitted for 2005 (AK DNR, 2005).

- **Exploration and Development Activities Kemuk Mountain Area -** There are no identified exploration projects reported in the Kemuk Mountain area as of 2004 (Szumigala and Hughes, 2005). No APMA or AHEA exploration projects were submitted for 2005 (AK DNR, 2005).

- **Exploration and Development Activities Kijik Lake Area -** There are no identified exploration projects reported in the Kijik Lake area as of 2004 (Szumigala and Hughes, 2005). No APMA or AHEA exploration projects were submitted for 2005 (AK DNR, 2005).

- **Recent Exploration and Development Activities Pebble Copper Area -** Three properties had extensive exploration activities conducted during 2004; Pebble Copper, Big Chunk (BC), and Pebble South. Northern Dynasty Minerals, LTD. conducted comprehensive drilling, base-line environmental and socioeconomic studies to support Federal and State project permit applications. Also, Northern Dynasty conducted site testing and engineering studies for a bankable feasibility study which will be started in 2005. In-fill drilling to upgrade resources to measured and indicated status and to finalize pit design was conducted. During 2004, more than 157,614 feet of core drilling in 227 holes was completed, in-fill drilling totaled 101,539 feet in 122 holes, metallurgical and process drilling totaled 21,335 feet in 26 holes, geotechnical drilling totaled 32,502 feet in 70 holes, and exploration drilling totaled 13,815 feet in 9 holes. A new higher-grade, laterally extensive gold, copper, and molybdenite "East Zone" was discovered on the east side of the "Central Zone" of Pebble Copper. Mineralization has been discovered to a depth of 2,379 feet, and extends beyond to an unknown depth. More

extensive drilling was conducted during 2005. This deposit would be mined by underground methods and is richer than the Central Zone (Szumigala and Hughes, 2005).

Liberty Star Gold Corporation conducted exploration activities on the Big Chunk (BC) property, abutting the northwest corner of the Pebble Copper claims. Airborne magnetic survey, geologic, geochemical, space imagery, and aeromagnetic studies identified 21 anomalous areas. Geological sampling, mapping, and diamond drilling activities were conducted during 2004 (Szumigala and Hughes, 2005).

Full Metal Minerals, Ltd. conducted exploration activities on the Pebble South property, abutting the south side of the Pebble Copper claims. A geological sampling program, geophysics and ground magnetic studies were completed in 2004. Eleven anomalous areas were identified with two high priority targets identified; the Boo and TYP properties (Szumigala and Hughes, 2005).

Two AHEA exploration projects were submitted for the Big Chunk (BC) and Pebble Copper projects for 2005 (AK DNR, 2005).

In 2006 Northern Dynasty Minerals, LTD. conducted comprehensive drilling, base-line environmental and socioeconomic studies to support Federal and State project permit applications. A total of 74,000 feet of core drilling was done with emphasis on determining the overall size and grade of the Pebble East deposit discovery made in 2004. This drilling extended the north-south strike length to over 7,000 feet in which the grades consistently exceed 1% copper equivalent.* The deposit is still open ended to the north and south across a width exceeding 4,000 feet. The discovery of the Pebble East has boosted the inferred mineral resource at the deposit by nearly 90%. This deposit is richer than the Central Zone, but lies at depth would be mined by underground methods.

As of February 2007 the Pebble Deposit has inferred resources, at a 1.0% copper equivalent cutoff, of:

1.4 billion **tonnes grading 1.29% copper equivalent, containing 24.6 billion pounds of copper, 20.9 million ounces gold, and 1.2 billion pounds of molybdenum.

Northern Dynasty has stated that the combined resources at the Pebble Deposit constitute one of the most significant metal accumulations in the world. In 2007 the company plans to focus efforts on Pebble East with an estimated 250,000 feet of drilling to further expand the resource and upgrade the classification of known mineralization (Northern Dynasty news releases, January 23 and February 20, 2007)

*Copper equivalent (CuEQ = Cu% + (Au g/t x 12.86/22.05) + (Mo% x 132.28/22.05)
**tonnes = metric tons.

- **Exploration and Development Activities Platinum Area –** There are no identified exploration projects reported in the Platinum area as of 2004 (Szumigala and Hughes, 2005). One APMA placer mining project was submitted for the Salmon River for 2005 (AK DNR, 2005).

- **Exploration and Development Activities Shotgun Hills Area –** TNR Gold Corporation conducted geological and geochemical exploration programs during 2004. This resulted in acquiring 14,080 acres of new State mining claims. The claims follow a north-south trend from the Main Shotgun Zone and are called the Shot, King, and Winchester areas. New drill targets for 2005 were identified along this zone as well as more extensive drilling of the Main Zone. One AHEA exploration project was submitted for the Shotgun/Mose Project for 2005 (AK DNR, 2005).

- **Sleitat Mountain Area –** There are no identified exploration projects reported in the Sleitat Mountain area as of 2004 (Szumigala and Hughes, 2005). No APMA or AHEA exploration projects were submitted for 2005 (AK DNR, 2005).

- **Construction of the Wood River Bridge –** The Alaska Department of Transportation and Public Facilities (ADOT&PF), with the Federal Highway Administration, have made an Environmental Assessment and Finding of No Significant Impact for the proposed construction of the Wood River Bridge in Alaknagik. The bridge is currently in the design phase, with construction to begin in late 2007 or in 2008 (ADOT&PF 2005).

- **Iliamna Airport Improvements –** The ADOT&PF began a study of ways to improve the Iliamna airport in 2005, including identifying improvement options, preparing engineering and environmental reports, and completing a master plan that outlines short-term (5 years), intermediate (10 years), and long-term (20 year) airport improvements (ADOT&PF 2005).

- **Manokotak Airport Improvements –** The ADOT&PF with the Federal Aviation Administration is proposing improvements to Manokotak Airport in Manokotak. Improvements include expanding the runway, surfacing the entire facility, providing adequate area for snow storage, constructing an apron and taxiway system, installing an airport lighting system and precision approach path indicators and runway end identification lighting, adding two snow removal equipment storage building bays, and extending overhead electrical lines to the new facility. A draft Environmental Assessment was published in July, 2005 (ADOT&PF 2005; FAA 2005).

- **Proposed Naknek River Bridge and Aviation Operations Improvements –** The proposed ADOT&PF project would entail a bridge spanning the Naknek River and connecting the three communities of the Bristol Bay Borough, South Naknek, Naknek, and King Salmon. The bridge would tie into the existing Omnibus road that connects Naknek and King Salmon. A bridge would influence aviation use patterns and the priority of aviation operations, and improvements at the individual airport facilities, some of which had been identified by 2005 and were waiting for funding (ADOT&PF 2005).

- **Near-Term Recommendations for Community Linkages –** In the Transportation Plan, the ADOT&PF recommends five community linkage projects, three of which are in or immediately adjacent to the Bay planning area: Williamsport-Pile Bay roadway improvements; Iliamna-Nondalton road improvements and bridge construction connection; and Dillingham-Aleknagik road improvements and bridge construction connection (ADOT&PF 2005).

- **ADOT&PF Recommendations for Port and Harbor Improvements –** One recommended set of port improvements is Williamsport navigation improvements and dock facility, and Pile Bay dock and boat launch facility. While this is outside the Bay planning area, it is seen as providing an intermodal complement to key transportation infrastructure, some of which would probably be within the planning area (ADOT&PF 2005).

- **ADOT&PF Marked Winter Trail System –** Provides a system of trail markers that permit safe travel by snowmachine between Bristol Bay communities during the winter months (ADOT&PF 2005).

c) Speculative Development

- **ADOT&PF Corridor Delineation –** The purpose of corridor delineation is to recognize the patterns of existing travel and desired travel in the region, and to establish and protect the surface transportation "highways" that would best serve the region's long term social and economic infrastructure needs. The Transportation Plan identifies four primary corridors, three of which are in or immediately adjacent to the Bay planning area: Cook Inlet to Bristol Bay corridor; Alaska Peninsula corridor, and Dillingham/Bristol Bay corridor (ADOT&PF 2005). It is possible that all or segments of these projects may be completed during the life of this plan.

- **ADOT&PF "Triggers" for Planning –** ADOT&PF's Transportation Plan recommends a series of triggers for re-evaluation of lower-priority projects that could lead to their development within the 20-

year period considered by the plan (ADOT&PF 2005). This is dependent on such factors as a dramatic increase in population and increased demand from the economic sector.

3. Resources

a) Cumulative Effects to Soils, Water Resources, Vegetation and Air Quality

(1) Cumulative Effects to Air, Vegetation, Soils, and Water from Minerals

Past and Present Effects to Soils and Vegetation

Past and present effects to soil and vegetation resources would largely result from surface disturbing activities that degrade the vegetative cover, compact soils, and expose ice-rich permafrost soils causing thermokarst erosion and subsidence. Wetland soils, stream bank soils and vegetation; and lakeshore soils and vegetation would be particularly vulnerable due to the increased possibility of additional vegetation loss. Weeds may become more prevalent, along with erosion from seasonal breakup, ice scouring, wave action, and high flow events. Thermokarst erosion could also result from the cumulative effect of seismic and exploration activity when less than ideal snow conditions expose tussock tundra to surface disturbance during winter months. Habitat maintenance and enhancement through adherence to the Required Operating Procedures, Stipulations, and project-specific requirements would normally reduce the unnecessary long-term disturbance to soils.

Cumulative Effects to Soils and Vegetation

Leasables. Based on findings presented in "Present and Reasonably Foreseeable Future Development," limited on-shore oil and gas development would occur on non-BLM lands within this planning period. Therefore, the direct and indirect effects to soils and vegetation presented for each alternative, which include the development of a gas field in the Koggiling block under Alternatives B, C, and D, are an adequate analysis of the cumulative effects of mineral leasing on soils and vegetation.

Locatables. Based on the Reasonably Foreseeable Development Scenario for Locatable and Salable Minerals (BLM, 2006), the following acres of total surface disturbance on non-BLM lands could occur from mining:

- There is expected to be a very high amount of reasonable foreseeable future locatable lode mineral activity in the Pebble Copper area. Future exploration, development, and lode and placer mining activities are expected to continue at eleven lode locations on State land. During the next 20 years mineral related lode activities would result in a disturbance of 6,450 acres for lode exploration and development activities in the Pebble Copper area; 6,400 acres would be a result of activities at the Pebble Copper property.
- There is expected to be a high amount of reasonable foreseeable future locatable lode and placer mineral activity in the Shotgun Hills area. Future exploration, development, and lode and placer mining activities are expected to continue at three lode operations: at the Shot, Shotgun/Mose, and Win properties and one placer operation on the King Salmon River. During the next 20 years mineral related activities would result in a disturbance of 1,311 acres in the Shotgun Hills area; 1,310 acres for lode exploration and 1 acre of placer exploration on State land.
- There is expected to be a moderate to high amount of reasonable foreseeable future locatable lode and placer mineral activity in the Platinum area. During the next 20 years mineral related activities would result in a disturbance of 56 acres in the Platinum area; 10 acres for lode exploration and 46 acres of placer exploration on Native land.
- Other smaller placer and lode developments are anticipated on non-BLM lands throughout the planning area.

These numbers, combined with the highest projected numbers of surface disturbance on BLM lands (115 acres under alternatives B and D) from mining disturbance, total 7,996 acres of projected reasonably foreseeable surface disturbance for all lands within the planning area. Based on the direct and indirect effects described in this Chapter, this represents a significant impact to soils directly disturbed by mining operations. However, the cumulative projected disturbed acreage of 7,996 represents only .03 percent of the total acres in the planning area. Reclamation on both State and BLM lands prescribed in Plans of Operations would help to restore soils and vegetation to pre-mining productivity.

Past and Present Effects to Water

Past and present events and actions that have affected fresh water resources within and adjacent to the Bay planning area have included climate change, mining activities, transportation projects, military activities, industrial and domestic activities and related disposal of hazardous materials, and construction of facilities. Climate change could affect annual precipitation amounts. Future reasonably foreseeable development activities associated with transportation projects and mineral activities may have adverse effects on water quality, although this would depend upon the location and area of activity. Mineral exploration and development can substantially decrease water supply in local aquifers, alter drainage patterns, and degrade the water quality in receiving waters.

Cumulative effects to Water

Leasables. Based on findings presented in "Present and Reasonably Foreseeable Future Development," limited on-shore oil and gas development would occur on non-BLM lands within this planning period. Therefore, the direct and indirect effects to soils and vegetation presented for each alternative, which include the development of a gas field in the Koggiling block under Alternatives B, C, and D, are an adequate analysis of the cumulative effects of mineral leasing on water resources.

Locatables. Cumulative effects to water from placer mining, including small informal projects may include deposition of heavy metals, including concentrations of arsenic and mercury (LaRoche et al. 2006; BLM 2006; Hunerlach et al. 1999; Alpers and Hunerlach 2005; Allan 1995). A problem that has been identified, is determining whether the source of the heavy metal is the mining operation, or whether it occurs naturally in the environment (Mueller and Matz 2002).

The cumulative case assumes exploration and development for all of the planning area. The planning area is comprised of several distinct watersheds or drainages that do not extend into adjacent areas outside the Bay planning area boundary. Therefore, activities involving surface water that are taking place outside the planning area would not be expected to directly impact water resources within the planning area; however, activities affecting surface water within the planning area could also have an effect downstream and in the bays. Additionally, water resources in aquifers which may extend beyond planning area boundaries could be affected by activities polluting or drawing from surface or underground water sources.

The following is a cumulative analysis of the effects and estimated quantity and quality of produced water disposed on the surface and estimated amount of surface water needed, by locatable mineral potential areas within the planning area:

Goodnews Bay/Snow Gulch area: Lode exploration at the Tatlignagpeke Mountain and Miltak Mountain locations on State-selected land and the Wattamuse-Granite Lode location on Native-selected land may result in some surface disposal of water required for drilling and short term camp facilities. Other disposal options are sometimes available, such as injection to a subsurface reservoir or removal from the location; otherwise, it may be locally disposed after appropriate treatment for contaminants. Operations would be required to meet applicable Federal and State water quality standards for permitting.

Water use for placer mining on Barnum Creek, Domingo Creek, Faro Creek, Jacksmith Creek tributary, and Slate Creek on State-selected land; and on the Arolik River, Malaria Creek, Snow Gulch, Tyone Creek, and Wattamuse Creek locations on Native-selected land would be limited to the amount put

through a gravity separation process (500 gallons per minute, possibly recycled; 38 million gallons based on seven working hours each of 180 days), for surface disposal of non-recycled water. An additional 9,000 to 18,000 gallons would be required for domestic purposes annually at each location, but disposal must meet applicable Federal and State water quality standards for permitting.

***Iliamna/Fog area*:** Lode exploration at the Dutton, Easy, Karen, and Meadow locations on State-selected land and the Duryea and Ground Hog locations on Native-selected land may result in some surface disposal of water required for drilling and short term camp facilities. Other disposal options are sometimes available, such as injection to a subsurface reservoir or removal from the location; otherwise, it may be locally disposed after appropriate treatment for contaminants. Operations would be required to meet applicable Federal and State water quality standards for permitting.

Water use for placer mining on Unnamed (west of Chetok) on Native-selected land would be limited to the amount put through a gravity separation process (500 gallons per minute, possibly recycled; 38 million gallons based on seven working hours each of 180 days), for surface disposal of non-recycled water. An additional 9,000 to 18,000 gallons would be required for domestic purposes annually at each location, but disposal must meet applicable Federal and State water quality standards for permitting.

***Iliamna/Kvichak area*:** Lode exploration at the Iliamna Project, D Block; Iliamna Project H, Block; and LSS 1-3 locations on State-selected land may result in some surface disposal of water required for drilling and short term camp facilities. Other disposal options are sometimes available, such as injection to a subsurface reservoir or removal from the location; otherwise, it may be locally disposed after appropriate treatment for contaminants. Operations would be required to meet applicable Federal and State water quality standards for permitting.

***Kasna Creek area*:** Lode exploration at the South Current Creek and Upper South Current Creek locations on Native-selected land may result in some surface disposal of water required for drilling and short term camp facilities. Other disposal options are sometimes available, such as injection to a subsurface reservoir or removal from the location; otherwise, it may be locally disposed after appropriate treatment for contaminants. Operations would be required to meet applicable Federal and State water quality standards for permitting.

***Kemuk Mountain area*:** No lode or placer mineral activities will occur on BLM, State-selected, or Native-selected land. Operations would be required to meet applicable Federal and State water quality standards for permitting.

***Kijik Lake area*:** Lode exploration at the Dick's Lode, Gull, and Kijik Mountain locations Native-selected land may result in some surface disposal of water required for drilling and short term camp facilities. Other disposal options are sometimes available, such as injection to a subsurface reservoir or removal from the location; otherwise, it may be locally disposed after appropriate treatment for contaminants. Operations would be required to meet applicable Federal and State water quality standards for permitting.

Water use for placer mining at the Bertha M. location on Native-selected land would be limited to the amount put through a gravity separation process (500 gallons per minute, possibly recycled; 38 million gallons based on seven working hours each of 180 days), for surface disposal of non-recycled water. An additional 9,000 to 18,000 gallons would be required for domestic purposes annually at each location, but disposal must meet applicable Federal and State water quality standards for permitting.

***Pebble Copper area*:** Lode exploration at the Hill 1759 location on Native-selected land may result in some surface disposal of water required for drilling and short term camp facilities. Other disposal options are sometimes available, such as injection to a subsurface reservoir or removal from the location; otherwise, it may be locally disposed after appropriate treatment for contaminants. Operations would be required to meet applicable Federal and State water quality standards for permitting.

The proposed Pebble mining project is located within the planning area on lands managed by the State of Alaska. This site is located in the headwaters of North Fork and South Fork Koktuli River. Each of these

rivers converges to connect with the Mulchatna River, to the Nushagak River, and eventually draining into Nushagak Bay. Though no BLM lands exist within the Koktuli River watershed, Native-selected lands exist within the lower Mulchatna River and large blocks of BLM and State- and Native-selected lands exist throughout the Nushagak River drainage (not bordering the Nushagak River). Pollutant discharges emitted from the proposed Pebble mine would be expected to meet State and Federal water quality regulations for the North Fork and South Fork Koktuli Rivers. Additional contributions of pollutants throughout the watershed, all meeting water quality discharge standards, may cumulatively exceed water quality standards. Potential waste water discharge occurring from activities on all lands within the greater Nushagak River drainage would be managed by the State of Alaska.

***Platinum area*:** Water use for placer mining at the Salmon River location on Native land would be limited to the amount put through a gravity separation process (500 gallons per minute, possibly recycled; 38 million gallons based on seven working hours each of 180 days), for surface disposal of non-recycled water. An additional 9,000 to 18,000 gallons would be required for domestic purposes annually at each location, but disposal must meet applicable Federal and State water quality standards for permitting.

Shotgun Hills area: No lode or placer mineral activities will occur on BLM, State-selected, or Native-selected land. Operations would be required to meet applicable Federal and State water quality standards for permitting.

All of the mineral activities in the Shotgun/Mose area are located on State land.

***Sleitat Mountain area*:** No lode or placer mineral activities will occur on BLM, State-selected, or Native-selected land. Operations would be required to meet applicable Federal and State water quality standards for permitting.

Other cumulative impacts to water

Leaky underground storage containers may provide contamination to ground water resources which may ultimately contribute to surface water contamination. The State of Alaska DEC Division of Spill Prevention and Response provides records for contaminated sites and leaking underground storage tanks for communities within the planning area that have the potential to affect water, soil, and vegetation. Table 4.7 probably does not represent a comprehensive list of all such sites in the planning area. It is probable that many sites have not yet been identified.

Table 4.7. State of Alaska DEC Division of Spill Prevention and Response Contaminated Sites by Community (ADEC 2006)

Community	Number of Contaminated Sites Identified	Number of Leaking Underground Storage Tanks Identified
King Salmon	49	9
Naknek	2	3
South Naknek	0	0
Iliamna	12	3
Nondalton	2	0
Pedro Bay	1	0
Manokotak	1	0
Aleknagik	1	0
Clark's Point	0	0
Dillingham	4	8
Ekwok	0	0
Goodnews Bay	0	0
Platinum	1	0
Igiugig	0	0
Kokhanok	0	0
Koliganek	1	0
Levelock	0	0
New Stuyahok	0	0
Newhalen	2	0
Port Alsworth	0	0
Portage Creek	0	0
Togiak	0	0
Twin Hills	1	0
Quinhagak	2	0

In addition to water quality impacts, consumptive uses of water for industrial and municipal purposes may impact surface and/or ground water supplies. Impacts from consumptive uses may include altered in-stream flow regimes and alterations or degradation of riparian vegetation.

Hydrocarbon Contamination

With reference to Table 4.7, a number of contaminated sites already exist in the planning area. The greatest concentration is in and around King Salmon. It is related to historic activities at the King Salmon Air Force Base and the King Salmon Airport. Red Fox Creek, located near King Salmon on State land, is the only EPA/Alaska DEC recognized impaired (for hydrocarbons) water body within the planning area. The aquifer in this area has also been affected, but it is not known to what extent the contaminants are hydrocarbons. The size and depth of this aquifer has not been mapped.

Because there have been no oil and gas exploration or development activities in the planning area, there have been no spills related to these activities. Other types of oil and fuel spills, if they have occurred, have been small, and have occurred in conjunction with other small-scale activities, generally taking place in and around the villages. Due to the minor degree of potential for oil and gas exploration and development in the planning area during the life of this plan, the potential for development–related oil or fuel spills to occur is considered to be low during the life of this plan. Effects to air, vegetation, soils and water would be the same as described in Section II.b. Direct and Indirect Effects for Air Quality, Soils, Vegetation and Water, and will not be repeated here.

Past and Present and Cumulative Effects to Air Resources

Past and present effects of air quality impacts may result from the emissions of hydrocarbons and by-products of combustion. Airborne particulates from fire, mining activities, OHV use, and road construction may cumulatively result in both long-term localized and short-term regional impacts to air quality and potential water quality from atmospheric deposition. These impacts may be regionally additive (e.g., increased concentrations of specific pollutants) or synergistic (e.g., chemical reactions that form ozone), and could degrade air quality. Ambient air quality in the Goodnews Bay – Bristol Bay region is relatively pristine.

The proposed Pebble mine is a large project that may provide an opportunity for air quality degradation from mining operations, infrastructure development, and access/road development. Proposed road construction for support of Pebble mining operations intersects Native-selected lands. Any permitted activities occurring on BLM lands during time of road construction will provide cumulative impacts to air quality.

Arctic haze is a phenomenon resulting from elevated concentrations of fine particulate matter found over the Arctic, primarily in winter and spring. Scientists believe that most of the pollutants contributing to Arctic haze are from combustion sources in Europe and Asia. Particulates from burning coal include mercury, arsenic, chromium, and selenium; those from oil combustion contain nickel and vanadium (AMAP 1997). It is not known to what extent local sources in Alaska contribute to Arctic haze in the southwest Alaska region. No major degradation of air resources as a result of any of the proposals in this plan is expected during the life of the plan.

Adherence to Required Operating Procedures, Stipulations and project-specific requirements, limitations on OHV use, and activity planning for BLM lands would protect air resources and keep impacts from a minor to moderate level. The fact that there is no forestry program, and based on a reasonably foreseeable projection of low level mineral development and low to moderate recreation use on BLM lands within the planning area during the life of this plan, the contribution to cumulative effects on soil, water, air, and vegetation resources from these activities is projected to be low.

(2) Cumulative Effects to Air, Vegetation, Soils, and Water from Lands and Realty Actions

Privatization of State or Native Corporation lands has the potential to open up areas to private development. After the land conveyance process is completed, BLM would seek to consolidate remaining unencumbered lands through land exchanges. The anticipated level of development would remain low during the life of this plan.

(3) Cumulative Effects to Air, Vegetation, Soils, and Water from Recreation

Direct and indirect effects as described in this chapter from Recreation on BLM lands, combined with the effects on other lands, would not have a significant impact on Soil, Water, Vegetation, or Air resources in the planning area. This assumption is based on the fact that recreation use throughout the planning area, on all lands, is dispersed. Recreation opportunities are not easily accessible in the planning area; consequently recreation use levels are relatively stable and are expected to remain that way.

(4) Cumulative Effects to Air, Vegetation, Soils, and Water from Travel Management

Alternatives A and B would not attempt to limit OHV use on BLM lands. Under these management scenarios, OHV use on all lands would continue unmanaged, which would result in a gradual extension of impacts as described in direct and indirect effects. Effects would include vegetation removal and compaction, soil compaction and shearing, soil subsidence where permafrost is present, trail braiding, and very localized increases of sedimentation at stream crossings. Because of the remote nature of the BLM lands in the planning area and limited amount of OHV use, these impacts cumulatively would not cause significant water quality degradation, alteration of drainage systems, or habitat damage.

Alternatives C and D would limit OHV use on BLM lands. This in combination with any OHV management on other lands would decrease the level of negative impacts described above.

b) Cumulative Effects related to Climate Change

Climate trends over the last three decades have shown considerable warming (USDA 2004; UAF 1999; AMAP 1997). This has already led to major changes in the environment and in Alaska's ecosystems. Alaska has experienced the largest regional warming of any state in the U.S., with a rise in average temperature of about five degrees Fahrenheit since the 1960s and eight degrees Fahrenheit in winter (UAF 1999). This has led to extensive melting of glaciers, thawing of permafrost and reduction of sea ice (UAF 1999).

Alaska's warming is part of a larger warming trend throughout the Arctic. The warming has been accompanied by increases in precipitation of roughly 30% between 1968 and 1990 in some areas. Other areas have experienced drying (UAF 1999). Projections suggest that the strong warming trend will continue, particularly warming during the winter months (UAF 1999). Some anticipated changes in weather patterns include intensification in the Aleutian low-pressure system, which may shift slightly southward. Alaska would then continue to grow wetter, with annual precipitation increases of 20-25% in the north and northwest, but little change from present conditions in the southeast. Winters are anticipated to be wetter in the east and drier in the west, with summers being drier in southeast Alaska and wetter elsewhere. Winter soil moisture changes with precipitation, but summer increased evaporation from a warmed climate exceeds any projected increases in precipitation, and soils are dry everywhere (UAF 1999).

Tree growth in the boreal forest depends on temperature and precipitation. Boreal forests may be at risk from climate change associated with regional warming. Potential impacts may include decreases in effective moisture sufficient for forest growth, tree mortality from insect and disease outbreaks, probability of an increase in wildland fires, changes caused by permafrost thawing and invasion of trees, shrubs and other plant species that are adapted to the new conditions (USDA 2004; UAF 1999).

Regional environmental changes are observed to be impacting the entire Bay planning area, including coastal areas. Another predicted result of climate change is a shift in vegetation. Projections are that the amount of tundra would shrink to its lowest extent in at least the last 21,000 years (ACIA 2004). Mosses and lichens are among the groups expected to decline as warming increases (ACIA 2004). The timeframe of these shifts will vary. Where suitable soils and other conditions do not exist, changes are likely a century away. However, significant changes in Arctic communities over the past few decades have already been documented (Sturm et al. 2001). The reduced sea ice along Alaska's coasts and a rising sea level are rapidly eroding the coastal soil. These are natural processes, but should be monitored on BLM-managed lands for effects on a wide variety of resources.

Changes in permafrost and resulting changes in lakes due to global climate change may negatively affect waterfowl. Shrinking pond surface areas could become a common feature in the discontinuous permafrost regions as a consequence of warming climate and thawing permafrost (Yoshikawa and Hinzman 2003).

Because climate change must be viewed from a global perspective, the magnitude of emissions potentially contributed by any proposed activities in the planning area need to be viewed in that context. Activities associated with oil and gas or mineral exploration and development, recreation, or prescribed burning would produce some greenhouse gases. The incremental contribution of greenhouse gases from the proposed alternatives in the planning area would be minor when compared to global greenhouse gas contributions. The Required Operating Procedures (Appendix A) allow for changes in project design in response to changing environmental conditions.

c) Cumulative Effects to Fisheries

(1) Cumulative Effects to Fisheries and Aquatic Habitat from Minerals Activities

Leasable. Based on findings presented in Reasonably Foreseeable Future Development, limited on-shore oil and gas development would occur on non-BLM lands within this planning period. Therefore, the direct and indirect effects to fisheries presented for each alternative, which include the development of a gas field in the Koggiling block under Alternatives B, C, and D, are an adequate analysis of the cumulative effects of mineral leasing on fish and fish habitat.

Locatable. Direct and indirect effects to fisheries and aquatic habitat from locatable mineral development are discussed earlier in this Chapter. This analysis presents a range of alternatives for locatable mineral development on BLM-managed lands. Alternatives B and D anticipate the most development, estimated at 115 acres of surface disturbance. BLM's Reasonably Foreseeable Development Scenario (RFD) describes anticipated surface disturbance on an additional 7,881 acres on State or Native lands within the planning area. Cumulative effects to fisheries would be dependent on the exact location of the anticipated development and the type of mining that would occur. The RFD for locatable minerals projects the greatest level of surface disturbance to be in the Pebble Copper and Shotgun Hills areas, mostly on State lands. These areas are projected to be mined using open pit methods, which generally include the mine pit, overburden and waste rock piles, tailings impoundment, a mill and facilities location, and associated roads. Remote Alaskan sites may include an employee camp, electrical generation plant, airfield, marine terminal, and road between the mill and the terminal that may be some distance.

In general, loss of riparian vegetation associated with such a mining operation would likely cause accelerated stream bank soil erosion resulting in impacts to water quality. Excessive sedimentation could cover fish eggs, resulting in die-off. This die-off of eggs could have population impacts to fisheries. Chemical pollution of aquatic habitat can have significant impacts to fisheries, particularly in anadromous fish populations. The impacts of multiple, small inputs of chemical pollution may be compounded further downstream. Spawning fish, though only for a short time, may be exposed to chemical pollution even though no pollutant concentrations are found in their destination water bodies. A longer exposure of time may result for species whose spawning grounds are impacted by pollutants, resulting in deformities, kills, or bioaccumulation of contaminants. Effects of water withdrawal from lakes and rivers for industrial uses may be intensified by climate change.

A continuation of current water and land use practices by private, State, and other Federal agencies would continue to affect fish habitat within the planning area. Higher intensity mineral development or exploration on lands upstream from BLM lands within a watershed could continue to be a concern due to sediment and water quality issues that influence the quality of fish habitat downstream from the source.

A large open pit mine such as those anticipated for the Copper Pebble and Shotgun Hills areas on State lands could have significant direct and indirect impacts to fish habitat in specific streams. Cumulatively, the anticipated surface disturbance on BLM lands, even under the most aggressive development scenarios under Alternatives B and D, would have little effect compared to the direct and indirect effects on State lands.

(2) Cumulative Effects to Fisheries from Travel Management

Alternatives C and D manage Off Highway Vehicles more intensely by limiting them to existing or designated trails and by implementing a 2,000-lb weight limit. Direct and indirect effects of these actions on fisheries and aquatic habitats are described earlier in this chapter. Cumulatively, OHV use on private or State lands in the area, if unmanaged, could result in localized adverse effects to fisheries and aquatic habitats, particularly at stream crossings.

Under Alternatives A and B, OHVs would be left unmanaged, allowing trail proliferation and associated impacts to fisheries to continue. This in combination with OHV use on private or State lands in the area, could result in significant localized adverse effects to fisheries and aquatic habitats.

d) Cumulative Effects to Wildlife

(1) Cumulative Effects to Wildlife from Minerals Activities, Travel Management, and Recreation

Future leasable mineral activities projected for the Koggiling Creek Planning Block, current and potential locatable mining within the Goodnews Bay/Snow Gulch and on State and Native managed lands throughout the planning area, combined with hunting, and climate change would have cumulative impacts on caribou. Depending on the location of development, these impacts could include: short or long-term disturbance to caribou insect relief habitat and migratory routes; disruption of caribou movements; stress and disturbance impacts to caribou during all seasons of the year; and possible reductions in herd productivity. Because caribou population size fluctuates naturally over time, it is difficult to determine if effects are accumulating at the population level, or just reflect natural shifts in population numbers.

Any new development as considered under Alternatives B, C, and D in combination with projected mineral development on State and Native lands, would result in additive impacts to caribou herds. If significant activity occurred within the calving grounds or crucial insect relief habitat, these impacts could be significant).

Within the Goodnews Bay/Snow Gulch area, much of the land is ANILCA 906(e) Top Filed land (61,105 acres) by the State, meaning it becomes State-selected land upon lifting of ANSCA 17(d)(1) withdrawals. Selected lands are segregated from mineral entry and leasing until such time as the lands are relinquished or conveyed. Therefore, no new mineral activities would occur over the short-term. If conveyed, mineral exploration or development could be authorized by the new land owner. According to the RFD for locatable minerals, 23 acres of disturbance is expected under Alternatives A, 43 acres in Alternative C, while 115 acres of disturbance is anticipated under Alternatives B and D, none of which would occur on unencumbered BLM lands. Some BLM lands may see increases in wildlife species due to mineral development on State and Native lands and a low occurrence with a less likely development scenario for BLM lands. This could potentially occur due to locatable mineral activities associated with the Pebble/Copper, Kemuk Mountain, and Goodnews/Snow Gulch areas.

Development of connecting transportation corridors would open the planning area to additional hunters, thereby increasing the duration of habitat fragmentation and alteration of behavior or movement patterns of wildlife. Construction of major road projects within the life of the plan would be dependent upon social and economic conditions and it is not clear which of these projects would be completed within the life of this plan. Those projects connecting two or three local communities are farther along in planning than those proposing to connect the Bristol Bay area with Anchorage, for example.

Should leasable or locatable mineral projects go forward during the life of the plan, temporary and/or long-term influxes of people could be expected, increasing the hunter pool and affecting wildlife species, especially big game animals. The activities with the greatest potential for cumulative effects to wildlife are mineral development in the Bristol Bay region and attendant infrastructure development, which would likely occur in sensitive habitat areas for the Mulchatna Caribou Herd, moose, brown bears, and migratory waterfowl species.

e) Cumulative Effects to Special Status Species

(1) Special Status Plants

Only one Special Status plant species is known to occur on BLM lands in the planning area. The widely scattered nature of Special Status plant populations and incomplete knowledge of their distribution and range complicate efforts to predict cumulative impacts. However, current and potentially increased levels of mining and mineral leasing development on State and private lands, combined with the potential for such development on BLM lands, could result in cumulatively adverse effects on Special Status plants and habitats over the long term. Dispersed recreation activities, including gradual increases in amounts and frequency of Off Highway Vehicle travel, remote landing sites for bush aircraft, temporary campsites,

and hiking may have minor adverse and cumulative impacts to sensitive plants and habitats on BLM lands. However, it is unlikely that anything other than lode mining in the Goodnews Bay Block would affect the sensitive *Smelowskia pyriformis*, or pear-fruited smelowskia. Tatlignagpeke Mountain has both habitats for the smelowskia and known lode mineral occurrences.

(2) Special Status Fish

There are no known Special Status fish species in the planning area.

(3) Special Status Wildlife

The widely scattered nature of Special Status Wildlife populations and incomplete knowledge of their distribution and range complicate efforts to predict cumulative impacts. Potentially increased levels of all types of mineral exploration and development on State, Native Corporation, and BLM lands could result in cumulative, adverse effects on Steller's eiders and their habitats over the long term. The exploration and development of one gas field, six exploratory wells (each disturbing approximately six acres), one seismic survey every five years (total of 250 miles) in the Koggiling creek planning block under Alternatives B, C, or D would result in minimal addition to cumulative impacts to these species due to the transient nature of their presence in this part of the planning area.

f) Cumulative Effects to Fire Management and Ecology Resources

Under the current fire management strategies being implemented across the planning area, there are few if any anticipated cumulative impacts on BLM lands. Wildland fire management is accomplished on an interagency basis and across administrative boundaries.

g) Cumulative Effects to Cultural Resources

Cumulative impacts to cultural resources could occur through incremental degradation of the resource base from a variety of sources which reduce the information and interpretive potential of historic and prehistoric properties, or which affect traditional cultural values important to Native Alaskans. Much of the anticipated development within the planning area would occur on non-Federal lands that are not covered by Federal cultural resource laws. As a result, there could be losses to the regional resource base that could potentially limit management options within the planning area.

h) Cumulative Effects to Paleontological Resources

Cumulative impacts to paleontological resources in the planning area could result from development on non-BLM lands as well as BLM lands, and from natural agents and unauthorized uses throughout the area.

i) Visual Resources

Continued development of Off-Highway Vehicle trails, roads, mining activities and associated infrastructure development, and wildland or prescribed fire could lead to changes to existing visual resources by altering basic visual elements of form, line, color, and texture at the landscape level. These changes will influence the design of similar projects on adjacent BLM lands where repeating these basic elements is an objective of the Visual Resource Management class. However, the VRM Class is not likely to change during the life of this plan.

4. Resource Uses

a) Cumulative Effects to Forest Products

There currently is no forest products program due to a lack of forests, lack of trees appropriate for commercial market, remoteness of the few trees that are located on BLM lands in the planning area, and lack of infrastructure to transport trees to market. It is unlikely that the situation will change during the life of this plan; therefore, there would be no impacts to a forest products program.

b) Cumulative Effects to Minerals

Leasable Minerals. The cumulative impacts to oil and gas resources would be the removal of the resources by producing wells on leases with the fewest restrictions and lowest operating costs. Production of oil and natural gas from one geologic reservoir would not affect the recovery of oil and/or natural gas from other geologic reservoirs. The production of natural gas and oil is a beneficial, irretrievable commitment of the resource, as the produced natural gas or oil no longer would be available for future use. The amount of oil, gas, or heat produced would vary depending on the number of wells drilled in the field and the ability to recover the resource.

The cumulative impact to Federal leases would be a reduction in lease value resulting from the application of stipulations and regulations. The cumulative impacts to lease developments would result from a reduction in wells drilled on leases encumbered with stipulations, an increase in wells drilled on leases with minimal constraints, and an increase in operating costs because of land use decisions, lease stipulations, and regulations. Restrictions on Federal leases could impact the leasing and development of adjacent non-Federal leasable minerals. If an exploration company cannot put a Block of leases together because of restrictions on Federal leasable minerals, the private or State minerals may not be leased or developed either. Leasing of Federal minerals on the other hand, could encourage the leasing of private or State minerals.

Oil and natural gas activities could be located in parts of the planning area where other mineral resources are mined or potentially could be mined. However, the production of oil and natural gas resources is not expected to be a significant impact on other mineral resources within the planning area. A potential conflict exists between coal and CBNG. Should coal resource development precede CBNG development in a specific area, the biogenic gas would be displaced. Similarly, if CBNG were to occur first, coal development would be delayed which could affect economics. The long-term aerial extent of the Reasonably Foreseeable Development Scenario (RFD) (e.g., the acreage affected) for petroleum activities is small relative to the planning area. After abandonment of the facilities and wells, exploitation of the other minerals still can occur.

Cumulative impacts would be greatest under Alternatives B and D, as no leasing will occur in Alternative A, and leasing would be less in Alternative C. Under Alternatives B, C and D, larger acreages of fluid mineral estate would be made available due to the revocation of ANCSA (d)(1) withdrawals. However, exploration and development are not readily anticipated on BLM lands as indicated by the low and very low development potential assigned to the resource locations in the RFD. Lands with the greatest resource potential are in ownership by other entities or on State- or Native-selected lands. In the case of selected lands, mineral activity will be delayed by segregation until the ownership status can be finalized. If conventional or coalbed resource development were to occur, the market would likely be local as indicated in the RFD.

Roads resulting from mineral exploration and development or community support would add infrastructure to a region largely without cost and could increase interest in exploration on BLM lands by reducing logistics costs. However, these types of benefits to industry could be offset by restrictions. An area on the cusp of showing economic development could become non-profitable by imposing restrictive guidelines. This would result in the displacement of mineral activities to adjacent landowners.

Locatable Minerals. Impacts to the Locatable Minerals program that are individually minor may cumulatively reduce exploration and production of commodities from public lands. Factors that effect mineral extraction and prospecting include, but are not limited to, permitting and permitting delays, regulatory policy, public perception and concerns, travel management, transportation, mitigation measures, proximity to sensitive areas, low commodity prices, taxes, and housing and other necessities for workers. BLM has no control over many of these issues. Most result in additional costs and/or permitting delays that could individually or cumulatively add additional costs to projects.

Public land with no access could reduce the amount of mineral exploration and development that may occur. Mineral resources in other ownership may not be developed if the adjacent public lands are withdrawn from mineral entry. The deposit may not be economically feasible to develop if it crosses multiple ownerships and only a portion is available for development.

Overall, Alternative A would be the most restrictive to mineral developments. Existing ANSCA 17(d)(1) withdrawals, specific to closure to mineral entry, would be retained. The next most restrictive would be Alternative C, which would revoke ANSCA 17(d)(1) withdrawals but would recommend two Areas of Critical Environmental Concern and propose three Wild and Scenic River segments.

Salable Minerals (Mineral Materials). Under Alternative C, the closure of two ACECs to sale/permit of mineral materials would essentially close a majority of BLM lands in the planning area to mineral materials development and production.

c) Cumulative Effects to Travel Management and Recreation

The planning area currently provides and would continue to provide a diversity of recreation experiences, regardless of the Alternative selected. The greatest influence on recreation experience within the planning area is the use of Off-Highway Vehicles (OHVs). Without management and some limitations on OHV use, the general trend in OHV-accessible topography, is for recreation experiences to trend toward semi-primitive motorized and Roaded Natural experiences. However, most of the planning area is dominated by steep topography, wetlands, dense vegetation, and remote settings with no road infrastructure, making it inaccessible to most OHVs, unless they are flown in to a destination. These areas provide for primitive and generally inaccessible recreation experiences except by aircraft or by boat, regardless of which Alternative is selected. Under Alternative C, river segments would be proposed for WSR inclusion. As a result, recreation opportunities could increase within the area of these rivers.

d) Cumulative Effects to Renewable Energy

No cumulative impacts to renewable energy are anticipated under any Alternative.

e) Cumulative Effects to Special Designations

(1) Areas of Critical Environmental Concern

A wide range of cumulative effects could occur to the variety of resources intended to benefit from designation of one or two Areas of Critical Environmental Concern in Alternatives C and D. These impacts would derive mostly from actions that are not guided by BLM management decisions, such as mineral development on State or Native lands adjacent to designated ACECs. Management within certain ACECs could be significantly diminished by cumulative impacts should numerous development projects occur either inside or immediately outside the boundaries of the ACEC. Under all actions, Alternatives B, C, and D, ANSCA 17 (d)(1) withdrawals would be lifted and all ANILCA 906(e) Top Filed land adjacent to the proposed Carter Spit ACEC would become State-selected, closing these lands to new mineral activities until conveyance occurs or selection becomes relinquished. Once an action is

taken regarding the land status of Top Filed lands, new mineral activities could be authorized which may impact water, vegetation, wildlife, Special Status Wildlife, and subsistence within the proposed Carter Spit ACEC.

(2) Wild and Scenic Rivers

No cumulative impacts to the rivers considered for Wild and Scenic River designation are anticipated under any Alternative. The determination of suitability for these rivers is a BLM determination and analyzed within the range of alternatives. Direct and indirect effects to these river areas have already been discussed in other portions of this chapter.

f) Cumulative Effects to Social and Economic Conditions

The global salmon industry will eventually affect the salmon industry in Bristol Bay. Salmon harvests have remained relatively stable in the last thirty years, but the value has decreased. Data reported in the Alaska Economic Trends article, The Global Salmon Industry (Gilbertson 2003) show decreasing value of salmon harvest. Although the fishery is healthy in Bristol Bay, it is forecast that participation in commercial fishing may drop in future years. The global salmon farming industry is displacing wild caught fish. Local and statewide revenue and employment in this industry may weaken as a result. Fish tax collected by the borough(s) could diminish.

The recreation industry will continue to be a positive input into the local and state economy. Recent studies report spending on recreation of over $90 million in 2005, and fulltime equivalent employment of over 1,300 persons. (Duffield, 2007) The McDowell Group reported statewide effects of tourism including total direct and indirect spending of $2.6 billion, employment 30,700 direct and indirect jobs, and $640 million in total direct and indirect visitor related earnings. McDowell, 2006)

Pebble Prospect is the significant mineral potential in exploration in the Bristol Bay region. The McDowell Group reported that Pebble provided 441 jobs to Alaska, including 21% local hire and 26% native hire. (McDowell, 2006) Although the Pebble mine is not yet licensed, income and employment for regional and state individuals and businesses are likely to continue. Mining activity in other parts of Alaska, continues to provide jobs, and revenue, as well as other benefits by agreement. A construction labor force of up to 2000 is forecast for Pebble.

Oil and Gas may be explored and developed in Bristol Bay Basin, either offshore, on the Alaska Peninsula or Nushugak Peninsula. There is state licensed activity on the Alaska Peninsula. This will add employment and income to the state, and eventually could involve local residents. The Lake and Peninsula or Aleutians East Boroughs may be able to collect revenue either from distribution of state revenues or from property tax.

The onshore and offshore oil industry in and near Prudhoe Bay is anticipated to decline. An authoritative source, DOE's Energy Information Administration (U.S. Dept. of Energy, 2001a), projects North Slope oil production to decline from 1.084 million barrels per day (MM bpd) in 2005 to 0.208 MM bpd in 2034. This decline encompasses oil exploration, development, production and associated direct employment.

Employment for oil workers on the North Slope is projected to decline from recent numbers. Total NSB employment exclusive of oil workers in 1998 was 4,651. 1998 NSB employment in mining (assumed to be all oil employment) was 4,753 workers. Of these, 70% (3,329) reside in the rest of Alaska outside the NSB, primarily in Southcentral Alaska and Fairbanks. The total of all workers in Southcentral Alaska and Fairbanks in 2002 was 284,000. In addition to the North Slope workers who reside in Southcentral Alaska and Fairbanks, additional workers commute to residences outside the State. As much as 30% of the North Slope work force, classified as oil and gas workers, commutes to locations outside the State. However, the workers commuting to residences outside the State would not generate economic effects of indirect and induced employment or expenditure of income in the State and would have a negligible effect on the economy of the rest of the U.S.

Without new oil and gas development, associated indirect employment in Southcentral Alaska, Fairbanks, and the North Slope Borough (NSB), and revenues to the Federal, State, and NSB governments are also anticipated to decline. From 1975-1995, Alaska's fluctuations in economy directly tracked fluctuations in oil prices and to other industry factors (McDowell Group, Inc., 1999b). Even though the Alaskan economy currently is not nearly as dependent on the oil sector as it was in the mid-1980's (when a major crash in the Alaska economy occurred), additional oilfield development in any region would generate employment, economic opportunity, and benefits to the cash economy of Alaska.

In addition to the North Slope workers who reside in Southcentral Alaska and Fairbanks, additional workers commute to residences outside the State. As much as 30% of the North Slope work force, classified as oil and gas workers, commutes to locations outside the State. However, the workers commuting to residences outside the State would not generate economic effects of indirect and induced employment or expenditure of income in the State and would have a negligible effect on the economy of the rest of the U.S. Total NSB employment exclusive of oil workers in 1998 was 4,651. The projected employment for workers on the North Slope residing in Southcentral Alaska and Fairbanks is in comparison to 1998 NSB employment in mining (assumed to be all oil employment) of 4,753. Of these, 70 percent (3,329) reside in the rest of Alaska outside the NSB, primarily in Southcentral Alaska and Fairbanks. Employment projections can also be compared to the total number of workers in Southcentral Alaska and Fairbanks in 2002 (284,000).

Cumulative effects of oil and gas development and production are addressed in other recent documents, including the Northwest National Petroleum Reserve-Alaska IAP/FEIS (USDOI 2003), and in the Alpine Final Development Plan FEIS (USDOI 2004). These are herein incorporated by reference.

BLM management of mineral resources, including oil and gas leasing, and metaliferous mineral exploration, recreation resources, and fisheries is not expected to contribute to cumulative effects to the regional economy. Only potential exploration for natural gas, prospectively near Dillingham, and a small amount of additional placer or lode mining, likely near Goodnews Bay, is expected to contribute to employment and income in the planning area.

g) Cumulative Effects to Environmental Justice

Alaska Natives are the predominant residents of southwestern Alaska, the area potentially most affected by activities under Alternative B, C, and D and other activities associated with cumulative projects in Alaska. Effects on Alaska Natives could occur because of their reliance on subsistence foods, and potential effects could impact subsistence resources and harvest practices. Potential cumulative effects from noise, disturbance, and oil spills on subsistence resources and harvest practices and socio-cultural patterns would focus on communities throughout the planning area.

It is acknowledged that cumulative socio-cultural impacts have occurred on the North Slope and that regional culture has undergone a noticeable change. The influx of money from wage employment has added benefits and raised the standard of living, but has also given rise to an array of social pathologies, including increased alcoholism. In southwest Alaska, arguably, the commercial fishing industry has long since had similar effects.

Expanded oil and gas development in Alaska, on both Federal and State leases, would expand the extent of disturbance effects on subsistence species and harvest patterns. While each individual project would likely be a small incremental increase, the cumulative effect would eventually become more repressive to the subsistence lifestyle. In addition to potentially diverting, deflecting, or disturbing subsistence species, oil and gas development could affect subsistence harvest by causing subsistence hunters to avoid certain areas because of concerns about firearm safety, and perhaps for aesthetic reasons. Southwestern Alaska still has vast undisturbed areas, yet the subsistence hunting environment continues to change in response to increased visitation and development.

Transportation facilities and activities would also contribute to cumulative effects to subsistence resources and, consequently, to the Native population. Any new permanent road connection in southwestern Alaska would also facilitate development, use, and visitation.

Contamination and oil spills could affect the food chain in the area of development and subsistence harvest. If this were experienced, the effects would fall largely on indigenous people.

h) Cumulative Effects to Subsistence

In combination with current locatable mineral activities, climate change, and population increases within the region of the planning area, the lifting of ANSCA 17(d)(1) withdrawals under Alternatives B, C, and D may contribute additional impacts to subsistence resources and uses. Under Alternatives B and D, 115 acres are expected to be disturbed from locatable mineral activities, as well as 36 acres for six natural gas wells and 20 acres of salable mineral mining for support of leasable mineral activities within the Koggiling Creek planning block. This possible development scenario on BLM lands, combined with reasonably foreseeable mineral development on State and private lands (7,881 acres of potential surface disturbance) will impact subsistence within the areas associated with these activities. This includes the areas known to be used by the Mulchatna Caribou Herd (MCH). As a result, subsistence would also be impacted, as all communities within the planning area rely on the caribou, including the MCH, as their primary source of terrestrial meat.

Privatization of State or Native Corporation lands would have the potential to negatively affect wildlife, wildlife habitat and subsistence use by opening up areas to private development.

Development of regional roads within the planning area would have the potential to negatively affect wildlife, and thus impact subsistence. These impacts would include habitat fragmentation, increased access into wildlife habitats, increased disturbance impacts, increased potential for mortality (road kills) and possible alteration of behavior or movement patterns of wildlife. If the proposed road(s) linked small or regional communities to the already existent road system within Alaska, then increased competition for subsistence resources would likely result, as non-local hunters would be able to access the area with little effort. This may also result in an increase in tourist traffic and recreational use of the area, causing additional impacts to wildlife.

Small roads that connect communities within the planning area may aid subsistence users in accessing their traditional harvest areas. However they may also concentrate hunting efforts along the road corridor, thus depleting resources from the area, and potentially altering harvest from currently used traditional harvest areas.

In summary, mineral development, privatization of land, and development of regional infrastructure would have cumulative impacts on subsistence. These activities have the potential to negatively affect wildlife and thus subsistence. Development of regional infrastructure such as roads, may improve access for non-local hunters, increasing competition for subsistence resources.

Under all alternatives, BLM would consider issuance of additional Special Recreation Permits for outfitter/guides or transporters on a case-by-case basis. BLM has the discretion to deny application for such permits, based on an analysis of the impacts of such activities to subsistence resources and uses. Number of Special Recreation Permits issued for BLM lands in the planning area has been stable. BLM does not permit outfitter/guiding activity on State or private lands or within National Parks or Wildlife refuges. Cumulatively, increasing and unlimited numbers of outfitter/guides or transporters, either on State, private, other Federal, or BLM lands, could have a significant impact on subsistence resources or access to subsistence resources through increased competition.

F. Irreversible and Irretrievable Commitment of Resources

Only those programs or resources that would have irreversible or irretrievable commitment of resources are included here.

1. Resources

a) Air Quality, Soils, Water, and Vegetation Resources

The reasonably foreseeable activities that would cause irreversible or irretrievable commitment of soil, water, and vegetation resources (habitat) would be leasable, locatable ,or salable mineral activities. These activities would be likely to occur under Alternatives B and D. This commitment level of resources is anticipated to be small in scale and only impact the immediate area. Large volumes of water withdrawn from rivers/streams may have watershed level impacts. These activities all require extensive material site excavation for gravel sources from road, pad, and airstrip construction. Impacts include irreversible loss of vegetation (ground cover) and habitat, soil compaction, soil erosion, thermokarst erosion, stream diversions, impoundments, and increased sediment runoff. These impacts would likely persist for the duration of the development, which once constructed, would continue for the foreseeable future. These impacts could be mitigated but not entirely removed. Pre-impact botanical and habitat inventories and associated habitat mitigation would minimize but would not eliminate these harmful impacts to vegetation and habitat.

b) Fish and Wildlife Management

(1) Fish

Actions that alter an aquatic community sufficiently to change the potential of a particular stream could represent an irreversible or irretrievable commitment of resources. The only reasonably foreseeable activities that would occur within the range of Alternatives considered would be leasable, locatable, and salable mineral activities. These activities would be more likely to impact fisheries under alternative B, in which ANSCA 17(d)(1) withdrawals would be lifted and no NSO buffers and ACECs would be proposed. Alternative D would propose NSO within 300 feet of the East and South Fork Arolik, Faro Creek, South Fork Goodnews River and Klutuk Creek (Appendix A, Stipulations and ROPs) to protect riparian habitat and fishery resources. Alternative A would result in less irreversible and irretrievable commitment of fishery resources.

(2) Wildlife

Under all Alternatives, some irretrievable and irreversible loss of wildlife habitat could occur from road construction and other development related surface disturbing activities. Loss of wetland habitat occupied by waterfowl and shorebirds could be particularly important. In most cases, alternate habitats would be available adjacent to development, and any habitat loss would have a minor effect. Impacts would be less under Alternatives A and C, while Alternative B does not propose 300 foot NSO buffers for the East and South Fork Arolik, Faro Creek, South Fork Goodnews River and Klutuk Creek and the Carter Spit ACEC compared to Alternative D.

c) Special Status Species

(1) Special Status Plants

Irreversible impacts to the special status plant, *Smelowskia pyriformis*, or pear-fruited smelowskia, could occur should lode mineral exploration or development occur on Tatlignapeke Mountain.

(2) Special Status Wildlife

Irreversible impacts to the Special Status Wildlife Species would likely occur under Alternative B compared to Alternatives A, C, and D. Alternative C proposes the Carter Spit ACEC to provide added protection to federally-listed migratory bird species.

d) Fire Management and Ecology

Areas that are in the Critical, Full, or Modified Management Options have the potential to lose key ecosystem components due to fire exclusion and move from condition class 1 to condition class 2 or 3. Based on desired conditions for land use and resource objectives, these conditions may be mitigated through fuel management projects or a change in management options. If the areas were not treated, fire size and severity could increase, life and property could be lost, and resources could be adversely impacted.

e) Cultural Resources

Mitigation through data recovery investigations at archaeological sites would recover information pertinent to current research concerns, but would also permanently remove the resource from future research and interpretive use, which would constitute an irretrievable and irreversible commitment of these resources. Any management actions that cause the inadvertent destruction of a cultural resource or make them susceptible to illegal collection could lead to the loss of these resources and would also be an irretrievable and irreversible commitment of these resources. Wildland fire may damage some types of cultural resources.

f) Paleontological Resources

Mitigation through data recovery investigations at significant paleontological sites would recover information pertinent to current research concerns, but would also permanently remove the resource from future research and interpretive use. This would constitute an irretrievable and irreversible commitment of these resources. Any management actions causing the inadvertent destruction of a paleontological resource or make them susceptible to illegal collection could lead to the loss of these resources and would also be an irretrievable and irreversible commitment of these resources. There would continue to be impacts on paleontological resources associated with unauthorized activities such as OHV use, dispersed recreation, and illegal collecting.

g) Visual Resources

Activities identified in this planning area under all Alternatives by direct, indirect and cumulative effects analysis may affect the visual resources within the planning area by the changes in the existing landscape character. Actions by the following activities may affect visual resources: OHV use, timber harvest, mining activities, exploration, recreation, infrastructure and industrial development, research projects, and activities on privately owned land. These activities may result in irreversible and irretrievable impacts to visual resources through degradation of soils and vegetation. This degradation is more likely under Alternative B.

2. Resource Uses

a) Minerals

Leasable Minerals. The production of oil and gas results in the irretrievable and irreversible loss of those natural, non-renewable resources. Most, if not all, surface disturbance and use can be restored through proper reclamation techniques.

Locatable Minerals. The removal of minerals from public lands result in the irretrievable and irreversible loss of those non-renewable natural resources, and their extraction causes potentially irreversible impacts to the natural environment and to the subsistence resources and habitat upon which residents of the region depend. However, this extraction may produce a short-term positive impact to a few residents of the region by providing them with a cash income.

Mineral Materials. The extraction of mineral materials from the natural environment within the planning area would be an irreversible and irretrievable commitment of those extracted mineral material resources. All impacts identified in prior sections are insignificant for mineral materials as the forecast need is negligible, and can be mitigated.

b) Renewable Energy

Lands developed for renewable energy projects would no longer be available for various other purposes.

c) Lands and Realty Actions

Lands transferred out of public ownership generally stay in private hands unless they are subsequently acquired for a public purpose. The right-of-way avoidance areas proposed in Alternatives C and D would limit the issuance of new rights-of-way in these locations.

3. Social and Economic Conditions

a) Social and Economic Conditions

Small increases in employment and personal income would occur over the life of gas field exploration, development, and operation activities. Employment in oil and gas related activities represent a loss of opportunity for workers to pursue employment in other fields. Investment by the lessees and operators in oil and gas exploration and development activities in the planning area represents a loss of opportunity to invest those monies elsewhere. Revenue increases to the State and Federal governments occurring during production years would result in the irreversible and irretrievable commitment of those revenues. Development would result in new infrastructure that would be removed at the end of production.

b) Environmental Justice

Long-term population and productivity effects to the Mulchatna Caribou Herd from oil and gas development in calving and critical insect-relief areas could produce irreversible and irretrievable effects to the herd. The subsistence caribou hunt by most villages in the planning area could be affected as well.

4. Subsistence

Exploration and development of leasable, locatable, and salable minerals in the planning area would be the three most important sources of irretrievable loss of wildlife habitat and subsistence resources to the residents of the planning area, as well as the potentially irreversible changes to the existing mixed subsistence-cash economy which most residents participate in. One of the sources of this change would include loss of opportunity to participate in subsistence activities due to participation in the cash economy. Since participation in subsistence, sharing and eating subsistence foods have meaning well beyond the economic aspects of the practice, the individual's physical, social, and spiritual well-being could be affected.

G. Unavoidable Adverse Impacts

Unavoidable adverse impacts are either impacts that remain following the implementation of mitigation measures or impacts for which there are no mitigation measures. Some unavoidable adverse impacts occur as a result of proposed management under one or more Alternatives. Others are a result of public use of BLM lands. Only those programs or resources that would have unavoidable adverse impacts are included here.

1. Resources

a) Soil, and Water Resources

Unavoidable adverse impacts to soil and water occur from road construction and material site excavation. Gravel roads, airstrips, and pads destroy soil structure through compaction and thermokarst erosion (where extensive permafrost exists), block natural drainage patterns, create stream flow diversions, impoundments, and increase sediment runoff that impairs water quality. By limiting the length of the roads and requiring that all permanent facilities have an approved drainage plan, a reduction in adverse impacts from project and related infrastructure development is possible but not unavoidable (Walker et al. 1987). Limiting development on floodplains and wetlands would assist compliance with regulations that direct Federal agencies to minimize the destruction, loss, or degradation of floodplains and wetlands.

b) Vegetation

While recognized as a natural part of northern ecosystems, occasional large, intense wildland fires will temporarily destroy vegetation and priority habitats such as lichen-rich plant communities that caribou are dependent upon. Recovery would be expected, but not always within the life of the plan. Scarring of the landscape could also result from unauthorized cross-country travel.

c) Fish and Wildlife

(1) Fish

Unavoidable direct disturbance to aquatic and riparian habitat would require many years (25-50+) to rehabilitate to a healthy functioning condition. Therefore, most of the habitat disturbed in the next 20 years would be additive to that lost in the past (at sites of previous placer mining). Some of the mining, especially placer mining, may take place on previously worked claims. This would result in setting back aquatic/riparian recovery by the number of years between the previous and future operation.

Ground water and surface water drawdown and associated impacts to nearby wetlands resulting from leasable and locatable mineral development can be a serious concern in some areas. The impacts resulting from drawdown of water resources could last for many decades, though not likely, considering anticipated development scenarios and precipitation rates within the planning area. This could potentially affect seeps and springs that provide thermal refugia in both summer and winter.

Unauthorized travel and permitted land use activities may increase sedimentation into fish-bearing streams with possible adverse effects. Many impacts can be reduced through use of Required Operating Procedures and project-specific mitigation requirements.

These sources of unavoidable impacts would be expected to be related to placer mining in localized areas on BLM lands in the Goodnews Block during the life of this plan. They are expected to be

moderate to significant in their effects, except where Required Operating Procedures, project-specific requirements, and mitigation are applied.

(2) Wildlife

Some disturbance and disruption of wildlife can occur under all Alternatives. Displacement or reduced habitat use by wildlife are likely to be local (within one-half to 2 ½ miles of development or activity). Disturbance and displacement from most activities occurring in the planning area, except for leasable and locatable mineral activities, would be short-term (a few hours to a few weeks). Disturbance and displacement due to mineral development could be long-term and could persist over the life of the development. Most unavoidable adverse impacts to wildlife, being short-term and localized, would not substantially affect populations.

d) Special Status Species

(1) Special Status Plants

One BLM Special Status Species of plant is located within the planning area, *Smelowskia pyriformis*, or pear-fruited smelowskia. It has been located in the western Alaska Range north of the planning area and in the southernmost Kuskokwim Mountains in the Goodnews Bay region (Drury and Rollins 1952; Hultén 1968; Murray 1981; Murray and Lipkin 1987; Parker 1994; Rollins 1993; Welsh 1974). This plant prefers higher elevations and rocky, scree covered mountain slopes, and so is not likely to be affected by wildland fires. However, it is found on BLM land in an area where lode minerals are present, and so it could be affected by the development of those minerals during the life of the plan. The degree of impact would depend on the extent and type of mineral operation. The fact that the plant was observed to grow in scattered locations would provide some advantage to its survival at the population level in this case.

(2) Special Status Fish

There are no Special Status Fish species in the Bay planning area.

(3) Special Status Wildlife

Unavoidable adverse impacts to Special Status Species of wildlife would be similar to those discussed under wildlife. Under Alternatives B, C, and D, some disturbance to Steller's eiders and other bird species by routine activities associated with locatable mineral activities, would be unavoidable. These impacts would be more common under Alternative B due to the combination lifting ANSCA 17(d)(1) withdrawals and no proposed Carter Spit ACEC. Effects would include temporary disturbance such as displacement of incubating females from nests or broods, or disturbance of feeding, molting and migrating birds. Eiders could habituate to some disturbances or move to alternate habitats. Lease Stipulations, Required Operating Procedures, and project-specific requirements would effectively mitigate many of the effects of disturbance to Steller's eiders, but some impacts could be unavoidable. Some eider habitat could be permanently lost due to construction of leasable mineral related facilities, as discussed previously. Most disturbances of endangered and threatened species associated with routine activities would be minimized or avoided through compliance with mitigation measures developed through the Section 7 consultation process.

e) Fire Management and Ecology

Large landscape-scale high severity fires would be unlikely to occur within the planning area. However, should the current warming and drying trend continue, such fires could occur in portions of the planning area within the life of the plan. Fire suppression activities pose an unavoidable risk to other resources, and have the potential to be high impact and long-term in nature. The use of heavy mechanical equipment on the ground surface could cause severe soil erosion and increase silt load into streams and rivers, as well as damage to or loss of cultural resources.

f) Cultural Resources

While measures are in place to identify threats to cultural resources and prioritize management actions, some impacts would be unavoidable. Wildland fire could damage some types of cultural resources. There would continue to be impacts to cultural resources from dispersed recreation activities, OHV use, vandalism, and other types of activities not authorized by the BLM. Natural processes such as erosion and natural decay or deterioration could also result in unmitigated damage to cultural resources.

g) Paleontological Resources

While measures are in place to identify threats to significant paleontological resources and prioritize management actions, some impacts would be unavoidable. Natural processes such as erosion and natural decay or deterioration result in unmitigated damage to paleontological resources and probably are the most common kinds of threats to these resources in this planning area. The other type of threat to these resources is human impact from dispersed recreation activities, OHV use, vandalism, and other types of activities not authorized by the BLM.

h) Visual Resources

Natural disasters or wildland fires would be an agent of change for visual resources, and could have unavoidable, adverse impacts to visual resources values at the landscape scale. These impacts may be relatively short-term, except in the instance of environmental change, where the vegetation would have no chance of recovery.

2. Resource Uses

a) Forest Products

The future of forest products in the planning area may provide even fewer opportunities than at present should the current warming and drying trend continue, and current insect infestations worsen. Other unavoidable effects in this case would include additional standing dead and fallen timber and the potential for larger, more intense wildland fires. There may be an increase in other types of drought-resistant vegetation in the place of existing forests. Alteration of forest habitat from placer mine development would result in long term loss of trees in limited areas.

b) Recreation Management

Changes in the amount of recreational visitation and associated duration and patterns of use could result in increased conflicts between users and unanticipated changes in resource conditions. These resource conditions may include declines in fish and game resources resulting from environmental degradation.

c) Travel Management

Regardless of the Alternative, access to public lands will become more complex as Native Corporation entitlements are met. As public lands become private lands, net access is lost even if BLM reserves 17(b) easements.

d) Renewable Energy

Mitigation measures would reduce the potential of bird strikes on wind turbines, but would not eliminate the possibility of incidents entirely.

3. Social and Economic Conditions

Economic effects of oil and gas leasing, exploration, development, and production in the planning area may be considered positive effects by many people. Increases in employment opportunity and potential personal income would occur over the life of the exploration, development, and production activities. Revenue increases to the State and Federal governments would occur during production years. However, these increases would be short-term (less than 30 years). They would occur only for the duration of the activities. Development activity would establish infrastructure that could enhance the future productivity of oil and gas exploration, development, and production.

4. Environmental Justice

The Environmental Justice Executive Order includes consideration of potential effects to Native subsistence activities. The only substantial source of potentially unavoidable Environmental Justice related to effects on Native communities from oil and gas exploration and development in the Planning area, would occur from displacement of caribou as a result of exploration and development in calving or insect relief areas. The Native communities throughout southwest Alaska harvest caribou from the Mulchatna Caribou Herd. Noise and disturbance from routine activities would be unavoidable, but not expected to produce disproportionate, highly adverse Environmental Justice impacts on the Alaskan Native minority populations in any community.

5. Subsistence

Unavoidable adverse impacts that would affect fish and wildlife would also affect subsistence. They include sedimentation of fish-bearing streams by natural erosion, unauthorized travel, alteration of habitat, and temporary or permanent localized disturbance and/or displacement of subsistence species. These unavoidable impacts are not expected to be significant during the life of this plan, and would not substantially affect populations or access to resources by the subsistence user.

Chapter V: Consultation and Coordination

Chapter V: Consultation and Coordination

A. Introduction

This chapter describes the public participation opportunities made available during the development of the Bay Draft Resource Management Plan (RMP) and Environmental Impact Statement (EIS). Public participation was conducted during the preparation of the document and will continue through managing efforts at the Anchorage Field Office (AFO).

The Anchorage Field Office (AFO) interdisciplinary team and BLM Alaska State Office were preparers of the Bay RMP/EIS. The Bristol Bay Environmental Inc. prepared the leasable mineral inventory report. Both teams provided technical and organizational analysis and review for the document. Formal consultation and collaborative efforts were made with the State of Alaska and Resource Advisory Council. Formal and informal consultation was conducted with the RMP/EIS team, agencies, groups, and individuals. Various Federal, State, and Native groups and agencies participated in Alternative development meetings and briefings. Also, during the scoping process, Government-to-Government consultation was conducted, as well as informational meetings with interested individuals and organizations.

This chapter also provides a listing of the document's preparers, and agencies and organizations who reviewed the Draft RMP/EIS.

B. Public Participation Opportunities

For purposes of planning, there are several methods offered for public participation. The types of public participation approaches used are described below:

1. Scoping

Public scoping meetings were held from January 2005 until the end of March 2005. These public meetings included communities such as: Anchorage, Dillingham, Homer, Soldotna, and smaller communities of Aleknagik, Koliganek, Iliamna, and Naknek. The publication of the Notice of Intent (NOI) for the Bay RMP/EIS was published on December 6, 2004. The public scoping meetings discussed a variety of issues which included: purpose for preparing a new plan, planning area and lands adjacent to BLM lands, planning schedule, planning criteria, framework of the plan, and examples of specific decisions addressed for the plan.

BLM identified preliminary management concerns which were addressed in the project's first newsletter in December 2004. Other management concerns were gathered by public input. A series of issues and topics were identified by Federal, State, and Native groups and agencies for consideration in the RMP/EIS during the planning process. Over 2,000 members of the public provided a total of 264 scoping comments during the scoping process. These comments were reviewed, organized by issue, and entered into a scoping comments database to facilitate retrieval and tracking through the RMP/EIS process. The

final Bay Plan Scoping Report is a separate document, available from the BLM Anchorage Field Office. You may request a copy of the report at: akbayrmp@blm.gov.

Scoping comments and input were collected during formal scoping meetings, Government-to-Government consultations, via email, telephone calls, faxes, and United States mail. Prior to the scoping period, representatives of BLM published public announcements in regional and local newspapers and provided public announcements on local radio to inform the public that BLM was beginning the Bay RMP/EIS process. A brochure was developed, and an electronic copy of it and a map of the planning area were posted on the Bay RMP/EIS planning website at www.blm.gov/ak/ado/BayRMP01.html.

2. Draft Alternative Development

A newsletter containing a summary of the draft Alternatives was mailed to the public and organizations for their review and informal comment on May 14, 2006.

3. Other Outreach Efforts

After the formal scoping period, a number of briefings and Government-to-Government consultations and/or briefings were carried out in the communities of Anchorage, Dillingham, King Salmon, New Stuyahok, and Quinhagak. Comments were recorded and became a part of the Administrative Record.

Comments continue to be received by email, by telephone, and by postal mail, and they are also made part of the Administrative Record. Comments will be accepted throughout the RMP process.

Briefings were conducted for organizations upon request. Briefings were provided for the Alaska Miner's Association, the Alaska Coalition, and the Bristol Bay CRSA in April and May, 2006. Newsletters were mailed out periodically to keep approximately 2,600 interested members of the public informed of BLM's progress on the Bay RMP/EIS.

4. Draft RMP/EIS Public Meetings and Subsistence Hearings

On September 29, 2006, a BLM notice was published in the Federal Register announcing the availability of the Bay Draft Resource Management Plan (RMP) and Environmental Impact Statement (EIS) (Federal Register 2006a). This notice was followed on October 13, 2006 by an additional notice by the Environmental Protection Agency announcing the same availability of the Bay Draft RMP/EIS. This began a 90-day comment period on the Draft RMP/EIS. Based on requests from the public and local government, the comment period was extended until February 5, 2007 resulting in a 130-day comment period. Between December 1, 2006 and January 17, 2007 BLM held public meetings and ANILCA 810 hearings in Goodnews Bay, Dillingham, Alegnagik, New Stoyahok, Naknek, and Newhalen. In addition, an open house meeting was held in Anchorage on November 28, 2007.

The first part of the meeting consisted of a BLM staff presentation summarizing the alternatives in the Draft RMP followed by an informal question and answer session. BLM staff were available to answer questions and discuss alternatives. After this informal discussion, a formal hearing was held. The meeting format varied slightly based on the size of the group and their desire to ask questions or give spoken testimony. The purpose of the formal hearings held at the end of each meeting was to gather testimony on the impacts to subsistence from alternatives presented in the Draft RMP. The Final Section 810 Analysis can be found in Appendix D of this document.

No hearing was held Anchorage. Additional comments on impacts to subsistence were given to BLM through written comments.

C. Consultation

1. U.S. Fish and Wildlife Service Consultation

As required by Section 7 of the Endangered Species Act (ESA) of 1973, prior to initiating any project by BLM that may affect any federally-listed threatened or endangered species or its habitat, consultation with the U.S. Fish and Wildlife Service (USFWS) must be made.

Section 7 consultation with USFWS was initiated by AFO via a letter, describing the proposed project, which included a copy of the Draft Bay RMP/EIS. During the informal consultation, an endangered species list was requested by BLM. The FWS provided a written response on October 30th, 2006 and indicated that the threatened species Steller's eider and the Kittlitz's murrelet, a candidate species, were present within the Bay Planning area.

The Draft RMP was submitted to the FWS for comment and informal consultation on October 11th, 2006. BLM met with FWS on April 17th, 2007 to discuss the Bay plan as it relates to the Endangered Species Act and how its alternatives will affect listed and candidate species.

Informal consultation determined that implementation of the preferred Alternative of the Bay RMP May Affect, but is Not likely to Adversely Effect Steller's Eider. The Service provided a Letter of Concurrence on July 25, 2007. This letter is on file at AFO. Evaluation of potential effects on species under the jurisdiction of NOAA-Fisheries determined that there would be no direct or indirect effects as a result of implementation of this plan. A memorandum detailing the Rationale for this No Effect determination is on file at AFO.

2. National Marine Fisheries Service Consultation

The National Marine Fisheries Service (NMFS) is responsible for the administration of the ESA as it applies to the listed cetaceans and pinnipeds in Alaska. These include seven species of endangered whales, and the endangered western population of Steller sea lions.

Informal consultation with NMFS was initiated by the AFO via a letter on February 16th 2005, describing the proposed project area and the project Alternatives, and requesting a species list. BLM met with NMFS on May 17th, 2007 to discuss the Bay plan as it relates to endangered species, and submitted a copy of the Bay RMP/EIS.

The planning area includes Essential Fish Habitat for all five species of salmon. An analysis of effects on Essential Fish Habitat is contained in Chapter IV, section (B)(3)(a) Fish of this document. The Draft RMP was submitted to NMFS for comment and, if necessary, additional consultation. Policy and management direction for EFH is contained in Chapter II, section (B)(1)(c)(3)(d) Essential Fish Habitat. A description of EFH in the planning area is included in Chapter III, section (B)(7)(a)(2) Fish Habitat Description.

3. Tribal Consultation

Tribal Consultation was conducted in accordance with the National Historic Preservation Act (NHPA) of 1966 to maintain BLM's Government-to-Government relationship between Native villages and corporations, via a letter to over 50 Native villages and corporations.

In order to continue with Government-to-Government coordination and consultation BLM will maintain communication with the villages throughout the planning process and during future planning efforts.

A copy of the Draft RMP/EIS was sent to all tribal entities within the Bay planning area for review and comment. A copy of the Proposed RMP/Final EIS will be sent to these tribal entities.

D. Collaborative Efforts

1. Cooperation with the State of Alaska

Since there is a vast amount of State-selected land within the Bay planning area, it is necessary for BLM to consult with the State of Alaska. Therefore, BLM involved the State of Alaska at the beginning of the planning process via a letter inviting the State of Alaska to participate in the RMP/EIS process. The State of Alaska and BLM developed a strategy for interagency cooperation and consultation for land use planning efforts for the Bay RMP/EIS. As part of this strategy, the State of Alaska and BLM jointly funded a liaison position. That person channeled information between the State and BLM during the planning process. This method has been effective in involving the State personnel in the review of draft materials and the exchange of information.

The State reviewed BLM's draft alternatives, preliminary draft RMP, response to comments, and preliminary Proposed RMP/Final EIS. These reviews produced a preferred strategy on management of State-selected lands. The State provided formal comments on the Draft RMP/EIS and these have been incorporated into Appendix I "Response to Comments."

2. Other Collaborative Efforts

A variety of public involvement strategies have been implemented throughout this planning process to improve communication and promote an understanding of the issues and the process in developing the RMP/EIS. A subgroup was formed by the Alaska Resource Advisory Council (RAC) under the provisions of the RAC charter to assist BLM in addressing planning issues.

The RAC is a 15-member advisory panel that provides advice and recommendations to BLM on resource and land management issues. Membership includes Alaskans from around the state who represent the energy industry, tourism, commercial recreation, environmental interests, archeological interests, elected officials, Alaska Native organizations, and the public-at-large. The RAC as a whole was kept informed of progress on the plan through briefings at quarterly meetings. Members of the RAC's Kobuk-Seward Peninsula plan subgroup were kept informed through e-mail and newsletters. RAC members were also invited to review BLM's draft alternatives. In December 2006, the RAC was briefed on the number and type of comments received and planned changes to the Preferred Alternative (Alternative D) in response to comments. RAC members provided comments on the recreation management issue in the Squirrel River. In February 2007, the RAC was updated on progress on the Proposed RMP/Final EIS.

BLM provided the Northwest Arctic Borough a briefing on the Draft RMP/EIS in May 2006 at the beginning of the public comment period. A Borough staff member attended most of the public meetings held within the planning area. Both the Northwest Arctic Borough and the North Slope Borough were given an opportunity to review the pre-publication version of the Proposed RMP/Final EIS.

E. Plan Distribution

Since initial scoping, BLM has maintained a mailing list of individuals, businesses, special interest groups, and Federal, State, Tribal, and local government representatives interested in the development of the Bay RMP/EIS (currently at approximately 2,600 individuals/groups).

In an effort to reduce printing costs notices were mailed to everyone on the mailing list in August 2006 asking whether they wished to remain on the mailing list, and in which format (hard copy or CD) they wished to receive the document for review. Copies of the Draft RMP/EIS are also available for public inspection at the following locations:

- Alaska State Library 2
- ADEC Library
- Dillingham Public Library
- Homer Public Library 2
- Anchorage Municipal Library (Z.J. Loussac Library)
- ARLIS 4
- Naknek Public Library
- DOI Natural Resource Library 2
- Department of the Army CRREL Library
- Kenai Peninsula College Library
- Library of Congress
- UAF Rasmuson Library
- UAF Wildlife Library
- U.S. Department of Interior Library
- Soldotna Public Library

Federal Government Agencies

- Alaska Maritime NWR
- Kenai NWR
- Alaska Peninsula/Becharof NWR
- Togiak NWR
- Bureau of Indian Affairs
- BLM- Director's Office
- Minerals Management Service
- U.S. Fish and Wildlife Service
- USDI – National Park Service
- Katmai National Park and Preserve Complex
- Lake Clark National Park and Preserve
- NPS-Division of Environmental Quality
- NMFS, Protected Resource Management Division
- Federal Aviation Administration
- U.S. Army
- U.S. Air Force
- U.S. Department of the Interior-Office of Environmental Policy and Compliance
- U.S. Department of the Interior-Office of External Affairs
- U. S. EPA Alaska Regional Director

State Government Agencies and Organizations

- Alaska Chamber of Commerce
- Alaska Department of Natural Resources (ADNR)
- Alaska Department of Fish and Game
- Alaska State Historic Preservation Officer
- Honorable Frank Murkowski, Governor of Alaska
- University of Alaska, Anchorage-Land Management
- University of Alaska, Fairbanks Cooperative Ecosystem Study Unit (CESU)

Local Governments and Communities

- City of Aleknagik
- City of Clark's Point
- City of Dillingham
- City of Ekwok
- City of Goodnews Bay
- City of Quinhagak
- City of Manokotak
- City of Togiak

- City of New Stuyahok
- City of Newhalen
- City of Nondalton
- City of Pedro Bay
- City of Platinum
- Bristol Bay Borough
- Lake and Peninsula Borough

Tribal Government and Communities

- Bristol Bay Native Corporation
- Bristol Bay Native Association
- Ekwok Village Council
- Aleknagik Natives, Ltd.
- Calista Corporation
- Igiugig Native Corporation
- Illiamna Natives Limited
- Choggiung Limited
- Koliganek Natives Limited
- Olsonville Inc.
- Levelock Natives Limited
- Saguyak, Inc.
- Manokotak Natives Limited
- Ekwok Natives Limited
- Paugvik Incorporated, Limited
- Kuitsarak, Inc.
- Stuyahok Limited
- Kijik Corporation
- Pedro Bay Native Corporation
- Aleknagik Traditional Council
- Native Village of Goodnews Bay
- Arviq, Inc.
- Qanirtuuq, Inc.
- Illiamna Village Council
- King Salmon Village Council
- Togiak Natives Corporation
- Kokhanok Village Council
- Twin Hills Native Corporation
- New Koliganek Village Council
- Levelock Village Council
- Portage Creek Village Council
- Manokotak Village Council
- Native Village of Kwinhagak
- Naknek Village Council
- South Naknek Village Council
- Newhalen Tribal Council
- Twin Hills Village Council
- Nondalton Tribal Council
- Pedro Bay Village Council
- Platinum Traditional Council

Congressional Delegation

- U.S. Representative Don Young
- U.S. Senator Lisa Murkowski
- U.S. Senator Ted Stevens

State Legislators

- Rep. John Coghill Jr.
- Rep. John Harris
- Rep. Vic Kohring
- Rep. Peggy Wilson
- Rep. Harry Crawford
- Rep. Sharon Cissna
- Rep. Eric Croft
- Rep. Ethan Berkowitz
- Rep. Norman Rokeberg
- Rep. Lesil McGuire
- Rep. Beth Kerttula
- Rep. Kevin Meyer
- Rep. Mike Chenault
- Rep. Carl Moses
- Rep. Mary Kapsner
- Rep. Richard Foster
- Rep. Reggie Joule
- Rep. Kim Elton
- Rep Albert Kookesh
- Rep. Gary Wilken
- Rep. Gene Therriault
- Rep. Lyda Green
- Rep. Gretchen Guess
- Rep. Bettye Davis
- Rep. Johnny Ellis
- Rep. Ben Stevens
- Rep. John Cowdery
- Rep. Gary Stevens
- Rep. Lyman Hoffman

Non-Governmental Organizations and Businesses

- Alaska Coalition
- Alaska Miners Association
- Alaska Quiet Rights Coalition
- Alaska Sportsmans Lodge
- Delta Discovery
- Mountain Defense League
- The Nature Conservancy
- The Wilderness Society

Table 5.1. List of Preparers

Name	Responsibility
Gary Reimer	District Manager
Mike Zaidlicz	Field Manager
Charles Denton	Project Lead and Hydrologist
James Moore	Planning and NEPA Coordinator
Mike Kasterin	Regional Economist
Doug Ballou	Outdoor Recreation Planner
Larry Beck	Hazardous Materials
Dorothy Bonds	Realty Specialist (Lead)
Robert Brumbaugh	Minerals Specialist
Jeff Denton	Subsistence, Wildlife, T&E Species
Rodney Huffman	Realty Group Manager
Jeff Kowalczyk	Outdoor Recreation Planner
Sarah McCabe	GIS Coordinator
Paxton McClurg	GIS Coordinator
Gerald Minick	GIS Coordinator
Charmain McMillan	Planning Assistant
Darla Pindell	Minerals Economist
Donna Redding	Archaeologist
Bruce Seppi	Wildlife, T&E Species
Brian Sterbenz	Fire and Fuels
Mark Meyer	Locatable Minerals
Tim Sundlov	Fisheries
Sindra Wolfsen	Physical Scientist
Patricia McClenahan	Compiler/Writer
Caron Gibson	Editor

Table 5.2. List of Reviewers

Name	Title
Bureau of Land Management Alaska	
Jeanie Cole	Land Use Planner
Gene Ervine	Interpretive Specialist
Randy Goodwin	Outdoor Recreation Planner
Scott Guyer	Natural Resource Specialist
Terry Hassett	17(b) Easement Specialist
Bruce Hollen	Special Status Species Biologist
Mike Kasterin	Regional Economist
Lon Kelly	Manager Arctic Field Office
Robert King	Archaeologist
Lee Koss	Hydrologist
Susan Lavin	Realty Specialist
Mary Lynch	Planning and Environmental Coordinator
Mark Meyer	Physical Scientist
Stacie McIntosh	Subsistence Coordinator (Acting)
David V. Mushovic	Realty Specialist
Bill Overbaugh	Outdoor Recreation Planner
John Payne	Wildlife Biologist
Jerri Sansone	Realty Specialist
Carolyn Spoon	Realty Specialist
Larry Standley	Hydrologist
Jeanne Standley	Natural Resource Specialist
Wayne Svejnoha	Hazmat Specialist
Dennis Tol	Fisheries Biologist
Bill Diel	Leasable Minerals
Curtis Wilson	Supervisory Land Use Planner
Alaska Department of Natural Resources Representative	
Carol Fries	Natural Resources Manager