U.S. Fish & Wildlife Service

Izembek

National Wildlife Refuge
Land Exchange/Road Corridor

Final Environmental Impact Statement

Chapter 4 Environmental Consequences

U.S. Fish and Wildlife Service Mission Statement

The Mission of the U.S. Fish & Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.

Refuge System Mission Statement

The Mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

—National Wildlife Refuge System Improvement Act of 1997

On the Cover: Izembek National Wildlife Refuge, 2007

Photo from the NCTC Image Library

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4.0 ENVIRONMENTAL CONSEQUENCES

This chapter provides the scientific and analytic basis for evaluation of the potential effects of each of the alternatives described in Chapter 2 on the physical, biological, and social environments. Direct and indirect effects to each resource are first analyzed, followed by an analysis of the potential contribution of the proposed alternatives to cumulative effects – the effects of the past, present, and reasonably foreseeable future actions. These steps are described in more detail below.

4.1 Analysis Methods and Impact Criteria

The following terms are used throughout this document to discuss effects:

- **Direct Effects –** caused by the action and occur at the same time and place (40 CFR 1508.8). The project area and areas of potential effects are further described below in Section 4.1.1.
- **Indirect Effects –** defined as effects which are "caused by an action and are later in time or farther removed in distance but are still reasonably likely. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8). Indirect impacts are caused by the project, but do not occur at the same time or place as the direct impacts.
- **Cumulative Effects –** additive or interactive effects that would result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). Direct impacts are limited to the proposed action and alternatives only, while cumulative impacts pertain to the additive or interactive effects that would result from the incremental impact of the proposed action and alternatives when added to other past, present, and reasonably foreseeable future actions. Interactive impacts may be either greater or less than the sum of the individual impacts; thus, the action's contribution to the cumulative case could increase or decrease the net effects.
- **Reasonably Foreseeable Future Actions –** this term is used in concert with the Council on Environmental Quality definitions of indirect and cumulative impacts, but the term itself is not further defined. Most regulations that refer to "reasonably foreseeable" do not define the meaning of the words, but do provide guidance on the term. For this analysis, reasonably foreseeable future actions are those that are external to the proposed action, and likely (or reasonably certain) to occur, although they may be uncertain. Typically, they are based on documents such as existing plans, permit applications, and fiscal appropriations. Reasonably foreseeable future actions considered in the cumulative effects analysis consist of projects, actions, or developments that can be projected, with a reasonable degree of confidence, and for this analysis would occur over the next 5 to 10 years (from 2012 to 2022).

4.1.1 EIS Project Area and Scope for Analysis

The project area is described in relation to the action alternatives identified in Chapter 2, namely 2 alternative road corridors, a hovercraft alternative, and a marine ferry alternative. The analysis area includes the proposed exchange parcels as outlined in Chapter 1, as well as the proposed footprints of the action alternatives. The geographic area of the action alternatives generally includes the water body of Cold Bay and the isthmus to the north. The road alternatives would connect the communities of King Cove and Cold Bay via the isthmus. The marine alternatives, including hovercraft and ferry, would connect the communities via routes across Cold Bay. The action alternatives are described in detail in Chapter 2. Figure 1-1 encompasses the analysis area; figures illustrating the alternatives are displayed in Chapter 2. While the project area can be delineated based on the physical footprint of the exchange parcels and action alternatives, potential resource impacts are considered in a spatial context appropriative to each resource.

Evaluation of cumulative effects requires an analysis of the potential direct and indirect effects of the proposed alternatives, in combination with other past, present, and reasonably foreseeable future actions. Potential sources of past, present, and reasonably foreseeable future actions may occur outside of the EIS project area, including changes in demography, transportation, and health care programs.

4.1.2 Incomplete and Unavailable Information

The Council on Environmental Quality guidelines requires that:

> When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking (40 CFR 1502.22).

In the event that there is relevant information, but "the overall costs of obtaining it are exorbitant or the means to obtain it are not known" (40 CFR 1502.22), the regulations instruct that the following should be included:

- A statement that such information is unavailable;
- A statement of the relevance of such information to evaluate reasonably foreseeable significant adverse impacts;
- A summary of existing information that is relevant to evaluating the adverse impacts; and
- The agency's evaluation of adverse impacts based on generally-accepted scientific methods.

In the analysis, this EIS identifies those areas where information is unavailable to support a thorough evaluation of the environmental consequences of the alternatives. Efforts have been made to obtain all relevant information. However, data gaps still exist at this time for several reasons, such as the costs of obtaining the missing data are exorbitant, the data will take several years to obtain, or the means to obtain the data are unknown. Limited resources to collect and analyze baseline information due to limited funding are problematic. Where data gaps still exist, the EIS provides the information listed above, according to Council on Environmental Quality guidelines. The resource analyses in Chapters 3 and 4 discuss limitations of data; an overview of incomplete and unavailable information is provided in Section 2.9.

4.1.3 Methods for Determining Level of Impact

Direct and Indirect Effects

Direct effects would be caused by the alternative, and would occur at the same time and place (i.e., within the project area) as the alternative. Indirect effects would also be associated with the alternative, but would occur later in time or geographically separated from the action. Direct and indirect effects could be associated with the construction, operation, and demobilization of any phase of the transportation alternatives under review in this EIS. The direct and indirect effects for each resource or resource use are based on the intensity (magnitude), duration, extent, and context of the impact. Definitions are provided below.

Intensity (Magnitude)

Low: A change in a resource condition is perceptible, but it does not noticeably alter the resource's function in the ecosystem or cultural context.

Medium: A change in a resource condition is measurable or observable, and an alteration to the resource's function in the ecosystem or cultural context is readily detectable.

High: A change in a resource condition is measurable or observable, and an alteration to the resource's function in the ecosystem or cultural context is clearly and consistently observable.

Duration

Temporary: Impacts would be intermittent, infrequent, or last only a single season or for the duration of a discrete activity, such as construction.

Long-term: Impacts would be frequent, or extend from several years up to the life of the plan.

Permanent: Impacts would cause a permanent change in the resource that would last beyond the life of the plan even if the actions that caused the impacts were to cease.

Extent (Scope)

Local: Impacts would be limited geographically to discrete portions of the project area; impacts would not extend to a broad geographic region or a broad sector of the population and its range.

Regional: Impacts would extend beyond a local area, potentially affecting resources or populations throughout the EIS project area.

Extended: Impacts would potentially affect resources or populations beyond the region or EIS project area.

Context

Common: The affected resource is not rare in the locality and is not protected by legislation. The portion of the resource affected does not fill a unique ecosystem role within the locality or the region.

Important: The affected resource fills a rare ecosystem role either within the locality or the region, or the resource is protected by legislation, such as the *Endangered Species Act* or *Wilderness Act*.

Unique: The affected resource is protected by legislation and the portion of the resource affected fills a unique ecosystem role within the locality or the region.

Summary Impact Levels

The tables below (Tables 4.1-1 through 4.1-3) provide a *guideline* to place the effects of the alternatives in an appropriate context and to reach summary conclusions about the level of impact, taking into account the impact categories of intensity, duration, extent, and context. These tables are intended to serve as general guidelines to assist the reader in understanding the impact analysis. The impact criteria tables use terms and thresholds that are quantified for some components and qualitative for other components. The terms used in the qualitative thresholds are relative, necessarily requiring the analyst to make a judgment about where a particular effect falls in the continuum from negligible to major. No effect is also possible.

No effect: The alternative would not affect the resource.

Negligible: Impacts are generally extremely low in intensity (often they cannot be measured or observed), are temporary, localized, and do not affect unique resources.

Minor: Impacts tend to be low intensity, of temporary duration, and local extent, although common resources may experience more intense, longer-term impacts.

Moderate: Impacts can be of any intensity or duration, although common and important resources may be affected by higher intensity, longer term, or broader extent impacts. Unique resources may be affected by medium or low intensity impacts, shorter duration or intermittent episodes of impact over a long period, at a local or regional scale.

Major: Impacts are generally medium or high intensity, long-term or permanent in duration, a regional or extended scope, and affect important or unique resources.

Impacts may be beneficial or adverse. Impacts are generally assumed to be adverse, unless specifically noted. While some impacts are readily evaluated as beneficial or adverse, others may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. For example, the effects to wilderness under the road alternatives include both removing land from wilderness to construct the proposed road and adding large tracts of land to wilderness. This is a complex trade-off; acres added or removed from wilderness are not the single factor that characterizes the action as either beneficial or adverse. The public comments on the Draft EIS clearly indicated a difference in values regarding some of the potential impacts of the alternatives. Impacts to public health and safety, wildlife, wetlands, wilderness, and subsistence are among the key elements of the decision to be made in this EIS. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact for those resources that are characterized as indeterminate.

Impact Criteria for Physical Resources

Table 4.4-1 indicates examples of the mechanisms for measuring the effects of the alternatives on physical resources. This table summarizes the criteria for determining the level of impact based on the intensity, duration, extent and context.

Table 4.1-1 Impact Criteria for Effects on Physical Resources

Type of Effect	Impact Component	Effects Summary		
Changes to Physical Resource Character	Magnitude or Intensity	**High**: Acute or obvious changes in resource character.	**Medium**: Noticeable changes in resource character.	**Low**: Changes in resource character may not be measurable or noticeable.
	Duration	**Permanent**: Chronic effects; resource would not be anticipated to return to previous levels.	**Long-term**: Resource would be reduced through the life of the project and would return to pre-activity levels at some time after completion of the project.	**Temporary**: Resource would be reduced infrequently but not longer than the span of the project construction and would be expected to return to pre-activity levels at the completion of the activity.
	Geographic Extent	**Extended:** Affects resources beyond the region or EIS project area.	**Regional:** Affects resources beyond a local area, potentially throughout the EIS project area.	**Local:** Impacts limited geographically; discrete portions of the project area affected.
	Context	**Unique:** Affects unique resources or resources protected by legislation.	**Important:** Affects depleted resources within the locality or region or resources protected by legislation.	**Common:** Affects usual or ordinary resources; not depleted or protected by legislation.

Impact Criteria for Biological Resources

Table 4.1-2 indicates the mechanisms by which the effects of the alternatives on biological resources can be measured. This table summarizes the criteria for determining the level of impact based on the intensity, duration, extent and context. The effects to biological resources are based on ecosystem characteristics, not land status. Thus, changes in habitat and population are evaluated for the project area, separate from changes in land status. Changes in land status rarely result in near-term changes in ecological characteristics, although over time, management within a federal conservation unit would provide stronger protection of habitat. Changes in land status, including resource characteristics of lands exchanged, are evaluated in the Social Environment (Table 4.1-3).

Table 4.1-2 Impact Criteria for Effects on Biological Resources

Type of Effect	Impact Component	Effects Summary		
Behavioral Disturbance	Magnitude or Intensity	**High**: Acute or obvious/abrupt change in behavior due to project activity; animals depart from the EIS project area.	**Medium**: Noticeable change in behavior due to project activity; animals move away from EIS project area.	**Low**: Changes in behavior due to project activity may not be noticeable; animals remain in the vicinity.
	Duration	**Permanent**: Change in behavior patterns would continue even if actions that caused the impacts were to cease; behavior not expected to return to previous patterns.	**Long-term**: Behavior patterns altered for several years and would return to pre-activity levels some time after actions causing impacts were to cease.	**Temporary**: Behavior patterns altered infrequently, but not longer than the span of project construction and would be expected to return to pre-activity levels after actions causing impacts were to cease.
	Geographic Extent	**Extended**: Affects resources beyond the region or EIS project area.	**Regional**: Affects resources beyond a local area, potentially throughout the EIS project area.	**Local**: Impacts limited geographically; limited to vicinity of the project footprint.
	Context	**Unique**: Resources protected by legislation and the portion of the resource affected fills a unique ecosystem role within the locality or region.	**Important**: Affects depleted resources within the locality or region or resources protected by legislation.	**Common**: Affects usual or ordinary resources in the EIS project area; resource is not depleted in the locality or protected by legislation.
Habitat Alterations	Magnitude or Intensity	**High**: Acute or obvious changes in resource character.	**Medium**: Noticeable changes in resource character.	**Low**: Changes in resource character may not be measurable or noticeable.
	Duration	**Permanent**: Chronic effects; resource would not be anticipated to return to previous levels.	**Long-term**: Resource would be reduced for up to the life of the project and would return to pre-activity levels some time after that.	**Temporary**: Resource would be reduced infrequently but not longer than the span of 1 year and would be expected to return to pre-activity levels.
	Geographic Extent	**Extended**: Affects resources beyond the region or EIS project area.	**Regional**: Affects resources beyond a local area, potentially throughout the EIS project area.	**Local**: Impacts limited geographically; limited to vicinity of the project footprint.
	Context	**Unique**: Resources protected by legislation and the portion of the resource affected fills a unique ecosystem role within the locality or region.	**Important**: Affects depleted resources within the locality or region or resources protected by legislation.	**Common**: Affects usual or ordinary resources in the EIS project area; resource is not depleted in the locality or protected by legislation.

Type of Effect	Impact Component	Effects Summary		
Changes to Wetlands	Magnitude or Intensity	**High:** Changes to wetland system functions are obvious; impacts may cease wetland functions and impair values.	**Medium:** Wetland system functions and values may be altered: changes are measurable or noticeable.	**Low:** Changes to wetland system functions and values may not be measurable or noticeable.
	Duration	**Permanent:** Wetland system functions and values would be removed or altered and would not be anticipated to return to previous functions and values even if the action that caused the impacts ceased.	**Long-term:** Wetland system functions would be reduced throughout the life of the project but could return to pre-activity functions and values at some time after the action that caused the impacts ceased.	**Temporary:** Wetland system functions and values would be reduced, but not longer than the span of project construction and would be expected to return to pre-activity functions and values at the completion of the activity.
	Geographic Extent	**Extended:** Affects wetland resources beyond the region or EIS project area.	**Regional:** Affects extensive wetland systems; impacts extend beyond a local area, potentially throughout the EIS project area.	**Local:** Small-scale wetlands are affected; these are limited geographically to discrete portions of the project area.
	Context	**Unique:** Affects wetlands of very high quality or resources with national or international importance.	**Important:** Affects impaired or depleted wetlands or resources with local or regional importance.	**Common:** Affects wetlands typical of the area and comparable areas for compensatory mitigation are abundant in the vicinity.

Impact Criteria for Socioeconomic Resources

Table 4.1-3 indicates the mechanisms by which effects of the alternatives on social environment resources can be measured. This table summarizes the criteria for determining the level of impact based on the intensity, duration, extent, and context.

Table 4.1-3 Impact Criteria for Effects on Socioeconomic Resources

Type of Effect	Impact Component	Effects Summary		
Effects on Subsistence	Magnitude or Intensity	**High**: Year round change in subsistence use patterns.	**Medium**: Seasonal change in subsistence use patterns.	**Low**: Shift within seasonal subsistence use patterns.
	Duration	**Permanent**: Changes in use patterns would occur longer than 5 years or persist after actions that caused the impacts ceased.	**Long-term**: Changes in use patterns for greater than 1 year to less than 5 years.	**Temporary**: Changes in use patterns for less than 1 year or the duration of project construction.
	Geographic Extent	**Extended**: Effects realized throughout the EIS project area and may extend beyond the EIS project area.	**Regional**: Effects realized by 2 or more communities.	**Local**: Effects realized by a single community.
	Context	**Unique**: Affects subsistence resources/ access/ or harvest and sharing practices beyond the region.	**Important**: Affects subsistence resources/ access/ or harvest and sharing practices within the region.	**Common**: Affects only locally abundant subsistence resources or little changes in harvest and sharing practices.
Effects on Socioeconomic Indicators	Magnitude or Intensity	**High**: Changes in social indicators (such as employment, population, or tourism levels) exceed normal limits and trends or greater than 10% increase or decrease.	**Medium**: Changes in social indicators generally within normal limits and trends or between 5% to 10% increase or decrease.	**Low**: Changes in social indicators difficult to perceive or measure, generally below normal limits and trends or <5% increase or decrease.
	Duration	**Permanent**: Changes in social indicators persist after actions that caused the impacts cease.	**Long-term**: Changes in social indicators extend up to several years (life of the project) and would return to pre-activity levels some time after actions causing impacts were to cease.	**Temporary**: Changes in social indicators last less than 1 year or the period of project construction.
	Geographic Extent	**Extended**: Affects multiple sectors of multiple communities in the region and/or a single sector of a community outside the region.	**Regional**: Affects 2 or more communities in the region or multiple sectors of a single community.	**Local**: Affects a sector of a single community; may alter but does not impair functions of that sector.
	Context	**Unique**: Affects minority or low-income communities.	**Important**: Not Applicable.	**Common**: Affects communities that are not minority or low-income.

Type of Effect	Impact Component	Effects Summary		
Effects on Public Health and Safety	Magnitude or Intensity	**High**: Above background conditions and causes effects that are chronic, irreversible, or fatal.	**Medium**: Above background conditions and causes effects that necessitate treatment or medical management and are reversible.	**Low**: Above background conditions, but within normal variation of human health conditions.
	Duration	**Permanent**: Changes in health indicators persist after actions that caused the impacts cease.	**Long-term**: Changes in health indicators extend up to several years (life of the project) and would return to pre-activity levels some time after actions causing impacts were to cease.	**Temporary**: Changes in health indicators last for less than 1 year or the period of project construction.
	Geographic Extent	**Extended**: Affects communities throughout the EIS project area.	**Regional**: Affects 2 or more communities in the EIS project area.	**Local**: Affects individuals in a single community.
	Context	**Unique**: Affects minority or low-income communities.	**Important**: Not Applicable.	**Common**: Affects communities that are not minority or low-income.
Effects on Qualities of Wilderness Character (Adapted from: Landres et al. 2008)	Magnitude or Intensity	**High**: Changes to wilderness character would have highly noticeable influence on the visitors experience and could permanently alter more than 1 aspect of wilderness character.	**Medium**: Changes to wilderness character would be clearly detectable to the visitor and could have an appreciable effect on 1 or more aspects of wilderness character.	**Low**: Changes to wilderness character would be slightly detectable (if at all) by the visitor and would not have overbearing results on wilderness character.
	Duration	**Permanent**: Permanent changes to wilderness character would occur.	**Long-term**: Changes to wilderness character would occur frequently but would return to pre-activity levels within 1-5 years after actions causing impacts were to cease.	**Temporary**: Changes to wilderness character would not occur or would last less than 1 year or for the duration of project construction.
	Geographic Extent	**Extended**: Effects would extend throughout the wilderness.	**Regional**: Effects would extend through a large portion of the wilderness, such as an eco-region, habitat type, or recreation use area.	**Local**: Effects would occur at site-specific locations within the wilderness.
	Context	**Unique**: The lands in question are protected by legislation and managed for wilderness characteristics.	**Important**: Not applicable.	**Common**: The lands in question are not protected by legislation and are not managed for wilderness characteristics.

Type of Effect	Impact Component	Effects Summary		
Changes to Cultural Resource Character	Magnitude or Intensity	**High**: Loss of integrity required for eligibility to the National Register of Historic Places.	**Medium**: Measurable impacts to integrity not sufficient to affect National Register eligibility.	**Low**: No detectable changes in integrity.
	Duration	**Permanent**: Chronic effects; resource would not be anticipated to return to previous levels.	**Long-term**: Resource integrity would be reduced but effects could be mitigated with active management.	**Temporary**: Resource integrity would be reduced but short term mitigation would be expected to restore pre-activity levels.
	Geographic Extent	**Extended**: Affects resources with significance beyond the region or EIS project area. Significance is defined in 36 CFR 79.	**Regional**: Affects resources with significance throughout the EIS project area. Significance is defined in 36 CFR 79.	**Local**: Impacts limited geographically to discrete portions of EIS project area. Significance is defined in 36 CFR 79.
	Context	**Unique**: Affects cultural resources eligible for the National Register and significant at the national or state level.	**Important**: Affects cultural resources eligible for the National Register and significant at the local level.	**Common**: Affects cultural resources not eligible for the National Register, but protected by other laws.

4.1.4 Resources Not Carried Forward for Analysis

While marine characteristics are relevant to the design of the hovercraft and ferry alternatives, these characteristics would not be altered by any of the proposed alternatives. Bathymetry and circulation, waves, and sea ice would not be affected and are not further discussed in the analysis of impacts.

4.1.5 Irreversible and Irretrievable Commitment of Resources

A commitment of resources is irreversible when the impacts of the proposed action or alternatives would limit the future options for use of the resource, that is, when the impacts could not be reversed, except perhaps in the long term. A commitment of resources is irretrievable when the use or consumption of a resource cannot be renewed or recovered by future generations. This section summarizes the irreversible and irretrievable commitments of resoeurces for the five alternatives analyzed in this EIS.

Under Alternative 1 – No Action, the Service would not enter into a land exchange with King Cove Corporation and the State of Alaska for the purpose of constructing a road between King Cove and Cold Bay, Alaska. As an indirect effect, the transfer of the land currently selected by the King Cove Corporation, and located within the Izembek Wilderness to the east of Cold Bay, may proceed under Alternative 1. Under the federal subsistence management regulations, selected but not conveyed lands are considered federal public lands subject to federal subsistence management, so conveyance to the King Cove Corporation would remove 5,430 acres of selected lands from the current status of federal management and application of the federal subsistence program to a new status as private lands, managed by the King Cove Corporation. This parcel would no longer be managed as part of the Izembek Wilderness. This change in ownership and management of the King Cove Corporation selected parcel would be an irreversible and irretrievable commitment of resources.

Under Alternative 2 - Land Exchange and Southern Road Alignment, the land exchange would be executed to provide to provide for construction of an 18.5 mile single lane gravel road segment from the northeast Terminal to the state land boundary just north of the community of Cold Bay. Approximately 6.0 miles of road construction on the western portion of the alignment would include existing roads and trails. The estimated amount of federal land exchanged in this alternative for the road corridor would be 201 acres, including 131 acres in the Izembek Wilderness. The proposed land exchange would also result in approximately 52,583 acres of former state and King Cove Corporation owned lands coming into federal ownership and management. This would represent a net change of 52,382 acres added to federal management. All land transfers would be an irreversible and irretrievable commitment of resources. The details of potential effects on the physical, biological, and social environment are summarized provided in Table 2.8-1.

Under Alternative 3 - Land Exchange and Central Road Alignment, the land exchange would be executed to provide to provide for construction of a 20.0 mile single lane gravel road segment from the northeast Terminal to the state land boundary just north of the community of Cold Bay. Approximately 9.0 miles of road construction on the western portion of the alignment would include existing roads and trails. The estimated amount of federal land exchanged in this alternative for the road corridor would be 227 acres, including 152 acres in the Izembek Wilderness. The proposed land exchange would also result in approximately 52,583 acres of former state and King Cove Corporation owned lands coming into federal ownership and management. This would represent a net change of 52,356 acres added to federal management. All land transfers would be an irreversible and irretrievable commitment of resources. The details of potential effects on the physical, biological, and social environment are summarized provided in Table 2.8-1.

Alternative 4 – Hovercraft Operations from the Northeast Terminal to Cross Wind Cove (six days per week) would require no land exchange and no new construction beyond that already in place or authorized under the 2003 EIS. As with Alternative 1, the King Cove Corporation selected lands (5,430 acres) would be removed from management as part of the Izembek Wilderness. This change in ownership and management of the King Cove Corporation selected parcel would be an irreversible and irretrievable commitment of resources. The details of potential effects on the physical, biological, and social environment are summarized provided in Table 2.8-1.

Alternative 5 – Lenard Harbor Ferry with Cold Bay dock improvements, would use a ferry to travel 14 miles between a terminal in Lenard Harbor and a substantially modified Cold Bay dock. No fill or dredging would be required for dock modifications, as piles would be driven by a pile driver mounted on the dock or a barge. This portion of the project would have a 0.6 acre total footprint. The new foot print for the Cold Bay dock improvements would represent an irreversible and irretrievable commitment of resources. As with Alternative 1, the King Cove Corporation selected lands (5,430 acres) would be removed from management as part of the Izembek Wilderness. This change in ownership and management of the King Cove Corporation selected parcel would be an irreversible and irretrievable commitment of resources. The details of potential effects on the physical, biological, and social environment are summarized provided in Table 2.8-1.

4.2 Alternative 1 – No Action

Under Alternative 1, the Service would not enter into a land exchange with King Cove Corporation and the State of Alaska for the purpose of constructing a road between King Cove and Cold Bay, Alaska. Modes of transportation available in 2012 between the cities of King Cove and Cold Bay would continue to operate, including air, personal marine vessels, ferry service approximately twice per month in the summer season, and construction of infrastructure to support a marine-road link. The marine component of the marine-road link does not presently exist, but could be served by a landing craft/passenger ferry in the future (AEB 2012).

In correspondence with the Corps, the Aleutians East Borough indicated it is exploring an aluminum landing craft/passenger ferry to provide a marine-road link between the Northeast Terminal and Cross Wind Cove if the land exchange is not approved, in accord with their permit for construction of the road to the Northeast Terminal.

The Aleutians East Borough has identified the general dimensions, passenger capacity, and type of craft they are exploring. The Aleutians East Borough has not, however, identified the frequency of operations it would offer, the specifics on design of a vessel beyond its general dimensions and likely carrying capacity, or the timeline for when a landing craft could become operational in the future, as this marine service would only be offered in lieu of a road connection between the communities of King Cove and Cold Bay. Without those specifics, the Service does not have complete data regarding the reasonably predictable actions of the Aleutians East Borough to develop this mode of transportation if the land exchange does not occur. In order to compare the No Action Alternative to the other four alternatives, the Service made assumptions about the landing craft/passenger ferry within Chapter 4, Environmental Impacts. The No Action alternative is based on the information the Aleutians East Borough has provided about their actions if the land exchange is not approved. The Service's assumptions are as follows:

- The landing craft would only be acquired and deployed if a land exchange does not occur, as the Aleutians East Borough has indicated.
- The specifications for the craft were derived from by information provided by the Aleutians East Borough (AEB 2012, Appendix I):
    - Aluminum landing craft 59 feet long by 16 feet wide with an adjustable landing ramp
    - Replaceable wear pads for hardening the vessel bottom
    - Capacity to carry approximately 30 passengers with cargo and occasional wheeled vehicles, in particular an ambulance
- The vessel specifications identified by the Aleutians East Borough were supplemented with information provided by manufacturers of a landing craft similar to that generally described by the Aleutians East Borough (Crews 2012):
    - The vessel would be fitted with two 500 horsepower inboard engines.
    - The vessel should perform well in up to 12-foot seas, but would have to slow down in a 5 to 6-foot chop.
    - The capital cost of such a craft would be approximately $500,000.

4.2.1 Physical Environment

4.2.1.1 Air Quality

Direct Effects and Indirect Effects from Construction

Air pollutants associated with the project construction are potentially generated from combustion equipment and from fugitive sources, such as ground disturbances which may produce airborne dust. Under Alternative 1, the No Action alternative, no construction activity would take place; therefore, no new combustion equipment or other air pollution generating activities beyond those already existing would occur. No new emissions of air pollutants would be expected.

Summary

With no new construction associated with Alternative 1, no direct or indirect effects on air quality for this alternative would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new combustion equipment or other air pollution generating activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, no new emissions of air pollutants would be expected. If a land exchange and road corridor is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. Since the frequency of potential future service is unknown, the direct and indirect effects on air quality of the operation and maintenance of such a vessel cannot be calculated on an annual basis for comparison with other alternatives. However, combustion emissions estimates were calculated on a per trip basis based on emission factors for similar-sized engines using standard EPA factors. Direct effects and indirect effects from the operation of a landing craft/passenger ferry of the size and type identified by the Aleutians East Borough would produce approximately 0.73 tons of carbon dioxide equivalent per round trip from the Northeast Terminal to Cross Wind Cove.

Summary

With no new combustion equipment or other air pollution generating activities from operation and maintenance of transportation methods, beyond those already existing, Alternative 1 would have no direct or indirect effects on air quality from operation and maintenance. A future landing craft/passenger ferry service would contribute approximately 0.73 tons of carbon dioxide equivalent per trip. This would be a negligible effect because the intensity would be low (not measurable or noticeable), the duration would be long-term but intermittent (occurring only during vessel operation), the extent would be local (impacting only the area immediately surrounding the vessel route), and resource context is common because the area is not within a designated Class I airshed.

Mitigation Measures

No standard mitigation measures would be implemented under Alternative 1 because no new air pollution generating activities are associated with this alternative.

Cumulative Effects

No new air pollution sources would occur under Alternative 1. A current project or activity that would have the potential to affect air quality in the area is the completion of the road to the Northeast Terminal. This road would produce similar air pollutant emissions as those shown for the southern road alignment under Alternative 2 (essentially a continuum), but in the vicinity of the specific action only. The construction of this action is expected to be completed in 2013. Reasonably foreseeable future actions include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via existing air and marine service. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway. This action could cause a temporary increase in dust from construction. No other reasonably foreseeable future actions in the immediate vicinity would affect air quality. The effects from a possible landing craft operation at some future date would have a negligible contribution to cumulative effects, should such service be initiated.

Conclusion

Alternative 1 would have no direct or indirect effect on air quality and would provide no incremental additive or interactive impacts to cumulative effects. If landing craft service is implemented at some date in the future, this could result in negligible effects to air quality.

4.2.1.2 Climate

According to the International Panel on Climate Change (IPCC 2007), anthropogenic greenhouse gas emissions have grown since pre-industrial times, increasing by 70 percent between 1970 and 2004. Additionally, carbon dioxide emissions, which have increased by about 80 percent during that timeframe, are primarily due to fossil fuel use. Greenhouse gas emissions are projected to increase from the year 2000 to 2030 by 25 percent to 90 percent, with fossil fuels maintaining their dominant role in the energy industry. It is considered very likely by the scientific community that global warming and global climate changes during the 21st century will be larger than those observed in the 20th century if greenhouse gas emissions continue at or above current emissions (IPCC 2007). Consistent with this view is that any activity that would emit greenhouse gases, whether a continuation of existing activities or a new greenhouse gas-emitting activity, including those proposed for the project, would be expected to contribute to this increase in global climate change.

Actual effects of climate change that have already been observed and are expected to continue include increasing air temperatures, rising sea levels, decreasing thickness and extent of sea ice, changes in precipitation amounts, changes to ocean salinity, ocean acidification, increases in coastal erosion, and changes to storm intensity and frequency. Climate change effects pose threats to the man-made environment as well as the natural environment including wildlife habitat and the food web. Due to the relative uncertainty of climate change models and the complex relationship of the factors that contribute to climate and climate change, it is not feasible to accurately predict project-related impacts in terms of actual impacts to climate change (e.g., degrees of temperature change, inches of sea level rise). However, it is generally accepted in the scientific community that increasing greenhouse gas atmospheric concentrations tend to warm the planet (EPA 2011), so for this analysis, greenhouse gas emissions are used as a surrogate to predict an activity's impact on climate change and to compare alternatives.

In accordance with the Council for Environmental Quality's guidance for considering climate change in NEPA documents, effects associated with climate change are considered to be those that are 1) a result of implementing the proposed action; and 2) a result of how climate change could affect the proposed alternatives and associated activities.

Direct Effects and Indirect Effects from Construction

No construction activity would be associated with Alternative 1; therefore, no construction-related direct or indirect impacts to climate change would result from Alternative 1.

Summary

No construction-related direct or indirect impacts to climate change would result from Alternative 1.

Direct Effects and Indirect Effects from Operation and Maintenance

Effects associated with climate change that would result from Alternative 1 are attributed to greenhouse gas emissions that result from trips between the communities of Cold Bay and King Cove. These include greenhouse gases emitted directly from the vessel used to transport people and vehicles between the communities. For Alternative 1, the modes of transportation used between the cities of King Cove and Cold Bay include:

- Regularly scheduled flights;
- Personal transit by local fishing vessels (including medical evacuation transport);
- Ferry service twice per month seasonally; and
- A possible future landing craft/passenger ferry service with an unknown frequency of service.

These modes of transportation would still be in use for each action alternative described in the following sections, with the exception of the possible landing craft/passenger ferry service.

Effects of global climate change could, over time, affect the transportation operations included in Alternative 1. Changes to storm intensity and frequency could have the largest effect on transportation. If storms increase in frequency and intensity, it could impact the safety of airplane, boat, and landing craft transportation.

The King Cove and Cold Bay communities have small populations. Under Alternative 1, vehicular traffic is limited since no roads connect with other roads outside of the vicinity of either community. For comparison between alternatives, emissions from flights and personal fishing vessels are not quantified, since these would likely be the same for all alternatives and are difficult to quantify. State ferry service, which operates 2 trips per month (May – September), would also be the same for each alternative and is therefore not included in the emissions calculations. Alternative 1 would have no greenhouse gas emissions to compare to the other alternatives. Therefore, for comparison purposes with the other alternatives, the estimated annual emissions of carbon dioxide equivalent greenhouse gasses would be zero. If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. Since the frequency of service is unknown, the direct and indirect effects on climate change from the operation and maintenance of such a vessel cannot be calculated on an annual basis for comparison with other alternatives. However, combustion emission estimates were calculated on a per trip basis based on emission factors for similar-sized engines using standard EPA factors. Direct effects and indirect effects from the operation of a landing craft/passenger ferry of the size and type identified by the Aleutians East Borough would produce approximately 0.73 tons of carbon dioxide equivalent per round trip from the Northeast Terminal to Cross Wind Cove.

Greenhouse gases can remain in the atmosphere from decades up to centuries or longer. Greenhouse gas concentrations contribute to warming the planet and climate change on a global level (IPCC 2007). While climate change affects the entire globe, certain geographic areas and ecosystems are more susceptible to the effects of climate change than others. Coastal areas vulnerable to damage from rising sea levels, permafrost regions, and ecosystems dependent on sea ice are examples of such areas that are more susceptible to the effects of climate change. Weather and climate patterns play major roles in the components of an ecosystem: precipitation affects waterbodies and vegetation type and coverage, temperatures affect vegetation and wildlife species able to thrive in certain environments, etc.

Summary

Alternative 1 includes existing commercial and non-commercial modes of transportation between the communities of King Cove and Cold Bay for limited trips. These low population areas are limited in transportation options. Alternative 1 would not generate direct and indirect impacts to climate change as sources of greenhouse gases are common to all other alternatives. Direct effects and indirect effects from the potential future operation of a landing craft/passenger ferry of the size and type identified by the Aleutians East Borough would produce approximately 0.73 tons of carbon dioxide equivalent per round trip from the Northeast Terminal to Cross Wind Cove. The annual amount of carbon dioxide emissions for future operation of a landing craft/passenger ferry cannot be calculated because the proposed number of trips has not been determined. The annual carbon dioxide equivalent produced by the other alternatives ranges from 847 to 2,045 tons per year.

Mitigation Measures

No effects to climate from Alternative 1 are expected, so no mitigation measures are proposed.

Cumulative Effects

The amount of greenhouse gases in the atmosphere is the cumulative result of past and present emissions (and removals) of greenhouse gases from human and natural processes. Carbon dioxide, methane, and nitrous oxide are considered long-lived greenhouse gases and can remain in the atmosphere from a decade to centuries or more. Due to these properties, cumulative effects to climate change from greenhouse gas emissions are both additive and synergistic in nature (see discussion in Section 3.1.2.1). According to the International Panel on Climate Change, carbon dioxide is considered the most important greenhouse gas due to its dominant atmospheric concentration. Under this alternative, approximately 0.73 tons of carbon dioxide equivalent would be contributed per round trip of the potential future operation of a landing craft/passenger ferry of the size and type identified by the Aleutians East Borough.

In the EIS project area, additional future activities that would emit greenhouse gases into the atmosphere, such as carbon dioxide, include the Cold Bay Airport Runway Safety Area project.

In general, individual greenhouse gas emissions by themselves do not have a large impact on climate change. However, once added with all other greenhouse gas emissions in the past and present, these emissions would combine to create a potentially perceptible change to climate; they could also contribute to future climate change impacts, although these effects would likely not be measurable. The effect of a possible landing craft operation at some future date would have a negligible contribution to cumulative effects on climate change, should such service be initiated.

Conclusion

Alternative 1 is expected to have no direct or indirect effects because sources of greenhouse gases under Alternative 1are common to all the other alternatives. For comparison purposes Alternative 1 will produce no effects. However, under Alternative 1 the land exchange would not be approved, and if a landing craft/passenger ferry were to be implemented at some date in the future, there would be direct and indirect effects on climate from the emissions from that type and size a vessel. The duration of those emissions would be long-term because they are considered to be long-lived greenhouse gases that can remain in the atmosphere for a decade to centuries or more, and the geographic extent is extended with an important context because the emissions are additive to other world wide atmospheric concentrations that contribute to global warming. The magnitude, however, would be very low because the amount of carbon dioxide emitted would be similar to other small vessels operating in the area and would not be noticeable or measurable. The resulting overall effect would therefore be considered negligible.

4.2.1.3 Geology and Soils

Direct Effects and Indirect Effects from Construction

As no new construction of facilities in the project area would occur under the No Action alternative, geological processes and soils would not be altered as a result of construction by this alternative.

Summary

No construction-related direct or indirect impacts to geological processes or soils would result from Alternative 1.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new effects on geologic processes and soils from operation and maintenance of existing transportation methods. If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. However, since the frequency of service is unknown, the operation and maintenance effects on geologic processes and soils from shoreline erosion, through wave action generated by the landing craft during departures and arrivals, cannot be calculated for comparison with other alternatives.

Summary

With no new activities to cause erosion or other effects on geologic processes and soils, beyond those already existing, Alternative 1 would have no direct or indirect effects on geologic processes and soils from operation and maintenance. A potential future landing craft/passenger ferry service would contribute some effects that cannot be quantified.

Mitigation Measures

No standard mitigation measures would be implemented under Alternative 1 because no new activities affecting geologic processes and soils are associated with this alternative.

Cumulative Effects

Past and present effects on geologic resources include disturbance of soils and beach materials at the new Northeast Terminal, and soils along the road corridor from the City of King Cove to the new facility and at the Lenard Harbor material site. Geologic resources from the Lenard Harbor material site are being used for construction of the road and pad for the new Northeast Terminal. Construction materials, including crushed rock and rip rap, would be stockpiled at the Lenard Harbor material site for up to 10 years for operation and maintenance. Waste materials from excavations would be disposed on upland areas. Reasonably foreseeable future actions include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air, ferry, or fishing vessels, and would have no effect on geologic resources or soils. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway, which would have a direct effect on geology and soils in that local area. No other reasonably foreseeable future actions are in the immediate vicinity that would affect geologic processes or soil resources. With no direct or indirect effects to geologic processes and soils expected under Alternative 1, there would be no contribution to cumulative effects on these resources.

Conclusion

Alternative 1 would result in no direct and indirect effects on geologic resources and soils in the project area. If landing craft service is implemented at some date in the future, this could result in some shoreline erosion effects from wave action generated by the landing craft during departures and arrivals, which cannot be quantified without more information. The summary rating for impacts to geologic processes and soils expected under Alternative 1 would be negligible because any possible erosion generated by a vessel in the future would be of low magnitude, probably not measurable, would be intermittent, only occurring when the vessel passes, and would affect small local areas, if any, of shoreline susceptible to erosion from vessel wakes. Shoreline erosion from one additional vessel operating in Cold Bay would probably not be noticeable above any on-going erosion caused by the wakes from vessels that currently operate in the bay.

4.2.1.4 Hydrology/Hydrologic Processes

Direct Effects and Indirect Effects from Construction

No new construction would occur within the project area resulting from the No Action alternative; hydrology and hydrologic processes would not be altered.

Summary

No construction-related direct or indirect impacts to hydrology or hydrologic processes would result from Alternative 1.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects to hydrologic resources, including water resources or water quality may occur under Alternative 1 during use of existing marine modes of transportation, but would be negligible under routine operations. No new modes of transportation or effects to hydrologic resources would be introduced. Fuel spills are a low probability event, but could affect water quality if they were to occur. The extent of the effects would be localized to Cold Bay at the docking locations and along the preferred routes of travel used by vessels.

Waters of the State of Alaska (surface water and groundwater) are regulated by the Alaska Department of Environmental Conservation in accordance with Alaska Administrative Code, Title 18, Chapter 70, *Water Quality* (18 AAC 70) (ADEC 2009a); Chapter 75, O*il and Other Hazardous Substances Pollution Control* (18 AAC 75) (ADEC 2008); and Chapter 80, *Drinking Water* (18 AAC 80) (ADEC 2009b).

Summary

Operation and maintenance effects to water resources or water quality may occur under Alternative 1 during use of existing marine modes of transportation, but would be negligible under routine operations. No new modes of transportation or effects to hydrologic resources would be introduced. Although effects would be intermittent but long-term in duration, they would be low intensity (not noticeable and difficult, if not impossible to measure), local in extent (affecting only the immediate vicinity), and common in context (not affecting any unique or important resources or values). Fuel spills are a low probability event, but could affect water quality if they were to occur.

Mitigation Measures

No additional mitigation measures would be required beyond those are currently being implemented by existing marine modes of transportation.

Cumulative Effects

No new direct and indirect impacts to hydrologic processes would occur under Alternative 1. The impacts from existing vessels may include fuel and sewage releases at the docking locations and along the preferred routes. Reasonably foreseeable future actions in the immediate vicinity include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air or marine vessels. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway which would have a direct effect on hydrology in that local area. No other reasonably foreseeable future actions are in the immediate vicinity that would affect hydrology or hydrologic processes. Alternative 1 would have no contribution to cumulative effects on these resources. If landing craft service is implemented at some date in the future, this could result in a negligible contribution to cumulative effects.

Conclusion

Alternative 1 would have no direct or indirect effect on water resources and would provide no incremental additive or interactive impacts to cumulative effects. If landing craft service is implemented at some date in the future, this could result in negligible effects.

4.2.1.5 Hazardous Materials

Under Alternative 1, the land exchange would not be implemented and the road would not be constructed; thus no direct or indirect effects regarding transfer of responsibility of contaminated sites documented within lands proposed for exchange would occur.

Direct Effects and Indirect Effects from Construction

No new construction would occur under Alternative 1; therefore, no direct or indirect effects to hazardous materials and waste management associated with construction activities of Alternative 1 would result.

Summary

No direct or indirect effects as a result of construction would occur under Alternative 1.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects from fuel spills may occur under Alternative 1 during use of existing marine modes of transportation, but would be negligible under routine operations. Fuel spills are a low probability event, but could occur. If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. As part of any landing craft operations, a hazardous materials and petroleum product control plan would be developed and implemented to address handling, storage, and disposal of hazardous materials or petroleum products used or generated.

Summary

With no new methods of transportation, Alternative 1 would produce no new direct or indirect effects from hazardous materials associated with operation and maintenance. Should a future landing craft/passenger ferry service be implemented, it would be required to have a hazardous materials and petroleum product control plan.

Mitigation Measures

No standard mitigation measures would be implemented under Alternative 1 because no new activities are associated with this alternative.

If a future landing craft/passenger ferry service is implemented, it would be required to have a hazardous materials and petroleum product control plan that addresses the prevention, containment, cleanup, and disposal of hazardous waste material including petroleum products generated during operation and maintenance activities. The plan would also contain fuel handling procedures described in a fuel handling and spill response plan. Examples of mitigation measures to address fuel spills include the requirement for spill response supplies, adequate in type and quantity for the equipment being used, to be onsite and readily accessible at all times.

Cumulative Effects

Reasonably foreseeable future actions include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air or existing marine vessels, but should not affect the management of hazardous materials. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway, which should also not have an effect on hazardous materials. No other reasonably foreseeable future actions are in the immediate vicinity that would affect the management of hazardous materials. The effects from a possible landing craft operation at some future date would be addressed in a hazardous materials and petroleum product control plan, and would produce negligible contributions to cumulative effects, should such service be initiated.

Conclusion

Alternative 1 would have no impacts to hazardous materials and waste management and would provide no incremental additive or interactive impacts to cumulative effects.

If landing craft service is implemented at some date in the future, there would be potential from fuel spills. Fuel spills are a low probability event, but could affect water quality. Potential effects under routine operations would be temporary in duration, low intensity because of the amount of fuel likely to be carried on such a vessel, local in extent (affecting only the area in the vicinity of the vessel before the fuel is removed or dissipates into the atmosphere) and common in context, resulting in a negligible contribution to cumulative effects on water quality and an overall negligible effect.

4.2.1.6 Noise

Direct Effects and Indirect Effects from Construction

Alternative 1, the No Action alternative, would have no noise generating activities from construction; hence no effects on the existing noise environment would result.

Summary

Alternative 1 would have no new construction and therefore no noise effects.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new noise generating activities. If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some future date to complete a marine-road link between the communities of King Cove and Cold Bay. With the frequency of service unknown, the direct and indirect effects of the operation and maintenance of such a vessel cannot be calculated. However, noise levels from such a vessel would likely be similar to fishing vessels currently operating in the area, and therefore would produce negligible direct and indirect effects.

Summary

Alternative 1 would have no direct and indirect effects on noise. Future noise levels from a landing craft/ferry would likely be similar to fishing vessels currently operating in the area, and therefore would produce only negligible direct and indirect effects.

Mitigation Measures

No mitigation measures would be implemented under Alternative 1 because no new noise generating activities are associated with this alternative.

Cumulative Effects

A current project that would have the potential to affect noise in the area is the completion of the King Cove Access Road Project (construction equipment) and from the future use of that road by passenger vehicles and maintenance equipment. Reasonably foreseeable future actions in the immediate vicinity include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air, ferry, or marine vessels. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway. This action could cause a temporary increase in noise from construction. No other reasonably foreseeable future actions in the immediate vicinity would affect noise. With the frequency of service unknown, the effects on noise from the operation and maintenance of a landing craft cannot be calculated, but would likely be similar to fishing vessels currently operating in the area, with potential for negligible contributions to cumulative effects.

Conclusion

Alternative 1 would result in no direct and indirect effects on noise in the project area. However, if Alternative 1 is selected, a landing craft/passenger ferry could be implemented in the future.

With the frequency of service unknown, the direct and indirect effects on noise from the operation and maintenance of such a vessel cannot be calculated, but would likely be similar to fishing vessels currently operating in the area, with potential for negligible direct and indirect effects.

4.2.2 Biological Environment

4.2.2.1 Terrestrial and Aquatic Plant Communities

Vegetation and resulting plant communities are vital biological elements that influence many of the other biological, physical, and social resources addressed in this EIS. Vegetation provides food and cover for land mammals and birds, including threatened and endangered species. Aquatic vegetation provides habitat for waterfowl, mammals, and fishery resources. Wetlands are identified and wetland functions are recognized based upon the types of vegetation present. Water quality, soils, and even climate and noise are influenced by the presence and characteristics of vegetation. Within the list of social environment topics, visual resources, wilderness characteristics, subsistence activities, cultural resources, and land uses are all greatly influenced by the types of vegetation resources present.

The functions of vegetation are extensive and vary in relation to other components of the environment. Plant communities can also be said to provide "services," which are considered to be benefits that human populations receive from functions that occur in ecosystems and are based upon the relationship with other resources and their contribution to the values of resource users. A substantial variable that influences the value of a plant community is location. For example, vegetation that functions as suitable nesting land cover for waterfowl is most valuable when located within close proximity to the other waterfowl habitat requirements, such as breeding and brood rearing ponds. Lichens and vascular plants located on wind-blown slopes and ridge tops are valuable for caribou winter grazing, and plant communities that function to filter sediments from surface water flows are most valuable adjacent to ponds and streams. The direct and indirect effects on vegetation resulting from the alternative described below are therefore recognized in relation to the functions of the affected plant communities and the values of those functions based on location.

As an indirect effect under this alternative, the King Cove Corporation selected lands may be withdrawn from the Izembek Wilderness and conveyed to the King Cove Corporation, which would then control the land use, subject to the provisions of ANCSA Section 22(g). This provision requires that King Cove Corporation would manage its land in such a way that no adverse effects result on the adjacent lands of the Izembek National Wildlife Refuge. The land cover types on this land include a diversity of perennial ice and snow, open water, barren land, dwarf shrub, emergent herbaceous vegetation, and grassland/herbaceous vegetation (see Table 3.2-2). The King Cove Corporation could develop these newly conveyed parcels, subject to a compatibility determination by the Izembek National Wildlife Refuge manager concluding that no adverse effects occur on lands of the Izembek National Wildlife Refuge. Thus any potential development could permanently alter these vegetation types in the local area of the King Cove Corporation lands, but would not extend beyond to the lands of the Izembek National Wildlife Refuge.

Direct Effects and Indirect Effects from Construction

Alternative 1 would have no new construction beyond what was authorized in the 2003 EIS and subsequent permits, so direct effects to vegetation were already addressed in those documents. The indirect effect of potential development on the newly conveyed King Cove Corporation lands would likely be low in intensity (no such development projects are reasonably foreseeable), local in extent, permanent in duration, and affecting resources that are common in context (resources not rare in the locality and is not protected by legislation). These would represent a minor indirect effect.

Summary

Alternative 1 would result in no direct and minor indirect effects on vegetation from construction and the conveyance of the King Cove Corporation selected lands. If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. This action would likely have no effects to vegetation.

Direct Effects and Indirect Effects from Operation and Maintenance

Alternative 1 would result in no direct or indirect effects on vegetation from operation and maintenance of existing forms of transit.

Adoption of the No Action alternative would not introduce new impacts to vegetation, due to operation and maintenance.

Summary

No new direct or indirect effects on vegetation would result from operation and maintenance.

Mitigation Measures

No mitigation measures would be required.

Cumulative Effects

Alternative 1 would make a minor contribution to cumulative effects to vegetation because no vegetation-disturbing direct effects would be implemented, but minor effects could result from the conveyance of the King Cove Corporation selected lands.

Conclusion

Alternative 1 would result in a minor effect on vegetation.

4.2.2.2 Wetlands

Wetlands are prevalent in the landscape within the project area and provide a range of ecological services. The wetland types in the project area (described in Chapter 3) provide a wide diversity of habitats used by fish and wildlife and they provide biogeochemical and hydrologic wetland functions. The functions performed by these wetlands, as listed on Table 3.2-7, are considered to have "value," which is based upon the goods and services to society that emanate from these functions (Brinson 1993). The wetlands within the project area have been recognized as having very high value through the designation of these lands and waters as part of the National Wildlife Refuge System, as a State Game Refuge, and as a Wetlands of International Importance site (Ramsar 1986).

Direct Effects and Indirect Effects from the Land Exchange

The No Action alternative would not introduce new direct impacts to wetlands. No wetlands would be filled, nor would their soils, vegetation, or hydrology be altered. However, as an indirect effect under this alternative, King Cove Corporation lands proposed in the land exchange within the Izembek National Wildlife Refuge including the approximately 5,430 acres of King Cove Corporation selected lands within the Izembek Wilderness Area (containing approximately 1,917 acres of wetlands) could be subject to development by King Cove Corporation. These lands are subject to the provisions of ANCSA 22(g) and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes.

Direct Effects and Indirect Effects from Construction

Alternative 1 would have no new construction and no land exchange. This would result in no direct effects and no indirect effects on wetlands.

Summary

No direct indirect effects on wetlands would result from Alternative 1.

Direct Effects and Indirect Effects from Operation and Maintenance

Continued operation and maintenance of current modes of transportation between the cities of King Cove and Cold Bay would not result in direct or indirect effects on wetlands beyond what was identified and analyzed in the 2003 EIS. The previously considered actions include the completion of an access road from Lenard Harbor to the Northeast Terminal that is estimated to fill 11 acres of primarily lowland wet sedge meadow wetland. If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. This action would not likely have effects to wetlands.

Summary

No new direct or indirect effects on wetlands would result from operation and maintenance.

Mitigation Measures

No mitigation measures would be required.

Cumulative Effects

Alternative 1 would result in no additional direct effects on wetlands because no wetland disturbing activity would be implemented. Indirectly, an unspecified area of wetlands could be affected from the conveyance of the King Cove Corporation selected lands, should these lands be developed and that development includes wetland areas. Therefore, the alternative could make a minor contribution to cumulative effects to wetlands.

Conclusion

Alternative 1 would result in no new direct effects and potentially minor indirect and cumulative effects on wetlands. Overall, Alternative 1 would result in minor effects on wetlands.

4.2.2.3 Fish and Essential Fish Habitat

Alternative 1 would continue the current transportation methods between the communities of King Cove and Cold Bay via commercial air carriers and privately owned marine vessels. The primary mechanisms for effects on fish are noise and pollution generated from marine vessels. Fish resources and Essential Fish Habitat associated with the marine environment are the only groups impacted by this alternative, as the land-based components do not impact freshwater fish or freshwater Essential Fish Habitat.

Direct Effects and Indirect Effects from the Land Exchange

There would be no land exchange for the purpose of constructing and operating a road between the communities of King Cove and Cold Bay. However, as an indirect effect under this alternative, King Cove Corporation selected lands may be conveyed to the King Cove Corporation. These lands are subject to the provisions of ANCSA 22(g) and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes. This action would not affect fish and Essential Fish Habitat and is not discussed further.

Direct Effects and Indirect Effects from Construction

Alternative 1 would have no new construction beyond what was authorized in the 2003 EIS and subsequent permits. The alternative would have no direct or indirect effects from construction on fish resources.

Summary

No direct or indirect effects from construction would result from Alternative 1.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new methods of transportation or other fish habitat altering activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, no new direct effects and indirect effects from operation and maintenance would occur.

If a land exchange and road corridor is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. Since the frequency of service and other factors is unknown, the direct and indirect effects on fish and Essential Fish Habitat of the operation and maintenance of such a vessel cannot be determined. However, direct effects from potential future landing craft operation would include intermittent disturbance to marine fish from noise and from the physical presence of the landing craft along the travel route. Impacts would be concentrated near the water surface along the travel path and landing pads, with some disturbances extending into the water column. Indirect effects resulting from landing craft operations are not anticipated. Noise disturbance would be intermittent and minimal, similar to disturbances from fishing vessels commonly used in the area.

Oil, sewage or other contaminant leaks from landing craft operations are possible and could affect small numbers of fish depending on the location and magnitude of the spill, and the prevailing winds. Under normal operations, including proper safety procedures, the risk of a spill is small. The chance of catastrophic spills, such as caused by a vessel collision, grounding, or sinking, is possible, but no greater than other vessels (fishing) currently operating in the area.

Summary

Alternative 1 would result in no new methods of transportation or other fish habitat altering activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, Alternative 1 would have no new effects from operation and maintenance activities to fish resources. Existing noise disturbance to fish and Essential Fish Habitat from existing methods of travel would continue. Similarly, the existing potential for oil, sewage, or other contaminant leaks would continue. Therefore, the direct and indirect effects from operation and maintenance under Alternative 1 would be negligible.

Mitigation Measures

No mitigation measures would be required under Alternative 1 because no new activities or effects are associated with this alternative.

Cumulative Effects

Past actions include impacts to anadromous and freshwater fish habitat through road and trail development dating back to the 1940s, when the Cold Bay Airport was constructed. The completion of the King Cove Access Project (USACE 2003) has some potential to affect fish or Essential Fish Habitat within the EIS project area. The project includes the extension of the King Cove Road from Lenard Harbor to the Northeast Terminal on Cold Bay and the construction of a new landing site. The 2003 EIS considered the effects of road construction on marine species and Essential Fish Habitat along the shoreline portion of the road and determined the effects would be negligible. Likewise, appropriate design features were incorporated to ensure no anadromous or freshwater fish habitat would be affected. The 2003 EIS, however, identified a number of potential effects that could occur from road traffic crossing salmon habitat (operation). Anticipated types of effects include reduction in water quality through erosion of streambanks, sedimentation, scouring, risk of fuels and other hazardous materials entering stream systems, and increased human access which could lead to increased harvesting along the road corridor.

A reasonably foreseeable future action considered is the expansion of the North Pacific Groundfish Observer Program to all vessels, regardless of size. This is expected to increase the number of observers transiting between the communities of Cold Bay and King Cove. However, the number of observers travelling between these locations will still remain very low relative to the total passenger demand, and is doubtful to add substantially to the transportation demand. Therefore, no effects to fish or Essential Fish Habitat are anticipated.

The effects from a possible landing craft operation at some future date would have effects primarily associated with vessel noise, and secondarily from the potential to leak oil, sewage, or other contaminants. These effects would produce a negligible contribution to cumulative effects on fish and Essential Fish Habitat, if such service is initiated.

Conclusion

Alternative 1 would have no direct or indirect effect on fish or Essential Fish Habitat and would provide no incremental additive or interactive impacts to cumulative effects. If landing craft service is implemented at some date in the future, this would result in negligible effects.

4.2.2.4 Birds

Direct Effects and Indirect Effects from Construction

Alternative 1 would have no new construction beyond what was authorized in the 2003 EIS and subsequent permits. Direct and indirect effects to birds and bird habitats were addressed in the 2003 EIS; Alternative 1 would have no new direct or indirect effects to birds.

As an indirect effect of Alternative 1, the land exchange would not occur and the 5,430 acres of King Cove Corporation selected lands on the northeast side of Cold Bay could be conveyed from the Izembek National Wildlife Refuge to the King Cove Corporation. These lands are a mixture of wetland habitats in the northern half and upland habitats in the south. The area likely provides nesting and foraging habitat for Tundra Swans, Mallards, Black Scoters, other ducks, Bald Eagles, Willow Ptarmigan, other landbirds, Rock Sandpipers, Dunlin, and other shorebirds. High densities of Tundra Swans nest in the wetland areas of this parcel. The upland areas likely provide good nesting and foraging habitat for ptarmigan and other landbirds. The change in ownership of these lands would remove the wilderness designation and potentially make the lands available for development, subject to the provisions of ANCSA Section 22(g), which could adversely affect birds through localized loss of habitat and periodic disturbance from human activities and vehicles used for access.

Summary

Alternative 1 would have no direct effects from construction on birds. The indirect effect of conveyance of the King Cove Corporation selected lands could result in activities that disturb birds, but this would have a low intensity because the land exchange would not result in a noticeable change in resource condition. Effects would be permanent duration because the new ownership would continue beyond the project; local in extent because the effect is limited to the selected parcel; and important in context because the parcel is within the area designated as a Wetland of International Importance. The indirect effects of the conveyance of the selected parcel would be minor.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new methods of transportation or other disturbance or habitat altering activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, no new direct effects and indirect effects from operation and maintenance would occur.

If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. Landing craft use is most likely to affect seabirds and waterfowl since those groups are more likely to occur in Cold Bay. The effects of a landing craft on birds include flushing when a vessel approaches. The frequency of encounters would be intermittent, but would persist at a low intensity. The duration of effects would be considered long-term (intermittent but persistent), occurring in a localized geographic area. Birds have likely become accustomed to boat traffic in Cold Bay, so disturbance from a landing craft would likely be negligible, but could vary, depending on levels of service.

Oil or other contaminant leaks from landing craft operations are possible and could affect small numbers of seabirds and waterfowl depending on the location and magnitude of the spill, and the prevailing winds. Under normal operations including proper safety procedures, the risk of a spill is small. The chance of catastrophic spills, such as caused by a vessel collision, grounding, or sinking, is low due to the infrequency of use, the proposed route away from shallow areas, and safety precautions that would be mandatory for public service vessels.

Summary

With no new methods of transportation or other disturbance or habitat altering activities from operation and maintenance of transportation methods, beyond those already existing, Alternative 1 would have no new effects from operation and maintenance activities to bird resources. Existing noise disturbance to birds from existing methods of travel would continue. If landing craft service were implemented in the future, the effect on birds would likely be negligible, but could vary, depending on levels of service.

Mitigation Measures

No mitigation measures would be required under Alternative 1 because no new activities or effects are associated with this alternative.

Cumulative Effects

Past and present actions that have and may continue to affect birds in the project area are described in Section 3.2.4. The completion of the King Cove Access Road may result in more hunting for waterfowl and other species (e.g., seals) at Kinzarof Lagoon and the northeast side of Cold Bay, which could disturb waterfowl and other birds as well. Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through the community of King Cove, upgrades to the Cold Bay Airport, and minor changes to land use patterns in the King Cove Corporation selected lands consistent with Section 22(g) of ANCSA. These actions may cause an increase in periodic disturbance to birds and minor alteration of habitat. Alternative 1 would result in a minor contribution to cumulative effects on birds.

Conclusion

Under Alternative 1, the King Cove Corporation selected lands could be withdrawn from wilderness status and conveyed to the King Cove Corporation, resulting in potential land use changes subject to the provisions of Section 22(g) of ANCSA. Such potential developments would need to be consistent with the purposes of Izembek National Wildlife Refuge, but there may be some minor indirect effects to birds using these lands, including localized loss of habitat and increased periodic disturbance. These effects would have a low intensity because the conveyance of the selected parcel would not result in a noticeable change in resource condition; a permanent duration because the new ownership would continue beyond the project; local in extent because the effect is limited to the selected parcel; and important in context because the parcel is within the area designated as a Wetland of International Importance. The indirect effects of the conveyance of the selected parcel would be minor. There would be no direct or indirect effects on birds from construction or operation and maintenance. If landing craft service is implemented at some date in the future, this would result in negligible effects. The overall effect to birds would be minor.

4.2.2.5 Land Mammals

Direct Effects and Indirect Effects from Construction

Alternative 1 would have no new construction beyond what was authorized in the 2003 EIS and subsequent permits, resulting in no direct or indirect effects on land mammals.

Under this alternative, the land exchange would not occur. As an indirect effect, the King Cove Corporation selected lands on the northeast side of Cold Bay may be conveyed to the King Cove Corporation. These lands are high density brown bear habitat in the spring, summer, and fall, with a small amount of denning habitat at the south end. Caribou use the area during the winter. The change in ownership of these lands would remove the wilderness designation and potentially make the lands available for development, subject to the provisions of ANCSA Section 22(g) and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes. These effects would have a low intensity because the land exchange would not result in a noticeable change in resource condition; a permanent duration because the new ownership would continue beyond the project; local in extent because the effect is limited to the selected parcel; and important in context because the parcel is designated as wilderness and is within the area designated as a Wetland of International Importance. Therefore the land conveyance could have a minor indirect effect on brown bears, caribou, and other land mammals in the local area of the King Cove Corporation lands, but effects would not be expected to extend beyond to the lands of the Izembek National Wildlife Refuge, as a result of the ANCSA 22(g) requirements.

Summary

Alternative 1 would have no direct effects on land mammals from construction. The indirect effect of conveyance of the King Cove Corporation selected lands could result in activities that would disturb land mammals, but this would be a minor indirect effect.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new activities from operation and maintenance of transportation methods beyond those already existing. Therefore, no direct or indirect effects would occur.

If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. This activity may briefly disturb land mammals near operations at the Northeast Terminal and at Cross Wind Cove. The duration of land-based operations would be brief and the number of individual animals potentially affected would be small, the geographic area affected would be localized, and the resources affected would be common. Thus, effects would be negligible.

Summary

With no new activities from operation and maintenance of transportation methods, beyond those already existing, Alternative 1 would have no direct or indirect effects on land mammals from operation and maintenance. A future landing craft/passenger ferry service would result in negligible effects.

Mitigation Measures

No mitigation measures would be required under Alternative 1 because no new activities or effects are associated with this alternative.

Cumulative Effects

Past and present actions that have and may continue to affect land mammals in the project area include sport and subsistence hunting and trapping, wildlife viewing, and management. Because the project area is in a national wildlife refuge, past and present actions that would affect wildlife have been purposefully limited. Very few land-disturbing activities have taken place in the refuge since its establishment. This area has experienced very low hunting and trapping pressure due to its inaccessibility. The completion of the King Cove Access Road is expected to result in greater hunter and trapper access to large mammals and furbearers in the project area.

Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human disturbance to land mammals. Alternative 1 would result in a minor contribution to cumulative effects on land mammals due to the conveyance of the selected parcel to King Cove Corporation.

Conclusion

Under Alternative 1 the King Cove Corporation selected lands could be withdrawn from wilderness status and conveyed to the King Cove Corporation, resulting in potential land use changes subject to the provisions of Section 22(g) of ANCSA. Such potential developments would need to be consistent with the purposes of Izembek National Wildlife Refuge, but there may be some minor indirect effects to brown bear and caribou using these lands. These effects would have a low intensity because the land exchange would not result in a noticeable change in resource condition; a permanent duration because the new ownership would continue beyond the project; local in extent because the effect is limited to the selected parcel; and important in context because the parcel is designated as wilderness and is within the area designated as a Wetland of International Importance. There would be no direct effects on land mammals from construction or operation and maintenance. If landing craft service is implemented at some date in the future, this would result in negligible effects. The overall effect to land mammals would be minor.

4.2.2.6 Marine Mammals

Under Alternative 1, as an indirect effect the King Cove Corporation selected lands could be conveyed to the King Cove Corporation and would be subject to the provisions of ANCSA 22(g) and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes. There would, however, be no land exchange for the purpose of constructing and operating a road between the communities of King Cove and Cold Bay. This action would not affect marine mammals and is not discussed further.

Fourteen species of marine mammals inhabit the North Pacific Ocean adjacent to Cold Bay and the Bering Sea adjacent to Izembek Lagoon (see Section 3.2.6). Of these, harbor seals, killer whales, harbor porpoise, and gray whales occur with some regularity in the EIS project area, so will be evaluated as to potential effects from the proposed alternatives. Northern sea otters and Steller sea lions are discussed in Section 4.2.2.7, Threatened and Endangered Species. Pinnipeds (harbor seals) and cetaceans (killer whales, harbor porpoise, and gray whales) are analyzed together. Although harbor seals use both terrestrial and marine habitats and the cetaceans are restricted to marine habitats and are less commonly sighted in the project area, many of the impact conclusions are the same. Where differences occur they are noted.

Direct Effects and Indirect Effects from Construction

No construction would be associated with this alternative beyond what is authorized in the 2003 EIS and subsequent permits for completion of the road to the Northeast Terminal.

Summary

No construction would be associated with this alternative, so this alternative would have no effects from construction on harbor seals, killer whales, harbor porpoise, and gray whales.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, no new effects would be expected.

If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. The primary types of potential direct and indirect effects on harbor seals, killer whales, harbor porpoise, and gray whales from operation and maintenance of a landing craft are disturbance, primarily from noise, vessel strikes, or habitat degradation. The analysis of effects and conclusions take into consideration mitigation measures.

Harbor seals occur in Cold Bay throughout the year in various marine, estuarine, and freshwater stream habitats, and coastal areas for resting, traveling and feeding. Noise from a landing craft could disrupt these behaviors. Operation of a landing craft between the Northeast Terminal and Cross Wind Cove could displace harbor seals that move to avoid the vessel. Harbor seals with pups are not reported to frequent the area of a landing craft route, but if present, may move away from the vessel noise to inshore areas of Cold Bay. Seasonal foraging by harbor seals may occasionally be disrupted through disturbance of schooling salmon in the Cross Wind Cove area (see Section 4.55.2.3, Fish). Seals have been observed feeding on several species of salmon migrating to spawning areas in Russell Creek; schools might temporarily scatter during vessel operations (USACE 2003).

Killer whales, harbor porpoise, and gray whales are relatively uncommon in Cold Bay (Sections 3.2.6.2, 3.2.6.3, and 3.2.6.4), but are occasionally sighted in the upper part of the bay and near the Cold Bay dock. The possible landing craft route between the Northeast Terminal and Cross Wind Cove traverses possible feeding and transit areas for these species. If the landing craft intersects whales and porpoises, disturbance reactions, such as avoidance could result (Richardson et al. 1995). Since the frequency of service and other factors for such a landing craft is unknown, the direct and indirect effects on marine mammals from surface and subsurface noise disturbance cannot be determined.

A year round exclusion zone prohibits vessel travel north of the direct line route between the Northeast Terminal and Cross Wind Cove. The closest point where a landing craft would pass Kinzarof Lagoon, an area frequented by harbor seals, would be 3.2 miles. This exclusion zone would minimize acoustic disturbances to seals and cetaceans in northern Cold Bay and the entrance to Kinzarof Lagoon. It could also provide a refuge for foraging, resting, and pupping harbor seals. The no travel zone in the head of Cold Bay would mitigate noise disturbance impacts on harbor seals.

Indirect effects of a landing craft operation include habitat alterations caused by fuel leaks or spills into the nearshore marine environment. Mitigation measures were developed to protect drainages and the marine environment from sediment, hazardous substances, and fuels.

Summary

With no new activities from operation and maintenance of transportation methods, beyond those already existing, Alternative 1 would have no direct or indirect effects on marine mammals from operation and maintenance. A future landing craft/passenger ferry service could result in direct or indirect effects, but without information on the frequency of service and other factors for such a landing craft, the direct and indirect effects on marine mammals from surface and subsurface noise disturbance cannot be determined.

Mitigation Measures

No mitigation measures would be required under Alternative 1 because no new activities or effects are associated with this alternative.

Cumulative Effects

Past and present actions that have and may continue to affect harbor seals, killer whales, harbor porpoise, and gray whales in the project area include commercial fishery-related mortality, entanglement in fishing gear, subsistence harvest, boat strikes, and the construction of the King Cove Access Road. Actions and effects differ by species.

Estimates for incidental mortality in commercial fisheries are unreliable due to lack of observer coverage, but minimum estimated takes are low relative to the respective population sizes. For harbor seals, the estimated mortality was zero for the Gulf of Alaska stock (1992-2004) and 2.9 per year for the Bering Sea stock (2002-2006) (Allen and Angliss 2011). The highest level of reported incidental mortality for harbor porpoise was 35.8 per year (2002-2005) from the Gulf of Alaska stock by the Kodiak Island set gillnet fishery (Allen and Angliss 2011).

The annual estimated subsistence harvest from the Gulf of Alaska stock of harbor seals was 807 per year (2003-2007) and was 96 per year from the Bering Sea stock for 2002-2006 (Allen and Angliss 2011). Killer whales and harbor porpoise are not harvested for subsistence. Eastern North Pacific gray whales are subject to a subsistence harvest by the Russian Chukotka people, with an average annual take of 121 whales. Eastern North Pacific gray whales also experience occasional entanglements and boat collisions across the breadth of their range from Alaska to Mexico (Allen and Angliss 2011). Despite these activities, the population steadily increased and was removed from the List of Threatened and Endangered wildlife in 1994.

The completion of the King Cove Access Road may result in more waterfowl hunting at Kinzarof Lagoon and the northeast side of Cold Bay. Additional activity in the area might disturb harbor seals hauled out in the area, but would not affect killer whales, harbor porpoise, or gray whales. Reasonably foreseeable future actions in the EIS project area include an increase in the number of fisheries observers coming through the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause a small increase in human activity in the area but are not expected to affect harbor seals, killer whales, harbor porpoise, or gray whales. Alternative 1 would result in no contribution to cumulative effects on harbor seals, killer whales, harbor porpoise, and gray whales. The effects from a possible landing craft operation at some future date cannot be determined.

Conclusion

Alternative 1 would have no direct or indirect effect on marine mammals and would provide no incremental additive or interactive impacts to cumulative effects. The possible direct and indirect effects of a landing craft, if implemented at some date in the future, cannot be determined without information on the frequency of service and other operating factors.

4.2.2.7 Threatened and Endangered Species

The 3 threatened and endangered species included in this EIS—Steller's Eiders, northern sea otters, and Steller sea lions—are addressed separately below. Because the effects on 2 candidate species, Yellow-billed Loon and Kittlitz's Murrelet, are similar to those expected to occur to Steller's Eiders, the analysis of effects for these species have been included in a single section. Although Yellow-billed Loon and Kittlitz's Murrelet have no legal protection under the *Endangered Species Act* at this time, they could become listed before the project is completed.

<u>Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet</u>

Under Alternative 1, the land exchange would not occur and as an indirect effect the King Cove Corporation selected lands on the northeast side of Cold Bay may be conveyed from the Izembek National Wildlife Refuge to the King Cove Corporation.

The change in ownership of these lands would remove the wilderness designation and potentially make the lands available for development, but these lands are subject to the provisions of ANCSA 22(g) and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes. These lands likely do not contain habitat for any of species considered here.

Direct Effects and Indirect Effects from Construction

No construction would be associated with this alternative, other than the road to the Northeast Terminal, which is currently permitted and scheduled for completion.

Summary

No construction would be associated with this alternative, and so there would be no effects from construction on Steller's Eiders, Yellow-billed Loon, and Kittlitz's Murrelet.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, no new effects would be expected.

If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. Potential direct and indirect effects on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets caused by operation and maintenance of a potential future landing craft from the Northeast Terminal to Cross Wind Cove would be disturbance, primarily from noise, collision, and habitat degradation.

Steller's Eiders occur in the EIS project area during the nonbreeding season from the molt in the fall to pre-migration staging in the spring. They are largely absent from the area from mid-May to mid-July. Eiders generally begin arriving in Izembek Lagoon in August with numbers increasing in September. Observations of eiders in Kinzarof Lagoon increase in October (Laubhan and Metzner 1999). Eider presence would overlap with the operation of such a landing craft if it were to operate between April and mid-May, and late summer through October.

Kittlitz's Murrelets have been seen in Cold Bay and are known to breed in the Izembek National Wildlife Refuge near Frosty Peak. Murrelets nesting in other parts of the Izembek National Wildlife Refuge could be present in the EIS project area during the spring, summer, and fall.

Yellow-billed Loons are rarely seen in the Izembek National Wildlife Refuge (Taylor and Sowl 2008), but could occur in the EIS project area during spring or fall migration, or during the winter.

The primary source of disturbance would be noise from a potential future landing craft, with possible displacement of eiders, loons, or murrelets in response to the noise. Since the frequency of service and other factors for such a vessel is unknown, the direct and indirect effects on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets from disturbance cannot be determined.

Summary

With no new activities from operation and maintenance of transportation methods, beyond those already existing, Alternative 1 would have no direct or indirect effects on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets from operation and maintenance. Effects from a future landing craft/passenger ferry service cannot be determined.

Mitigation Measures

No mitigation measures would be required under Alternative 1 because no new activities or effects are associated with this alternative.

Cumulative Effects

Past and present actions that have affected and may continue to affect Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets in the project area are described in the Conservation Concerns within Section 3.2.7.1. Included are human caused disturbances, predation, climate change and ocean acidification, and exposure to oil and other contaminants. The completion of the King Cove Access Road may result in more waterfowl hunting at Kinzarof Lagoon and the northeast side of Cold Bay, which could disturb overwintering Steller's Eiders and Yellow-billed Loons. Completion of the road, however, is considered part of the existing conditions.

Reasonably foreseeable future actions in the EIS project include an increase in the number of fisheries observers coming through the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human activity in the area and an increase in human disturbance but are not expected to affect Steller's Eiders, Yellow-billed Loons and Kittlitz's Murrelets. Alternative 1 would result in no contribution to cumulative effects on Steller's Eider, Yellow-billed Loon and Kittlitz's Murrelet. The effects from a possible landing craft operation at some future date cannot be determined.

Conclusion

Alternative 1 would have no direct or indirect effect on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets and would provide no incremental additive or interactive impacts to cumulative effects. The effects from a possible landing craft operation at some future date cannot be determined.

Northern Sea Otter: Southwest Alaska Distinct Population Segment

Direct Effects and Indirect Effects from Construction

No construction would be associated with this alternative, other than the road to the Northeast Terminal, which is currently permitted and scheduled for completion.

Summary

No additional construction and no effects on northern sea otters from construction would be associated with this alternative.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, no new effects would be expected.

If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. Potential direct and indirect effects on northern sea otters from operation and maintenance of a landing craft between the Northeast Terminal and Cross Wind Cove would be disturbance, primarily from noise, boat strikes, and habitat degradation. However, since the frequency of service and other factors for such a landing craft is unknown, the direct and indirect effects on northern sea otters from disturbance cannot be determined.

Sea otters, including young pups, travel, rest, and feed year round throughout Cold Bay. They concentrate in high densities in upper Cold Bay and Kinzarof Lagoon, particularly near the entrance to the lagoon. A landing craft route would avoid the nearshore waters at the entrance to Kinzarof Lagoon since the area north of the direct line route between the Northeast Terminal and Cross Wind Cove would be closed to landing craft operation.

This exclusion zone would minimize acoustic disturbances to sea otters in northern Cold Bay and Kinzarof Lagoon. It could also provide a refuge for foraging, resting, and pupping.

If the landing craft comes into operation, noise and the visual presence of the vessel on the route across Cold Bay could disturb sea otters near the Northeast Terminal, causing them to dive or move away from the vessel. Sea otters encountering the passing landing craft may endure some stress and exert energy escaping the disturbance.

Indirect effects of the potential landing craft operation may include habitat alterations caused by fuel leaks or spills into the nearshore marine environment. Mitigation measures were developed to protect drainages and the marine environment from sediment, hazardous substances, and fuels. Assuming these measures are retained and implemented, effects on sea otters and their habitat from fuel leaks or spills are not expected.

Summary

With no new activities from operation and maintenance of transportation methods, beyond those already existing, Alternative 1 would have no direct or indirect effects on northern sea otters from operation and maintenance. Effects from a future landing craft/passenger ferry service cannot be determined.

Mitigation Measures

No mitigation measures would be required under Alternative 1 because no new activities or effects are associated with this alternative.

Cumulative Effects

Past and present actions that have and may continue to affect northern sea otters in the project area are described in Section 3.2.7.4. The completion of the King Cove Access Road may result in more waterfowl hunting at Kinzarof Lagoon and the northeast side of Cold Bay, which could disturb sea otters and pups resting and foraging in the area.

Reasonably foreseeable future actions in the EIS project include an increase in the number of fisheries observers coming through the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human activity in the area and an increase in human disturbance, but are not expected to affect sea otters. Alternative 1 would result in no contribution to cumulative effects on northern sea otters. Effects from a potential future landing craft/passenger ferry service cannot be determined.

Conclusion

Alternative 1 would have no direct or indirect effect on northern sea otters and would provide no incremental additive or interactive impacts to cumulative effects. The effects from a possible landing craft operation at some future date cannot be determined.

<u>Steller Sea Lion: Western Distinct Population Segment</u>

Direct Effects and Indirect Effects from Construction

No construction would be associated with this alternative, other than the road to the Northeast Terminal, which is currently permitted and scheduled for completion.

Summary

No additional construction would be associated with this alternative, so no effects from construction on Steller sea lions would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative would have no new activities from operation and maintenance of transportation methods, beyond those already existing. Therefore, no new effects would be expected.

If the land exchange is not approved, a landing craft/passenger ferry could be implemented by the Aleutians East Borough at some date in the future to complete a marine-road link between the communities of King Cove and Cold Bay. Potential direct and indirect effects on Steller sea lions from operation and maintenance of a landing craft between the Northeast Terminal and Cross Wind Cove are disturbance, primarily from noise, boat strikes, and habitat degradation.

Steller sea lions occur in Cold Bay throughout the year, although most observations are during the summer when sea lions feed near salmon spawning streams or on fish scraps near the Cold Bay dock. They occasionally occur in upper Cold Bay near Kinzarof Lagoon. Landing craft arrivals and departures at Cross Wind Cove could disperse schooling salmon and temporarily disrupt sea lions that may be foraging there during the summer salmon spawning season.

A landing craft route between the Northeast Terminal and Cross Wind Cove would cross areas where Steller sea lions travel and feed and could, potentially, be disturbed. Steller sea lion reactions to landing craft noise may include avoidance of the vessel by diving or swimming away. Steller sea lions are widely distributed across Cold Bay, so the potential for disturbance and displacement is low. However, since the frequency of service and other factors for such a landing craft is unknown, the direct and indirect effects on Steller sea lions from disturbance cannot be determined.

Mitigation measures include a year round exclusion zone that prohibits landing craft from traveling north of the direct line route between the Northeast Terminal and Cross Wind Cove. This exclusion zone could minimize disturbances to any Steller sea lions that occasionally use that area.

Indirect effects of the landing craft operation include habitat alterations caused by fuel leaks or spills into the nearshore marine environment. Mitigation measures were developed to protect drainages and the marine environment from sediment, hazardous substances, and fuels. Assuming these measures are retained and implemented, effects on Steller sea lions and their habitat from fuel leaks or spills are not expected.

Summary

With no new activities from operation and maintenance of transportation methods, beyond those already existing, Alternative 1 would have no direct or indirect effects on Steller sea lions from operation and maintenance. Effects from a future landing craft/passenger ferry service cannot be determined.

Mitigation Measures

No mitigation measures would be required under Alternative 1 because no new activities or effects are associated with this alternative.

Cumulative Effects

Past and present actions that have and may continue to affect Steller sea lions in the project area are described in Section 3.2.7.5. The completion of the King Cove Access Road may result in more waterfowl hunting at Kinzarof Lagoon and the northeast side of Cold Bay. Additional activity in the area may disturb the few sea lions that occasionally occur in the area. Reasonably foreseeable future actions in the EIS project area include an increase in the number of fisheries observers coming through the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human activity in the area, but are not expected to affect Steller sea lions. Alternative 1 would result in no contribution to cumulative effects on Steller sea lions. Effects from a future landing craft/passenger ferry service cannot be determined.

Conclusion

Alternative 1 would have no direct or indirect effect on Steller sea lions and would provide no incremental additive or interactive impacts to cumulative effects. The effects from a possible landing craft operation at some future date cannot be determined.

4.2.3 Social Environment

4.2.3.1 Land Ownership and Management

Baseline Assumptions for Analysis of Land Ownership and Management

Alternative 1 is the baseline for analyzing changes in land ownership on land use, land management, and the ability of the refuges to meet their ANILCA purposes. The Act states that the Secretary of the Interior may convey land to the State of Alaska for a road corridor between the communities of King Cove and Cold Bay across Izembek National Wildlife Refuge. Prior to making this decision, the Secretary of the Interior must analyze the impacts of the proposed land exchange and the potential construction and operation of the road. Generally land exchanges approved by the Service result in a configuration of refuge lands that improves the ability of the Service to meet the purposes of the refuge and the mission of the National Wildlife Refuge System over the existing ownership pattern. Proposed land exchanges or acquisitions must either benefit fish and wildlife resources, satisfy other purposes for which the refuge was established, or be necessary to satisfy other national interests. In addition to improving the Service's ability to meet the purposes of the refuge, the Service may have other specific objectives for exchanging land. As described in detail in Chapter 1, the Secretary of the Interior was directed by Congress to analyze a proposed Izembek National Wildlife Refuge Land Exchange and potential road corridor through the refuge in an EIS. Alternative 1 is the current ownership pattern of lands; a land exchange would not occur under Alternative 1.

Chapter 1 describes the mandates of ANILCA in managing Alaska refuges. Section 303 of ANILCA lists the purposes for which the Izembek and Alaska Peninsula National Wildlife Refuges were established and for which the Service would manage refuge lands involved in this proposed exchange. These purposes include:

- (i) To conserve fish and wildlife populations and habitats in their natural diversity...;
- (ii) to fulfill the international treaty obligations of the U.S. with respect to fish and wildlife and their habitats;
- (iii) to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and
- (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the Refuge.

Conservation of certain groups of fish and wildlife populations and their habitats was emphasized in subparagraph (i), but these groups varied among the two refuges. Refuge purposes were "to conserve fish and wildlife populations and habitats in their natural diversity, including, but not limited to" the following:

- (i) Izembek National Wildlife Refuge Unit: waterfowl, shorebirds and other migratory birds, brown bears and salmonoids [sic]
- (ii) Alaska Peninsula National Wildlife Refuge: brown bears, the Alaska Peninsula caribou herd, moose, sea otters and other marine mammals, shorebirds and other

migratory birds, raptors, including bald eagles and peregrine falcons, and salmonoids [sic] and other fish.

In Title VII, Congress designated approximately 300,000 acres of Izembek National Wildlife Refuge as wilderness (Section 702). The Wilderness Act of 1964 provides the following additional purposes for management of the Izembek Wilderness:

(i) to secure an enduring resource of wilderness;
(ii) to protect and preserve the wilderness character of areas within the National Wilderness Preservation System; and
(iii) to administer [the areas] for the use and enjoyment of the American people in a way that will leave them unimpaired for futures use and enjoyment as wilderness.

Since ANILCA created and enlarged Alaska refuges and mandated specific purposes for management, part of the analysis of a proposed land exchange is to assess the effect of the land exchange on the Service's ability to meet the statutory purposes of the refuges. The following section describes the current situation as to use, management, and ability to meet the refuge purposes of the current configuration of refuge lands. Existing use and management of the parcels offered by the State of Alaska and King Cove Corporation are also described. Subsequent sections in Chapter 4 compare use, management, and ability to meet refuge purposes of each alternative and its proposed land configuration of refuge, state, and King Cove Corporation lands against Alternative 1, which is the current land ownership pattern. Additional information regarding land ownership, management is available in Section 3.3.1 and additional information regarding public use is available in Section 3.3.6.

Existing Land Ownership, Management, and Use

State of Alaska

<u>Sitkinak Island</u>

Sitkinak Island is owned almost entirely by the State of Alaska except for the lands separating Sitkinak Lagoon from Sitkinak Strait which are an inholding of the federal government managed by the Service as part of the Alaska Maritime National Wildlife Refuge or by the Coast Guard as a public land withdrawal within the refuge (1,619 acres). The management of the state lands is described in the *Kodiak Area Plan* (ADNR 2004b). Generally, no facilities are allowed and public use is dispersed and focused on activities requiring no development. Use of the island is limited because of the expense of access.

<u>State Parcel</u>

The 2 townships that make up the State of Alaska parcel are surrounded by the Alaska Peninsula National Wildlife Refuge and are currently managed by the Alaska Department of Natural Resources in Region 21 of the Bristol Bay Area Plan (ADNR 2005). These parcels are state owned lands, and do not lie within the Izembek State Game Refuge. The land is managed for Generally Allowed Uses (11 AAC 96.020). See Chapter 3.3.6.3 for a more detailed description of public use of these parcels.

No roads or managed trails are on the State of Alaska lands in the North Creek Unit. Access to or within the state lands involved in the proposed project area requires the use of an all-terrain vehicle, aircraft, small boat, or by foot. Float planes can be used in tidal areas and lakes within the parcel.

Kinzarof Lagoon Tidelands/Submerged Lands

State-owned tidelands and submerged lands and waters of Kinzarof Lagoon (including eelgrass habitat and intertidal shorelines) to the Izembek State Game Refuge are managed as general purposes General Purpose lands by the Alaska Department of Natural Resources and not under the Izembek State Game Refuge Plan.

National Wildlife Refuge System – Izembek National Wildlife Refuge and Alaska Peninsula National Wildlife Refuge

As defined by ANILCA, public uses of Izembek National Wildlife Refuge must be compatible with the purposes for which Izembek National Wildlife Refuge was established. In addition to the subsistence uses described in Section 3.3.7, visitors from outside the local area and the residents of the communities of Cold Bay, King Cove, False Pass, and to a lesser extent, Nelson Lagoon and Sand Point, use Izembek National Wildlife Refuge lands for a variety of public uses, as shown in Table 3.3-52. Section 3.3.6.1 provides a detailed description of public use for Izembek National Wildlife Refuge; a general overview of management of the refuges is provided in Section 3.3.1.

Section 3.3.3.1 describes in detail the surface transportation network on Izembek and Alaska Peninsula National Wildlife Refuges under the current situation. The following summary of this chapter follows.

The Izembek National Wildlife Refuge Comprehensive Conservation Plan (Service 1985a) states:

> Access to refuge lands by traditional means will be permitted for subsistence purposes in accordance with Section 811 of ANILCA. Traditional means as defined in service regulations (50 CFR 36) include boats (excluding air boats), off-road vehicles, light pickup trucks and passenger vehicles. Use of trucks, passenger vehicles and off-road vehicles will be limited to designated roads and trails open to general public use.

However, regulations were never promulgated to implement this decision formally upon approval of the comprehensive conservation plan. As a result, motorized vehicles are permitted on designated trails within the Izembek Wilderness for subsistence uses by local rural residents, except wehre closed by regulation. Visitors are permitted only non-motorized access (hiking) throughout the Izembek Wilderness (Service 1985a).

By state regulation, Alaska Administrative Code 92.540(2)(B), the western part of the Izembek Wilderness is “closed to the use of any motorized vehicle, except outboard motor-powered boats, for hunting, including the transportation of hunters, their hunting gear, or parts of game.”

Some abandoned trails dating to World War II exist within the Izembek Wilderness, but these trails are not maintained and have been re-vegetating naturally. Some may be used for subsistence purposes. Izembek National Wildlife Refuge does not have the capability or staff to maintain roads during the winter and summer seasons. During the winter, only a small portion of the refuge road system (Grant Point Road access to the radar station) is plowed regularly.

As part of mitigation for the 2003 King Cove Access Project, it was determined, in consultation with cooperating agencies, that there had not been traditional use of off-road vehicles for subsistence access adjacent to the proposed road that would be constructed along the eastern shore of Cold Bay. An area of approximately 2,640 acres of the Izembek Wilderness adjacent to the Northeast Terminal and King Cove Access Project road are closed to subsistence use of off-road vehicles (all-terrain vehicles).

Sitkinak Island

In the current situation, the federal government manages 1,619 acres on Sitkinak Island, under a U.S. Coast Guard withdrawal which grants that agency primary jurisdiction. Sitkinak Island is owned almost entirely by the State of Alaska except for these 1,619 acres of land, which contain an airstrip, road, and various buildings. The proposed exchange parcel includes of a former military installation with a 4,500-foot runway. The military installation has been deactivated and dismantled. Although the runway remains, no scheduled aircraft operate from the site (Kodiak Military History Museum 2005).

Since Sitkinak Island is within the boundary of the Alaska Maritime National Wildlife Refuge and the Coast Guard no longer uses the facilities, the Coast Guard would eventually relinquish the withdrawal for management as part of Alaska Maritime National Wildlife Refuge.

King Cove Corporation Selected Lands

The King Cove Corporation selected lands (5,430 acres) east of Cold Bay are currently managed by the federal government and lie entirely within the Izembek National Wildlife Refuge and are designated as wilderness. The King Cove Corporation selection includes resource values such as caribou winter use, high density brown bear habitat, Tundra Swan nesting, federal management of lands subject to Title VIII of ANILCA subsistence provisions, and management as designated wilderness.

This parcel was selected by the King Cove Corporation under ANCSA and formal conveyance of ownership is pending. Until the parcel is conveyed to King Cove Corporation, it is managed by the Service as part of the Izembek National Wildlife Refuge, subject to the rules and regulations of the National Wildlife Refuge System and ANILCA. This parcel, if conveyed to the corporation would be subject to the ANCSA 22(g) reservation. This provision requires that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes.

Within the boundaries of the Izembek National Wildlife Refuge, a federally reserved 25-foot wide public access easement (EIN 9a C4) leads to the selected parcel on the east side of Cold Bay. The easement is just over a mile long, and all-terrain vehicles up to 3,000 pounds gross weight are permitted for public access on this easement from the shore of Cold Bay to the Izembek Wilderness (across King Cove Corporation ownership) (USACE 2003).

Federal Aviation Administration Lands

Adjacent to the City of Cold Bay, lands are withdrawn for the Federal Aviation Administration for use in the maintenance of air navigation facilities. Since this withdrawal is within the Alaska Peninsula National Wildlife Refuge, the Service has secondary jurisdiction for other uses and the management policies of the Alaska Peninsula National Wildlife Refuge apply.

King Cove Corporation

Mortensens Lagoon Parcel

South of the City of Cold Bay, a gravel road extends towards Mortensens Lagoon. This tract is approximately 8,092 acres, pending refinement of the location of a ANCSA Section 17(b) easement and Russell Creek. This private land is an inholding within the boundaries of the Alaska Peninsula National Wildlife Refuge. The parcel is not subject to ANCSA Section 22(g) provisions because the Alaska Peninsula National Wildlife Refuge was created by ANILCA in 1980, after ANCSA was passed. King Cove Corporation lands are managed for shareholder use. Use by non-shareholders requires permits or formal permission.

Kinzarof Lagoon Parcel

The Kinzarof Lagoon parcel is private land owned by the King Cove Corporation, which lies within the boundaries of Izembek National Wildlife Refuge and the Izembek Wilderness boundary. This parcel is subject to the provisions of ANCSA 22(g), which requires that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes. The Kinzarof Lagoon parcel includes notable resource values such as caribou winter use, high density brown bear habitat, and harbor seal haulouts. No established roads or trails are located within the Kinzarof Lagoon parcel.

Alternative 1 Analysis

Direct Effects and Indirect Effects

Land Ownership

Under Alternative 1, no lands would be exchanged, no road would be constructed, and existing land ownership would remain the same for the foreseeable future, except that as an indirect effect, the King Cove Corporation land selection within the Izembek Wilderness may proceed to conveyance. The King Cove Corporation selection is part of the existing conditions, but proceeding to receive patent to its selected lands on the east side of Kinzarof Lagoon, affecting approximately 5,430 acres within the Izembek Wilderness, would be an indirect effect of the No Action alternative. The selected lands, when patented, would be subject to the provisions of ANCSA Section 22(g), as described in Section 3.3.1.1. As a result, the incremental conservation benefit of retaining this parcel as part of the Izembek National Wildlife Refuge (and wilderness) is less than if this parcel were private land not subject to ANCSA 22(g).

Federal lands within Izembek National Wildlife Refuge and Izembek Wilderness and in Alaska Maritime National Wildlife Refuge on Sitkinak Island would remain in federal ownership. Title to State of Alaska land and title and selection rights to King Cove Corporation land would be unchanged.

Land Use and Management

Under Alternative 1, a road connecting the communities of King Cove and Cold Bay would not be built and no land exchange would occur. Except for the indirect effect of the potential for conveyance of selected lands to the King Cove Corporation, there would be no change in who manages the various parcels and current management plans would remain in effect as shown in

Table 4.2-1. If the King Cove Corporation selected lands within the Izembek Wilderness are conveyed, their existing rights to manage these lands as private land owners would continue, subject to the requirements Section 22(g) of ANCSA and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes.

Summary

No new direct effects to land ownership, land use, and land management within the project area would result from Alternative 1. While the selection is part of the existing conditions, the conveyance of King Cove Corporation selected lands within Izembek Wilderness would be an indirect effect. These indirect effects are considered low in magnitude as less than 2 percent of the acreage of Izembek National Wildlife Refuge would be affected by a selection right that predates the establishment of the refuge. The indirect effects are considered local in extent because it affects only the King Cove Corporation and the selected parcel is at the margin of the refuge boundaries; the conveyed parcel would not bisect refuge lands nor be an isolated inholding in the refuge. These effects would be permanent in duration due to the long-lasting nature of land conveyances and land ownership. Affected resources are considered unique in context, due to the wilderness designation of adjacent lands affected. The King Cove Corporation selection is remote and impacts of any eventual development would be limited by the provisions of ANCSA Section 22(g).

The impact of Alternative 1 on land use and management would be considered minor, taking into account no direct effects and minor indirect effects. See Sections 4.2.3.6 and 4.2.3.10 for impact summaries of Alternative 1 related to Public Use and Wilderness.

Mitigation Measures

The No Action alternative would introduce no new direct effects and minor indirect effects on patterns of ownership and potential land use and management, so no mitigation measures are recommended.

Cumulative Effects

Relevant past actions would include the entitlement and selection of King Cove Corporation land under ANCSA, and the enactment of ANILCA, which redesignated the Izembek National Wildlife Refuge and created the Izembek Wilderness. No other present or reasonably foreseeable future land exchanges or other activities would induce more extensive changes to ownership patterns or altered land management practices.

Past actions that affect land management include all-terrain vehicle use because the road to the Northeast Terminal reaches near the boundary of the Izembek National Wildlife Refuge. Based on history of previous all-terrain vehicle use in the area, it may be assumed that new all-terrain vehicle routes would originate from that point. Eventually, an all-terrain vehicle route could reach the State Parcel from this location. Unauthorized all-terrain vehicle access to the refuge would continue to be a management challenge under Alternative 1.

The incremental contribution of Alternative 1 to cumulative effects on land ownership, use, and management is considered minor (indeterminate), due to the conveyance of the selected parcel. No other changes in land ownership and management would occur under Alternative 1.

Effects to Refuge Purposes

To assess the combined impacts of a land exchange upon a national wildlife refuge and determine if the land exchange is generally beneficial for the refuge, the exchange must result in a configuration of refuge lands that improves the ability of the Service to meet the purposes of the refuge and the mission of the National Wildlife Refuge System over the existing ownership pattern. Although the Act allows the Secretary of the Interior to conduct a land exchange for a road corridor across Izembek National Wildlife Refuge, the legislation also states that prior to making a decision the Secretary of the Interior must analyze the impacts of the proposed land exchange and the potential construction of the road.

This section and parallel sections under each alternative examine the primary purposes of the Izembek and Alaska Peninsula National Wildlife Refuges as mandated in ANILCA, Section 302 (1)(B) and 303 (3)(B) and the Wilderness Act and assess whether these purposes are better achieved under the current land configuration depicted as Alternative 1 (No Action) or in one of the proposed alternative land ownership configurations. To do this, the EIS summarizes potential impacts of the proposed land exchange and road construction (described in detail by resource area in Chapter 4) that specifically influence the Service's ability to achieve each of the ANILCA refuge purposes. (The pre-ANILCA purposes of the Izembek National Wildlife Refuge and the mission of the National Wildlife Refuge System are effectively covered by the ANILCA purposes and are not analyzed separately.)

<u>Refuge Purpose (i): to conserve fish and wildlife populations and habitats in their natural diversity, including, but not limited to; the following: ...;</u>

> [Izembek National Wildlife Refuge Unit:] "*waterfowl, shorebirds and other migratory birds, brown bears and salmonoids"* [sic]
>
> [Alaska Peninsula National Wildlife Refuge:] *brown bears, the Alaska Peninsula caribou herd, moose, sea otters and other marine mammals, shorebirds and other migratory birds, raptors, including bald eagles and peregrine falcons, and salmonoids* [sic] *and other fish.*

Under Alternative 1, the refuge, state, and King Cove Corporation lands would remain in their current configuration and a road would not be built across the narrow isthmus of the refuge; there would be no changes to land ownership, management, and use. The Service would continue managing the refuge as it has since the establishment of the refuge in 1960.

The isthmus serves as a land bridge and large mammal corridor connecting the eastern portion of the refuge to the western end of the Alaska Peninsula. For birds, the isthmus is also a corridor, to be flown over in a north-south fashion at low elevation to connect the eelgrass beds of Izembek Lagoon on the Bering Sea to the eelgrass of Kinzarof Lagoon on the Pacific Ocean. Chapter 3.2 describes wildlife populations and habitats currently found on the refuge. With little mechanized access to the isthmus, the area is relatively undeveloped and management of the refuge '*to conserve fish and wildlife populations and habitats in their natural diversity'* is largely directed at monitoring wildlife populations and harvest and working with other agencies and the public to manage the migratory bird populations and habitats in other parts of their range both within and outside of Alaska.

Refuge Purpose (ii): to fulfill the international treaty obligations of the U.S. with respect to fish and wildlife and their habitats;

Izembek National Wildlife Range was created in 1960 with Public Land Order (PLO 2216) "as a Refuge, breeding ground, and management area for all forms of wildlife." The early recognition of the productivity and diversity of wildlife habitats in the Izembek area by the federal government was reinforced in 1960 by the new State of Alaska, which focused on the importance of the wetlands to migratory birds and created the Izembek Lagoon State Game Refuge within the boundaries of the Izembek National Wildlife Range.

Since 1960, the Service and the State of Alaska have cooperated on managing the waterfowl and other water birds using the eelgrass beds and wetland habitats surrounding Izembek Lagoon. Particularly noteworthy are Black Brant with more than 98 percent of the world's population using Izembek Lagoon as a staging area prior to their fall migration to Mexico.

Cooperation between the two entities concerning waterfowl is largely conducted under the framework of the *Migratory Bird Treaty Act of 1918*. Following treaty amendments in 1997, regulations for subsistence bird harvests were established under the purview of the Alaska Migratory Bird Co-Management Council, operating under authority of the *Migratory Bird Treaty Act* (1918), as amended. Under the *Migratory Bird Treaty Act*, takings are prohibited unless expressly authorized or exempted. Losses from habitat impacts are considered takings under the definition of taking.

Further recognition of the wetlands of the Izembek area came in 1986 under the Ramsar Convention, when the Service and the State of Alaska recommended the Izembek area be designated as a Wetland of International Importance, meeting 6 of the 8 scientific criteria needed to qualify (only 1 criterion is needed for designation). The specific criteria that were met were: 1) volume of waterfowl use; 2) diversity of waterfowl; 3) major flyway populations; 4) outstanding example of wetland types (largest eelgrass beds in North America); 5) scientific research (long-term); and 6) practicality of conservation and management (Service 1986c). The Ramsar Convention promotes wetland conservation throughout the world. It is an intergovernmental treaty with a stated mission of "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world" (Ramsar Convention 2010).

Under Alternative 1, the Service would continue managing Izembek National Wildlife Refuge with a primary emphasis on working with national and international partners to manage the overall populations and habitats of Black Brant, Emperor Geese and other migratory waterbirds using the key resting and feeding lagoons and waters of Izembek National Wildlife Refuge. There would be no change in the designation of the area as a Wetland of International Importance or to management under the *Migratory Bird Treaty Act.*

Refuge Purpose (iii): to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and

Chapter 3.3.7 describes subsistence uses and regulatory framework for managing subsistence harvest on Izembek and Alaska Peninsula National Wildlife Refuges and other federal lands. For the Service, however, the third purpose of ANILCA directs refuge management to provide '*the opportunity for continued subsistence uses by local residents'* with the caveat that the '*opportunity'* be provided in context of the first two purposes of ANILCA, which are the fish and wildlife conservation purposes. As a result, the current situation as described in Alternative 1, offers a clear opportunity but with challenging access for subsistence uses within the refuges. The corollary of this alternative is that it strikes a balance between maintaining healthy, diverse wildlife populations while providing sufficient access to enable subsistence users to continue their harvest. Alternative 1 would not change the opportunity for continued subsistence uses by local residents.

<u>Refuge Purpose (iv): to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the Refuge.</u>

Under Alternative 1, there would be no changes to management and no water quality or quantity issues introduced in management of the Izembek National Wildlife Refuge.

<u>Izembek Wilderness Purposes: The Wilderness Act of 1964 provides the following additional purposes for management of the Izembek Wilderness:</u>

(i) to secure an enduring resource of wilderness;

(ii) to protect and preserve the wilderness character of areas within the National Wilderness Preservation System; and

(iii) to administer [the areas] for the use and enjoyment of the American people in a way that will leave them unimpaired for futures use and enjoyment as wilderness.

This section summarizes the current ability of the Service to meet the wilderness purpose of the Izembek National Wildlife Refuge. A detailed description and discussion of the nature of wilderness resources is described in Section 3.3.10. The specific impacts on the Izembek Wilderness are found by alternative in Chapter 4.

For the Service to secure an "*enduring resource of wilderness"*, the agency must manage the area to "*protect and preserve the wilderness character"* in order to leave it "*unimpaired for futures use and enjoyment as wilderness"* by the American people.

The four indicators of wilderness character being used to assess physical impacts to wilderness (untrammeled quality, natural quality, undeveloped quality, and outstanding opportunities for solitude or a primitive and unconfined type of recreation, described in Section 3.3.10) also serve to represent impacts to the nonuse values associated with wilderness. These 'nonuse' values are considered the 'preservation benefits' associated with the contribution of wilderness to individual and societal well-being and includes cultural and historic preservation, spiritual pleasure, personal growth, and bequest values. The 'bequest value' is the "*unimpaired for future uses and enjoyment of the American people*" language in the third wilderness purpose listed above. It is assumed that impacts to the four indicators would translate to impacts on nonuse wilderness values. Alternative 1, the current situation with largely undeveloped and intact habitats essentially fulfills the four indicators of wilderness character and the nonuse wilderness values. Alternative 1 would have no effect on wilderness purpose.

Conclusion

Alternative 1 would introduce no new direct impacts on land use, ownership, and management, while minor indirect effects include the conveyance of King Cove Corporation selected lands, including 5,430 acres of lands currently in Izembek Wilderness. The King Cove Corporation selection is remote and impacts of a ny eventual development would be limited by the provisions of ANCSA Section 22(g). The direct and indirect impact of the No Action alternative would be minor.

Although past actions that affect land management include all-terrain vehicle use in the vicinity of the Northeast Terminal, the contribution of Alternative 1 to cumulative effects would be minor and would not require mitigation.

Alternative 1 would not noticeably diminish the Service's ability to achieve the refuges' purposes identified in Public Land Order 2216, ANILCA, and the Wilderness Act.

The overall impact of Alternative 1 on land ownership, use, and management would be minor (indeterminate).

Table 4.2-1 Land Use and Management Comparison for Alternatives 1, 4, and 5

Exchange Parcel	Existing Condition			Under Alternative 1, 4, 5		
	Ownership	Management Plan(s)	Management Regime	Ownership	Management Plan	Management Regime
Road Corridor	Federal/Service	Izembek and Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plans	Minimal Management & Enhanced Public Use	No Change	No Change	No Change
	Federal/Service		Wilderness			
	Federal/Federal Aviation Administration	None	Federal Withdrawal for Aviation			
	King Cove Corporation	None	Private			
Sitkinak Island	Federal/Service	Alaska Maritime National Wildlife Refuge Comprehensive Conservation Plan	Minimal Management	No Change	No Change	No Change
	Federal/Coast Guard	None	Coast Guard Base			
State Parcels	State	Bristol Bay Area Plan	General Use	No Change	No Change	No Change
Mortensens Lagoon	King Cove Corporation	None	Private	No Change	No Change	No Change
Kinzarof Lagoon	King Cove Corporation	None	Private	No Change	No Change	No Change
King Cove Corporation Selected Parcel	Federal/Service	Selection rights secured, in the interim, subject to Izembek National Wildlife Refuge Comprehensive Conservation Plan	Selection rights secured, within Wilderness	Selected lands may proceed to conveyance to King Cove Corporation, development subject to ANCSA 22(g)	None	Private Not subject to public access. No longer wilderness. Not subject to Title VIII of ANILCA for federal subsistence provisions. Wetlands/ habitat subject to development in accord with ANCSA 22(g).

4.2.3.2 Socioeconomics

Socioeconomic Assumptions for Analysis of All Alternatives

This section describes the estimated forecasts and assumptions developed to analyze the direct and indirect effects of each alternative on: a) employment and income, b) economic activity, c) population and demographics, and d) fiscal impacts to local governments.

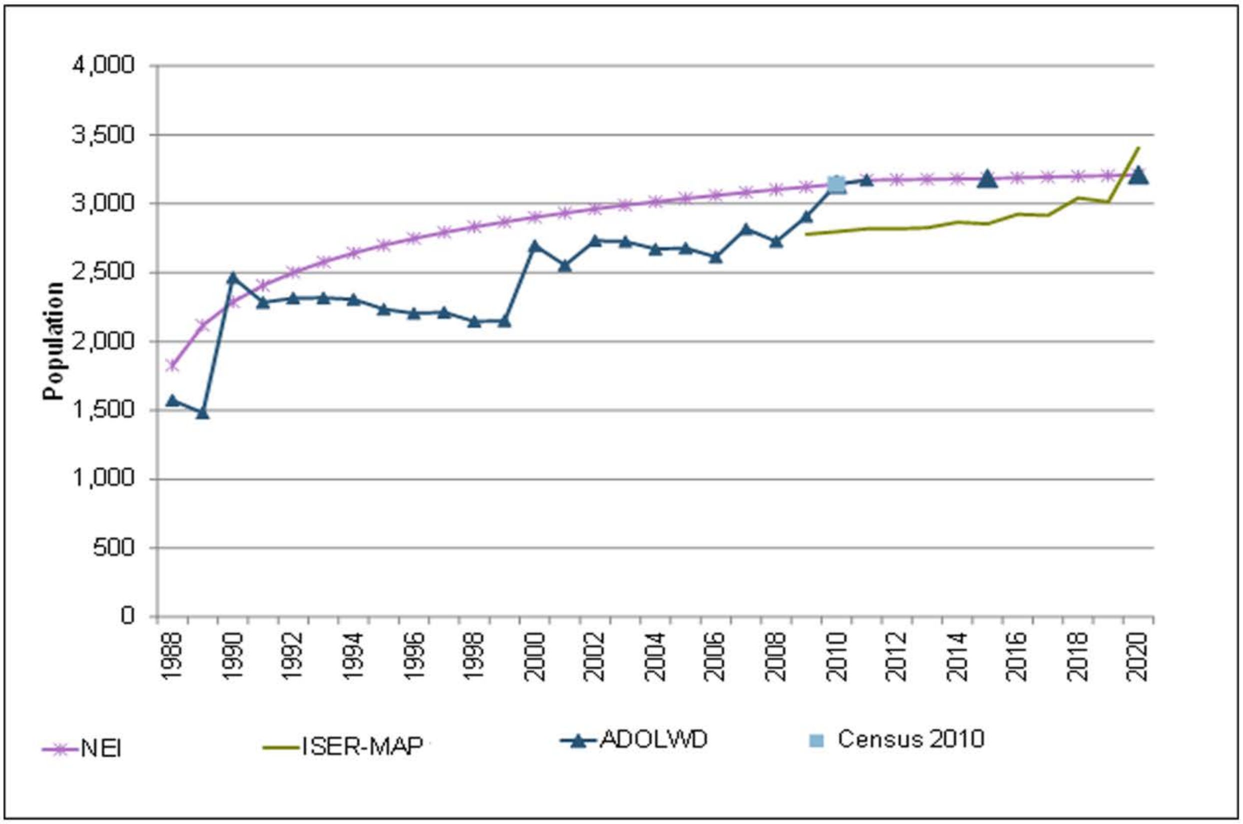
The socioeconomic effects of the various alternatives need to be estimated relative to a baseline. For purposes of this analysis, the baseline is considered to be the projection into the future of the socioeconomic conditions described in Chapter 3, Affected Environment.

Population Forecast

To assess the impacts of the alternatives on the cities of King Cove and Cold Bay and the Aleutians East Borough, population forecasts are needed. Population forecasts are available at the borough/census area level from the Institute of Social and Economic Research and the Alaska Department of Labor and Workplace Development (Department of Labor), but both have some shortcomings and neither includes forecasts for individual communities. To develop population forecasts for individual communities, borough/census area forecasts were used to allocate the borough total population to each community.

Three methodologies were considered for the Aleutian East Borough population forecasts: 1) a demographic approach used by the Department of Labor, 2) an integrated economic and demographic approach developed by the Institute of Social and Economic Research, and 3) an econometric approach (Northern Economics Inc. forecast). Figure 4.2-1 compares the results, which are explained in further detail below.

Figure 4.2-1 Three Forecasting Approaches, Population in Aleutians East Borough, 1988-2020



NEI – Northern Economics Inc.
ISER – Institute of Social and Economic Research
ADOLWD – Alaska Department of Labor and Workforce Development (Department of Labor)
Census – U.S. Census Bureau
Sources: NEI 2012; ISER 2009; ADOLWD 2012a; U.S. Census Bureau 2010-2012.

The approaches use historic data published by the Department of Labor to develop future projections. Historic population data for the Aleutians East Borough are available for 1988 to 2011 and are shown as a continuous line with triangular markers in Figure 4.2-1. The historical population line in Figure 4.2-1 incorporates the 1990 and 2000 Census, and the 2010 Census population is shown separately as a blue square. It is thought that the high value for 2010 population of the Aleutians East Borough reflects a shift in the timing when the census was performed. The timing of the census is important due to the seasonality and magnitude of seafood processing workers living in group quarters in the Aleutians East Borough (see discussion in Section 3.3.2.1).

The Department of Labor forecasts are only available in 5-year increments at the borough/census area level and statewide. Forecasts for the Aleutians East Borough are shown in disconnected blue triangles in Figure 4.2-1. According to the Department of Labor (medium growth) projections, the population in the Aleutians East Borough is expected to reach 3,210 persons by 2020. The Department of Labor approach consists of projecting forward in time using a cohort component method. Projected births and in-migrants are added, and projected deaths and out-migrants are subtracted, for each age-by-sex group that defines a cohort. The population living in group housing is held constant in age and size throughout the projection period; this population is a large proportion of the borough's total population.

In addition to demographic factors such as birth and death rates, aggregate economic factors may further influence future population. The Institute of Social and Economic Research developed a model that combines economic, fiscal, and demographic variables and provides population forecasts at the borough/census area level and statewide. The Institute of Social and Economic Research forecasts assume that economic factors can create an effect on migration patterns, as opposed to the Department of Labor forecasts that assume that migration patterns follow trends from previous years. In the Institute of Social and Economic Research model, if economic factors lead to greater employment requirements than can be met by the existing labor force, the labor force must expand through migration to meet the employment requirements. The model assumes a limit to how much the labor force can expand without an increase in population. Therefore, an expansion of the economy would likely lead to a growth in the population.

The Institute of Social and Economic Research forecasts are preferred over the Department of Labor forecasts as long as the assumptions behind the model are valid. The Institute of Social and Economic Research forecast depends on a set of assumptions, both generic and project-specific developed for an analysis of in-state gas demand (see NEI et al. 2010). However, the inclusion of the development of the large diameter natural gas pipeline from the North Slope to Calgary, which leads to a jump in population between 2019 and 2020 (shown in Figure 4.2-1 unnecessarily confuses the assessment of the alternatives under consideration in this EIS.

The Northern Economics forecasts use a logarithmic regression model based on past trends in population. The logarithmic function indicates the population grows with decreasing increments that tend to stabilize the population in the long run. In general, the Northern Economics forecasts track very closely with the Department of Labor forecasts, but because forecast populations are available for each year, the Northern Economics population forecasts for the Aleutians East Borough have been used here.

Table 4.2-2 Population Baseline Forecasts, 2010-2020

	Aleutians East Borough	City of King Cove	City of Cold Bay	Akutan	False Pass	Nelson Lagoon	Sand Point
2010[1]	3141	938	108	1,027	35	52	976
2011	3,170	950	100	1,040	30	50	1,020
2012	3,170	920	110	970	40	60	1,070
2013	3,180	920	110	970	40	60	1,070
2014	3,180	920	110	970	40	60	1,070
2015	3,180	930	110	980	40	50	1,070
2016	3,190	930	110	980	40	50	1,070
2017	3,190	930	110	980	40	50	1,070
2018	3,200	930	110	990	40	50	1,070
2019	3,200	930	120	990	40	50	1,070
2020	3,210	940	120	1,000	30	50	1,070

[1] Population numbers after 2010 rounded.
Source: U.S. Census Bureau 2010-2012, NEI 2012

In summary, the 10-year forecast for the Aleutians East Borough population shows an annual average growth of 0.22 percent, reaching about 3,210 by 2020 (Figure 4.2-1, and Tables 4.2-2 and 4.2-3). Tables 4.2-2 and 4.2-3 also show population forecasts for the communities of King Cove, Cold Bay, Akutan, False Pass, Nelson Lagoon, and Sand Point. During the next 10 years, the population in the City of King Cove is expected to increase at a compound average annual growth rate of 0.6 percent every year, while the City of Cold Bay is expected to decline at -4.1 percent. Forecast year-over-year changes in the borough and in each of the communities are shown in Table 4.2-3. The year-over-year forecast growth rates for the City of King Cove are the basis of forecast changes in the number of passengers that may travel between the cities of King Cove and Cold Bay in the future.

Table 4.2-3 Forecast Year-Over-Year Population Change as a Percent of the Previous Year, 2010 – 2020

	Aleutians East Borough	City of King Cove	City of Cold Bay	Akutan	False Pass	Nelson Lagoon	Sand Point
2010	-	-	-	-	-	-	-
2011	0.99%	1.07%	-12.04%	1.27%	-20.00%	-13.46%	4.10%
2012	0.09%	-2.55%	18.58%	-6.88%	50.75%	26.52%	5.01%
2013	0.09%	-0.05%	1.29%	-0.13%	-0.54%	-0.28%	0.29%
2014	0.09%	0.15%	0.17%	0.40%	-2.98%	-1.79%	-0.04%
2015	0.09%	0.16%	0.09%	0.42%	-3.04%	-1.81%	-0.06%
2016	0.17%	0.23%	0.17%	0.48%	-2.85%	-1.64%	0.03%
2017	0.17%	0.23%	0.17%	0.46%	-2.75%	-1.55%	0.04%
2018	0.17%	0.23%	0.17%	0.44%	-2.66%	-1.48%	0.05%
2019	0.17%	0.22%	0.17%	0.43%	-2.57%	-1.41%	0.05%
2020	0.17%	0.22%	0.17%	0.41%	-2.50%	-1.35%	0.06%

Source: U.S. Census Bureau 2010; NEI 2012

Each of the community-level populations was projected independently based on historic population data since the 1980s. The sum of the individual projections matched closely to the borough's projections for each year. Any discrepancies between the borough-level projections and the sum of the community level projections were allocated among the communities in proportion to their share of the borough's population.

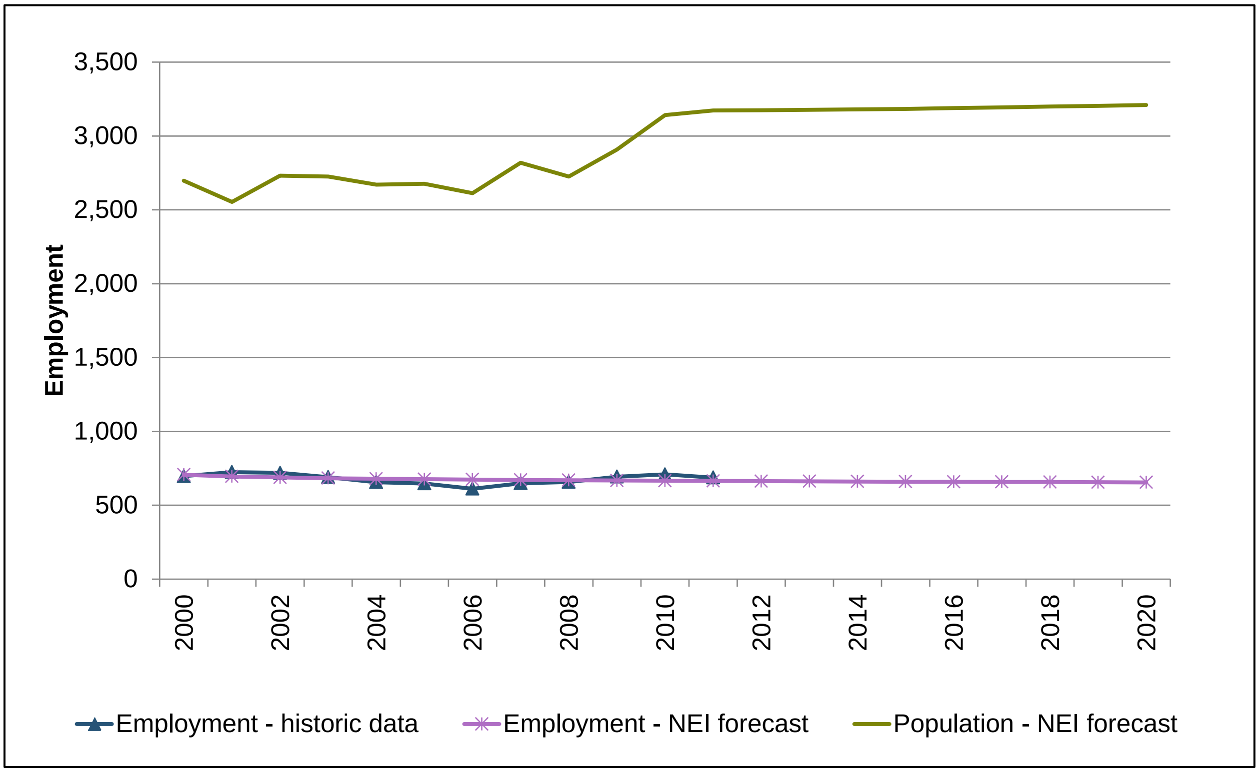
Any population forecast is uncertain and the precision declines as the projection extends further into the future. Projections for small areas also have a higher level of uncertainty. The results in this section should be interpreted with caution since many factors could drastically affect future populations.

Employment

Employment forecasts use a logarithmic regression model based on past trends and are analogous to population forecasts developed in the previous section. The 10-year forecast for the Aleutians East Borough employment by place of residence shows a compounded annual average decrease rate of -0.2 percent, reaching about 660 working residents by 2020 (Figure 4.2-2).

Note, as discussed in Section 3.3.2.2, employment by place of residence does not include most of the onshore processing jobs that constitute a very large portion of jobs that occur in the Aleutians East Borough. Data on employment by place of residence are the only employment data available at the community level, and therefore are the data included in this section. Seafood processing employment in King Cove is addressed qualitatively.

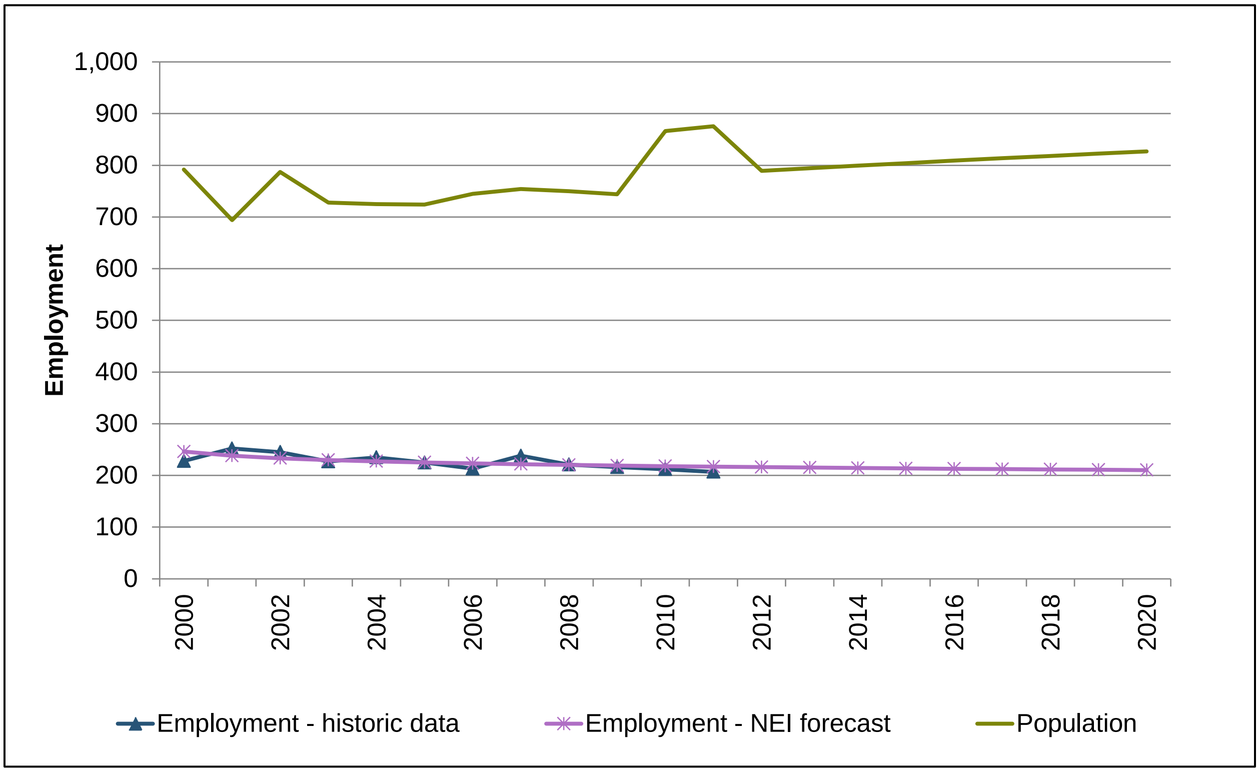
Figure 4.2-2 Baseline Forecasts of Employment by Place of Residence, Aleutians East Borough, 2000-2020



Source: NEI 2012; ADOLWD 2012a

The 10-year forecast for employment by place of residence in the City of King Cove shows an annual average decrease of -0.4 percent, reaching about 210 working residents by 2020 (Figure 4.2-3). In addition to resident workers, it is anticipated that the large seafood processor (e.g., Peter Pan Seafoods) will continue to employ up to 500 non-residents during peak seasons.

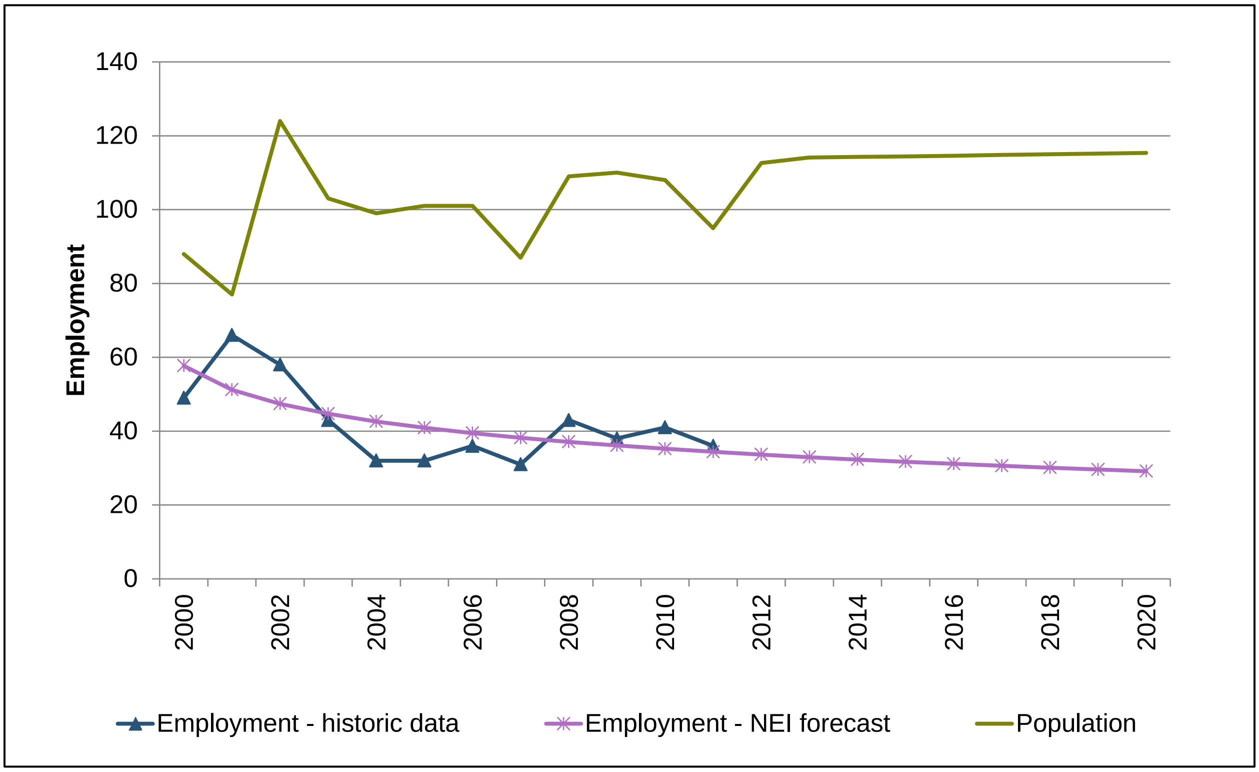
Figure 4.2-3 Baseline Forecasts of Employment by Place of Residence, City of King Cove, 2000-2020



Source: NEI 2012; ADOLWD 2012a

The 10-year forecast for employment by place of residence in the City of Cold Bay shows an annual average decrease of -1.9 percent, reaching about 30 working residents by 2020 (Figure 4.2-4).

Figure 4.2-4 Baseline Forecasts of Employment by Place of Residence, City of Cold Bay, 2000-2020



Source: NEI 2012; ADOLWD 2012a

Baseline Fiscal Conditions of Local Governments

Under baseline conditions, the Aleutians East Borough has limited discretionary funds available to subsidize a transportation alternative. Total general fund revenues have averaged about $7 million per year over the past 5 years. A substantial portion of borough revenues is associated with fish harvesting and related transfer payments from the State of Alaska. No information is available that would suggest changes in future revenues from the fisheries resource. Revenue sharing from the state is important because it is a source of funding for schools, municipal assistance, and similar programs. Other than shared fish taxes, revenues that are shared from the state to local governments are generally derived from revenues generated by oil and gas production on the North Slope. Anticipated oil and gas revenues are likely to remain stable since production is falling but oil prices are increasing. The combination of these factors suggests that annual general fund and school fund revenues are likely to continue at recent levels throughout the study period.

According to the audited financial statements from 2004 - 2010, the Aleutians East Borough has had revenue surpluses in every year but 2008, including 2 years in which the hovercraft operated at a loss (2009, 2010). Over the 7-year period from 2004 to 2010, the borough would have had an average annual revenue surplus of $1.06 million, if the revenues and costs of the hovercraft are excluded. In general, revenue surpluses are used to build up the Aleutians East Borough capital asset funds, which include its Permanent Fund. In 2010, the borough's Permanent Fund held $22 million. In addition, the borough reported $1.7 million in undesignated funds in 2010.

Hovercraft service provided by the Aleutians East Borough from Lenard Harbor to the City of Cold Bay hovercraft site at Cross Wind Cove was suspended in November 2010. Since operations began in 2007, the Aleutians East Borough identified issues with operability and reliable service from Lenard Harbor. Revenue generated by operations did not meet initial projections. According to the Aleutians East Borough, operation costs exceeded revenues, requiring an annual subsidy of over $1 million by the borough. Subsequently, the borough decided to modify the hovercraft, and redeployed it for operations at Akutan in 2012, as discussed in Chapter 2.

Baseline Transportation Assumptions for All Alternatives

To estimate travel expenses for the alternatives, the number of trips taken must be estimated. Table 4.2–4 shows the estimated total number of passenger trips for the years 2013 – 2020 and for 2025. The first row shows the estimated baseline number of passenger trips per year. While this same number of trips is assumed to occur under each alternative, the distribution of trips by primary travel mode and associated ground transportation type varies across alternatives. In this section, the distribution of passenger trips by primary travel mode is used to estimate the costs of travel, including the cost estimates of ground vehicle travel that will be required under the alternatives using marine travel.

Table 4.2-4 Estimated Baseline Passenger Trips for all Alternatives and Induced Trips under Alternatives 2 and 3, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Baseline Passenger Trips under all Alternatives	6,101	6,110	6,120	6,134	6,148	6,162	6,176	6,189	6,234
Construction Induced Passenger Trips under Alternatives 2 and 3	0	500	500	0	0	0	0	0	0
Other Induced Passenger Trips by Residents under Alternatives 2 and 3	0	0	0	460	461	462	463	464	468
Total Trips under Alternatives 2 and 3	**6,101**	**6,610**	**6,620**	**6,594**	**6,609**	**6,624**	**6,639**	**6,654**	**6,701**

Note: See Transportation, Section 4.2.3.3
Source: NEI 2012

In addition to estimates of baseline passenger trips, Table 4.2–4 contains estimates of induced trips. Induced trips are generated because, in economic terms, demand tends to trend upward to meet capacity. These "extra" trips are generated because of economic activity associated with an alternative, a lower cost of travel, convenience, or other factors that produce trips that would not have occurred without implementation of the alternative. One set of trips are induced by the construction of the roads under Alternatives 2 and 3. The second set of induced trips is assumed to be taken by residents, and in general is considered to be a benefit of access provided by the respective alternative. The trips are considered benefits because they are induced and therefore optional trips that would only be taken if the benefits of the trip outweigh the costs.

To fully estimate the baseline travel costs, the total amount spent on marine vessels, air taxis, and the cost of ground travel must be estimated. Ground travel occurs in all of the alternatives; it is required to move between:

- City of King Cove and King Cove Airport
- City of King Cove and Lenard Harbor

- City of King Cove and the Northeast Terminal
- City of King Cove and Cold Bay Airport via either of the 2 road options

Ground travel time and costs create important differences across alternatives, and they must be estimated to fully understand the impacts of the alternatives. Table 4.2–5 summarizes road based travel distances and travel times from the center of the City of King Cove to each of the key destinations, using the distance and average driving speeds (20 mph) as described in Section 4.2.3.3.

Table 4.2-5 One-Way Distances and Travel Times from the City of King Cove to Key Destinations

Origin and Destination	One-Way Distance from City of King Cove (miles)	Travel Time at 20 miles per hour (hours and minutes)
City of King Cove to King Cove Airport	4	12 minutes
City of King Cove to Lenard Harbor	9.6	29 minutes
City of King Cove to Northeast Terminal Area	21.6	1 hour; 5 minutes
City of King Cove to Cold Bay Airport via Alternative 2 (Southern Road)	43.2	2 hours; 10 minutes
City of King Cove to Cold Bay Airport via Alternative 3 (Central Road)	45.2	2 hours; 16 minutes

Note: See Transportation, Section 4.2.3.3

An important factor when considering ground travel costs is whether the vehicle will be carrying passengers both ways, or only one-way. For example, when traveling to King Cove Airport, it is likely that the vehicle can be used to drop off departing passengers, and then to pick up arriving passengers on the same trip. This is because the planes are not based at the King Cove Airport and they return to the Cold Bay Airport immediately after arriving in King Cove; therefore, it is likely that a friend or family arrived at the same time and in the same aircraft that will be taken by another departing family or friend. This is not the case for a proposed hovercraft (Alternative 4), or the proposed ferry (Alternative 5); all vessels would be based on the east side of Cold Bay. Therefore, a driver from the City of King Cove dropping off passengers at the Northeast Terminal would most likely return to the City of King Cove without passengers. In other words, a full vehicle round trip is required to accommodate one-way trips of marine-based passenger trips. In effect, the travel distance, travel time, and travel costs are all doubled for vehicles dropping off passengers at the marine terminals.

It is also important to note that different groups of travelers are likely to make different ground travel choices and to travel in different manners. While the trips estimated in Table 4.2-4 represent individual *passenger trips*, some of these trips will be combined in one vehicle. This discussion on economic activity focuses on 4 key economic groups that travel between the cities of King Cove and Cold Bay using the different modes of travel examined in the alternatives:

- Seafood fish processing crews
- Seafood company managers and technicians
- Fishing crew members and fishery observers
- Residents and other persons not associated with fisheries

These 4 groups would have different modes of travel between King Cove and Cold Bay, depending on the alternative. Each group would use ground vehicles of varying capacity, according to volume of passengers that need to travel, and using the most cost and time efficient mode of travel. The groups are proportioned in each alternative because each would have different travel patterns. In order to generate estimates of ground transportation, the following set of assumptions about the types of vehicles that the key groups use when traveling to and from the marine terminals and airports was developed. These are described below.

Bus/Van: This is assumed to be a shared-ride van, for non-exclusive use of seafood company employees or contractors. The van driver is assumed at a fully-loaded wage rate (including benefits) of $25/hour. The vehicle is assumed to carry 8 passengers travelling on an average one-way trip. Fully amortized costs for the van are $1.00/mile. (The federally authorized charge per vehicle mile is currently $0.55. This analysis assumes $1.00/mile to account for the larger than average size of the vehicle and the higher cost of vehicle ownership in the City of King Cove, including the high cost for fuel, cost of transportation of the vehicle to King Cove, and high cost of parts and maintenance labor.) Under the road alternatives (Alternatives 2 and 3), the vehicle is assumed to be a 30-passenger school bus (carrying 20 passengers on an average one-way trip) with fully amortized costs of $1.50/mile. It could also carry additional passengers beyond seafood company employees, for a seat fare. Under all alternatives, it is presumed that the vehicle picks up or drops off processing crew members, but not both (i.e., the bus/van travels one-way loaded and one-way empty). Estimated costs per passenger for the bus/van for each alternative are shown in Table 4.2–6.

Sport Utility Car Service: A sport-utility based car service would be used to pick up or drop off a maximum of 3 passengers to/from the City of King Cove. The sport utility car service would have a driver with a fully-loaded wage rate (including benefits) of $25/hour. The sport utility car service is assumed to have a fully amortized cost of $1.00/mile. Estimated costs per passenger for the sport utility car service for each alternative are shown in Table 4.2–6.

Commercial Shuttle Van: This is a commercial vehicle used to transport passengers between the City of King Cove and the marine terminals under Alternatives 4 and 5, and between the City of King Cove and the Cold Bay Airport under Alternatives 2 and 3. The van charges a fixed rate for one-way trips. The fully amortized cost of the vehicle is $1.00/mile. If 3 persons are on board (the presumed average passenger load), then the shuttle earns the owner/operator a return of $25/hour. An exception to the 3 passenger fare basis is the rate charged to and from the King Cove Airport. In this case, the fare assumes 2 passengers because of the relatively short distance and because the air taxis typically carry 4 or fewer passengers. Rates to and from both the King Cove and Cold Bay airports are developed with the assumption that there will be paying passengers in both directions. Estimated fares per passenger for the commercial shuttle van for each alternative are shown in Table 4.2–6.

Personal Vehicles: These are not-for-hire private vehicles. The drivers are un-paid residents of King Cove, who are willing to provide services free of charge to friends and family if the vehicle is making the trip anyway. The vehicles are assumed to have a fully amortized cost of $1.00 mile and carry an average of 2 passengers per trip. For trips to either airport, it is assumed the vehicle carries passengers in both directions. For trips to the marine terminals, it is assumed the vehicle carries passengers in only 1 direction. Costs per passenger that accrue to the driver of personal vehicles are shown in Table 4.2–6.

Table 4.2-6 Estimated One Way Ground Travel Cost[1] per Passenger from the City of King Cove, by Alternative and Vehicle Type

Vehicle Type	Approximate Passenger Count	Alternative 1: Air Service: King Cove Airport	Alternative 2: Southern Road	Alternative 3: Central Road	Alternative 4: Hovercraft at Northeast Terminal	Alternative 5: Ferry at Lenard Harbor
Bus/Van	2,000	$8.08	$13.13	$13.68	$15.28	$6.96
Sport Utility Car Service	200	$16.17	$70.03	$72.96	$81.47	$37.13
Shuttle	1,450 – 1,700	$10.00	$46.00	$48.00	$33.00	$19.00
Private Driver + 2 Passengers	2,450 – 2,700	$4.00	$43.20	$45.20	$21.60	$9.60
Weighted Average [2]	6,100 – 6,600	$7.75	$49.20	$50.60	$12.02	$8.97

12010 dollars.
2 distributed by vehicle type and proportion of travelers by vehicle type.
Source: NEI 2012

Alternative 1 Analysis

Direct Effects and Indirect Effects from Construction

Under Alternative 1, current air transportation between the cities of King Cove and Cold Bay would continue to operate. As described in Chapter 2, the borough has indicated that they may implement a landing craft, at a capital cost of approximately $500,000, at an unspecified later date. There is insufficient information to include the specifics of a landing craft service in the No Action alternative.

As no new construction of facilities in the project area would occur under the No Action alternative, socioeconomic factors would not be altered in this alternative.

Summary

No construction-related direct or indirect impacts would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

This section discusses the direct and indirect impacts resulting from operations and maintenance of Alternative 1 from several perspectives: a) employment, b) population and demographics, and c) and fiscal impacts to local governments.

Estimates of passenger trips and total passenger travel costs (in 2010 dollars) by year are shown in Table 4.2–7. The total number of trips increases in proportion to the forecast year over year population growth rate in the City of King Cove. All of the growth in traffic is attributed to resident and non-fishing related trips. The total number of trips would increase from 6,101 to 6,189 between 2013 and 2020, and then up to 6,234 in 2025. Considering the average cost of ground travel and estimated trips, total travel costs would increase from $645, 245 in 2013 to $659,165 in 2020. Ground vehicle travel accounts for about 7 percent of cost associated with the No Action alternative.

Table 4.2-7 Estimated Trips and Travel Cost by Air Travel under Alternative 1, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Trips and Travel Cost for Passengers using Air Transportation									
Total Trips	**6,101**	**6,110**	**6,120**	**6,134**	**6,148**	**6,162**	**6,176**	**6,189**	**6,234**
Total Cost of Trips ($2010)[1]	**645,245**	**646,179**	**647,176**	**648,680**	**650,161**	**651,622**	**653,065**	**654,492**	**659,165**

Note: Ground trips to and from the airport are apportioned according to the type of vehicle and number of fishery or non-related fishery passengers.
[1] Cost for ground travel from City of King Cove to airport terminal and airfare.
Source: NEI 2012

Under Alternative 1, the total cost per passenger by air per one-way trip is estimated to be $107.75 ($98 in air fare plus an average of $10.75 in ground travel costs.) Average ground travel costs per person by ground travel mode are shown above in Table 4.2–6

Employment associated with air taxi services between King Cove and Cold Bay is difficult to estimate because the air taxi operators working in the area supply services between many different communities. It is reasonable to state that under Alternative 1 no change is expected in the number of jobs associated with air taxi service. Thus, no changes in employment would result from implementation of Alternative 1.

No new effects on population and demographics would occur within Alternative 1.

No fiscal effects to the Aleutians East Borough would result from Alternative 1.

Summary

Alternative 1 would generate no new employment and income, no changes to population and demographics, and no fiscal effects to the Aleutians East Borough. Passenger trips and travel costs would not be changed.

Mitigation Measures

No mitigation measures for Alternative 1 have been identified.

Cumulative Effects

Local government fiscal resources have been influenced by the previous operations of the Suna X hovercraft. Reasonably foreseeable future actions related to transportation and socioeconomic indicators are few, including additional fishery observers travelling to the City of King Cove and upgrades to the Cold Bay Airport. This alternative would generally perpetuate existing conditions; with no additional contributions to cumulative effects on socioeconomic indicators.

Conclusion

Since transportation modes and costs are expected to be held constant, the No Action alternative introduces no new direct or indirect effects to employment, population, demographics, and fiscal resources for the local government. There would also be no contribution to cumulative effects on socioeconomic indicators.

4.2.3.3 Transportation

Transportation Assumptions for Analysis for All Alternatives

The existing regional transportation system available to King Cove residents was described in Chapter 3. A challenge for residents has been affordable and reliable access to the Cold Bay Airport. Though the King Cove Airport has Monday – Saturday, twice-daily air taxi service for transit to Cold Bay Airport (and back), this schedule is sometimes curtailed by inclement weather. Because of King Cove Airport requirements for navigation, flights are in daylight hours only, which are reduced in the winter months. Other marine services are currently provided privately on an as-needed basis by commercial entities such as seafood processors for their employees, or by individual boat owners.

Hovercraft service from Lenard Harbor was initiated in 2007, but was suspended in 2010 in response to substantial operating losses and other factors by the operator, the Aleutians East Borough. After modifications to the hovercraft, the borough redeployed it for service in Akutan in 2012. The borough determined that they may institute a landing craft passenger service sometime in the future, but there is insufficient information about that possibility to fully analyze it in the No Action alternative.

Currently no road access exists between the communities of King Cove and Cold Bay. A project is currently permitted for a new access road extending north of the City of King Cove to the Northeast Terminal area. This road is scheduled for completion in 2013. The hovercraft hangar has been canceled, but other infrastructure is still planned for construction (see Section 2.4.1 for details). Affordable and reliable emergency transportation, especially for medical and public safety reasons, is of primary importance to some King Cove residents, as noted in the scoping comments shown in Appendix C, in the public comments on the Draft EIS shown in Appendix G, and as discussed in Section 4.2.3.4, Public Health and Safety.

Trip Estimates

Table 4.2–8 shows trip travel times for all modes (road, marine, and air) for Alternatives 1 - 5.

Table 4.2-8 Estimated Travel Times, by Modes of Transit, Alternatives 1-5

Mode of Transit	Road Travel							Marine and Air Travel		Estimated Total Time (min)
	City of King Cove to King Cove Airport (mi)	King Cove Airport to Lenard Harbor (mi)	Lenard Harbor to Northeast Terminal (mi)	Northeast Terminal to Cold Bay Airport[1] (mi)	Cold Bay dock to Cold Bay Airport (mi)	Total Road Distance (mi)	Total Road Travel Time[2] (min)	Northeast Terminal to Cross Wind Cove (mi)	Travel Time[3] (min)	
No Action - Air (Alt. 1)	4.0	n/a	n/a	n/a	n/a	4	12	n/a	20	**37**
Road-Southern (Alt. 2)	4.0	5.6	12.0	21.6	n/a	43.2	130	n/a	n/a	**130**
Road-Central (Alt. 3)	4.0	5.6	12.0	23.6	n/a	45.2	136	n/a	n/a	**136**
Hovercraft (Alt. 4)	4.0	5.6	12.0	n/a	1.1	22.7	68	8.2	15	**83**
Marine (Ferry) (Alt. 5)	4.0	5.6	n/a	n/a	1.1	10.7	32	14.0	74	**106**

[1] Includes distance from Blinn Lake to the Cold Bay Airport (Alternative 3, 3.6 miles; Alternative 2, 3.1 miles.
[2] Assumes road vehicle speed of 20 mph,
[3] Assumes 10 knots (11.5 mph) for marine, 30 knots (34.5 mph) for hovercraft

Estimates of passenger traffic are shown within each of the alternatives. The estimate assumes that the mode of transportation for each alternative would not operate concurrently, with the exception that air taxi traffic would continue under all alternatives. The estimates also assume that traffic and passengers would grow at the same rate as the population. The starting point is the 2009 U.S. Department of Transportation statistics counts (US DOT 2012), which indicated 5,317 passengers between King Cove and Cold Bay. This is assumed to be the bulk of demand for passengers traveling between the King Cove and Cold Bay airports. Hovercraft passengers (Alternative 4) are estimated using 2007-2010 data collected by the Aleutians East Borough.

The estimates shown should be considered as descriptive of possible transportation pattern changes associated with each alternative. The tables do not reflect seasonal peaks that would likely occur. It is noted that the 35 trip-per-day estimate provided for a road in the 2003 EIS is used in some other resource sections where maximum sensitivity is required, such as estimating road capacity or safety.

For consumers, transportation mode choices would largely be based on the purpose, reliability, cost, transit times, and safety of the trip, as discussed in Section 4.2.3.2., Socioeconomics, and Section 4.2.3.4, Public Health and Safety. The same is true for commercial passengers, such as seafood company workers, as they are transported in and out the Cold Bay and King Cove communities. Because of their numbers, representing more than half of annual current air passengers, business decisions about their transport could dominate transportation patterns that develop in any alternative.

Table 4.2–9 shows a summary of consumer costs, reliability (of scheduled service), and travel times for each of the alternatives. Considerations in determining consumer cost, translation of passenger trips to traffic operations, such as the number of passengers ride-sharing in a road trip, and travel times are discussed in Section 4.2.3.2, Socioeconomics. In that section, passengers and their traffic patterns are distinguished by group, including seafood workers, and year round residents. Consumer costs among the modes become quite similar for all travel modes, when ground transportation to access the mode is taken into account. Estimates of reliability by mode are discussed in Section 3.3.3.2, and should be considered very broadly.

As discussed in Section 3.3.3.2, annual and daily availability of transportation modes considered in Alternatives 1-5 varies. For air transportation, availability is mostly limited to daylight hours because of limitations at the King Cove Airport, and commercial schedules. Charter flights may or may not be available beyond scheduled flights. Air transportation is limited in availability for on-demand trips. Historically, the former hovercraft, operating from Lenard Harbor, was unable operate for up to 30 percent of the schedule, due to wind and ice conditions, and crew availability. Road transportation is almost always available, assuming regular and timely maintenance. The same is true for ferry transportation, which has broad operating tolerances, though a ferry must be taken out of service periodically for maintenance and inspections.

The travel time and reliability of trips is an important parameter for comparison of alternatives, because it affects the time that an emergency response could be conducted. It also may influence trip displacements among transportation modes and could be weighed by residents as importantly as cost. Responsiveness to on-demand transportation is highest with a road, though it should be considered that travel by road between the cities of King Cove and Cold Bay would take over 2 hours to complete, and the ferry about 1.5 hours.

Table 4.2-9 Summary of Consumer Costs, Reliability, and Travel Time Estimates for Alternatives 1-5

Alternative	Estimated Consumer Cost per Passenger[1]	Reliability of Scheduled Service	Travel Times from King Cove (minutes)
Alternative 1 – No Action - Air Travel	$106	75%	37
Alternative 2 – Southern Road	$49	98%	130
Alternative 3 - Central Road	$51	98%	136
Alternative 4 - Hovercraft	$104	70%	83
Alternative 5 - Ferry	$101	95%	106

Note: Summarized from Socioeconomics (Section 4.2.3) and Transportation (Section 4.3.3.)
[1] Cost assumptions assume ratios of cannery workers connecting by group shuttle bus; others by 3 persons (2 passengers) per vehicle. Alternative 1, 4, and 5 assume round trip from the City of King Cove to terminals; Alternatives 2 and 3 assume round-trip from the City of King Cove to Cold Bay Airport and back. Numbers are rounded.

Freight estimates shown in the 2003 EIS showed average annual air freight to King Cove through 1999 at about 120,000 pounds (USACE 2003). The future distribution of air freight under any alternative is dependent on commercial assumptions that are beyond the scope of this EIS. One example of this is the U.S. bypass mail system, which provides revenue operating efficiency (generally for air taxis) serving remote communities in Alaska. No changes would be anticipated to the Alaska Marine Highway system or schedule, as it is part of a large network assumed to be relatively unaffected by community-level demand.

Alternative 1 Analysis

Direct Effects and Indirect Effects from Construction

No new construction would be associated with this alternative.

Direct Effects and Indirect Effects from Operation and Maintenance

Restrictions for surface transportation through the Izembek National Wildlife Refuge and wilderness would remain as present, as outlined in Chapter 3. Emergency responses would continue at the same rate as previously. Emergency responses via private residents and private commercial entities owning boats; and other agencies, such as the Coast Guard deploying helicopters, would also continue, as discussed in Section 4.2.3.4, Public Health and Safety.

Air transportation requires approximately 37 minutes travel time and has about 75 percent reliability. Under this alternative, it is assumed that air taxi trips to the Cold Bay Airport would remain at similar levels to the present.

By 2020, air passengers in the Alternative 1 scenario are estimated at 6,189, as shown in Table 4.2–10. Trips to the King Cove Airport are not anticipated to appreciably change traffic levels on city roads.

Table 4.2-10 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 1

Alternative 1 No Action	2013	2014	2015	2016	2017	2018	2019	2020	2025
Air Taxi Passengers	6,101	6,110	6,120	6,134	6,148	6,162	6,176	6,189	6,264

Note: Projected according to King Cove city population growth rates shown in Table 4.2-3 .
Source: NEI 2012

Summary

Alternative 1 introduces no new effects to transportation availability. Alternative 1 presents no new effects to existing transportation systems.

Mitigation Measures

No mitigation measures have been identified for Alternative 1.

Cumulative Effects

Reasonably foreseeable future actions include a small increase in fisheries observers going to the City of King Cove. Demand for transportation to the Cold Bay Airport would increase slightly at approximately the same rate as population growth. Alternative 1 would not contribute to cumulative effects on transportation.

Conclusion

There are no new direct or indirect effects and no new contributions to cumulative effects to transportation associated with Alternative 1.

4.2.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

Under Alternative 1, no land exchange would occur and there would be no new construction beyond the existing conditions of what was authorized in the 2003 EIS and subsequent permits. No direct or indirect effects on public health and safety would occur due to construction.

Summary

No change to existing baseline conditions would occur under this alternative. There would be no direct or indirect impacts to public health and safety from construction because no construction is necessary in this alternative.

Direct Effects and Indirect Effects from Operation and Maintenance

The Aleutians East Borough, which includes the cities of Cold Bay and King Cove, has been designated a Medically Underserved Area by the Health Resources and Services Administration of the U.S. Department of Health and Human Services (HRSA 2010a). Under the No Action alternative, community public health and safety concerns would continue. The King Cove Clinic provides primary outpatient and limited emergency care to King Cove residents and for other communities (including False Pass and Nelson Lagoon), workers at a seafood processing plant, and fishermen operating in the area. Cases requiring advanced care exceeding that available at the King Cove Clinic (including medical evacuations) require transportation to the Cold Bay Airport. From there, patients are transported to medical facilities offering more advanced care in Anchorage, Alaska, Seattle, Washington, or elsewhere. (For additional information on medical facilities, refer to Section 3.3.4). Travel between the communities of King Cove and Cold Bay is currently by private boat, the Alaska State Ferry, or air only, which can be hazardous or impassable at times. The previously existing hovercraft service was discontinued between the communities of King Cove and Cold Bay in 2010 by the Aleutians East Borough. The Suna X hovercraft has been repurposed and in 2012, began operating in Akutan. The No Action alternative does not represent deterioration in recent levels of transportation and medical care access, but it could continue to be difficult at times for persons in the King Cove community to access health care services outside of King Cove.

Under the No Action alternative, patients requiring specialist or emergency care not available at the King Cove Clinic would continue to reach Cold Bay by air or boat. The Coast Guard can only provide occasional medical evacuations via helicopter when their assets are in the vicinity and not committed to other assignments. Helicopters must be mobilized from as far away as St. Paul Island, where Coast Guard Search and Rescue helicopters are stationed. One recent medical evacuation by helicopter was postponed because snow and zero visibility prevented the Coast Guard from landing safely in King Cove (AEB 2011a). In other recent cases, the Coast Guard completed medical evacuations from King Cove under potentially dangerous weather conditions (high winds, rain, and low clouds) (EAT 2011; AEB 2011a). For additional information on medical evacuations, refer to Section 3.3.4.

Some limitations exist in the use of the King Cove Airport. The King Cove Airport non-precision instrument approach can only be used when landing from the east during daylight hours and when the airport can be seen from 5.2 nautical miles or more because the final approach must be flown under visual flight rules. The State of Alaska recommends daytime use only of the runway due to topographic obstructions on the approaches and unpredictable winds. Therefore, flights from the King Cove Airport are not always possible. Accidents (including fatalities) have been associated with the King Cove Airport, most of which were attributed to adverse weather conditions, unfavorable winds, and poor visibility. One fatal plane accident occurred during a medical evacuation. (For additional information on airport conditions, refer to Section 3.3.3.)

Medical evacuation transport by fishing vessel between the City of King Cove and the City of Cold Bay can be difficult and potentially hazardous depending on the weather; Cold Bay sometimes has 15- to 20-foot seas in the winter. In a recent case, a medical evacuation was first attempted by fishing vessel, and then was forced to return to King Cove because of poor sea conditions. Transport of medical evacuation patients by fishing vessel can be difficult because the community of Cold Bay does not have a boat harbor. Boat access is limited to the Cold Bay dock, where passengers either have to climb a steel ladder, or are lifted to the deck of the dock via a winch system used to load/unload cargo from fishing vessels.

The time needed to evacuate patients from the King Cove Clinic to the Cold Bay Airport via air transportation is about 37 minutes, as shown in Table 4.2-8 Travel by boat can be difficult and potentially hazardous depending on the weather and the height of seas (see Sections 3.3.3 and 3.3.4.

Although the No Action alternative represents no reduction in service from the recent status quo, residents of the City of King Cove consider this level of service to be inadequate, as shown in Section 3.3.2. The World Health Organization defines “health” as “The reduction in mortality, morbidity and disability due to detectable disease or disorder, and an increase in the perceived level of health” (WHO 1999). Residents of the City of King Cove have indicated that the current lack of safe and reliable transportation to needed medical services affects their quality of life by affecting their peace of mind, particularly during extended periods of inclement weather that prevent marine and air travel. They have stated that they experience a lack of control and independence in their lives because current transport to needed medical services depends on numerous factors that are beyond their control.

Summary

Alternative 1 represents the No Action alternative, which would continue the current levels of transportation and access to medical care. Alternative 1 would introduce no new direct or indirect effects on public health and safety, since there would be no improvement or reduction in the levels of transportation and access to medical service relative to the recent status quo.

Mitigation Measures

Alternative 1 would not require mitigation measures for public health and safety.

Cumulative Effects

Past and present actions affecting public health and safety are described in Chapter 3 (Section 3.3.4). No reasonably foreseeable future actions would affect public health and safety. Under Alternative 1, limited availability of safe transportation to needed medical services would continue. Alternative 1 would make no contribution to cumulative effects on public health and safety.

Conclusion

Alternative 1 would have no direct or indirect effects on public health and safety and continues the status quo of transportation options and access to health services. The alternative would make no contribution to cumulative effects on this resource. Alternative 1 would have no effect on public health and safety.

4.2.3.5 Environmental Justice

As described in Section 3.3.5, Executive Order 12898 requires federal agencies to identify and address "disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." The City of Cold Bay meets the definition of a low-income community because of its high individual poverty rate within the context of the Aleutians East Borough, which has lower median income and higher rates of poverty than the State of Alaska. The City of King Cove meets the definition of a minority community because 86 percent of the population is Alaska Native or non-White. Therefore, the analysis of environmental effects must also examine whether there are disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The purpose of this section is to summarize potential impacts to these communities, including public health and safety and subsistence lifestyles resulting from the implementation of the alternatives, and to conclude whether the estimated effects pose an Environmental Justice issue or not.

Direct Effects and Indirect Effects

Public health and safety indicators for Alternative 1 include reliability and consistency of the transit method and travel times (see Section 4.2.3.4). The direct and indirect effects of the operation and maintenance phase of Alternative 1 on public health and safety represents a continuation of the existing condition, with no increase or decrease in existing level of transportation and access to health care.

Subsistence indicators for Alternative 1 include quantities of subsistence resources, access to subsistence resources, and competition for subsistence resources (see Section 4.2.3.7). There would be no new direct impacts and minor indirect effects on subsistence resources, access, or competition under Alternative 1 from the potential conveyance of the selected lands to the King Cove Corporation (Section 4.2.3.7).

Mitigation Measures

No mitigation measures are associated with Alternative 1.

Cumulative Effects

Past and present actions affecting public health and safety and subsistence are described in Chapter 3 (Section 3.3.4 and 3.3.7). There are no reasonably foreseeable future actions that would affect environmental justice indicators. Alternative 1 would have no contribution to cumulative effects on public health and safety resources and a minor contribution to cumulative effects on subsistence resources or activities.

Conclusion

Since Alternative 1 represents the existing condition, a disproportionate adverse impact to the cities of King Cove and Cold Bay would not be introduced and no Environmental Justice issue would be created. This conclusion is based on the analytic standards established in NEPA and Executive Order 12898. It is important to recognize that for residents of the Aleutians East Borough, the status quo under the No Action alternative is inadequate to the pressing needs for improved transportation service and access to health care, as discussed in Chapter 3.

The effects of the road alternatives on public health and safety are analyzed in Sections 4.3.3.4 and 4.4.3.4. The implications of the road alternatives for subsistence are described in Sections 4.3.3.7 and 4.4.3.7. Subsistence and public health and safety are key indicators for the Environmental Justice analysis.

4.2.3.6 Public Use

Direct Effects and Indirect Effects from Construction

Under Alternative 1, no land exchange would occur and no construction would proceed. Therefore no impacts to public land use would result from construction activities.

Summary

Under Alternative 1, no construction would occur and therefore no impacts to public land use would result from construction activities.

Direct Effects and Indirect Effects from Operation and Maintenance

No direct impact to the public uses of federal, state, or Native Corporation lands would be associated with the No Action alternative. A land exchange would not take place and public use of existing parcels would remain the same.

However, as an indirect impact under this alternative, approximately 5,430 acres of King Cove Corporation selected lands might proceed to conveyance to the King Cove Corporation. The change in ownership of these lands would remove the designation as wilderness, and the King Cove Corporation would exercise private land owner rights to use and develop the parcel. Because this parcel would be an inholding within the Izembek National Wildlife Refuge, it would be subject to the provisions of ANCSA Section 22(g) (for fuller discussion of limitations under Section 22(g), see Section 3.3.1.1). Current public use of this remote and relatively inaccessible parcel is estimated to be low. Upon conveyance, the parcel would become private land and not available for general public uses without authorization by the King Cove Corporation.

Summary

Alternative 1 would have no direct impacts and the indirect impacts would be minor as there is little public use of the parcel that may be conveyed to King Cove Corporation. If the lands are conveyed to King Cove Corporation, any public use would be at the discretion of the King Cove Corporation. A permit or some other authorization would likely be required.

Mitigation Measures

No mitigation measures are recommended. Future uses of the land would be subject to Section 22(g) of ANCSA.

Cumulative Effects

Relevant past actions include the enactment of ANILCA that designated the Izembek Wilderness. No present or reasonably foreseeable future actions would induce additional changes to public use in the vicinity. Consequently, the contribution of Alternative 1 to cumulative effects on public use is considered negligible.

Conclusion

Alternative 1 would have minor impacts to public use, due to the indirect effect of the conveyance of the selected parcel to King Cove Corporation. Future use of the parcel would be subject to the requirements of Section 22(g) of ANCSA. Future public uses of the parcels would be subject to authorization by the private land owner.

4.2.3.7 Subsistence

Direct Effects and Indirect Effects

Under Alternative 1, the land exchange would not be authorized, and there would be no new construction of a road from the Northeast Terminal to the Cold Bay Airport. As a result, there are no new direct effects introduced by the No Action alternative to subsistence uses, subsistence access, or competition for subsistence resources.

As an indirect effect, the transfer of the land currently selected by the King Cove Corporation, and located within the Izembek Wilderness to the east of Cold Bay, may proceed under Alternative 1. Under the federal subsistence management regulations, selected but not conveyed lands are considered federal public lands subject to federal subsistence management, so conveyance to the King Cove Corporation would remove 5,430 acres of selected lands from the current status of federal management and application of the federal subsistence program to a new status as private lands, managed by the King Cove Corporation. If these lands are conveyed to the King Cove Corporation, it is anticipated that the corporation will restrict access to this parcel to shareholders, with non-shareholder access by permit only. This is how the King Cove Corporation currently manages public access to other corporation lands. Geographically, the selected parcel is adjacent and east of current King Cove Corporation lands. It is likely very few residents from Cold Bay or the other regional communities currently access this remote parcel, as this would require crossing King Cove Corporation lands from the road to the Northeast Terminal. Thus, conveyance of this parcel to the King Cove Corporation is expected to have a minor effect on subsistence access, particularly because most subsistence users in this area would be shareholders of the King Cove Corporation, and shareholder access would be unaffected by the change in land ownership.

Effects on Subsistence Resources

The terminals at the Northeast Terminal and Cross Wind Cove are located in subsistence use areas for waterfowl, salmon, and other marine fish (as shown in Figure 3.3-23 for the community of King Cove, Figure 3.3-24 for the community of Cold Bay, and Figure 3.3-25 for the Community of False Pass (as recorded in the 1980s). However, with no marine-road link service, no new disturbance effects are introduced by the No Action alternative. No new incremental environmental effects on subsistence resources would be introduced by Alternative 1.

Effects on Access to Subsistence Resources

Under this alternative, the road to the Northeast Terminal provides access to the area near the terminal. No new incremental environmental direct effects would be introduced by Alternative 1. The indirect effects of conveyance of the selected lands to the King Cove Corporation are expected to be minor, as noted above.

Competition for Subsistence Resources

Alternative 1 introduces no new direct effects on the user groups competing to harvest subsistence resources. The indirect effect of conveyance of selected lands to the King Cove Corporation could result in minor effects on subsistence use patterns if non-subsistence users of the parcel are displaced and compete with subsistence users for access to resources. This impact would be anticipated to be very minor as there is likely little, if any, non-subsistence use of the parcel.

Summary

No new direct impacts to subsistence resources or uses would occur under Alternative 1. The indirect effect of conveyance of King Cove Corporation selected lands could have a minor effect on subsistence use patterns, including subsistence access, and competition for subsistence resources.

Mitigation Measures

No mitigation measures are proposed for subsistence resources.

Cumulative Effects

Past and ongoing actions related to subsistence are described in Chapter 3 (Section 3.3.7). No reasonably foreseeable future actions would affect subsistence use and resources in the project area except for the possible displacement of non-subsistence users that currently use the parcel to be conveyed to King Cove Corporation. Thus, Alternative 1 would make a minor contribution to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources.

Conclusion

Alternative 1 would have no new direct effects and could have minor indirect effects on subsistence, and could make a minor contribution to cumulative effects on these resources.

4.2.3.8 Cultural Resources

Direct Effects and Indirect Effects from Construction

There would be no land exchange and no construction associated with Alternative 1.

Summary

Under Alternative 1, no construction-related direct or indirect impacts to cultural resources are expected, as no construction would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

No direct or indirect effects on cultural resources from operation and maintenance would occur under Alternative 1.

Summary

Under Alternative 1, no operation or maintenance-related impacts to cultural resources would be expected.

Mitigation Measures

No mitigation measures are proposed for cultural resources under the No Action alternative.

Cumulative Effects

Alternative 1 would have no contribution to cumulative effects to cultural resources.

Conclusion

Alternative 1 would have no direct, indirect, or cumulative effects to cultural resources since no new actions would occur.

4.2.3.9 Visual Resources

Visual Resources Assumptions for Analysis for All Alternatives

The analysis area included all lands located within the administrative and jurisdictional boundaries of the land exchange areas. Within these areas, the effects analysis for visual resources focused primarily on a 15-mile buffer surrounding the proposed centerline of the proposed transportation corridor for each alternative. Although the analysis area differed by alternative, the impact assessment methodology is consistent across all alternatives.

Prevailing land use of administrative areas located outside of the proposed exchange areas are not expected to change as a result of change in ownership. For this reason, potential impacts to visual resources that may result from the proposed land exchange are expected to be negligible and are not discussed further in this analysis.

Potential impacts to visual resources that may result from the proposed project were evaluated using methods described in *Visual Impact Assessment for Highway Projects* (FHWA 1988).

Baseline visual quality was established for the administrative areas included in the proposed land exchange: (1) Izembek National Wildlife Refuge, Izembek Wilderness, and Alaska Peninsula National Wildlife Refuge; (2) State of Alaska-owned lands, (3) King Cove Corporation Lands, and (4) federally-owned lands in Alaska Maritime National Wildlife Refuge on Sitkinak Island. The visual quality baseline quantified vividness, intactness, and unity, and provided a metric by which to measure potential change in visual quality. This terminology is defined as follows (FHWA 1988):

- *Vividness*: The memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern.
- *Intactness*: The integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment.
- *Unity*: The degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony or inter-compatibility between landscape elements.

Potential impacts were analyzed from the composite viewshed of the following viewer groups situated in each administrative area:

- Recreational users, subsistence users on the Izembek National Wildlife Refuge including Izembek Wilderness, including those accessing the area via the Alaska Marine Highway System
- Residents of the City of Cold Bay;
- Residents of the City of King Cove; and
- Air travelers

Design factors considered in the impact analysis for Alternatives 2 and 3 included projected project design standards (i.e., capacity, access, and speed) and the anticipated roadway cross section. Potential impacts that may result from all action alternatives were assessed from views within (views *from*) and toward (views *of*) the proposed transportation corridor.

The impact analysis for views *of* the proposed project was based largely on the degree to which the proposed travel way contrasted existing landscape pattern elements (form, line, color, texture) and pattern character (dominance, scale, diversity, continuity) (FHWA 1988). Methods for determining the anticipated level of contrast were based on the Bureau of Land Management Contrast Rating procedure (BLM 1986). This method assumes that the extent to which the project results in adverse effects to visual resources is a function of the visual contrast between the project and the existing landscape character. Impact determinations are typically based on the level of contrast identified using visual simulations and are not a measure of the overall attractiveness of the project. Because no visual simulations were prepared for the proposed project, the level of contrast has been estimated based on analysis factors, including distance from the project; predominant angle of observation; dominant use (e.g., recreation, subsistence, industry); and duration of typical views. The impact analysis for views *from* the proposed transportation corridor focused on changes in visual access that would improve accessibility to a broader range of viewing opportunities on the refuge.

The levels of contrast are defined as follows:

- *None*: The element contrast is not visible or perceived.
- *Weak*: The element contrast can be seen but does not attract attention.
- *Moderate*: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- *Strong*: The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Indicators used to measure potential impacts to visual resources that may result from the proposed project included:

- The estimated level of visual contrast created by the project as determined by the contrast rating procedure (BLM 1986);
- The expected change in visual quality within lands crossed by the proposed transportation corridor as determined by change in vividness, intactness, and unity (FHWA 1988); and
- Change in visual access.

Additional qualitative indicators included the expected level of change to the existing landscape aesthetic, such as movement, activity (measured in terms of change in vehicular traffic and amount of people), noise, or naturalness.

Baseline scenic quality levels were established for all administrative areas involved in the proposed land exchange. All administrative areas were ranked as having *very high* scenic quality based on the inventory presented in Section 3.3.9, and a subsequent analysis of visual quality using the methods described in *Visual Impact Assessment for Highway Projects* (FHWA 1988). The Izembek and Alaska Peninsula National Wildlife Refuges, the corporation parcels, and the state lands were rated as very high for all indicators: vividness, intactness, and unity. The Sitkinak Island parcel has a very high rating for vividness, medium ratings for intactness and unity, and an overall high rating.

Alternative 1 Analysis

Direct Effects and Indirect Effects from Construction

No construction-related impacts to visual resources are expected, as no construction would occur.

Summary

Construction is not associated with this alternative and there would be no impact to visual resources.

Direct Effects and Indirect Effects from Operation and Maintenance

Transportation activity would continue at current levels. These actions are transient, and do not impact vividness, reduce intactness, or reduce unity in existing visual quality. As an indirect effect of this alternative, approximately 5,430 acres of King Cove Corporation selected lands may be conveyed to the King Cove Corporation and moved from the current interim status of management as part of the Izembek Wilderness. It is unclear how visual resources in the area could change based on conveyance of selected lands because there is no identified proposed future use. The parcel is contiguous with other parcels conveyed to King Cove Corporation and future uses would be subject to Section 22(g) of ANCSA and to the compatibility requirements of 50 CFR Parts 25 and 26. The Izembek National Wildlife Refuge manager may allow any use proposed by King Cove Corporation when the refuge manager determines the effects of the use on adjacent refuge lands and resources to be compatible with ANILCA and pre-ANILCA refuge purposes.

Summary

The No Action alternative introduces no new direct impacts to visual resources, and negligible indirect impacts associated with conveyance of the selected lands. The selected parcels are contiguous with other parcels conveyed to King Cove Corporation and future uses would be subject to Section 22(g) of ANCSA. Indirect impact duration would be permanent; King Cove Corporation ownership of the parcel would continue in perpetuity. Effects of the conveyance would occur only in the vicinity of the conveyed parcel; the geographic extent of the effects is considered local. The impacts would affect visual resources that are common in context, or visual resources that are not rare in the locality and are not protected by legislation. The summary impact of Alternative 1 on visual resources would be considered negligible.

Mitigation Measures

The No Action alternative would result in a negligible change in visual resources (associated with the conveyance of selected lands to King Cove Corporation) and no mitigation measures are recommended. Future uses of the land would be subject to Section 22(g) of ANCSA.

Cumulative Effects

Past and present actions affecting visual resources are described in Chapter 3 (Section 3.3.9). When the King Cove Access Road project is completed, it could have residual effects to visual resources. The extent of impacts to landform and vegetation would depend on resulting changes to the existing ground plane (i.e., removal/fill), and the amount of vegetation clearing that was required. However, these projects are expected to be compatible with existing landscape character. Since it is considered that this project is part of the existing condition, the direct and indirect impacts of Alternative 1 are considered negligible and the contribution of Alternative 1 to cumulative effects on visual resources is considered negligible (indeterminate).

Conclusion

Alternative 1 would have negligible (indeterminate) impacts to visual resources, due to indirect effects of the conveyance of the selected parcel to King Cove Corporation. Future use of the parcel would be subject to the requirements of Section 22(g) of ANCSA. Alternative 1 would make a negligible contribution to cumulative effects. The summary impact of Alternative 1 on visual resources is negligible (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.2.3.10 Wilderness

Wilderness character is considered based on 4 qualities, each with specific indicators. (Landres et al. 2008). The current status of Izembek Wilderness is discussed in the same manner in Section 3.3.10 (Service 2010b).

Direct Effects and Indirect Effects

State Lands, Kinzarof Lagoon and King Cove Corporation Selection under Alternative 1

Under Alternative 1, no land exchange would take place between the Service, King Cove Corporation, and the State of Alaska. Only federal lands can be included in designated wilderness so there would be no impacts to wilderness on state and private lands.

Approximately 5,430 acres of King Cove Corporation selected lands could be withdrawn from the Izembek National Wildlife Refuge and conveyed to the King Cove Corporation, subject to the provisions of ANCSA Section 22(g) and the compatibility requirements of 50 CFR 25 and 26. If these selected lands were conveyed, the Izembek National Wildlife Refuge manager may allow a use proposed by King Cove Corporation if it is compatible with ANILCA and pre-ANILCA refuge purposes including the purpose of maintaining wilderness character. There are no future plans identified for development and conveyance of this particular parcel is not assured.

National Wildlife Refuge Lands under Alternative 1

No additional acres would be added to designated wilderness and no acres would be removed from Izembek Wilderness through land exchange.

<u>Untrammeled Quality</u>

No additional direct or indirect impacts to the untrammeled quality of wilderness character would be associated with Alternative 1. The manipulation and control of ecological systems within the Izembek Wilderness would remain stable (Service 2010b).

<u>Natural Quality</u>

No additional direct or indirect impacts to the natural quality of wilderness character would be associated with Alternative 1. Izembek Wilderness would maintain a high level of ecological connectivity, and the integrity of the ecological systems within its borders would remain stable (Service 2010b).

<u>Undeveloped Quality</u>

With Alternative 1, the King Cove Access Road to the Northeast Terminal area would be operational in 2013. The Northeast Terminal area is located approximately 0.5 miles from the current Izembek Wilderness boundary (USACE 2003), increasing to 2 miles if the adjacent parcel is conveyed to the King Cove Corporation. The presence of the access road has already increased use of motorized vehicles within Izembek Wilderness, creating long-term impacts to a unique resource. Use of motorized vehicles along the edge and within Izembek Wilderness, due to the permanence of the access road, will persist through the life of the road.

Solitude or Primitive and Unconfined Recreation Quality

Under Alternative 1, current levels and patterns of air traffic and state ferry service to and from the communities of King Cove and Cold Bay would continue. These actions would create intermittent, low magnitude impacts to the solitude of visitors that are able to see or hear airplanes, and/or boat traffic from Izembek Wilderness (USACE 2003).

There could be long-term, localized impacts to solitude or opportunities for primitive and unconfined recreation that would persist resulting from sounds of vehicles traveling along the King Cove Access Road to the Northeast Terminal area and the sight and sound of unauthorized motor vehicle use occurring in the area and is likely to increase in the future. The Northeast Terminal building has been cancelled (See Chapter 2) so no building would be visible from the Izembek Wilderness. The changes to the soundscape from specific locations in the wilderness would be slightly detectable. If selected lands are transferred to the King Cove Corporation, noise and visual disturbance from the vicinity of the Northeast Terminal area could be reduced in Izembek Wilderness, as the wilderness boundary would be more distant from that location. The selected lands could also be developed by the King Cove Corporation, subject to the provisions of ANCSA Section 22(g), but there are no known plans for development at this time.

Summary

Alternative 1 would result in long-term, localized effects to wilderness character, which is a unique resource. Effects would be long-term due to the conveyance of the selected parcel to King Cove Corporation, which would last in perpetuity. Effects to wilderness character would be local because the parcel is located at the margin of the wilderness and proposed developments would be subject to the provisions of ANCSA Section 22(g). Therefore effects would be expected to be local, or limited geographically in extent to the conveyed parcel. Izembek Wilderness is considered a unique resource because it is protected by legislation and the isthmus area fulfills a unique ecosystem role within the region.

There would be no additional direct and indirect impacts to the untrammeled quality and natural quality of wilderness character, and minor additional direct and indirect impacts to the undeveloped and the solitude or primitive and unconfined recreation qualities, primarily due to the long-term alteration of soundscapes within Izembek Wilderness, and the increased opportunities for unauthorized use of motorized vehicles stemming from the access road. Due to the unique context of the Izembek Wilderness (protected by legislation and fulfilling a unique ecosystem role within the region), the direct and indirect impacts to wilderness character resulting from Alternative 1 would be minor.

Mitigation Measures

No mitigation measures are associated with Alternative 1.

Cumulative Effects

Use of all-terrain vehicles for non-subsistence uses across the refuge is prohibited. Currently, unauthorized use of motorized vehicles in the Izembek Wilderness occurs, most of which stems from the road and trail system outside of the City of Cold Bay (USACE 2003) and King Cove (Sowl 2011f). This motorized activity creates noise intrusions within the Izembek Wilderness that are localized in extent, low intensity, and temporary in duration. Past effects are considered local in extent, or limited to discrete portions of the project area. All-terrain vehicle tracks have been observed in the vicinity of the Northeast Terminal and Kinzarof Lagoon and leading to Moffet Lagoon, via the Joshua Green watershed. Past effects have been low in intensity, as resource conditions have been altered, but resource functions have not been impaired. The frequency of the activities have been intermittent, but observed increasing in frequency since the completion of the hovercraft landing pad at the Northeast Terminal. Continuous use of the same routes by motorized vehicles within Izembek Wilderness would intensify long-term effects through the creation of pioneer trails within the wilderness, and there is evidence that use has increased since completion of the hovercraft landing pad at the Northeast Terminal (Section 4.3.3.1).

The King Cove Access Road from Lenard Harbor to the Northeast Terminal area traverses King Cove Corporation lands along the east side of Cold Bay. During the construction phase, visitors within the Izembek Wilderness would be able to hear noise from vehicles and equipment; effects would be temporary (lasting only for the construction period), low intensity (perceptible, but not noticeably altering the wilderness context), and localized (limited to discrete portions of the project area in the vicinity of road construction). Portions of the road to the Northeast Terminal area would also be visible from localized areas within Izembek Wilderness, creating a permanent, medium intensity adverse effect on the solitude or primitive and unconfined recreation quality of wilderness character.

Alternative 1 would make a minor contribution to cumulative effects on wilderness character within Izembek Wilderness.

Conclusion

The direct and indirect impacts to wilderness character resulting from Alternative 1 would be considered minor. The duration of impacts to the soundscape of users within Izembek Wilderness would be long-term, due to the intermittent episodes occurring over the life of the project, limited to the construction season, but spanning several years. The presence of the access road could increase opportunities for unauthorized and non-traditional uses of motorized vehicles within Izembek Wilderness, potentially creating low intensity (perceptible changes in resource condition), long-term (spanning several years), local impacts to a unique resource (protected by legislation and the isthmus area fulfills a unique ecosystem role within the region). The conveyance of the selected parcel to King Cove Corporation would affect land resources that are common in context since the right to select this parcel pre-dates the establishment of Izembek Wilderness. The impact level for cumulative effects under Alternative 1 to wilderness character within Izembek Wilderness is considered minor.

4.3 Alternative 2 – Land Exchange and Southern Road Alignment

4.3.1 Physical Environment

4.3.1.1 Air Quality

Direct Effects and Indirect Effects from the Land Exchange and Construction

Emissions during roadway construction may be associated with land clearing, drilling and blasting, ground excavation, and cut and fill operations, as well as operations that would occur at associated material sites and temporary barge landing sites. Dust emissions vary depending on levels of activity, specific operations, and meteorological conditions, but are expected to remain within or near the construction area (local). The construction of the southern road alignment includes a road footprint of 107 acres through a designated wilderness (important context), and is expected to be completed over 2 seasons, between May and November, for a total of 14 months (temporary). Estimates of particulate matter emissions from this groundwork activity are based on emission factors provided in various sections of EPA's *AP-42, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources* (EPA 1995, 2006b).

Emissions of air pollutants during construction are also from fuel combustion by construction equipment. Estimates of construction emissions are based on general equipment specifications and use assumptions for the preparation of the southern road alignment. The equipment and operation is based on the full 14 months of construction (7 months per year), 22 days per month, and 8 hours per day. For this analysis, it is assumed that the equipment considered will be used for the entirety of the construction period. Equipment specifications and emission rates are based on data from the California Air Resources Board (California Air Resources Board 2011a,b). The California Air Resources Board information is used because it provides the most exhaustive database for equipment emissions (more than available through EPA sources). However, for this analysis, it is assumed that emission factors for equipment and vehicles in Alaska will not have as stringent emission requirements (limits) as those in California. Therefore, to be conservative, emission factors for the equipment and vehicles used for construction are assumed to be double those referenced by the California Air Resources Board.

Table 4.3-1 shows measurable and observable emission estimates for the individual combustion equipment, the fugitive dust emissions described above, and the total predicted annual emissions associated with the construction of this alternative. These are considered to be directly related to the project construction and have the potential to effect air quality in the vicinity of the specific construction activity. Indirect effects of this construction may be increased from other sources (such as roadways and rock crushing operations used for construction materials). These activities would also be temporary, and are expected to have minimal emissions, not likely to exceed the direct construction emissions.

Summary

Based on Table 4.3-1, the estimated emission rates for Alternative 2 construction activities would be: 7.61 tons of nitrogen oxide per year; 4.51 tons of carbon monoxide per year; 0.01 tons of sulfur dioxide per year; 6.81 tons per year of particulate matter less than 10 micrometers in diameter; 1.03 tons per year of particulate matter less than 2.5 micrometers in diameter; 1.07 tons per year of volatile organic compounds; and 892 tons per year of carbon dioxide equivalents.

The direct and indirect effects on air quality from the construction of Alternative 2 are expected to be medium in magnitude because the activity would produce localized emissions of nitrogen oxides, carbon monoxide, sulfur dioxide, and particulate matter that would be measurable and observable. Many emissions would persist 24 hours or less (temporary). The resulting minor effects to air quality would occur in the local vicinity of the construction activity. Over the period of construction, emissions of air pollutants are expected to be less than the estimated annual emissions that would result from operation and maintenance of the road (except for greenhouse gases, shown here as carbon dioxide equivalents; see Section 4.3.1.2 for more details). These emissions would be spread out over the road footprint area (107 acres). Therefore, the overall direct and indirect effect on air quality during construction should be minor.

Table 4.3-1 Estimated Emission Rates for Alternative 2 Construction Activities

Construction Equipment	Hours/ Day	Number of Units	Estimated Pollutant Emission Rates													
			NOx		CO		SO2		PM10		PM2.5		VOC		CO_2e	
			Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy
Diesel Construction Equipment																
Grader (175 horsepower)	5	2	2.70	1.91	1.48	1.05	0.003	0.002	0.16	0.11	0.14	0.10	0.35	0.25	248	175
Excavator (175 horsepower)	5	2	2.22	1.59	1.34	0.96	0.003	0.002	0.13	0.09	0.12	0.09	0.29	0.21	225	160
Dozer (250 horsepower)	5	2	3.88	2.82	1.15	0.84	0.004	0.003	0.16	0.11	0.14	0.10	0.41	0.30	333	241
Backhoe/ Loader (120 horsepower)	4	2	1.13	0.65	0.72	0.41	0.001	0.001	0.10	0.06	0.09	0.05	0.18	0.10	104	59.2
Vehicles with On Road Engines																
Pickup Truck	8	4	0.006	0.02	0.086	0.21	0.0001	0.0004	0.001	0.003	0.001	0.002	0.005	0.012	15.4	37.0
Flatbed	8	2	0.029	0.04	0.017	0.02	0.00004	0.00005	0.002	0.002	0.002	0.002	0.002	0.002	4.15	5.11
Worker Vehicles	2	20	0.019	0.06	0.242	0.75	0.0005	0.0014	0.004	0.012	0.003	0.009	0.017	0.052	49.8	149
Dump Truck	8	2	0.431	0.53	0.225	0.28	0.0005	0.0006	0.030	0.037	0.027	0.034	0.121	0.149	52.3	64.4
Fugitive Dust																
Heavy Construction				--		--		--		6.38		0.64		--		--
TOTAL (tons per year)				**7.61**		**4.51**		**0.01**		**6.81**		**1.03**		**1.07**		**892**

NOTES:

Pollutants: NOx - nitrogen oxides; CO – carbon monoxide; SO2 – sulfur dioxide; PM10 – particulate matter less than 10 micrometers in diameter; PM2.5 - particulate matter less than 2.5 micrometers in diameter; VOC – volatile organic compounds; CO_2e – carbon dioxide equivalents.

Construction equipment assumed for typical road construction activity.

Unit Hours per Day estimated based on typical load factors for construction equipment and vehicle use over an 8 hour day.

Number of Units based on best estimate for road construction project of this size over 14 month time frame.

Unit pound per hour (lb/hr) emission rates conservatively assumed to be double (2x) California Air Resources Board OFFROAD Mobile Source Emission Factors for diesel equipment (2010 data) and EMFAC2007 model for on road vehicles (with assumed mileage based on road construction project) (California Air Resources Board 2011a,b).

Total Tons per Year (tpy) emission rates based on Unit lb/hr rate times operating hours. Construction expected to occur for 8 hours per day, 22 days per month, and 7 months per year.

CO_2e is assumed to be composed of the following GHG components: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emission factors are equal to the sum of each of these components times their individual Global Warming Potential (GWP) factors. The GWP for these are: CO_2 = 1; CH_4 = 21; and N_2O = 310 (EPA 2009b).

Fugitive Dust emissions based on the emission factor of 1.2 tons/acre/month for total suspended particulate (EPA 1995), with a factor of 0.1 applied to account for ratio of PM10 to total suspended particulate, construction activities occurring for 22 days per month (as opposed to 30), and the local climate conditions (relatively wet as compared to the semi-arid conditions that the emission factor is based on). The annual rate is determined from the total project area of 107 acres spread out over the total construction period of 14 months to give 7.6 acres/month, annualized over 7 months.

Emissions of PM2.5 estimated to be 10 percent of PM10 emissions, based on gravel road emission ratio estimates (EPA 2006b).

Due to rounding, the total tpy may differ slightly from the sum of the individual tpy emission rates.

Direct Effects and Indirect Effects from Operation and Maintenance

Emissions during roadway operations and maintenance would be from vehicle travel, including both combustion emissions and emission from road dust. Estimates of combustion emissions are based on emission factors for a typical vehicle engine, along with travel estimates for the roadway. The travel time along the roadway between King Cove Airport and Cold Bay Airport is expected to be 118 minutes per trip. This does not include the distance between the City of King Cove and the King Cove Airport; it is the additional increment that would be traveled beyond the existing airport to reach the Cold Bay Airport. For the emissions calculations, an estimate of 19,000 annual trips was used (NEI 1999), which is substantially greater than the number of trips calculated in this EIS. This provides an upper limit estimate of potential emissions. Fugitive dust is generated by the travel on the gravel road, resulting in emissions of particulate matter. Estimates of particulate matter emissions are based on emission factors for unpaved roads (EPA 2006b). Annualized emissions are determined by multiplying the emission factor by the miles traveled. Table 4.3-2 shows the direct emission estimates for the vehicular travel along the southern road alignment. The estimates of particulate matter emissions from fugitive dust are conservatively high, based on the estimating methodology used by EPA in the reference. Indirect effects of this alternative may include increased use of other resources, such as additional travel (to get to the new roadway segment) and other activities (such as increased development on either end of the new road segment) which may also have an effect on air quality.

Summary

Based on Table 4.3-2, the estimated emission rates for Alternative 2 operation and maintenance activities would be: 22.8 tons of nitrogen oxide per year; 4.9 tons of carbon monoxide per year; 1.5 tons of sulfur dioxide per year; 26.6 tons per year of particulate matter less than 10 micrometers in diameter; 4.07 tons per year of particulate matter less than 2.5 micrometers in diameter; 1.86 tons per year of volatile organic compounds; and 847 tons per year of carbon dioxide equivalents. The total estimated annual emissions from the new road are a compilation of very small emission sources, operating intermittently, and spread out over a relatively large area. Isolated occurrences of increased particulate matter due to fugitive dust (on dry days) may have an effect on air quality, and these reoccurring short-term events would take place intermittently over the long-term. Overall effects to air quality from operation and maintenance of the road are anticipated to be minor because of the size of the emission sources, intermittent nature of operations and the relatively large area over which the emissions occur.

Mitigation Measures

Due to the predicted minor effects on air quality no mitigation measures would be required for Alternative 2. Due to the relatively wet climate of this area, and the low road use, mitigation of dust suppressants or road watering for reduction of particulate matter are impractical.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting air quality in or adjacent to the EIS project are few; they are described under Alternative 1 in Section 4.2.1.1. The contribution of this alternative to cumulative effects is considered to be minor.

Conclusion

Implementing Alternative 2 would have minor direct and indirect effects on air quality from both construction and operations and maintenance. This alternative would also result in minor contributions to cumulative effects on air quality. In relation to Alternative 1, air emissions under Alternative 2 would be a new incremental effect. The total estimated annual emissions would consist of small emission sources, operating intermittently, and spread out over a relatively large area. Seasonal occurrences of increased particulate matter due to fugitive dust may also have a minor effect on air quality. Thus, the overall conclusion is that Alternative 2 would have minor direct, indirect, and cumulative effects on air quality.

Table 4.3-2 Estimated Air Pollutant Emission Rates for Alternative 2 Operations and Maintenance Activities

Source/Activity	Usage	Emission Rates (tons per year)						
		NOx	CO	SO2	PM10	PM2.5	VOC	CO_2e
ROAD COMBUSTION SOURCES								
Average Vehicle Engine	10,327 MMBtu/yr	22.8	4.91	1.50	1.60	1.60	1.86	847
FUGITIVE DUST								
Gravel Roadway	351,100 VMT/yr	--	--	--	25.0	2.47	--	--
TOTAL (tons per year)		**22.8**	**4.91**	**1.50**	**26.6**	**4.07**	**1.86**	**847**

NOTES:

Pollutants: NOx - nitrogen oxides; CO – carbon monoxide; SO2 – sulfur dioxide; PM10 – particulate matter less than 10 micrometers in diameter; PM2.5 - particulate matter less than 2.5 micrometers in diameter; VOC – volatile organic compounds; CO_2e – carbon dioxide equivalents.

Usage value for combustion emissions for road operations based on project description: Vehicle travel is assumed at 20 miles per hour; with a conservative estimate of 10 miles per gallon on average; this equates to 2.0 gallons fuel per hour (gal/hr). Estimated annual travel is 19,000 one-way trips (NEI 1999), with the Alternative 2 one-way trip time between the King Cove Airport and Cold Bay Airport of 118 minutes, for a total of 75,367 gal/yr. Assume diesel fuel with heating value of 19,300 million British Thermal Units per pound of fuel (MMBtu/lb), and a density of 7.1 lb/gal fuel, for an annual usage rate of 10,327 MMBtu/yr.

Usage value for fugitive emissions based on project description: Estimated annual travel is 19,000 one-way trips (NEI 1999), with the Alternative 2 road length at 18.5 miles, for a total of 351,100 vehicle miles travelled per year (VMT/yr).

Fuel combustion emission factors for engines less than 600 horsepower (vehicles and smaller hovercraft service power engines) in lb/MMBtu are from EPA 1996a, Table 3.3-1. Assume PM2.5=PM10.

Fugitive dust PM10 and PM2.5 emission factors are from EPA 2006b, equations 1b and 2. Equation parameters are from Tables 13.2.2-1, -2, and -4, and Figure 13.2.2-1 for PM10 and PM2.5, and for public roads. Silt content conservatively estimated from industrial plant road for sand and gravel processing (Table 13.2.2-1). Mean vehicle speed assumed to be 20 miles per hour. Moisture content conservatively estimated at 20 percent. Emission factors are then calculated to be 0.142 lb PM10/VMT, and 0.014 lb PM2.5/VMT.

CO_2e is assumed to be composed of the following GHG components: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emission factors are equal to the sum of each of these components times their individual Global Warming Potential (GWP) factors. The GWP for these are: CO_2 = 1; CH_4 = 21; and N_2O = 310 (EPA 2009b).

Due to rounding, the total tpy may differ slightly from the sum of the individual tpy emission rates.

4.3.1.2 Climate

Direct Effects and Indirect Effects from Construction

Construction of the 18.5 miles of gravel road would involve greenhouse gas-emitting heavy machinery such as graders, excavators, dozers, backhoes, dump trucks, and other vehicles. The amount of greenhouse gases emitted from this machinery is estimated at approximately 892 tons of carbon dioxide equivalent per year for 2 years (see Section 4.3.1.1 for more detail on the calculations). In 2010, the State of Alaska emitted an estimated 3.6 million metric tons of carbon dioxide equivalent from petroleum use in the industrial sector, which includes construction activities (CCS 2007). Greenhouse gas emissions from construction of Alternative 2 would account for 0.02 percent of this state-wide annual total for a period of 2 years. Emissions from construction would only occur for 2 years and then cease; annual emissions would not be perceptible.

Summary

Even though climate change effects are considered to be long-term, extended, and affect important resources, the greenhouse gas emissions from construction of Alternative 2 are estimated to account for 0.02 percent of the state-wide annual total (3.6 million metric tons). Therefore, construction-related direct and indirect effects are considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Alternative 2 would impact climate change by greenhouse gas emissions that result directly and indirectly from trips between the communities of Cold Bay and King Cove. Sources of direct greenhouse gas emissions under Alternative 2 would include all of the transportation modes used in Alternative 1 plus greenhouse gas emissions from vehicles traveling on and maintaining the southern road alignment. Soot from engine exhaust could contribute to global climate change by absorbing heat in the atmosphere and reducing the reflection of sunlight. However, because the amount of vehicle traffic on the road would be relatively low, these impacts would be negligible. Indirect effects could result from vehicle travel on the southern road alignment from recreationists and wildlife viewers visiting the area. Visitation would likely be low due to the remote location of the project area, and therefore indirect impacts to climate change would be negligible.

To quantify the direct impacts for Alternative 2, greenhouse gas emissions measured as carbon dioxide equivalent were estimated for the modes of transportation that would be used for Alternative 2 (Table 4.3-3). Alternative 2 would contribute 847 tons per year of carbon dioxide equivalent, which is 847 tons more per year than Alternative 1. When compared at the state level, Alternative 2 would contribute approximately 0.02 percent of the State of Alaska's estimated emissions from on-road vehicles and less than 0.01 percent of the total transportation emissions in 2010 (CCS 2007). This amount is not expected to be perceptible. However, once greenhouse gases are emitted, they persist long-term in the atmosphere (see the discussion under Alternative 1).

Table 4.3-3 Summary of Annual Greenhouse Gas Emissions for Alternative 2

Activity	Frequency	Estimated Annual Emissions of Carbon Dioxide Equivalent (tons/year)
Vehicular Traffic	19,000 one-way trips/year	847
	Total	**847**

Note: Refer to Section 4.3.1.1 for complete details and assumptions regarding emissions calculations.

In addition to effects of the project on climate, climate change could also have an effect on the project. Effects of global climate change could affect the new road in the long-term with an increase in storm frequency and duration and rising sea levels which could inundate low-lying areas including the project area. Increased rates of coastal erosion could also affect the project area. Alaska has experienced larger temperature increases than the rest of the United States, and therefore the project area is particularly susceptible to climate change impacts. This could impact the viability of long-term road operations as well as maintenance activities associated with the proposed road alignment.

Summary

Alternative 2 would contribute 847 tons per year of carbon dioxide equivalent, which is 847 tons more per year than Alternative 1. When compared at the state level, Alternative 2 would contribute approximately 0.02 percent of the State of Alaska's estimated emissions from on-road vehicles and less than 0.01 percent of the total transportation emissions in 2010 (CCS 2007). This amount is not expected to be perceptible, and the magnitude for direct effects to climate from Alternative 2 is considered low. Although climate change effects are considered to be long-term, the overall direct and indirect effects are considered negligible since the magnitude is so low.

Mitigation Measures

The impacts to climate from Alternative 2 are expected to be negligible, so no mitigation measures are proposed.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting climate change are the same as Alternative 1, described in Section 4.2.1.2. Due to the extended amount of time that greenhouse gases remain in the atmosphere, any amount of greenhouse gas emissions can be reasonably expected to contribute to future climate change impacts. Annual carbon dioxide emissions from Alternative 2 would roughly equal the average annual emissions of approximately 177 U.S. passenger cars (EPA 2007). Although the amount of carbon dioxide is measurable, on a global scale, emissions from 177 U.S. passenger cars are a negligible amount of global cumulative effects to climate change.

Conclusion

Alternative 2 would contribute 847 tons per year of more greenhouse gas emissions than Alternative 1. In relation to Alternative 1, the greenhouse gas emissions under Alternative 2 would be a new incremental effect. However, Alternative 2 is expected to have negligible direct and indirect effects. Global climate change effects currently have a high enough intensity that perceptible changes around the globe have occurred, as described in Section 3.1.2.1. However, when compared to other global actions, Alternative 2 is expected to have a negligible contribution to cumulative effects. The overall contribution of Alternative 2 to climate change would be negligible.

4.3.1.3 Geology and Soils

Direct Effects and Indirect Effects from Construction

As a result of Alternative 2, disturbance of geologic resources and soils would occur along 18.5 miles of road. The road would be constructed using a balanced cut and fill methodology throughout the proposed corridor. In addition, competent bedrock and unconsolidated sand and gravel deposits may be produced at 1 or more material sites from within the project area for use as a road base, installation of a bridge, 7 box stream crossing culverts, and 154 intermittent and small stream pipe cross culverts. Organic soils disturbed during construction would be staged and stockpiled within the corridor then reused for finishing graded back slopes and reclaiming abandoned sections of existing roads and trails. Table 2.4-2 presents a summary of disturbed land acreage and volumes of excavation and fill proposed for Alternative 2.

This alternative would disturb 107 acres of common surface and shallow subsurface soil (primarily inceptisol andepts) along the road corridor and 1 acre at the barge landing areas near the Northeast and Cross Wind Cove ramps. Approximately 111,000 cubic yards of geologic resource material would be excavated during cut and fill activities. Approximately 29,000 cubic yards of crushed rock is planned for road construction and an additional 10,000 cubic yards would be processed and stockpiled at the material site for future road maintenance. Approximately 182,000 cubic yards of fill would be imported from the material site near the Northeast Terminal impacting 6 acres of King Cove Corporation lands. Direct impact from construction activities and disturbance of vegetation would expose new soil and rock, exposing soil to erosion from potential channelization of runoff.

Direct impacts on soils as a result of Alternative 2 would be permanent and localized. The types of soils impacted are common in the region. Soil impacts would include excavation, grading, compaction, and the direct loss of soil cover by exposure in the area of the new road, and exposure of soils to localized runoff and erosion.

Potential direct and indirect effects to soil could also arise from an uncontained release of fuel or other hazardous materials. Pollution from oil and other hazardous substances are regulated by the Alaska Department of Environmental Conservation in accordance with Alaska Administrative Code, Title 18, Chapter 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75) (ADEC 2008). The risk and impact of an uncontained release is reviewed in Section 4.3.1.5, as are the measures to reduce this risk.

If the project was to use rocks with a high concentration of sulfide minerals to fill wetlands or is otherwise placed at the surface of water, it could result in acid rock drainage. Since the actual type of rock planned for use during construction is not known, precautionary measures should be conducted to determine the usability of the geologic resource. Without assessing the usability of the rock, this action may propagate the generation of acid rock drainage which would impact the quality of the water bodies in which the rock would be placed.

Summary

Direct effects on geology and soils would include the disturbance of about 114 acres (107 acres in the road corridor, 1 acre at the barge landing, and 6 acres at the material site). Additionally, this alternative has potential for accidental release of fuel or other hazardous materials during the construction process, which could contaminate soils at the site of the spill. Effects from a spill are addressed under Hazardous Materials in Section 4.3.1.5. Effects on geology and soils from Alternative 2 are considered moderate because while the intensity would be high (obvious change in resource condition), and there would be permanent changes in the character of the soils along the road corridor; these changes would be in a confined area (the road corridor) and no unique or important soils would be affected.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct impacts from Alternative 2 would be less during operation and maintenance activities than from the previously discussed construction. Of the total 182,000 cubic yards of fill from the material site, 10,000 cubic yards would be processed and stockpiled at the material site for future road maintenance. Maintenance activities such as road grading and the filling of potholes could result in fugitive dust, most of which would settle on vegetation and soils next to the road bed.

Examples of indirect effects may be the planned reuse of organic soils for finishing graded back slopes and reclaiming abandoned sections of existing roads and trails. The chemical and physical characteristics of the soil used for reclaiming may impede potential agglomeration with soils existing at the planned reclaimed areas, resulting in dead zones for vegetative growth and/or high susceptibility to erosion during intense periods of storm runoff. Any increase in sediment load from runoff or dust would impact the quality of receiving surface water bodies.

Direct and indirect effects would continue as a result of operation and maintenance as stockpiled materials are distributed on the road surface, and as re-vegetation efforts continue.

Summary

Direct and indirect effects on soils would occur as a result of operation and maintenance as stockpiled materials are distributed on the road surface and as re-vegetation efforts continue post-construction. These effects would be substantially less (10,000 cubic yards of material) than those incurred during the construction phase of Alternative 2 (111,000 cubic yards of cut and fill excavated on site and 182,000 cubic yards of material from the materials site). As with effects to soils from construction, these would be considered moderate due to the permanent nature and obvious (high intensity) changes over a relatively small area (the road surface) and not affecting unique or important soils.

Mitigation Measures

Mitigation measures to limit soil erosion would include development and implementation of an Erosion and Sediment Control Plan (Mitigation Measure-A, see Appendix F [MM-A]), which defines the state and federal regulatory statutes and describes the construction industry standards for reducing sediment runoff during road construction projects. The plan will address the need for effective re-vegetation of disturbed stream banks and slopes with native species suited for the specific sites characteristics and proper management of stockpiled materials. Mitigation measures would also include development and implementation of a Storm Water Pollution Prevention Plan (MM-B). This plan would identify at-risk resources and implement control measures to protect those resources. It would also include a monitoring program that would be carried through the duration of the project.

Mitigation measures to limit fuel releases and or hazardous material spills would include development and implementation of a Hazardous Material and Petroleum Product Control Plan

(MM-C) which would identify the state and federal regulations, the procedures for preventing petroleum product and hazardous material discharges, responding to petroleum and hazardous material discharges, spill containment, cleanup and disposal, and reporting and notification requirements. A Fuel Handling and Spill Response Plan (MM-D) will also be required.

In addition to the above mitigation measures, rock planned for infill of wetlands and/or placed at the surface of water should undergo Acid Rock Testing (MM-E) to determine chemistry of the minerals, to mitigate the potential for acid rock drainage.

Cumulative Effects

In addition to the past, present and reasonably foreseeable future activities discussed under Alternative 1, Alternative 2 would result in additive, incremental, cumulative effects, Mobilization of equipment, fuel, and supplies; excavation, grading, and compaction; and resulting erosion of soil due to potential channelization of runoff would add to the cumulative effects on geology and soil resources. The implementation of Alternative 2 could directly result in disturbance of ground cover on up to 108 acres of regionally common soils plus an additional 6 acres of disturbance at the material site. The area within the construction footprint subject to cut and fill excavation would total 111,000 cubic yards of material. These additive incremental effects attributable to implementation of Alternative 2 would be considered moderate because they are of high magnitude (obvious), permanent, yet confined to a relatively small area and not affecting unique or important soils.

Conclusion

Soil removal/excavation and road construction would result in direct and indirect impacts to 108 acres of soils along the road corridor, 6 acres at a material site, and the excavation of 111,000 cubic yards of materials. About 182,000 cubic yards of additional materials will be obtained from the materials site and 10,000 cubic yards of materials would be stockpiled within the material site for road operation and maintenance activities. As noted in the sections above the overall effects on geology and soils are considered moderate because of the obvious and permanent nature over a relatively small area without affecting unique or important soils.

4.3.1.4 Hydrology/Hydrologic Processes

Direct Effects and Indirect Effects from Construction

Alternative 2 would disturb hydrologic resources along 18.5 miles of road during construction, which would use a balanced cut and fill methodology throughout the proposed corridor. As part of the road construction, 3.8 acres of wetlands would be filled with about 25,000 cubic yards of fill. Additionally, 1 bridge, 7 stream crossing culverts or small bridges, and 154 intermittent pipe cross culverts would be placed among hydrologic resources in the project area. At the construction staging area, less than 0.1 acres of state owned tidelands would be filled with up to 625 cubic yards of fill. Table 2.4-2 presents a summary of disturbed hydrologic resources and tideland acreage and volumes of fill proposed for Alternative 2.

Quantities of water would be needed for embankment compaction and dust control during construction. The area's typically wet weather should keep road materials moist; therefore, water requirements would be relatively low. Project water sources include 3 lakes and 1 creek. The creek water source would be at stream system #283-34-10700, located approximately 2 miles north of the Northeast Terminal. Intake would be limited to 600 gallons per minute. Source lakes include a 128-acre lake mid-way along the southern alignment that is connected to system stream #283-34-10500, a 33-acre lake on the western side of Alternative 2 that is not connected to any anadromous streams, and Blinn Lake, a 150-acre lake not connected to anadromous streams and located at the western terminus of Alternative 2. Water source locations and preliminary estimates of water quantities are shown in Appendix E.

Five of the 7 box culverts (or small bridges) and 1 large bridge would be located on fish bearing streams. The large bridge would be placed across a stream that drains a watershed of approximately 7,500 acres. The 7 smaller streams drain a total of 4,215 acres over 7 separate watersheds within the Kinzarof Lagoon watershed. Direct effects from construction activities and excavation would increase the sediment load into surrounding streams that would continue to move through the system once hydrologic processes are reestablished within each stream.

Modifications to hydrologic processes as a result of road construction may have a direct effect on wetlands, as well as on the hydrology of adjacent upland areas that influence wetland hydrology.

Direct effects on hydrologic resources and processes as a result of Alternative 2 would be permanent and affect both local sites and the entire road corridor. Direct effects include stream crossings and infill of wetlands in the area of the new road, and exposure of water resources to localized, temporary sediment discharges from disturbance during excavation and construction activities. These impacts would affect unique hydrologic resources (streams) designated as Essential Fish Habitat under the *Sustainable Fisheries Act*.

Another potential effect to water resources and water quality could arise from an uncontained release of fuel or other hazardous materials. Alaska waters are regulated by the Alaska Department of Environmental Conservation in accordance with Alaska Administrative Code, Title 18, Chapter 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75) (ADEC 2008). The risk and impact of an uncontained release is reviewed in Section 4.3.1.5, as are the measures to reduce this risk.

This alternative offers the least risk of adverse impacts to water quality related to fueling, with regards to Alternatives 1, 4, and 5 where refueling of marine vessels and transportation and storage of fuels are attributed. However, crossing and working around streams requires compliance with an erosion and sediment control plan and fish and wildlife protection plan.

Indirectly, water quality could be decreased by an increase in turbidity (sediment load) generated by disturbance of stream shorelines or discharge of excavated material during emplacement of the drainage structures. This decrease in water quality could impact fish habitats or the eelgrass beds within the lagoons downstream of the drainage structures.

Summary

Direct and indirect effects to hydrologic processes would occur as a result of fill placement in approximately 3.8 acres of wetlands, and the installation of an estimated 162 drainage structures along the road. Water may be extracted from three lakes and a stream in order to compact embankments and control dust. Indirect effects may occur from the uncontained release of hazardous materials and from stream turbidity generated by streambank construction activities. These moderate effects would be obvious (high intensity), permanent (the resource would not be anticipated to return to previous conditions), some of which would affect unique resources such as Ramsar designated wetlands and Essential Fish Habitat. Mitigation measures identified below would contain the effects to the local area reducing the possibility of affecting eelgrass beds downstream.

Direct Effects and Indirect Effects from Operation and Maintenance

Although direct impacts from Alternative 2 would be highest during construction, effects could continue during the period following project completion. Direct effects from construction activities and excavation would increase the sediment load into surrounding streams that would continue to move through the system once hydrologic processes are reestablished within each stream.

Indirect effects on hydrologic resources include an increase in sediment load from road runoff, which would impact the quality of the receiving surface water bodies. These effects may also include sedimentation and pollution from vehicles and other anthropogenic sources. Many of these effects would be mitigated to some degree through design considerations and mitigation measures, but some impact would be unavoidable. For example, particularly harmful spring breakups and historical flood events cannot be predicted. Some of these events would be expected to surpass design standards. Culverts would be designed for the 50-year storm event and analyzed for the passage of the 100-year storm event where drainage structures are located in a flood zone.

An indirect effect of the road is that all-terrain vehicles could establish routes from the roadway into adjacent areas. These routes could erode from use and increase sedimentation in streams. As a result of improved access through the proposed road corridor some traffic is likely to circumvent the barriers and pioneer new trails (USACE 2009). Increased incursions into the Izembek Wilderness by all-terrain vehicles, previously documented by Sowl (2011f), will likely increase. Effects would be intermittent, localized, and long-term. Unique water resources, specifically those with Essential Fish Habitat designation, could be affected.

Direct and indirect effects at the staging area near the Northeast Terminal would be highest during construction, but would continue at a reduced level during operation and maintenance activities. Effects would be in isolated areas where surface water runoff, concentrated by erosion control methods, discharges into areas near the staging area.

Summary

Direct and indirect effects would continue during the operation and maintenance stage of the alternative. Effects would include the continued movement of sediment once hydrologic processes are reestablished after construction and newly introduced sediment from eroding trails caused by all-terrain vehicles that might proceed past the barriers. These effects would be permanent and localized to the area within and near the road corridor. These effects would be medium intensity (noticeable), and permanent for this unique resource, resulting in an overall moderate effect on hydrology and hydrologic processes.

Mitigation Measures

Mitigation measures to limit the increase of turbidity would include development and implementation of an Erosion and Sediment Control Plan (MM-A). The plan would define the state and federal regulatory statutes and describe the construction industry standards for reducing sediment runoff into surface water bodies during road construction projects. Mitigation measures would also include development and implementation of a Storm Water Pollution Prevention Plan (MM-B), which would implement control measures to protect identified at-risk resources and their locations. Specific mitigation measures associated with the Alaska Department of Environmental Conservation standards should include a means of reducing turbidity and maintain levels below the state standards for clean water. These mitigation measures would include the monitoring of culverts and drainage structures for hydrologic and structural function post storm events and on an annual basis described in Hydrologic/Structural Monitoring (MM-G). Monitoring activities should also include observing streams for indications of unlawful stream crossings. Monitoring by camera or personnel would occur and fines/charges would be assigned to perpetrators. If damage to the stream occurs, restoration efforts, through a Restoration Plan (MM-H) would be conducted to ensure the water quality and functionality of the stream channel.

Mitigation measures to limit fuel releases and or hazardous material spills into surface water bodies would include development and implementation of a Hazardous Material and Petroleum Product Control Plan (MM-C) and a Fuel Handling and Spill Response Plan (MM-D), which would identify the state and federal regulations, the procedures for preventing petroleum product and hazardous material discharges, potential responses to petroleum and hazardous material discharges, spill containment, cleanup, disposal, and reporting and notification requirements.

Cumulative Effects

The incremental effects from Alternative 2 on hydrologic resources would be additive to other past, present and reasonably foreseeable future activities in Alternative 1 (Section 4.2.1.4). The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway which would have a direct effect on hydrology in that local area. No other reasonably foreseeable future actions are in the immediate vicinity that would affect hydrology or hydrologic processes.

Long-term maintenance of stream crossings would be additive to those impacts derived during construction activities. Effects could include potential non-point source pollution and unlawful stream crossings along the margins of the road corridor by the general public. The contribution to cumulative effects would be moderate.

Conclusion

Construction, operation, and maintenance of Alternative 2 would result in moderate direct and indirect impacts to hydrologic resources, including water quality, that would be medium to high in intensity (noticeable or obvious), permanent in duration (because the condition would not be expected to return to previous condition), limited to a local extent through the proper application of mitigation measures, and affecting resources that are unique in context. Indirect effects would include potential non-point source pollution and unlawful stream crossings along the margins of the road corridor by the general public. The contribution to cumulative effects would be moderate.

4.3.1.5 Hazardous Materials

Direct Effects and Indirect Effects of the Land Exchange

Under Alternative 2, the land exchange would be implemented prior to road construction; thus implementation of an environmental bond agreement, or other agreement, regarding the responsibility of contaminated sites documented within lands proposed for exchange would occur. The known contaminated site that would be involved in the land exchange is the Coast Guard Loran C Station west of Mark Lake on Sitkinak Island. According to available information regarding the site, petroleum hydrocarbon contaminated soil resulted from releases associated with 3 aboveground storage tanks and related pipelines, and several underground storage tanks. The releases were discovered in July 2002. Characterization and implementation of cleanup of impacted material began in 2010.

Under federal law, if lands previously contaminated are acquired through purchase or land transfer, generally an environmental bond is set up as an agreement with the land purchaser to finalize all responsible contamination cleanup, thereby exempting the new land owner from the cost and labor responsibility of cleaning up the contamination. Implementation of Alternative 2 would include negotiation of an agreement between the federal government and the State of Alaska for the contaminated land on Sitkinak Island.

Direct Effects and Indirect Effects from Construction

Under Alternative 2, equipment, supplies, and fuel would be mobilized over the course of 2 construction seasons. Hazardous materials such as fuel, battery acid, and hydraulic fluid would be onsite during construction operations. Fuel would be transported and stored at the temporary barge landing sites and selected staging areas along the road. The volumes of fuel needs for Alternative 2 are unknown. The greatest risk of a spill generally occurs during fuel transportation and equipment refueling. With standard spill prevention design and procedures, the risk of an accidental release into the environment (physical and biological resources) is comparatively low, and the use of limited amounts of fuel would be considered to have a low effect on other resources. Fuel transfer would be conducted using a common fuel transfer system for heavy construction equipment, generally using a designated fueling and maintenance vehicle that would transport the fuel to the selected equipment staging areas along the road corridor, and dispense the fuel using conventional methods (see Mitigation Measures, below).

Summary

Direct and indirect effects from hazardous materials could occur during construction from the uncontrolled release of fuel, battery acid, or hydraulic fluid. However, with the preventive mitigation discussed below, the risk of an accidental release into the environment (physical and biological resources) is comparatively low resulting in negligible effects. The intensity of the spill could be high, medium or low (depending on the quantity spilled) but the duration would be temporary with the proper application of a spill response plan, the spill would be in a confined area (local) and with a low risk to affect unique or important resources.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct impacts from Alternative 2 would be highest during road construction, and would be reduced in the period following the project completion. During operation and maintenance activities, fuel, battery acid, and hydraulic fluid used in maintenance vehicles and passenger vehicles would be in use. With standard spill prevention design and procedures, the risk of an accidental release from maintenance vehicles into the environment (physical and biological resources) is comparatively low, and the use of limited amounts of fuel would be considered to have a low effect on other resources.

Summary

Direct and indirect effects from hazardous materials could occur during operation and maintenance from the uncontrolled release of fuel, battery acid, or hydraulic fluid. However, with preventive mitigation discussed below, the risk of an accidental release into the environment (physical and biological resources) is comparatively low, and the potential for adverse effects would be negligible. The negligible conclusion is based on an intensity that would be high, medium or low (depending on the quantity spilled), with a duration that would be temporary (with the proper application of a spill response plan), a spill that would be in a confined area (local) with a low risk to affect unique or important resources.

Mitigation Measures

Mitigation measures would include temporary fuel storage tanks enclosed within a portable berm and a secondary containment device as described in a Fuel Handling and Spill Response Plan (MM-D). In addition, fuel transfer would be conducted using a common fuel transfer system for heavy construction equipment, generally using a designated fueling and maintenance vehicle that would transport the fuel to the selected equipment staging areas along the road corridor and dispense the fuel using conventional methods. During refueling of equipment, a temporary "duck pond" would be placed below the fuel intake of the equipment as a spill containment device. Spill containment systems minimize the potential for a release of hazardous materials to the environment (physical and biological resources). Secondary containment systems, including double-walled tanks and alarms, promote secure storage. A Hazardous Material and Petroleum Product Control Plan (MM-C) would be prepared and approved prior to the start of operations, and would provide detailed mandatory standards and procedures to prevent and respond to any release. Reporting and response procedures would be specified in the plan. Response supplies would be stored onsite.

Cumulative Effects

Past actions related to hazardous materials are described in Section 3.1.5. Reasonably foreseeable future actions include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, but should not affect the management of hazardous materials. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway which should also not have an effect on hazardous materials. No other reasonably foreseeable future actions are in the immediate vicinity that would affect the management of hazardous materials. If a spill were to occur on land, the impact would have a minor, incremental effect additive to past, present, and reasonably foreseeable future releases of hazardous materials within the project area. If the spill were to occur in wetlands or a water body, the effect could be higher in intensity, longer term (exceeding 2 years), cover a larger geographic extent, and affect more physical and biological resources than an upland spill.

However, with the preventive mitigation discussed, the risk of an accidental release into the environment (physical and biological resources) is comparatively low. The estimated contribution to cumulative effects is negligible.

Conclusion

With standard containment designs and operational response measures included as features of the proposed project, potential impacts from hazardous materials would be expected to be low. The greater risk comes in refueling transportation to and from the staging area to the equipment staging areas along the road corridor. Risk of spills during fuel transport to the project staging area could occur during 2 construction seasons between May and November, and equipment refueling activities would also occur during those times. If a spill were to occur on land, the impact would likely be short in duration and localized. If a spill occurred in wetlands or a water body, the impact would be long-term, cover a larger geographic extent, and have a greater effect on physical and biological resources. However, with preventive mitigation discussed, the risk of an accidental release into the environment (physical and biological resources) is estimated to be negligible.

4.3.1.6 Noise

Direct Effects and Indirect Effects from Construction

Noise during roadway construction would be due to both stationary and mobile sources (construction equipment) and specific operations that occur during construction activities. Stationary equipment that exhibits a constant noise level while operating, such as generators and compressors, is classified as non-impact equipment. Stationary equipment that exhibits a variable or sporadic noise level, such as jackhammers or blasting operations, is classified as impact equipment. Impact noise typically has high intensity and short duration (usually less than 1 second). Mobile equipment, such as dozers, graders, and other vehicles, typically operate in a cyclical fashion, between periods of full power and reduced power (during idle). Noise levels vary depending on the equipment (types and amounts), the level of activity, and the specific location of operation. Some examples of noise levels for specific equipment are provided in Table 4.3-4. Several types of equipment are shown here; not all of these are expected to be used for this construction project.

Table 4.3-4 Noise Emission Reference Levels for Construction Equipment

Equipment Description	Impact Device?	Acoustical Usage Factor	Maximum Equivalent Sound Level at 50 feet (decibels, A weighted)
Backhoe	No	40	78
Blasting	Yes	Not Available	94
Chain Saw	No	20	84
Compactor	No	20	83
Compressor (air)	No	40	78
Concrete Pump Truck	No	20	81
Crane	No	16	81
Dozer	No	40	82
Dump Truck	No	40	76
Excavator	No	40	81
Flat Bed Truck	No	40	74
Front End Loader	No	40	79
Generator	No	50	81
Grader	No	40	85
Impact Pile Driver	Yes	20	101
Jackhammer	Yes	20	89
Man Lift	No	20	75
Pickup Truck	No	40	75

NOTES:

Reference levels and usage factors are those used as default values in the Federal Highway Administration Roadway Noise Construction Model. Values shown here are from the Federal Highway Administration Roadway Construction Noise Model User's Guide (FHWA, 2006). Actual measured maximum equivalent sound level values are shown unless unavailable. If unavailable, Spec.721.560 values are provided.

The construction of the southern road alignment includes a road footprint of 107 acres, and is expected to be completed over 2 seasons, between May and November. A conservative assumption for construction operations and equipment was made for air quality, including assumptions about equipment (see Section 4.3.1.1). For the noise analysis, sound levels emitted from equipment in an immediate area would be assumed to be the highest expected noise levels. It is also assumed that the following equipment would be operating simultaneously for the road construction: 2 graders, 1 excavator, 2 dozers, 1 backhoe/loader, 2 pick-up trucks, 1 flatbed, 2 worker vehicles, and 1 dump truck. Actual equipment usage at any specific time would likely be less than this. Construction is only expected to occur during daylight hours. Although other equipment may be used during construction of the road (such as chainsaws), these are not included in this analysis, as these would not be used in conjunction with the noise profile identified above.

The southern road alignment is located within the Izembek National Wildlife Refuge and the Alaska Peninsula National Wildlife Refuge boundaries, and no residential or commercial receptors are in this area. The assumed minimum construction zone is 200 feet from the construction activity; this would be the distance to any potential nearby receptor (visitor or wildlife). At this distance, the noise level from this equipment is modeled to be equivalent sound level (L_{eq}) 72.2 dBA using the Federal Highway Administration Roadway Noise Construction Model. At a distance of 1,000 feet from the construction activity (a more likely receptor distance), the noise level from this equipment drops to equivalent sound level (L_{eq}) of 58.2 dBA. Compared to existing noise levels of approximately 50 dBA (see Section 3.1.6), the construction activities for Alternative 2 would have a moderate effect on noise. These effects would be short in duration, and would occur in the immediate vicinity of the activities.

Indirect project activities, such as rock crushing operations or the use of roadways to transport construction materials and equipment, could also affect noise. Such activities would be temporary and are expected to have negligible increases to noise levels. Although rock crushing operations would potentially exhibit high noise levels, this is not expected to increase noise levels beyond what currently exists at the material sites. However, it would potentially increase the number of events or hours during which this noise level occurs. The indirect effects would occur at different locations than the actual construction activities.

Summary

Noise effects would come from noise generating equipment and operations. At a distance of 1,000 feet from the construction activity, the noise level from construction equipment has an estimated equivalent sound level (L_{eq}) of 58.2 dBA, which is 8.2 dBA more than existing noise levels (see Section 3.1.6). The moderate direct effects on noise from the construction of Alternative 2 would have medium intensity (noticeable), but would have an intermittent and temporary duration. The noise would be localized (several hundred feet from the construction activity) but the area affected would include both the state owned corridor (extent common) and wilderness (context unique). Therefore, for those receptors that are within a designated wilderness, the effects may be greater. Noise effects on wildlife are discussed within the Biological Environment (Section 4.3.2). Effects would occur only during actual construction, and in the immediate vicinity of the construction activity. Indirect noise effects in any populated area would not occur; other indirect effects on noise would be negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Noise generated during roadway operations and maintenance is due to vehicle travel, and includes both engine noise and tire noise. Limited data is available regarding noise levels from vehicle travel on gravel roadways. One source indicates that vehicle travel is approximately 4 decibels higher on gravel than it would be on asphalt (Transportation Research Board 2011). An estimate of vehicle-generated noise made using the Federal Highway Administration Traffic Noise Model® (FHWA 2004) estimated that 10 medium trucks and 3 heavy trucks per hour, 365 days per year, over 8 hours per day, resulted in a total estimate of 19,000 annual trips (NEI 1999). This gives an average hourly estimate of 6.5 vehicles per hour. A factor of 2 is applied to account for a worst-case hour, or 13 vehicles per hour, with the conservative assumption that most of those are medium-sized trucks. Acknowledging the proposed southern alignment road is to be used for noncommercial purposes, and to be even more conservative, it was assumed that 3 of the trucks are heavy trucks, and the remaining 10 are medium trucks. It is also assumed that the vehicles are all travelling at 20 miles per hour. The predicted noise level at 50 feet from the roadway centerline is 52.5 dBA. Adding 4 dBA to this to account for the gravel surface, the estimated equivalent sound level (L_{eq}) for travel on this roadway is 56.5 dBA. Compared to existing noise levels of approximately 50 dBA (see Section 3.1.6), the operation and maintenance for Alternative 2 would be perceivable to humans. This slight increase in noise level would be short in duration (as vehicles pass), and would occur in the immediate vicinity of the roadway. Although the noise would be intermittent, the intermittent episodes would occur over the life of the project.

Indirect effects of this alternative may include additional travel on existing roads to get to the new roadway segment and increased development on either end of the new road segment. These activities may have an effect on noise. In addition, it is also assumed that all-terrain vehicles, motorcycles, and snowmachines would be used on the roadway. All-terrain vehicles and motorcycles are predicted to generate noise levels in excess of 80 dBA (Wyle Laboratories 2005), while snowmachines in good working order manufactured after 1976 should emit no more than 73 dBA (ISMA 2012). Due to the relative low use of the roadway, and generally low population of the area, indirect effects on noise are expected to be negligible.

Summary

The predicted noise level at 50 feet from the roadway centerline is 52.5 dBA, plus an additional 4 dBA to account for the gravel surface. The estimated equivalent sound level (L_{eq}) for travel on this roadway is 6.5 dBA more than existing noise levels (see Section 3.1.6). The direct effects on noise from the operation and maintenance of Alternative 2 are expected to be moderately loud, localized, and intermittent throughout the life of the project. Sounds would be able to be heard in designated wilderness. The noise sources from the new road would be a compilation of very small noise emitters (single vehicles), operating intermittently, and spread out over a relatively large area. Isolated occurrences of loud vehicles in certain conditions (specific location and meteorological events such as wind and rain) may have a moderate effect on noise. Overall, the indirect effects of noise from the operation and maintenance of the road are expected to be negligible.

Mitigation Measures

Due to the predicted negligible to moderate effects on the noise environment, no mitigation measures are identified for Alternative 2.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting noise in or adjacent to the EIS project are described in Section 4.2.1.6. A current project that would have the potential to affect noise in the area is the completion of the King Cove Access Project road currently under construction. Reasonably foreseeable future actions in the immediate vicinity include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway. This action could cause a temporary increase in noise from construction. No other reasonably foreseeable future actions are in the immediate vicinity that would affect noise. Alternative 2 would have a minor contribution to cumulative effects on noise.

Conclusion

In relation to Alternative 1, the noise from Alternative 2 would be a new incremental effect. Alternative 2 would have a moderate direct and negligible indirect effect on the noise environment from construction in the immediate vicinity of the southern road alignment. During operation and maintenance, noise would consist of intermittent episodes, intermittently occurring over the life of the project, spread out over a relatively large area. Direct effects would be minor, indirect effects would be negligible, and overall the alternative would have a minor contribution to cumulative effects on noise.

4.3.2 Biological Environment

As discussed in Section 4.1, the effects to biological resources are based on ecosystem characteristics, not land status. Thus, changes in habitat and population are evaluated for the project area, separate from changes in land status. Changes in land status rarely result in near-term changes in ecological characteristics, although over time, management within a federal conservation unit would provide stronger protection of habitat. Changes in land status, including resource characteristics of lands exchanged, are evaluated in the Social Environment (Section 4.3.3).

4.3.2.1 Terrestrial and Aquatic Plant Communities

Direct Effects and Indirect Effects from Land Exchange

Alternative 2 would result in the addition of approximately 52,583 acres of native land cover types (some are non-vegetated) to the National Wildlife Refuge System while relinquishing ownership of an estimated 1,820 acres of native land cover types; a net gain of approximately 50,763 acres. The King Cove Corporation's selected parcel of 5,430 acres would also be maintained by the National Wildlife Refuge System; however, the corporation would select an equal acreage from within the Alaska Peninsula National Wildlife Refuge. See Chapter 3 for a more complete description of terrestrial and aquatic plant communities within the proposed exchange parcels.

No effects on terrestrial and aquatic plant communities have been identified that would result from the proposed land exchange because no activities in the reasonably foreseeable future have been identified that would alter plant communities. Plant communities and values, as described in the affected environment section (Chapter 3) would remain the same, before and after the proposed land exchange. Other effects of the proposed land exchange, such as Land Ownership and Management, Public Use and Subsistence management are addressed in Section 4.3.3.1, Section 4.3.3.6, and Section 4.3.3.7.

Direct Effects and Indirect Effects from Construction

Construction associated with Alternative 2 would consist of an 18.5-mile road within a 100-foot wide corridor. Direct effects on plants would include the loss of native plant communities, which is shown in Table 4.3–5. Impact to rare plant species is unknown, as surveys in this area have not been conducted.

Construction of the road would result in a loss of approximately 103 acres of upland moist dwarf scrub and upland moist meadow, 3 acres of lowland wet low sedge/scrub, and about 1 acre of lowland wet sedge meadow vegetation. These plant communities function as bird nesting, resting, forage, and cover habitat for numerous migratory waterfowl, shorebirds, and other land birds, and they provide caribou and bear grazing habitat. The high values of these plant communities is due to their location adjacent to the high quality habitats of Izembek and Kinzarof Lagoons, used by thousands of waterfowl and other species and recognized internationally by the Ramsar Convention and designated as wilderness. They are also important for foraging and as a migration corridor for the Southern Alaska Peninsula Caribou Herd, brown bear, and various furbearers and other land mammals, and as erosion and storm water control to maintain water quality and spawning habitats for anadromous fish populations recognized as

Essential Fish Habitat. Alternative 2 would also result in a loss of approximately 1.0 acre of vegetation for the construction of 2 temporary barge landing sites adjacent to the existing ramps at the Northeast Terminal and Cross Wind Cove.

Table 4.3-5 Land Cover Type Impact for Alternative 2 (Approximate Acres)

Draft EIS Cover Types	Corridor[1]	Direct Impacts[2]
Upland Moist Dwarf Scrub/Upland Moist Meadow (Umds/Umm)	191	103
Lowland Wet Low Sedge/Scrub (Lwlss)	8	3
Lowland Wet Sedge Meadow (Lwsm)	2	1
Lakes and Ponds (Lp)	<1 (approx. 0.2)	0

[1]Includes only National Wildlife Refuge lands within an average 100-foot wide road corridor.

[2]Includes King Cove Corporation lands and National Wildlife Refuge lands within the construction footprint; note that Table 3.2-3 analyzes a 400-foot wide road corridor.

Indirect effects would result from modifications to the hydrology in areas immediately adjacent to the road. Road fill would disrupt subsurface flows causing some ponding upslope and some dewatering downslope. This change may result in a change in the species composition of vegetation communities immediately adjacent to the road. The extent of such changes cannot be known prior to construction. Site specific changes would be dependent upon the size of the drainage area, slope, and soil characteristics. Proper siting and maintenance of drainage structures for the proposed road would minimize impacts to hydrology and vegetation species composition.

Summary

The direct effects from construction would result in the loss of approximately 107 acres of native plant communities from construction of the road, and approximately 1 acre of beach and coastal vegetation at 2 temporary barge landing sites. These effects would be moderate because of their high intensity (change in resource condition would be clearly measurable and observable); permanent in duration (change would last beyond the life of the project even if the site was no longer maintained or used as a road); local in extent (limited geographic area). These vegetation communities are considered to fill a unique ecosystem role within Izembek Wilderness and are designated as a Wetland of International Importance (Ramsar designation). There would also be moderate indirect effects from construction that would include changes in the composition of vegetation communities in areas adjacent to the road footprint due to the resulting change in hydrology. These effects would be medium intensity because this change would be measurable and observable; permanent in duration because the change would last beyond the life of the project even if the site was no longer maintained or used as a road; and local in extent because of the limited geographic area; for these unique plant communities.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance activities associated with Alternative 2 would have indirect effects on plant communities, such as road dust on vegetation from the gravel road surface, an increase in human traffic in the plant communities, and impacts from invasive plant species.

Although road dust is often limited because of the amount of rainfall common to the region, the frequent winds can increase road dust production and distribution during periods of low to no precipitation. The wind rapidly dries out the fine dust of the road beds and can carry it far from the road. Vehicle traffic on the gravel roads exacerbates this condition by moving clouds of dust up into the air column where it is carried away by the wind. Dust production is particularly high during cold, dry winters. As a result, some amount of road dust would accumulate on vegetation near the road, resulting in indirect effects such as changes in plant community composition. To evaluate potential impacts to vegetation from operation and maintenance of the proposed road, data from another low-volume gravel road were evaluated. According to Densmore (1995, cited in USACE 2003) vegetation composition along the park road in Denali National Park appeared to experience changes due to dust accumulation. Within 16 feet of the west side of the road, moss and lichen cover were lower than at distances of 164 feet and 492 feet, while ground cover of perennial herbs was higher in the 16-foot zone. However, the amount of traffic on the road in Alternative 2 is expected to be much less than in Denali National Park. Changes to vegetation plant communities would be expected to be negligible.

Although mitigation measures, discussed below, include the installation of a chain barrier or bollard barrier on each side to the road to prevent motorized access into the Izembek Wilderness, it is likely that some traffic will circumvent the barriers and pioneer new routes on the adjacent landscape, resulting in indirect effects on vegetation (USDA 2006) Also see Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1. Efforts to exclude all-terrain vehicles through the use of physical barriers often fail (USACE 2009). Guard post and cable barriers can be stretched, cut and removed, barbed-wire barriers can be cut, steel posts can be pulled up or bent to the ground, and a welded pipe fences can be pushed or pulled to the ground allowing all-terrain vehicles to cross. Therefore, some motorized trespass is likely to result, causing indirect effects to vegetation such as the loss of vegetative cover and soil erosion, particularly on steep slopes and within wetlands. Soil erosion within or adjacent to streams and wetlands would result in the transport of sediment potentially impacting water quality, coastal wetlands, and eelgrass beds. Once established, all-terrain vehicle trails crossing streams and wetlands commonly become increasingly wider with deeper ruts, destroying additional vegetative cover and causing additional soil erosion, with possible habitat fragmentation and increasing habitat edge effects. Tundra and wetland habitats are slow to recover from habitat degradation cause by mechanized vehicles. Tracks and old trails created during World War II are still visible in the Cold Bay area more than 60 years later.

Operation and maintenance of the road is expected to have indirect effects from invasive species. Invasive species are located in the community of Cold Bay and are also likely present in the vicinity of the community of King Cove. Roads contribute to the spread of invasive species in 2 ways. Invasive species can grow within the road footprint itself, usually at the edge. Typically, these species are adapted to disturbed areas and spread readily. In addition, roads are pathways for invasive species to be spread from other locations as people or vehicles carry seeds that are deposited along the road.

Summary

Indirect effects from operation and maintenance include changes to the plant community in response to dust accumulation from the road, and eroding of pioneering trails caused by motorized vehicles that manage to circumvent the bollards or chain barrier. The operation of the road may also aid in the spread of invasive species in the Izembek National Wildlife Refuge vicinity. The lands affected as a result of implementation of Alternative 2 are uniquely located adjacent to high quality habitats of Izembek and Kinzarof lagoons, used by thousands of waterfowl and other species and recognized internationally by the Ramsar Convention. The indirect effects to vegetation from operations and maintenance of Alternative 2 would result in alterations to the functions of the plant communities and those changes would be measurable or observable (medium in intensity). The duration would be permanent because the alterations to the plant communities would remain, even if the road was no longer used; and the extent would be local for these unique vegetation resources (unique ecological role within the isthmus of Izembek Wilderness and Ramsar designation). The indirect effects to vegetation would therefore be considered moderate.

Mitigation Measures

Barriers (MM-V) (either a chain barrier or bollard barrier) would be installed along the length of the roadway on both sides, as specified in the Act, to prevent motorized vehicles from accessing the Izembek Wilderness.

Additional recommended mitigation measures include an Invasive Species Management Plan (MM-K) to limit the spread of non-native plant species, and pre-construction Rare Plant Surveys (MM-J).

Cumulative Effects

Past actions include impacts to vegetation through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. The completion of the King Cove Access Project (USACE 2003) also contributes to effects on vegetation. In addition, the new route to the Northeast Terminal has already provided access for all-terrain vehicles to that area, resulting in all-terrain vehicle trails within the Izembek Wilderness with impacts to native plant communities. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect vegetation.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the degradation of terrestrial habitats.

The result of implementing Alternative 2 would include the loss of approximately 107 acres of native plant communities along the proposed road corridor and the loss of 1 acre of native vegetation at 2 temporary barge landing sites. Alternative 2 would also create the opportunity for invasive species to spread within the Izembek National Wildlife Refuge vicinity.

Alternative 2 would have a moderate contribution to cumulative effects on vegetation.

Conclusion

Direct and indirect effects to vegetation due to implementation of Alternative 2 would be high in intensity (change is clearly observable) for the 107 acres of plant communities that would be removed. The intensity would be medium for plant communities adjacent to the new road, due to changes in plant composition from alterations in hydrology and/or introduction of invasive species. The duration of the impacts would be permanent lasting beyond the life of the project, the extent would be local and the context would be unique because of the juxtaposition of the proposed corridor relative to designated wilderness. These vegetation communities are considered to fill a unique ecosystem role within the isthmus of Izembek Wilderness. The summary impact of Alternative 2 on vegetation would therefore be considered moderate. The analysis considers implementing an invasive species management plan and pre-construction rare plant surveys with annual invasive species monitoring and treatment plans to mitigate impacts.

4.3.2.2 Wetlands

Wetlands are critical components of the landscape within the project area. Refer to Table 3.2-7 and Section 4.2.2.2 for an overview of wetland functions.

The values of wetlands are considered to have been reduced when their functional capacity is eliminated or reduced through either direct or indirect manipulation of the soils, vegetation, or hydrology that supports a particular wetland. Project activities, such as the development of building sites or construction of roads would have direct effects on wetlands within the footprint of a project when the wetland is filled, resulting in the complete loss of habitat, biogeochemical, or hydrologic function. Wetlands located upslope and downslope from a project area may be indirectly impacted through the manipulation of hydrology. Other potential impacts to nearby wetlands may include changes to the vegetative community through the introduction of new plant species or the reduction/elimination of native species through competition, or as a result of operation and maintenance activities. Alterations in the vegetative community of a wetland may influence functions, such as providing food and cover for wildlife, filtration of sediments, or recycling of nutrients.

Direct Effects and Indirect Effects from the Land Exchange

Implementing Alternative 2 would result in a land exchange between the federal government, State of Alaska, and King Cove Corporation (Table 4.3–6). Approximately 41,887 acres of the State parcels (containing approximately 8,571 acres of wetlands) would be transferred to the federal government; approximately 8,092 acres of the King Cove Corporation owned Mortensens Lagoon parcel (containing 2,920 acres of wetland) and approximately 2,604 acres of the King Cove Corporation owned Kinzarof Lagoon parcel (containing 1,235 acres of wetland) would be transferred to the federal government; approximately 1,619 acres of the federally owned Sitkinak Island parcel (containing 980 acres of wetland) would be transferred to the State of Alaska; approximately 5,430 acres of King Cove Corporation selected lands (containing 1,917 acres of wetland) would be retained in federal ownership, however additional lands (likely including wetlands) would be conveyed from the Alaska Peninsula National Wildlife Refuge; and approximately 201 acres of Izembek National Wildlife Refuge lands would be transferred to the State of Alaska to develop a road along the 19.4-mile long southern alignment (containing an estimated 13 acres of wetland within the corridor proposed for exchange).

Table 4.3-6 Wetland Acres to be Exchanged

	Wetland Acres to be transferred to the Service	Wetland Acres to be transferred to the State	Wetland Acres to be retained by the Service
State Parcel	8,571		
Mortensens Lagoon Parcel	2,920		
Kinzarof Lagoon Parcel	1,235		
Sitkinak Parcel		980	
Selected Parcel			1,917*
Southern Corridor		13	
Totals	**12,726**	**993**	**Undetermined***

*Note: However, additional wetlands could be conveyed from the Alaska Peninsula National Wildlife Refuge to King Cove Corporation.

The transfer of the Kinzarof Lagoon parcel to the Izembek National Wildlife Refuge and the transfer of submerged lands and waters of Kinzarof Lagoon (including eelgrass habitat and intertidal shorelines) to the Izembek State Game Refuge would result in management under the *Izembek State Game Refuge Plan.* While the designation of additional lands and waters as part of the Izembek State Game Refuge would afford additional protections beyond those of general state lands, they are subject to less protection than the lands within National Wildlife Refuges. In general, the Alaska Department of Fish and Game would need to issue a Special Area Permit for any activity that might damage resources on the State Game Refuge or otherwise disturb wildlife or disrupt existing public uses. In contrast, most uses on a National Wildlife Refuge require both a Compatibility Determination and an ANILCA Section 810 evaluation; additionally, a special use permit may be required. For the Izembek National Wildlife Refuge, a special use permit requires compliance with NEPA, which could include the preparation of an environmental assessment or environmental impact statement. Currently, the State Game Refuge is open to new locatable mineral entry, mineral prospecting, and mineral leasing, although the Izembek Game Refuge Plan recommends the Alaska Department of Fish and Game, in cooperation with the Alaska Department of Natural Resources, close the State Game Refuge to new locatable mineral entry, mineral prospecting, and mineral leasing. National Wildlife Refuges are closed to new mineral entry by law.

In summary, the federal government would gain approximately 12,726 acres of wetlands while relinquishing ownership of 993 acres of wetlands (980 acres on Sitkinak Island and 13 acres in the road corridor). See Chapter 3 for a more complete description of wetlands within the proposed exchange parcels.

No effects on wetland resources have been identified that would result from the proposed land exchange, because no activities in the reasonably foreseeable future have been identified that would alter wetlands on these parcels. The wetland functions and values, as described in the affected environment section (Chapter 3) would remain the same, before and after the proposed land exchange. Wetlands, regardless of ownership, are protected by the Clean Water Act.

Direct Effects and Indirect Effects from Construction

Construction associated with Alternative 2 consists of an 18.5-mile road within an average 100-foot wide corridor. Direct effects would include the loss of wetland functions on approximately 3 acres of lowland wet low sedge/scrub and less than 1 acre (estimated 0.8 acres) of lowland wet sedge meadow wetlands as these wetlands would be filled with 20,000 to 25,000 cubic yards of deposited material. Also, direct effects would occur when 1,200 cubic yards of fill would be placed in about 1.0 acre of beach system wetlands for construction of temporary barge landing sites/staging areas.

Approximately 162 drainage structures would be installed, consisting of 1 major stream (riverine wetland) crossing requiring a bridge, 7 minor stream crossings requiring either box culverts or small bridges, and approximately 154 cross drainage culverts. The alternative would stay on upland hills and ridges for the majority of the route. Connectivity between major watersheds, wetlands, and water bodies would be maintained by box culverts or bridges in the few places where the route crosses streams and lowland areas. The cross drainage culverts identified above would be placed in upland areas at appropriate locations to maintain the existing localized drainage patterns. Although a complete on-site wetland survey was not completed for this EIS to confirm the jurisdictional wetland designations of these cross drainage sites, it can be presumed that some of these drainage areas would meet wetland criteria.

Indirect effects would result from modifications to the hydrology of adjacent wetlands because road fill would disrupt subsurface flows causing some ponding upslope and some dewatering downslope. Rerouting surface waters through 154 cross drainage culverts could also result in a change of wetland functional capacity.

Wetlands do not function as discrete features on the landscape. The isthmus in Izembek National Wildlife Refuge is a wetland complex that includes the interaction between uplands where the water table may be higher than the adjacent lowland containing a wetland. Disruption of surface water flow in uplands may impact both surface and subsurface flows, with the latter being an equally important component of wetland hydrology in that groundwater may be the primary source of water in a lowland wetland. As summarized on the wetland functions table (Table 3.2-7), these affected wetlands and hydrologically connected uplands may serve to moderate the flows in streams running into Kinzarof Lagoon. The continually saturated condition of the Kinzarof marsh wetlands does not allow them to absorb water, but the dense vegetation and hummocky microtopography slows runoff. The wetland vegetation promotes sediment deposition during overbank flow conditions. The marshes' vegetation binds stream banks and the shoreline against erosive high flows, reducing bank erosion and its resulting turbidity and sedimentation. These tundra system wetlands likely have moderately high primary productivity and nutrient and element cycling. Water table declines through the season could allow the reduction and later oxidization of various elements. They likely export organic materials that support the lagoon ecosystem, including the migrating, staging, and wintering waterfowl and migrating shorebirds for which Kinzarof Lagoon is known. During summer, these wetlands are used as breeding and foraging habitat for waterfowl, shorebirds, songbirds, and ptarmigan. Because of the abundance of surface water, the complex interspersion of seasonal open water and vegetation, and proximity to Kinzarof Lagoon, these wetlands support several other species of water dependent wildlife. The wetland vegetation also provides some cover and contributes detritus and invertebrates to the streams that support fish. Indirect effects from construction could affect the quality and functionality of the entire wetland complex on the isthmus of the Izembek National Wildlife Refuge.

Another indirect effect of road construction may be the status of the Izembek National Wildlife Refuge and Izembek State Game Refuge as a Wetland of International Importance under the Ramsar Convention. This special recognition is based upon the site's unique ecology and the importance of the geographic location along migration routes. Of particular note are the very large eelgrass beds that provide food for as many as 150,000 ducks and 300,000 geese using the areas during fall migration. Nearly the entire eastern Pacific coast population of Brant feed and stage in Izembek Lagoon in the fall and a large percentage of the world population of Steller's Eider and Emperor Goose also use the area. Birds that use the area migrate and winter along both coasts of the Pacific Ocean and among the islands of the south Pacific, giving the site a high degree of international importance. The primary Ramsar criteria met by the Izembek site includes: the presence of rare or unique wetland type; the presence of large volumes and diversity of waterfowl consisting of major flyway populations; its value for supporting long-term scientific research and its practicality for conservation and management. Because the Ramsar Diploma, issued in 1986, designates the entirety of the Izembek National Wildlife Refuge as a Wetland of International Importance, the proposed road corridor for Alternative 2 would be within the Ramsar site (see Section 3.2.2.2 and Figure 3.2-2) except for that segment near Blinn Lake within the Alaska Peninsula National Wildlife Refuge.

Obligations made to the Convention upon application for designation as a Wetland of International Importance include the commitment to support the objectives of “wise use of wetlands” and to “stem the loss of wetlands and to ensure their conservation” (Ramsar 1986). While the Ramsar Convention is not regulatory and has no sanctions for violating treaty commitments, the terms of the Ramsar Convention constitutes a solemn treaty and are binding in international law (Ramsar 2010). The Izembek wetlands were among the four first wetland areas in the United States to be designated Wetlands of International Importance which occurred concurrently in 1986 with the U.S. Senate’s ratification of the Ramsar Convention. The nomination was supported by the Alaska Department of Fish and Game (Mason 1986).

Under the terms of Article 3.2 of the Convention, the parties are expected to report to the Convention any changes or threats to the ecological character of their listed wetlands. It states that a change in ecological character is to be determined through the use of an effective monitoring and survey program linked to the Ramsar criteria or criteria fulfilled by the site at the time of designation for the Ramsar List. The Izembek wetlands were determined to meet six of the eight Ramsar criteria.

If Alternative 2 is approved, the Service would report the proposed change to the Ramsar Convention and carry out a re-evaluation to determine if the proposed alternative may affect the eligibility under the Ramsar criteria. Factors that could affect the eligibility include: adjustment of the wilderness status for the area within the 201-acre corridor, the fill of approximately 3.8 acres of wetland within the 416,193-acre Ramsar site, and the indirect effects of construction on wetland functions, hydrology, and vegetation.

Summary

The direct and indirect effects from construction would be the loss of 3.8 acres of lowland wet low sedge/scrub and lowland wet sedge wetlands and 1.0 acre of beach system wetlands. The placement of fill would result in the loss of hydrologic, biogeochemical, and habitat wetland functions. However, when placed in the context of wetland functions performed by the 4,000-5,000 acre Kinzarof marsh system, the magnitude of this loss would be medium. The indirect effect on adjacent wetlands would also be medium in intensity due to modifications of wetland hydrology and likely alterations to wetland vegetation. The resulting effects would be permanent and local. The wetlands are considered unique because of their designation as Wetlands of International Importance, designation as Essential Fish Habitat under the *Sustainable Fisheries Act*, and their unique location adjacent to high quality habitats of Izembek and Kinzarof lagoons. The resulting direct and indirect effects are therefore moderate.

Wetland losses from road construction would contribute slightly to the continuing overall loss of America’s wetlands, which was recently highlighted by the U.S. Department of Interior (USDOI 2011). Also, according to the articles of the Ramsar Convention, the Service would report to the Ramsar Convention the resulting changes to the ecological character of these listed wetlands.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance activities associated with Alternative 2 would have indirect effects on wetlands, such as road dust on vegetation from the gravel road surface, and an increase in human access in wetlands within and adjacent to the project area.

Although road dust is often limited because the region typically receives a large amount of rainfall, the area's frequent winds can rapidly dry out gravel road beds and increase dust distribution away from roads during periods of low to no precipitation. Therefore, some amount of road dust would accumulate on wetland vegetation near the road, resulting in indirect effects such as changes in wetland vegetation. To evaluate potential impacts to vegetation from operation and maintenance of the proposed road, data from another low-volume road were evaluated. According to Densmore (1995, cited in USACE 2003), vegetation composition along the park road in Denali National Park appeared to experience changes due to dust accumulation. Within 16 feet of the west side of the road, moss and lichen cover were lower than at distances of 164 feet and 492 feet, while ground cover of perennial herbs was higher in the 16-foot zone. Changes to wetland plant communities would be expected to have a negligible effect on wetland functions such as maintenance of plant communities for wildlife habitat cover and habitat feeding, and biogeochemical functions such as the retention of particulates and export of organic carbon. However, the road would also serve as a corridor through which invasive species can advance. If invasive species establish in wetland areas, they could reduce the value of these wetlands as wildlife habitat.

Low vegetation, limited topographical relief, and easy access to fish and wildlife resources make the isthmus of the Izembek National Wildlife Refuge an attractive location for all-terrain vehicle use once road access to the isthmus is built (see Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1). Although mitigation measures, discussed below, include the installation of a chain barrier or bollard barrier on each side to the road to prevent motorized traffic from traveling outside the road corridor and into the Izembek Wilderness, it is likely that some traffic would circumvent the barriers and pioneer new routes on the adjacent landscape resulting in indirect effects on wetlands, such as disruption of hydrologic processes and destruction of vegetative cover. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). Efforts to exclude all-terrain vehicles through the use of physical barriers often fail (USACE 2009): guard post and cable barriers can be stretched, cut, and removed; barbed-wire barriers can be cut; steel posts can be pulled up or bent to the ground; and welded pipe fences can be pushed or pulled to the ground allowing all-terrain vehicles to cross. Therefore, motorized access is likely to result, causing indirect effects to wetlands such as the loss or alteration of vegetative cover, soil compaction, and soil erosion.

As a result of improved access and favorable topography, all-terrain vehicle use would increase quickly. Existing all-terrain vehicle trails observed in the Kinzarof Lagoon area reveal that the vehicles often travel several miles, following drainages or wet graminoid meadows because the terrain is smoother and easier to travel. The road corridor proposed under this alternative would serve as a starting point for all-terrain vehicle access by subsistence and recreational users from King Cove and Cold Bay. It is reasonable to predict, based on documented use trends, that all-terrain vehicle use would increase with improved road access (illegal and legal) and would be difficult to control. Under Alternative 2, a web of trails would grow across the 4-mile wide isthmus and provide access to beaches on the Bering Sea/Izembek Lagoon and Pacific Ocean/Kinzarof Lagoon coasts, and fragile coastal wetlands could be adversely affected.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. All-terrain vehicles would reduce the functional capacity of impacted wetlands, which slow runoff, moderate stream flows, and provide important habitats, such as nesting and escape cover. Riparian areas and wetlands associated with streams that may be paralleled or crossed by all-terrain vehicles would experience a loss of vegetation, bank erosion, a reduction in water quality and the transport of sediment to coastal wetlands and eelgrass beds. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the immediate and severe degradation of wetland habitats.

Summary

Indirect effects to wetlands from operation and maintenance would include changes to the plant community in response to dust accumulation from the road and a reduction of wetland function along eroding pioneering trails caused by motorized vehicles that manage to circumvent the bollards or chain barrier. The effects from dust would be minor, but the effects from motorized vehicles would be moderate, because they would be medium in intensity (measurable), permanent (effects of eroding trails would continue even if the road use was discontinued), and local to extended in geographic extent for unique wetlands. The wetlands affected within the proposed corridor as a result of implementation of Alternative 2 are uniquely located adjacent to high quality habitats of Izembek and Kinzarof lagoons, used by thousands of waterfowl and other species. The overall effect as a result of operation and maintenance is therefore moderate.

Mitigation Measures

Barriers (MM-V)(either a chain barrier or bollard barrier) would be installed along the length of the roadway on both sides, as specified in the Act, to discourage motorized vehicles from accessing both wetlands and uplands within the Izembek National Wildlife Refuge and Izembek Wilderness. In addition, the route was designed to avoid wetlands where possible and to minimize impacts to wetlands. Appropriate Mitigation of Wetland Loss (MM-L) including appropriate best management practices, to satisfy Executive Order 11990 (Protection of Wetlands) would be imposed on permits or other authorizations from the Corps and the Alaska Department of Fish and Game when depositing fill into wetlands or installation of stream crossings.

Cumulative Effects

Past actions include impacts to vegetation through road and trail development dating back to the 1940s during World War II. The majority of these impact scars have been reclaimed by vegetation.

The completion of the King Cove Access Project (USACE 2003) would also contribute to effects on wetlands. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect vegetation.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the degradation of terrestrial habitats.

As a result of this project, approximately 6 acres of low sedge and herbaceous meadow wetlands have been filled along the segment from King Cove Airport to Lenard Harbor, and 3 acres of depression wetlands were filled at the Northeast Terminal site. The remainder of the project, which consists of a 12-mile long, 14-foot wide access road from the Lenard Harbor site to the Northeast Terminal site (currently under construction), will fill an additional 11 acres of primarily lowland wet sedge meadow wetland. However, as a mitigation measure for wetlands altered by the King Cove Access Project, King Cove Corporation donated 11.9 acres of high value wetlands at the entrance of Kinzarof Lagoon to the United States, which were designated as Special Aquatic Sites under 40 CFR 230.40-A and are now part of the Izembek Wilderness.

The implementation of Alternative 2 would result in additive incremental effects that include the loss of wetland functions on approximately 3.8 acres along the proposed road corridor, the loss of 1 acre of wetland functions at the temporary barge landing sites, and the reduction of wetland functions on adjacent wetlands.

Alternative 2 would have a moderate contribution to cumulative effects on wetlands because these additive effects would be of medium intensity, permanent, and local for these unique wetlands.

Conclusion

Direct and indirect effects to the Kinzarof marsh system from implementation of Alternative 2 would be medium in intensity, due to modifications to local hydrology and/or changes to the vegetative component on less than 5 acres within this 416,193 acre Ramsar site. The duration of the impacts would be permanent, the extent would be local, or beyond if the barriers are ineffective, and the context is considered unique, due to the designation as Wetlands of International Importance, Essential Fish Habitat, and the juxtaposition of the proposed corridor relative to designated wilderness. The wetlands are considered to fill a unique ecosystem role within the isthmus of Izembek Wilderness. The resulting effects would be a moderate contribution to cumulative effects on wetlands and the summary overall impact of Alternative 2 on wetland resources would be considered moderate.

4.3.2.3 Fish and Essential Fish Habitat

As described in Section 2.4.2, Alternative 2 would construct 18.5 miles of single lane gravel road through the Izembek isthmus. It is referred to as the southern road alignment, and is the more southerly of the road alternatives. Both road alignments were designed primarily to reduce impacts to wetland vegetation and hydrology, bird habitat, and land mammals. Minimizing impacts to fish habitat was also a consideration.

Direct Effects and Indirect Effects from the Land Exchange

Implementation of Alternative 2 would result in a land exchange between the federal government, State of Alaska, and King Cove Corporation. Although some access and usage patterns could be altered as a result, fisheries management would remain under the jurisdiction of Alaska Department of Fish and Game and would not be affected. The anadromous streams (Essential Fish Habitat) within the Mortensens Lagoon, Kinzarof Lagoon, and State parcels would not be added to the National Wildlife Refuge System, but retained by the State of Alaska as submerged lands beneath inland navigable waters. Therefore, it is not anticipated that Alternative 2 would affect fish and Essential Fish Habitat on the other exchange parcels outlined under Alternative 2.

Alternative 2 does not have marine components, except to the extent that barging activities and temporary barge landings would be required during construction.

Direct Effects and Indirect Effects from Construction

Approximately 162 drainage structures would be installed along the southern road alignment, consisting of 1 bridge over a major stream, 7 box culverts or small bridges over minor streams, and approximately 154 cross-drainage culverts. The southern road alignment detailed in Alternative 2 involves 8 crossings of anadromous or fish-bearing streams. These streams would be crossed using either bridges or box culverts, and are detailed in Table 2.4-3. Six of these streams are classified as anadromous by Alaska Department of Fish and Game, and have a specific stream system number assigned. The anadromous streams are: 283-34-10700; 283-34-10600; 283-34-10560; 283-34-10500; 283-34-10500-2031; and 283-34-10430. They are shown in Figure 3.2-9. These 6 streams have documented salmon runs, and are designated as Essential Fish Habitat. The remaining 2 streams are known to be fish-bearing, but do not have recorded populations of anadromous fish, and have not been classified as anadromous.

Quantities of water would be needed for embankment compaction and dust control during construction. The area’s typically wet weather should keep road materials moist; therefore, water requirements to control dust along the roadway would be relatively low. Project water sources include 3 lakes and 1 creek. The creek water source would be at stream system #283-34-10700, located approximately 2 miles north of the Northeast Terminal. Intake would be limited to 600 gallons per minute. Source lakes include a 128-acre lake mid-way along the southern alignment that is connected to system stream #283-34-10500, a 33-acre lake on the western side of Alternative 2 that is not connected to any anadromous streams, and Blinn Lake, a 150-acre lake not connected to anadromous streams and located at the western terminus of Alternative 2. Water source locations and preliminary estimates of water quantities are shown in Appendix E.

The potential effects of construction on freshwater and anadromous fish and Essential Fish Habitat in the streams crossed by all road sections would be minimized through environmentally appropriate design and installation criteria, best management practices, and through site-specific implementation of mitigation measures, as described in the Mitigation Measures section below and required under Section 6403(e)(3) of the Act. Design standards would ensure the retention of valuable fish habitat within all fish-bearing streams, with no net loss of rearing, feeding, or spawning habitat. Sediment control during road construction and fish crossings features would comply with industry standards developed by the American Fisheries Society.

Direct effects to anadromous species are not anticipated to be measurable. Habitat loss would be minimal, and mitigation measures would ensure that construction activities did not occur during sensitive periods. Indirect effects resulting from turbidity, noise, or pollution would be possible, but not likely, and would be negligible should they occur.

It is anticipated that freshwater species using the lower reaches of streams crossed, such as sculpin and flounder, would be more susceptible to direct effects such as loss of habitat through fill, constricted migration pathways from culvert installation, and to indirect effects such as increased turbidity, noise, or pollution from construction equipment. Freshwater species found primarily in lakes, ponds, or upper stream reaches, such as stickleback and lamprey, are not likely to be affected by road construction.

No effects are anticipated on marine fish or marine Essential Fish Habitat resulting from construction under Alternative 2.

Summary

Anticipated effects from the construction of the southern road alignment would be limited to freshwater fish resources in the lower reaches of streams crossed by the alignment. Direct and indirect effects would be of low intensity (no noticeable change to the resource condition with appropriate mitigation measures applied), temporary in duration (lasting only during the 2 year construction period), and local in extent (within the vicinity of the road alignment). The habitat is considered unique, due to its status as Essential Fish Habitat under the *Sustainable Fisheries Act*. Therefore, the direct and indirect effects from construction under Alternative 2 would be negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

No direct effects on fish or fish habitat are expected from the operation and maintenance of the southern road alignment provided structures installed across or within streams are maintained, such as repairing collapsed culverts or removing debris. However, numerous indirect effects are likely, and include reduction in water quality through erosion, sedimentation, and pollution from vehicles and other anthropogenic sources. Many of these effects would be mitigated to some degree through design considerations and mitigation measures, but some impact would be unavoidable. For example, particularly harmful spring breakups and historical flood events cannot be predicted and could surpass the 50-year flood event design standards used for the project. Pollution from anthropogenic causes, in the form of incidental trash and dumping, is also difficult to mitigate. Although unlikely to be prevalent, some of this behavior is likely to occur, and could potentially adversely impact freshwater and anadromous fish habitat. In addition, some motorized trespass is likely to occur, as discussed in the Terrestrial and Aquatic Plant Communities and Wetland sections above, resulting in indirect adverse effects to fish habitat, such as the loss of streambank vegetative cover, bank failure, sedimentation, and a reduction in water quality.

Another important potential indirect effect is increased harvesting pressure on subsistence and game fish resulting from increased access. Although road access exists to some anadromous streams within the Cold Bay and King Cove area, the creation of a road is likely to increase fishing pressure in these newly accessible streams if modifications to harvest regulations are not implemented and signs are not posted to inform travelers of changes in fishing regulations. Without taking such regulatory action prior to fishing seasons, harvest would have to be closely monitored by Alaska Department of Fish and Game, as several of the streams have limited salmon escapements, and could be adversely affected by a substantial increase in harvest pressure. Public outreach, good signage, and enforcement would be essential to prevent overexploitation. Specifically, stream 283-34-10600 (East Kinzarof Stream), stream 283-34-10560 (unnamed), stream 283-34-10530 (unnamed), stream 283-34-10500 (Kinzarof North Stream), and stream 283-34-10430 (unnamed) have small or poorly defined runs of coho, chum, and sockeye salmon that would be vulnerable to overharvest. Stream 283-34-10700 (Southeast Kinzarof Stream) is a major salmon-producing stream, and would likely be able to support limited harvest. (See Section 3.2.3.4 for a complete description of the anadromous resources within the EIS project area.)

Impacts resulting from Alternative 2 would be limited to freshwater fish resources. Marine fish and marine Essential Fish Habitat would not be affected.

Summary

No direct effects on fish resources or Essential Fish Habitat would result from the operation and maintenance of the southern road alignment. Most unavoidable indirect effects, such as effects to water quality or degradation of fish habitat from all-terrain vehicle use, would be of low to medium intensity (may be observable and measurable), long-term duration (intermittent but persistent for the life of the project), local in extent (limited to the drainages within the isthmus area), and would impact unique resources (Essential Fish Habitat), resulting in a moderate effect. Indirect effects on the fish resources from increased harvest pressure resulting from improved access could also result if the harvest is not monitored and harvest regulations modified when necessary. However, with the additional recommended mitigation measure of harvest regulation adjustments no effects should result from increased harvest. Therefore, the indirect effects from operation and maintenance under Alternative 2 would be moderate.

Mitigation Measures

The mitigation measures directed at controlling the introduction of foreign and potentially deleterious substances into the waterways include: Fish and Wildlife Protection Plan (MM-M), Erosion and Sediment Control Plan (MM-A), Storm Water Pollution Prevention Plan (MM-B), Hazardous Material and Petroleum Product Control Plan (MM-C), and Fuel Handling and Spill Response Plan (MM-D).

Although diverse, these measures are all directed at limiting any pollution of the immediate or broader environment from substances associated with road construction, operation, maintenance, and use.

Additionally, Road Design (MM-W) and a Fish and Wildlife Protection Plan (MM-M) would be implemented that would detail specific measures to be implemented to protect important fish and wildlife resources during construction and operation. Specifically, stream crossings would be carefully designed, constructed, and maintained to avoid or minimize any impacts to fish and fish habitat. Crossings of anadromous fish streams will meet Alaska Department of Fish and Game permit conditions contained in the most recent version of the memorandum of agreement between Alaska Department of Fish and Game and Alaska Department of Transportation and Public Facilities regarding the design, construction and maintenance of culverts in anadromous fish streams. Stream crossings of cataloged fish streams will have culverts designed to category 1 (stream simulation).

In combination, these mitigation measures would reduce many of the effects on fish and fish habitat within the EIS project area resulting from the implementation of Alternative 2. However, they would not completely eliminate all potential effects. Maintenance of structures installed across or within streams, such as repair of collapsed culverts or removing debris, is critical to ensure effectiveness. Continuous monitoring of turbidity and storm event monitoring of hydrocarbons would occur upstream and downstream of stream crossing of fish bearing streams during construction and for 3 years post construction to ensure the compliance with Department of Environmental Conservation water quality standards and Alaska Department of Fish and Game standards for fish bearing streams [Hydrologic/Structural Monitoring)MM-G)]. Additionally, culverts and drainage structures should be monitored for hydrologic and structural function post storm events and on an annual basis.

An additional mitigation measure, Adjustment of Harvest Limits (MM-O), includes the appropriate adjustments of bag limits and open seasons for harvesting from these streams with new access, under emergency order authority of the Alaska Department of Fish and Game if overharvest is occurring, or by the Alaska Board of Fisheries during their 3-year regulatory cycle, and/or the Federal Subsistence Board through their 2-year regulatory process, along with information, education, signage, and enforcement strategies.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting fish or Essential Fish Habitat in or adjacent to the EIS project area are described under Alternative 1 in Section 4.2.2.3.

The completion of the King Cove Access Project (USACE 2003) would also contribute to effects on essential fish habitat. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect fish habitat.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. These routes may cause erosion to existing streams and this in turn could cause the degradation of fish habitat.

Implementation of Alternative 2 would include unavoidable indirect effects such as reduction in water quality through erosion, sedimentation, and pollution from vehicles and other anthropogenic sources. Thus, the contribution to cumulative effects on fish and Essential Fish Habitat from the implementation of Alternative 2 would be moderate.

Conclusion

Effects on fish and Essential Fish Habitat from most aspects of the southern road alignment would be of low to medium intensity, long-term to permanent in duration and local in extent for these unique resources. Unavoidable indirect effects such as record storm events and pollution from anthropogenic causes could occur. All-terrain vehicles accessing areas beyond the road could also cause sedimentation or erosion of streambanks along fish bearing streams and/or the loss of riparian and bank vegetation that provides habitat for fish. The potential for overharvesting of anadromous resources facilitated by improved access would be minimized by appropriate adjustments in harvest regulations. The contribution to cumulative effects on fish and Essential Fish Habitat would be moderate, and the combined effects on fish and fish habitat under Alternative 2 would be moderate, because the intensity would be low to medium (may be observable and measurable), with a long-term duration (intermittent but persistent for the life of the project), local in extent (limited to the drainages within the isthmus area), and would impact unique resources (Essential Fish Habitat).

4.3.2.4 Birds

Alternative 2 would involve the construction of 18.5 miles of single lane gravel road, including 136 turnouts for passing, through a corridor across the Izembek isthmus. An additional 0.9 miles would require no new construction but would be included in subsequent operation and maintenance. Approximately 201 acres would be conveyed from the Service to the State of Alaska. This route is referred to as the southern road alignment, and is the more southerly of the 2 proposed road alternatives considered. The construction footprint would cover 107 acres of tundra habitat. The road would be maintained and remain open throughout most the year. Alternative 2 would also exchange several other parcels of land, between the State of Alaska, the King Cove Corporation, and the Service.

The southern road alignment would be located along the southern edge of the Izembek isthmus, from 0.5 mile (2,640 feet) to 1.0 mile (5,280 feet) north of Kinzarof Lagoon. The route was designed to minimize the impact of the proposed road on Black Brant and wetlands by locating the road closer to Kinzarof Lagoon rather than Izembek Lagoon.

The effect of the southern road alignment on birds depends on many factors, including how the birds are using the project area, the seasonality of construction activities, and the mitigation measures used to reduce potentially adverse effects on birds.

In the following analysis, general impacts to bird species are presented as an introduction, followed by an analysis of the impacts to specific species and groups of birds. The birds are grouped based on the use of the area and the expected type of impact as follows:

- Tundra Swan and Other Breeding Birds
- Black Brant, Emperor Goose, and Other Migrating/Wintering Birds
- Seabirds

Breeding birds are those species that are known to nest in the project area or immediate vicinity and may include migratory species, i.e., those coming to the project area to breed seasonally (spring through fall), and resident species, i.e., those occurring throughout the year, but may include local movements to avoid severe weather events. Both breeding and migrant species are expected to forage in the project area. Seabirds are those species that spend the majority of their time in marine environments, specifically the open ocean typically beyond the shoreline. This group may include both migrant and resident (wintering) species. Seabirds nest on cliffs or shorelines so are not expected to be nesting in the project area. Please refer to Chapter 3 for general species information.

Impacts to Steller's Eider, Kittlitz's Murrelet, and Yellow-billed Loon are described in Section 4.2.7, Threatened and Endangered Species.

<u>General Impacts – Breeding, Migrating, and Wintering Birds</u>

Direct Effects and Indirect Effects from the Land Exchange

The State Parcel in the northern portion of the project area contains many wetland areas suitable for nesting Tundra Swans, Black Scoters, and other waterfowl, waterbirds, and shorebirds. The parcel also has shoreline bordering Bristol Bay which provides some foraging and resting habitat for gulls, waterfowl, and shorebirds, but is less productive compared to nearby lagoons. The

Mortensens Lagoon parcel contains wetlands that support a high density of nesting Tundra Swans and likely other nesting waterfowl and shorebirds. Bald Eagle nests have been documented on the parcel and it supports a variety of other nesting landbirds. The shoreline and intertidal areas of Mortensens Lagoon are important foraging and resting habitat for Emperor Geese, migrating shorebirds and several waterfowl species. Gyrfalcons and other migratory raptors potentially use this area for hunting shorebirds and waterfowl. See Chapter 3 for a more complete description of birds and their habitats within the proposed exchange parcels.

No effects on bird resources have been identified as a result of the proposed land exchange because no activities in the reasonably foreseeable future have been identified that would alter bird populations or their habitats. The bird populations and habitats with associated resource values, as described in the affected environment (Chapter 3) would remain the same, before and after the proposed land exchange. Other effects of the proposed land exchange, such as Land Ownership and Management, Public Use and Subsistence management are addressed in Section 4.3.3.1, Section 4.3.3.6, and Section 4.3.3.7.

Direct and Indirect Effects from Construction

Road construction impacts of Alternative 2 for birds would include the direct loss of 107 acres of tundra habitat due to road corridor (footprint) and may include behavioral disturbance for a minimum of 2 years for road construction activities. Construction is planned to occur annually between May and November.

Those breeding, migrating, or wintering bird species most sensitive to construction disturbances, primarily noise based on intensity, frequency, and duration; movement of earth-moving machinery and heavy equipment; and, proximity to human activity, would be affected with the most predictable response of birds avoiding the area. Other species may be attracted to newly created edge habitats or the gravel surface resulting from road construction. For example, the Semipalmated Plover, a shorebird that nests in the Cold Bay area, is attracted to nesting on gravel substrates (Nol and Blanken 1999).

Although adults should be able to avoid wildlife-vehicle collisions in most circumstances, their eggs and chicks cannot. Persistent and frequent disturbances may cause adults to abandon their nests if initiated before start of construction, or otherwise preclude breeding for the season. Other species that may be attracted to the road surface to forage for invertebrates in the gravel or new habitat edges along the margins of the road include American Pipit, Lapland Longspur, and a variety of post-breeding or migrant shorebirds. Willow Ptarmigan and other granivorous (seed-eating) birds visit gravel roads to collect grit to aid digestion and may be attracted to gravel roads. Additionally, some birds may be attracted to the road for taking dust baths, and migrant shorebirds may use the road surface for night roosting.

While the disturbance from actual construction would be relatively short-lived (minimum of 2 years), the modification or loss of habitat would be permanent. Behavioral disturbance would be caused by construction activities and human presence along the proposed road corridor which is currently relatively undisturbed by human activities or visitation. Construction activities occurring between May and November each year would overlap nesting by many birds including courtship, mating, nest building, incubation, brooding, rearing, and fledging behavior. Also, the construction would overlap early staging for migration, which may be as early as July for some species (mid-June for Western Sandpiper). The disturbance caused by 2 years of construction activities may cause birds to alter migrating, feeding, or breeding routines. Behavioral changes could lead to reduced breeding success or reduced fitness for the energy demands of migration and/or wintering. Each species has their own tolerance levels for disturbance from construction activities and avoidance of disturbed areas. In addition to the 107 acres lost to the road footprint, construction activities may cause the incremental loss of habitats closest to the construction zone decreasing the total suitable habitat available for some species.

Direct and Indirect Effects from Operation and Maintenance

Road operation and maintenance for Alternative 2 on breeding, migrating, or wintering birds may include habitat avoidance caused by increased human presence and physical risk of wildlife-vehicle collision resulting in injury or mortality.

The risk of vehicles colliding with birds may be low due to the anticipated slow speed limit and low number of daily/annual vehicles on the road. However, it is probable that vehicles could collide with wildlife, especially during bad weather or periods of poor visibility, or if traffic speeds or volume exceeds what has been projected and analyzed. Juvenile and molting birds would be at a disadvantage and vulnerable. Overall, the number of birds potentially affected by wildlife-vehicle collisions is expected to be small.

The general effect of roads on birds has been well-studied (Trombulak and Frissell 2000; Transportation Research Board 2002; Environment and Natural Resources Institute 2004; Kociolek and Clevenger 2011) but remains difficult to accurately predict for any given project or environmental conditions. While some birds may become habituated to predictable use of the road by vehicles, behavior changes are more likely to be caused by: noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for birds to habituate to any single or multiple disturbance(s).

The aspect of road operation and maintenance that may have the greatest adverse impact on breeding, migrating, or wintering birds is the potential increase in human access into the project area. Not only would the road allow more human access to the area, but an indirect effect may be that it causes more people to visit the area simply because they can. More humans in the project area, regardless of their activity, would disturb more birds. Areas once protected by their remoteness, or at a minimum, difficulty for human access, are no longer inaccessible, and the associated noise, higher speed horizontal movement, and typically exposed human silhouette are more likely to startle and stress birds. The area affected by human disturbance could be much larger than the road footprint, and would vary by species and season (Forman 2000; Forman et al. 1997; Forman and Deblinger 2000). While some species are fairly tolerant of human activities, others react more strongly and would avoid a wide area around the road. Mortality to game birds such as ptarmigan and waterfowl could increase if more hunters are able to access the area. For additional discussion, see Social Environment (Section 4.3.3).

Due to the importance of the bird habitat potentially affected by this project, ABR (2010) evaluated road construction, operation, and maintenance disturbances for waterfowl species, specifically Black Brant, a species known for its sensitivity to human-related disturbances (Schroeder 1984; Ward, Stehn and Derksen 1994; Reed et al. 1998). ABR (2010) determined that most of the road would be visible from areas used by Black Brant in Kinzarof Lagoon, but the noise level from passenger cars or pick-up trucks would be less than the background noise level. To offset this, ABR (2010) recommended a 0.5 mile (2,640 foot) buffer from the road to minimize disturbance to waterfowl using the intertidal areas of Kinzarof Lagoon. Given the likelihood that people would use the road to access Kinzarof Lagoon with all-terrain vehicles and by foot, this 0.5 mile (2,640 foot) buffer is unlikely to be realized in some locations, leading to increased disturbance beyond the ABR (2010) recommended buffer (Figure 4.3-1, Figure 4.3-6 and Figure 4.3-7; see also Figures 4.3-2 through 4.3-5 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1). The combined effects of all-terrain vehicle use and human access would be greater than the construction and operation effects for the proposed road (Sowl and Poetter 2004; Sowl 2008c; and Sowl 2011f). Some birds are particularly sensitive to human activity during nesting, brood rearing, or molting periods. Wintering birds are nutritionally stressed during periods of inclement weather and less able to tolerate disturbances or regain energy reserves following disturbances (Bartelt 1987; Belanger and Bedard 1989; Korschgen and Dahlgren 1992; Bechet, Gairoux and Gauther 2004; Pease, Rose and Butler 2005; Sedinger et al. 2011).

Summary of Road Construction, Operation, and Maintenance Effects

Road construction activities of Alternative 2 on breeding, migrating, and wintering birds would include the permanent loss of 107 acres of tundra habitat. Road construction (for short-term) and subsequent operation and maintenance (for long-term) may include physical risks to wildlife-vehicle collision. New edge and gravel substrate habitats would be created that may benefit some species. Habitat alteration or loss would be most noticeable within the road corridor footprint, and affect those birds closest to the construction activities or road operations and/or species most sensitive to disturbance.

The effect of the road operation and maintenance on birds is difficult to accurately predict, although it is well-studied generally. While some birds may become habituated to predictable traffic patterns and flow, behavior changes are more likely to be caused by noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Some species attracted to the newly created edge habitats or the gravel surface of the road may be directly impacted as a result of wildlife-vehicle collisions. Other species may experience increased harvest pressure by subsistence and sport hunters in areas previously considered remote and difficult to access. Direct and indirect operation and maintenance effects would be long-term within the project area but causing incremental loss or reduced habitat quality for areas within and adjacent to the road corridor.

Important and unique species will be discussed in more detail below.

Figure 4.3-6 Alternatives 2 and 3: Tundra Swan Nests with Flush Zones and Projected All-Terrain Vehicle Trails

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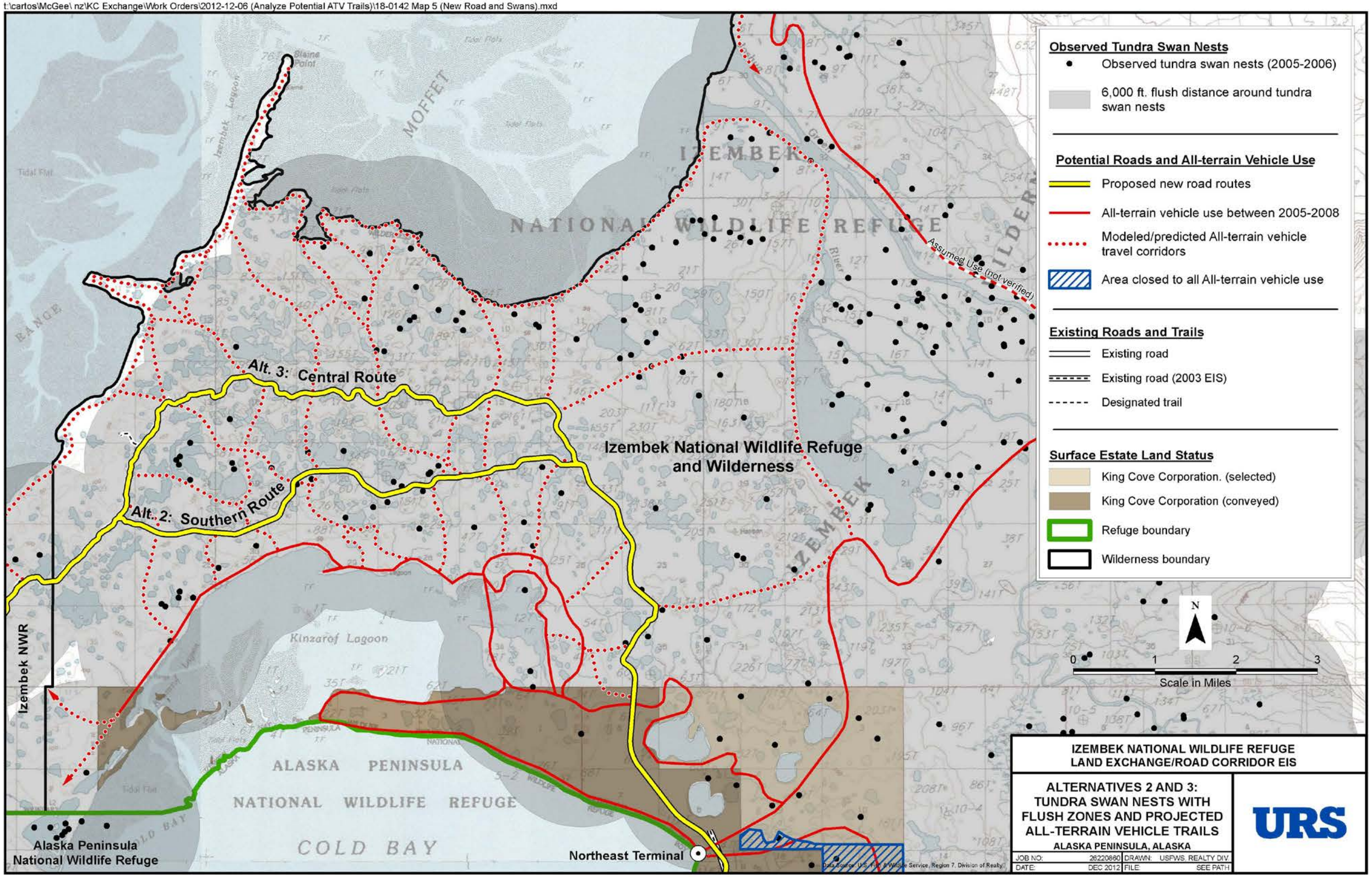
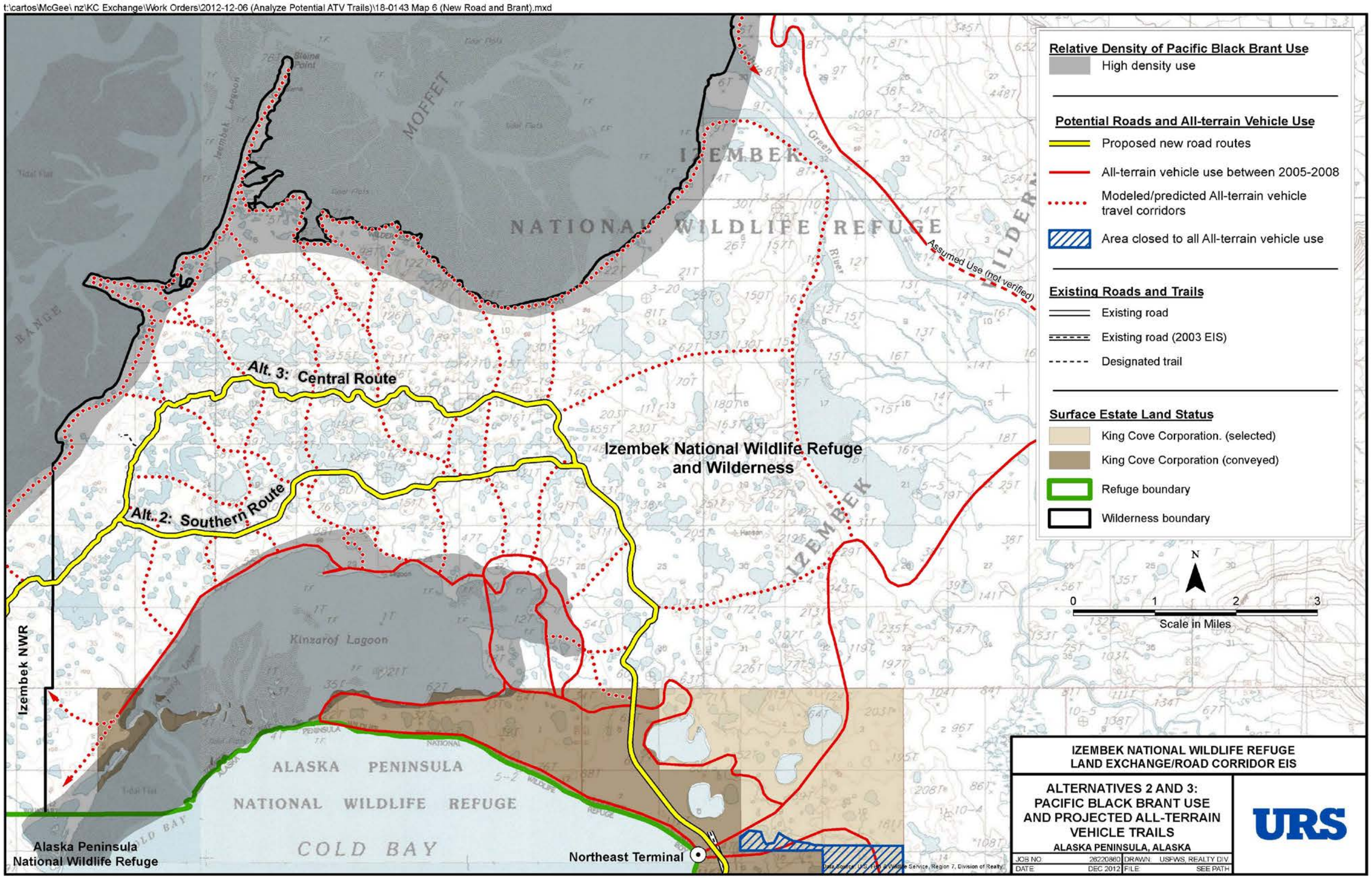


Figure 4.3-7 Alternatives 2 and 3: Pacific Black BrantUse and Projected All-Terrain Vehicle Trails



Common Mitigation Measures

A Fish and Wildlife Protection Plan (MM-M) that includes the following elements is required:

- All solid or putrescible waste generated during the project activity shall be removed or otherwise disposed of in a method approved by the Alaska Department of Environmental Conservation. All efforts will be made to prevent bears and other wildlife from being attracted to or having access to food or garbage during construction and operation of any transportation link.
- All lighting that could present a hazard to migratory birds will be shielded to prevent bird strikes. Shielding means that the fixtures distribute light downward towards the work area, minimizing light directed up or to the sides.
- Project personnel, their contractors, and others will not use construction project access to hunting and trapping areas that are not available to the general public to support harvest opportunities.
- Migratory birds, their eggs, and young are fully-protected by international treaty. To avoid/minimize the destruction of nests/young, construction-related impacts (nesting habitat removal) should occur either before birds have started nesting or after the nesting season is over. The nesting season is typically April 15 - July 15. If any construction activity takes place during the nesting season of any species, nest surveys must be completed before any ground disturbing activity takes place. If any nests or chicks are found, all construction activity will stop immediately and the Service will be consulted.
- Bald eagles nest in the project area March through August. By March 1, the applicant will have in place a plan to survey all construction areas and a suitable buffer (determined by Service) for the presence of nesting bald eagles. If any active nests are found (incubating birds or adults with chicks), construction activity will stop immediately and the Service will be consulted.

In addition, motorized vehicle access beyond the roadway corridor would be prohibited. Barriers (MM-V), either bollard and chain, or bollard only, would be placed on each side of the roadway to physically prevent all-terrain vehicles and other motorized vehicle access. Signs that explain the access restrictions and the reasons for them would be posted along the road.

Only non-commercial use (MM-U) of the road would be allowed. Guides are not allowed to use the road for guided hunts or commercial wildlife viewing.

These measures would only be effective in reducing impacts if they are continually enforced. In the absence of consistent enforcement, unauthorized access is almost certain to occur. It is assumed that some level of unauthorized access would occur, including access for subsistence harvest purposes, and the impact of it is included in the effects analysis.

Cumulative Effects

Reasonably foreseeable future actions include an increase in the number of fisheries observers coming to the community of King Cove and upgrades to the Cold Bay Airport. The cumulative effects analysis is presented for each species and group below. The geographic extent for this analysis is the entire range of each species or group of species so that all actions potentially affecting birds in the project area are analyzed. For example, habitat loss on a species' breeding grounds would be additive to habitat loss in their wintering area.

The contribution to cumulative effects also includes numerous indirect effects of past present and reasonably foreseeable future actions over time. Increased human access into any area previously with only limited, if any, human presence is likely and predictable, and would contribute to cumulative effect. This aspect of road operation and maintenance may have the greatest adverse impact on birds. Not only would the road allow more human access to the area and more humans in the area would disturb more birds although the degree of disturbance may vary by species and individual.

Off-road vehicles, particularly all-terrain vehicles, are a common mode of transportation in Cold Bay, King Cove, and other area villages, so the potential for illegal off-road access is high with the construction of a new maintained, gravel-surface road with numerous turnouts for passing. The increase of all-terrain usage has brought heightened awareness and concern regarding public lands resources in the context of the proposed road corridors. Areas once protected by their remoteness, or at a minimum, difficulty for human access, are no longer inaccessible, and the associated noise, higher speed horizontal movement, and typically exposed human silhouette are more likely to startle and stress wildlife. Peer-reviewed literature from field studies regarding the negative impacts of all-terrain vehicles on wildlife and their habitats is extensive. All-terrain vehicle impacts include: damage to soils and vegetation that reduces forage and escape or thermal cover; physiological stress or behavioral responses that require energy reserves at times when recovery may be difficult, displacement of wildlife from normal routines, most notable breeding; may preclude wildlife use of high traffic areas or frequently used trail networks; and contributes to the over-exploitation by humans of resources (Berry 1980; Bury 1980; Webb and Wilshire 1983; Sinnott 1990; ADF&G 1996; Happe, Shae and Loya 1998; Beale 2007; among others). The extensive military off-road vehicle use surrounding Cold Bay during World War II is evident through extensive scars still visible 70 years later.

Site-specific documentation of increasing all-terrain vehicle use in areas immediately adjacent to Cold Bay and King Cove indicates what has and most likely would occur adjacent to the proposed road corridors upon completion (Sowl and Poetter (2004), Sowl (2008, 2011f), and discussion under Social Environment).

The ABR (2012) analysis of road construction, operation, and maintenance effects of a 0.5 mile (2,640 foot) buffer from the road did not account for human presence beyond the road corridor that is predictable and probable in the foreseeable future upon completion of construction and opening of the road for vehicle use. All-terrain vehicle use would most likely exceed background noise levels. The creation of tangent trails (single or two-track) would encourage further deeper intrusions into areas that have not had measureable human presence. Predators frequently use roads and/or pedestrian trails to access foraging areas or find wide-ranging prey. Additionally, humans are frequently accompanied by domestic dogs during their outdoor pursuits, an easily recognizable predator threat to many birds, especially ground-foraging and nesting species such as ptarmigan and waterfowl. Subsistence hunting and/or gathering, or sport hunting may affect birds even though they are not target species, for example Tundra Swan. Given frequent or persistent disturbance, birds may minimize their use or abandon areas, thereby reducing the overall total habitat available.

Cumulative effects from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time, such as; anticipated on and off-road vehicle use, and new human use patterns including increased harvest of subsistence and/or game species, poses a greater risk to wildlife and their habitats by creating conditions conducive to a population sink and/or ecological trap. By definition, a source population is that which has sufficient numbers in excess over mortality to maintain itself or increase indefinitely, and a sink population is that which has insufficient excess or net loss (mortality) which over time, may decline to eventual extinction at that location. Sources and sinks are increasingly important considerations in human-altered environments. An ecological trap is a situation in which wildlife settle in seemingly optimal habitat, but conditions were either deceptive or change rapidly to suboptimal, threatening survival if the individual remains at that site, or, upon departure if it was unable to gain sufficient body energy reserves for movement or survival. A factor contributing to population sink conditions are subsidized predators – those predators that are tolerant of human presence and tend to increase in association with humans, specifically gulls (*Larus* spp.), Common Raven, and red fox (Truett et al. 1997; Mitchell and Pihl 2005). For the Izembek isthmus, an undeveloped environment and designated wilderness, even slight alterations to species nutrient uptake, survival rates, increased predation, habitat fragmentation, flock/herd social structure, or behavioral stress could contribute to conditions creating a population sink or ecological trap situation (Van Horne 1983; Pulliam 1988; Pulliam and Danielson 1991; Krebs 2001; Franklin, Noon and George 2002; Battin 2004; Lindenmayer and Fischer 2006; Beale 2007).

Conclusion

The general direct and indirect effects of the construction of Alternative 2 on birds would be adverse because of the loss of habitat, but the creation of edge habitats and gravel surfaces may attract some species. The construction, operation, and maintenance of the road would result in minor effects for these species within the total project area because, although the intensity near the road corridor would be high and the duration would be permanent, the extent is geographically local (effects would not extend to broad geographic region or a broad sector of the population) and the context is common (resources are not depleted in the locality and are not protected by legislation). However, moderate to major effects would occur for localized populations near the road.

<u>Tundra Swan and Other Breeding Birds</u>

Izembek National Wildlife Refuge hosts the only known resident non-migratory population of Tundra Swan in North America (Limpert and Earnst 1994; Dau and Sarvis 2002). Additionally, migratory Tundra Swans of the western population (Pacific Flyway) occur at the Izembek National Wildlife Refuge (Dau and Sarvis 2002; Limpert and Earnst 1994; Pacific Flyway Council 2001; Meixell 2007; Service 2009b). As a large bird, the Tundra Swan requires proportionately larger water bodies for suitable nesting and molting sites and actively defends larger nesting territories (Limpert and Earnst 1994; Bowler 2005). Depending on the distribution of large ponds on the isthmus between Kinzarof and Izembek lagoons, fewer swan pairs occupy the same area as smaller sized goose or duck species.

The nonmigratory Tundra Swan population on Izembek National Wildlife Refuge numbers about 200 individuals based on a mean population size from 1980 to 2003 (range 57-266 individuals), with a large number of sub-adults and non-breeding adults, and only an estimated 40 percent of the population is presumed to breed in any given year (Bart, Earnst and Bacon 1991; Dau and Sarvis 2002; Meixell 2007; Meixell et al. In press). When 2004 to 2009 Tundra Swan population data is added that of 1980 to 2003, the mean population size drops from 200 to 174 individuals (average mean of 187 individuals) (Sowl 2011d). For the period 1980 to 2003 this represents about 23 to 86 nests per year. Using an estimated 35 breeding pairs in any given year (40 percent of 187 individuals), one (1) nest may represent about 2.9 percent of the total breeding population. Overall, the non-migratory Tundra Swans have lower reproductive success than other North American migratory Tundra Swan populations and there has been a documented 75 percent decline in this population from 1980 to 2003 (Meixell 2007; Meixell et al. In press).

Contributing to the non-migratory Tundra Swan decline is low productivity related to high rates of mortality for eggs and young, up to 95 percent (50 percent less than 10 days age, i.e., eggs through hatching to 10 days; 30 percent 11-30 days age; and 15 percent 31 or more days of age) (Dau and Sarvis 2002; Meixell 2007). Predation is identified as the primary causal factor contributing to nest mortality, although prevailing inclement weather may also be a contributing factor (Dau and Sarvis 2002; Meixell 2007; Meixell et al. In press). Tundra Swans do not cover eggs with nest material prior to departure making eggs susceptible to avian predation and/or thermal stress (Monda, Ratti and McCabe 1994). On the lower Alaska Peninsula, it is not uncommon for swans to nest on peninsulas and the lake shores, meaning they are vulnerable to land-based predators and particularly at risk from predators that search shorelines. Some swans nest away from lakes and out in wetlands or tundra, which may be a defensive strategy to minimize predation near shorelines

It is speculated the population persists due to the immigration of individuals from the migratory western population of Tundra Swans (Dau and Sarvis 2002; Meixell 2007; Miexell et al. In press), plus adult longevity of up to 21 years for an ecological lifespan (Bart, Earnst and Bacon 1991; Limpert and Earnst 1994).

The low productivity rate along with the long-term population decline for the non-migratory Tundra Swan makes it vulnerable to any factors influencing nesting and/or brooding success. Tundra Swans demonstrate strong nest-site fidelity, returning to the same breeding territories annually (Monda, Ratti and McCabe 1994; Meixell 2007; Meixell et al. In press). Birds that return to lakes in areas of high human activity such as near roads may have a lower chance of successful reproduction if disturbance levels are intense, frequent, or persistent. Mammalian predators (bear, wolves, and fox) are known to use roadways and trails as access avenues to potential hunting areas. Swans nesting near roads or trails may have increased risk of predation due to this behavior. Adults with cygnets spend more time grazing in uplands than any other swan species where they feed more efficiently than in water (Earnst 1992, 2002; Limpert and Earnst 1994; Bowler 2005). Also, swan families (adults and cygnets) have longer feeding bouts than other swans with parents spending the majority of time vigilant and in territorial defense (Earnst 1992, 2002).

Aleutian and Arctic Terns may nest within the proposed road corridor, but the Aleutian Tern is highly sensitive to disturbance and would abandon colonies in response to human disturbance (Haney, Andrew and Lee 1991; Litvinenko and Shibaev 1991). Other breeding birds in the project area could include raptors, shorebirds, gulls (*Larus* spp.), gamebirds (ptarmigan and waterfowl), and passerines. These species are more widespread and the Izembek isthmus does not constitute a significant part of their total ranges so these species are considered common in this impact analysis.

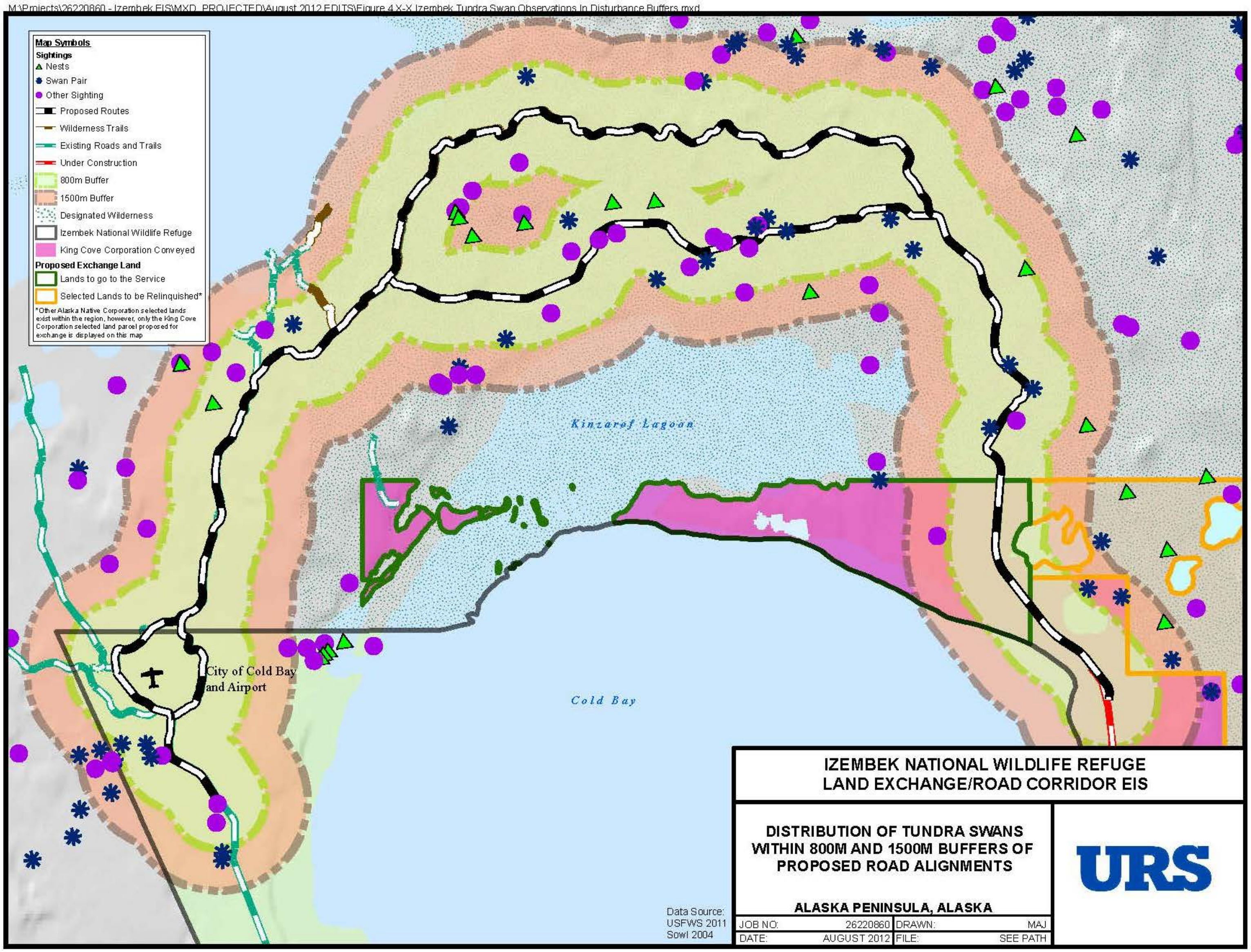
Direct and Indirect Effects from Construction

Road construction impacts of Alternative 2 for birds would include the direct loss of 107 acres of tundra habitat caused by the road corridor footprint. There may be some risk to wildlife-vehicle collision, more to chicks or juveniles than adults under most circumstances, but this risk may be minimal with the anticipated low speeds and traffic flow proposed.

Additionally, road construction effects on Tundra Swans and other breeding birds would include behavioral disturbance and direct habitat loss. The southern road alignment crosses through high density Tundra Swan habitat with nests documented in close proximity to the proposed road alignment (Figure 4.3-1). Behavioral disturbance is likely during construction along the roadway corridor. Affected individuals, or nesting pairs, would likely be displaced. If nesting is underway when construction activities begin in May, it is probable that re-nesting would not occur for the affected pair during that year due to the protracted breeding cycle which extends into the winter for Tundra Swans (Limpert and Earnst 1994; Bowler 2005). Swans demonstrate a strong fidelity to nest sites and would typically attempt at or nest near the same location as the previous season each year. However, with road construction projected to require 2 years, nesting behavior would be disrupted again and any nesting effort abandoned.

Other breeding bird species would experience behavioral disturbance from the construction noise and vehicle and human presence along the proposed road alignment, some of which is previously undisturbed. Clearing is planned to take place outside of the nesting season; however, many migratory species arrive paired and begin establishing territories, courtship, and breeding upon arrival as early as late-March or April, and construction is scheduled to begin in May. Construction is projected to continue through October, while many larger species with proportionately prolonged breeding season may be attending young-of-the-year, or migratory species are staging and feeding to gain energy reserves for long-distance migration and/or wintering.

Figure 4.3-1 Distribution of Tundra Swans within 800 Meter and 1500 Meter Buffers of the Proposed Road Alignments



The disturbance caused by 2 consecutive years of construction noise, heavy equipment moving around, and human presence could cause birds to alter their migrating, feeding, or breeding behaviors. These behavioral changes could range from simple displacement into comparable habitats or displacement to suboptimal habitats that may place birds at immediate risk, or risk later in their life history. The most severe change could result in the complete and permanent abandonment of the project area. For larger species requiring proportionately large home ranges or defensible territories such as loons, Tundra Swans, Sandhill Cranes, geese, or raptors, displacement from one location to another creates additional stress as alternate sites are typically occupied.

Direct and Indirect Effects from Operation and Maintenance

Road operation and maintenance effects to the Tundra Swan and other breeding birds may include long-term physical risks due to wildlife-vehicle collision, physiological or behavioral stress, and habitat preclusion due to noise, road traffic, and new human use patterns in the project area. Specific response depends on species and/or individual tolerance to disturbance, including life history events, season, and intensity, frequency and duration of disturbance(s). While some birds may become habituated to predictable vehicle patterns and traffic flow, behavioral changes are more likely to be caused by: noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for birds to habituate to any single or multiple disturbance(s).

Tundra Swans from the migratory Pacific Flyway western population have demonstrated on occasion some tolerance of active roadways in North Slope oil fields but still avoided areas within 330 to 660 feet, as a factor of visual and noise disturbance (Monda, Ratti and McCabe 1994). Increased human access is another consideration as nesting Tundra Swans on the North Slope were highly sensitive to human presence during incubation and brood-rearing with adults flushing at distances up to 6,600 feet during this critical period (Monda 1991).

Peer-reviewed literature documents the fact that the Tundra Swan, and the entire Genus *Cygnus*, is intolerant of human disturbance during incubation, brooding, or when adults are molting (Henson and Grant 1991; Monda 1991; Earnst 1992, 2002; Limpert and Earnst 1994; Monda, Ratti and McCabe 1994; Bowler 2005; Schmidt et al. 2009). Adults frequently leave nests in response to approaching humans over one-mile distant and rarely return to nests as long as humans are visible. Repeated disturbance may lead to nest abandonment (Sowl and Poetter 2004). On the Izembek National Wildlife Refuge, Tundra Swan adults with cygnets have been documented at moving up to 6.0 miles (31,680 feet) from brood-rearing lakes (Sowl and Poetter 2004). Swans with young cygnets reacted strongly to an observer walking through their brood rearing areas during the Izembek isthmus bird point count surveys by flying repeatedly over the observer and calling (Sowl, pers. obs.). As the southern road alignment is closer to Kinzarof Lagoon and higher density swan nesting, the options for escape through avoidance are limited, as they are generally on the isthmus. Recent research indicates that the population of Tundra Swans breeding near the Cold Bay road and off-road vehicle trail system has steadily declined over the past 20 years (Sowl 2007b).

A site-specific analysis of nesting Tundra Swans affected by the southern alignment road construction, operation, and maintenance across the Izembek isthmus suggests that less than one (1) breeding pair per year, based Service unpublished survey data from 1985 to 2005, within a

0.5 mile (2,640 foot) zone parallel to and either side of the proposed road (ABR 2012), would be affected by road construction and operation. If a zone of almost 1.0 mile (5,280 feet) was used to estimate the area of disturbance, an average of 2.5 breeding pairs would be disturbed each year. The ABR (2012) estimate of nests affected is based upon raw data from nests detected during survey flights that have not been statistically analyzed for observer error. Therefore, number of actual nests affected by road operation and maintenance may be larger.

Using population estimates with only 40 percent of the total population breeding in any given year, 2.5 nests may comprise 7.1 percent of the total annual recruitment for the non-migratory Tundra Swan population (Bart, Earnst and Bacon 1991; Dau and Sarvis 2002; Meixell 2007). However, the ABR (2012) zone does not address effects from vehicles that stop, plus the effects from all-terrain vehicles and humans on foot within and outside road corridor. As off-road and pedestrian use would most likely go beyond the alignment barrier, seeking closer wildlife viewing or subsistence or sport hunting opportunities, the disturbance effects may extend well beyond 1.0 mile (5,280 feet) from the roadway (See Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1).

The ABR (2012) analysis of a 0.5 mile (2,640 foot) or 1-mile (5,280 foot) area was intended for identifying swan nests affected by the road corridor. However, the affected area defined by this buffer over the length of 18.5 miles is 11,840 acres for 0.5-miles on either side of the road, or 23,680 aces for 1.0 miles on either side of the road, defines habitat that would be lost or severely degraded for Tundra Swan use due to disturbance caused by increased human access and associated disturbances. Using the response distance to humans of 6,600 feet (Monda 1991), the Tundra Swan habitat loss of degradation may include an area of 29,600 acres over the length of the proposed road. Note that Figure 4.3-6, which displays a more conservative 6,000 foot flush distance around Tundra Swans nests encompases the entire isthmus area

The indirect effects caused by road operation and maintenance should be considered an adverse effect and risk for the non-migratory Tundra Swan population due to a combination of considerations, including a lower reproductive success than migratory Tundra Swan populations and a documented 75 percent decline in this population from 1980 to 2003 (Meixell 2007).

Unauthorized off-road use of all-terrain vehicles and further intrusions by humans, often accompanied by domestic dogs (a recognizable predator for ground-nesting species), for legitimate hunting, subsistence gathering, or wildlife viewing into the wilderness area may create additional habitat loss, behavioral alteration, or physiological stress. This consideration greatly extends the 1.0 mile (5,280-foot) area analyzed by ABR (2012) and disturbances are not limited to Tundra Swans.

Any effort to define exact locations where unauthorized access would occur, or frequency, duration, and intensity of use would be speculative, but it may become substantial over time as demonstrated with off-road trail establishment rates near Cold Bay (Sowl and Poetter 2004; Sowl 2008c, 2011f; see discussion under Social Environment). Nearly 70 percent of King Cove households are subsistence based, using an estimated 40 geese per year, and the population has nearly doubled since the last subsistence harvest survey in 1986 (Braund et al. 1986; Fall et al. 1993). Given this population growth rate, it may predict a major change in human use patterns in the project area. Tundra Swans are not currently listed as a subsistence species by the Alaska Migratory Bird Co-Management Council or hunted species by Alaska Department of Game and

Fish, but the hunting of other species, particularly waterfowl, may be a compounding physiological stress for Tundra Swans in addition to those disturbances thus far identified.

The effect of roads on birds has been well studied (Kociolek and Clevenger 2011) but remains difficult to accurately predict for a given project. While birds may become habituated to predictable traffic speeds and flow patterns, behavioral acceptance is less likely with noisier vehicles, unpredictable speeds and patterns, vehicles that stop, and humans on foot. Some birds may avoid the road when vehicles or pedestrians are present, other species may be attracted to the road.

For example, passerines (song birds) may take dust baths in the roadway, shorebirds may forage for invertebrates amongst in the gravel, and ptarmigan may use the road as a source of small rocks to aid in digestion of seeds. Semipalmated Plovers in particular would most likely nest along the margins of the gravel roads and turnouts.

Other birds breeding in the project area known to be highly sensitive to disturbance include Common Loon, Aleutian Tern, and Dunlin. Common Loons breed on large lakes in the project area and are highly territorial. Although loons have been shown to habituate to disturbances on some breeding lakes, repeated disturbance could reduce breeding success (Evers et al. 2010). Aleutian Terns are a relatively rare species and have been known to abandon breeding colonies, both seasonally and permanently, in response to human disturbance (Haney, Andrew and Lee 1991; Litvinenko and Shibaev 1991). Dunlin have been designated as a species of high conservation concern due to restricted breeding, suspected population declines, and threats on the wintering grounds. Individuals displaced from nesting areas in the project area may miss a breeding season if they are unable to relocate successfully.

The high potential for the road to increase human access into the project area may have the greatest adverse impact on breeding waterfowl. The new road would allow unprecedented access into remote areas of Izembek National Wildlife Refuge, and the large number of turnouts would encourage all-terrain vehicle and humans on foot beyond the 1.0 mile area suggested by ABR (2010). More humans in the project area, regardless of their activity, would disturb more birds. Breeding birds are especially sensitive to disturbance and may abandon nests if sufficiently disturbed. Young birds are also more susceptible to predators if the adult(s) abandon them in response to disturbances.

The increased human access may also increase subsistence or sport hunting pressure and enables the potential over-exploitation of birds at some locations, by both humans and predators. It is expected that the permanent effect of the road would be a reduction in bird density in an area larger than the project footprint.

There would likely be a risk of wildlife-vehicle collision, more to chicks or juveniles than adults under most circumstances proposed. Impacts to some common breeding species would likely be restricted to the road corridor, which may become a local population sink. Semipalmated Plovers nest on gravel substrates and forage in open habitats, which would most likely include the road surface and margins. Incubating birds that nest on the road edge may habituate to traffic as long as it is slow and steady, but nests in or adjacent to the road are at higher risk of being abandoned or destroyed by vehicles. After hatching, small chicks have been observed foraging on roads have been killed by vehicles on multiple occasions (Sowl 2012).

It is possible that vehicles could collide with adult Tundra Swans during inclement weather or conditions of poor visibility. Due to the small and declining size of the population, the impact of any swan mortality has the potential to affect the population overall.

Summary of Road Construction, Operation, and Maintenance Effects

Road construction effects of Alternative 2 for birds would include the permanent loss of 107 acres of tundra habitat caused by the road corridor footprint. Construction effects would also include physiological and behavioral stress caused by noise, movement of heavy construction machinery, and human presence at periodic internals between May and November annually for a minimum of 2 years. Further, construction effects would most intense closest to the road corridor and progressively decreasing outwards. The most predictable and likely response of Tundra Swans would be avoiding the area.

Road operation and maintenance effects to the Tundra Swan and other breeding birds may include long-term physical risks due to wildlife-vehicle collision, physiological or behavioral stress, and habitat preclusion due to noise, road traffic, and new human use patterns in the project area. Specific response depends on species and/or individual tolerance to disturbance, including life history events, season, and intensity, frequency and duration of disturbance(s). While some birds may become habituated to predictable vehicle patterns and traffic flow, behavioral changes are more likely to be caused by: noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for birds to habituate to any single or multiple disturbance(s). The greatest response anticipated for Tundra Swans is to vehicles that stop on the road or situations where people stop and get out of their vehicles.

Further, due to the response distances of breeding Tundra Swans to human presence, up to 29,600 acres of habitat could be unavailable or reduced in value for Tundra Swans. Road use may cause the abandonment of 2.5 territories, reflecting a loss of 7.1 percent of the breeding population, based on an estimated average of 35 breeding pairs annually. New human access and use patterns along the proposed road, including all-terrain vehicles, subsistence hunting and gathering and/or sport hunting, and wildlife viewing are anticipated to create disturbances to the most sensitive breeding species, shown through the example of the Tundra Swan, beyond the road corridor. The extent of impacts are difficult to project, but similar trends have been documented for the expansion of human use and all-terrain vehicle trails in areas close to resident human populations (Sowl and Poetter 2004; Sowl 2008c, 2011f).

Mitigation Measures

All the mitigation measures listed under the Common Mitigation Measures, above, are expected to reduce the level of, but not completely avoid, adverse impacts to Tundra Swans and other breeding birds. Clearing the vegetation for the road construction outside the bird nesting window would avoid active nest destruction [Fish and Wildlife Protection Plan (MM-M]. If any construction is to take place during a breeding season, the project proponent would be required to conduct breeding bird surveys, including Tundra Swans, before, during, and after construction to minimize the risk of disturbance or injury to breeding birds. The Service would need to be consulted at all phases of this monitoring and mitigation effort for construction to proceed. Restricting mechanized access beyond the roadway [Barriers (MM-V)] would also greatly reduce potential adverse effects to these sensitive species, although this measure would be very difficult to monitor and enforce. Even if vehicles remain in the roadway, increases in foot traffic could affect breeding species through disturbance and increased subsistence harvest of birds and their eggs. Direct and indirect habitat loss may not be mitigated as both losses would be permanent and new habitat cannot be created or enhanced elsewhere without displacing other Tundra Swans or impacting other species. Potential impacts to Tundra Swans do not simply displace individuals from usable habitat but preclude its use for reproduction. As a result, Tundra Swan population productivity and recruitment would be adversely impacted.

Cumulative Effects

In addition to the effects from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time, as discussed above under General Impacts, the cumulative effects for Alternative 2 to Tundra Swan and other breeding birds include other physiological and behavioral stress that may be caused by ongoing noise and movement of vehicle traffic, and human presence at periodic intervals.
Indirect effects of increased human access to the isthmus area within the reasonably foreseeable future includes the probability that within the 1.0-mile radius from the road alignment a known minimum of 2.5 breeding Tundra Swan pairs may be impacted by road disturbances, and Tundra Swans may abandon nesting within this affected area totaling 23,680 acres. Based on population estimates with only 40 percent of the total population breeding in any given year based on an average of 35 pairs annually from 1980 to 2009, 2.5 nests may comprise 7.1 percent of the total annual recruitment for the non-migratory Tundra Swan (Bart, Earnst and Bacon 1991; Dau and Sarvis 2002; Meixell 2007). Using the response distance to humans of 6,600 feet (Monda 1991), the Tundra Swan habitat loss of degradation may include an area of 29,600 acres over the length of the proposed road.

The indirect effects caused by road construction, operation and maintenance should be considered a major effect and risk for the non-migratory Tundra Swan population with a documented 75 percent decline from 1980 to 2003 (Meixell 2007).

Summary

Using the 6,600-foot response-distance for Tundra Swans to human presence along the length of the road corridor, results in a total of 29,600 acres affected along the road alignment. However, this affected area does not consider new disturbances created by human access related to new all-terrain vehicle trails or pedestrian use that may greatly expand disturbances beyond the road corridor during the reasonably foreseeable future. Also, the projected loss of a minimum of 2.5 nests may affect 7.1 percent of the total breeding population. Therefore the contribution to cumulative effects from Alternative 2 would be major.

Conclusion

The intensity of the effect on Tundra Swan and other breeding birds from road construction, operation, and maintenance of Alternative 2 would be high for Tundra Swans (loss of nesting habitat would be consistently observable) and medium for other breeding birds (the change in resource condition would be detectable), the duration would be permanent (lasting beyond the life of the project due to the improved human access to the nesting area) and local (limited geographically) for this unique resource. Because the Tundra Swans at the Izembek National

Wildlife Refuge are the only known wild, non-migratory population of Tundra Swans in North America (Limpert and Earnst 1994; Dau and Sarvis 2002), this species is considered unique in this impact analysis. The resulting effect is considered to be major and the contribution to cumulative effects would be major.

Black Brant, Emperor Goose, and Other Migrating/Wintering Birds

Izembek Lagoon and adjacent coastal areas support nearly the entire population (98 percent) of Black Brant during spring and fall migrations where they feed on the extensive eelgrass beds and other marsh plants (Ward, Markon and Douglas 1997; Reed et al. 1998). Conservation of the Black Brant and their habitats are the primary purpose for which Izembek National Wildlife Refuge was established (Einarsen 1965). Increasing numbers of Black Brant are remaining to winter in the Izembek area in recent years, accounting for up to 30 percent of all Black Brant (Collins and Trost 2010), perhaps as a result of the increasing number of ice-free days with climate change and less favorable winds for migration (Ward et al. 2005; Ward et al. 2009a). Long distant migrants depend upon atmospheric wind patterns to assist their migrations and changes in these wind patterns can have major effects on their ability to complete these migrations successfully (Newton 2008; Gill et al. 2009). This trend indicates the increasing importance of the Izembek area for the Black Brant population not only for fall migratory staging but also a critical wintering site. Izembek Lagoon is the preferred winter habitat, but it is shallow and frequently freezes, thereby becoming unavailable. When displaced from Izembek Lagoon by ice or poor weather and tides, brant would also use Kinzarof Lagoon, Hook Bay, St. Catherine's Bay, and other areas with ice-free eelgrass beds on the Pacific side of the peninsula (Sowl and Poetter 2004; ADF&G 2010i).

The fact that Black Brant travel great distances to feed and stage for migration at this location, strongly suggests that this is an unusually favorable site. Because the Izembek National Wildlife Refuge plays such an important role in the life history of the entire population of Black Brant, this species is considered unique in the effects analysis.

The Emperor Goose is endemic to the Arctic Pacific Rim, breeding primarily in the Yukon-Kuskokwim Delta (where 80 to 90 percent of the global population breeds annually), northwestern Alaska, and northeastern Russia, while wintering from the Commander Islands to the Alaska Peninsula to Kodiak Island (Headley 1967; Eisenhauer and Kirkpatrick 1977; Petersen et al. 1994; Schmutz 2005; Hupp and Safine 2008). With its limited distribution, it is possibly the rarest goose species in North America (Wells 2007).

The proposed road corridor is a low density use area for breeding Emperor Geese and used primarily as a spring and fall migration staging and/or wintering area with abundant aquatic and terrestrial foraging habitat. The Emperor Goose is primarily a vegetarian on breeding grounds, but omnivorous at other times of the year. During the non-breeding seasons, they forage on bivalves and other intertidal invertebrates, eelgrass, sea lettuce (*Fucus* spp) and berries (Petersen 1983; Schmutz et al. 1994; Hupp and Safine 2002; Petersen, Schmutz and Rockwell 2011). When open water bodies are frozen elsewhere on the Alaska Peninsula, Emperor Geese concentrate in the Izembek isthmus and select suitable habitats (bay margins, tidal flats, or uplands) depending on tides, ice and weather conditions (Petersen et al. 1994; Hupp et al. 2008a). During spring and fall staging the isthmus area serves as a flight corridor between the Izembek and Kinzarof lagoons.

Emperor Goose seasonal and annual survival rates are below those of other goose species (Schmutz et al. 1994; Hupp et al. 2008a). The Emperor Goose also has a relatively low reproductive potential with females not attaining breeding maturity until 3 or 4 years of age (Petersen 1992). Further, over 33 percent of females fail to breed in any given year in the Yukon-Kuskokwim Delta (Petersen 1992). It is for the above reasons that this species is considered important in the effects analysis.

Other migrant species that commonly use the proposed road corridor or adjacent areas during spring and/or fall include: Cackling Goose and other waterfowl species; Western Sandpiper, Least Sandpiper, Rock Sandpiper, Dunlin, Pacific Golden-Plover and other shorebirds (Tibbitts. Gill and Dau 1996); Lapland Longspur and other passerines; and falcons and other raptors. Species that occur in low densities on upland habitats during the winter include Willow Ptarmigan, Snow and McKay's Buntings, Gray-crowned Rosy Finches, and occasionally Snowy Owls. With the exception of the MacKay’s Bunting, these species are widespread and considered common in the effects analysis. Some shorebird species may begin to stage for migration as early as late-June, with most actively flocking by mid to late-August.

Direct and Indirect Effects from Construction

Construction of Alternative 2 would affect Black Brant, Emperor Geese, and other migrating and/or wintering birds through loss of 107 acres of tundra habitat for the road corridor footprint. Actual road construction is anticipated to occur between May and November annually, which may influence fall staging, particularly the accumulation of energy reserves required for long distance movement. Construction noise, movement, and human presence may increase physiological stress or alter behavior nearest the road corridor and decreasing outward with increasing distance from the road. The greatest response to fall staging birds would be near construction equipment operations and when workers stop and get out of their vehicles. Black Brant, Emperor Geese, or waterfowl would lose foraging opportunities in the 107-acre road footprint. However, the creation of new edge and gravel substrate habitat may benefit other species.

Direct and Indirect Effects from Operation and Maintenance

Operation and maintenance of the proposed Alternative 2 road alignment would not interfere with Black Brant and Emperor Goose feeding in Kinzarof and Izembek lagoons or other open water. Physical risk through wildlife-vehicle collisions is expected to be minimal with the most likely occurrence, if any, during periods of inclement weather or low visibility. Road traffic noise, movement, and human presence may increase physiological stress or alter behavior nearest the road corridor and decreasing outward with increasing distance from the road. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for birds to habituate to any single or multiple disturbance(s). Disturbances from road traffic and periodic maintenance, including snow removal and/or road grading would be most intense closer to the road corridor and outwardly progressively less with increasing distance.

The greatest response to migrating or wintering birds would be when vehicles stop on the road or situations where people stop and get out of their vehicles. More important, human access to high density flocks during fall hunting equates to increased disturbance at locations previously difficult for humans to access. Constant alerts and escape flights may interfere with acquiring body fat reserves for migration or winter survival. As noted, the fact that Black Brant fly so far to feed and stage for migration at this location strongly suggests that this is an unusually favorable site.

Half a million shorebirds stop at Izembek Lagoon and adjacent areas during migration to forage on the abundant food resources and rest in the area. They need to put on sufficient energy reserves to fuel the long migration flights to their wintering areas or prepare them for harsh winter conditions. Frequent and persistent disturbance of these species during their staging period could result in reduced foraging time, displacement of birds from foraging areas, higher stress level, and depletion of energy reserves during avoidance behaviors. Displaced waterfowl may go to areas where food is less abundant, of lower quality, or not available or where competition with other birds is great. Reduced foraging opportunities may result in birds being in poorer body condition prior to migration or winter. These considerations may be conducive to ecological trap and population sink conditions for some species, especially those most sensitive to disturbance or with smaller populations thereby, less resilient to population loss or fluctuations.

Only 12 percent of breeding Black Brant responded to moving vehicles within 980 feet along roadways in oil fields of the North Slope and resumed normal behavior within 5 minutes (Murphy and Anderson 1993). While breeding Black Brant were not the focus for the road operation and maintenance study on the North Slope, behavioral responses may be used to demonstrate the species tolerance to human-related disturbances at least within the North Slope oil fields where human access is highly regulated and limited (Sedinger and Stickney 2000; National Research Council 2003). It must also be considered that nesting success for North Slope Black Brant is chronically low, 44 to 55 percent (Sedinger and Stickney 2000) as opposed to 80 percent in other colonies (Barry 1967; Reed et al. 1998; Sedinger et al. 2002), and this seems to conflict with Black Brant tolerance to disturbance and its response may be reflected in other aspects of species physiology, biology or ecology.

Brant are particularly sensitive to disturbances. Studies have shown that staging brant are sensitive to the noise and visual movement of low flying aircraft, helicopters, and small boats, and such disturbances may interrupt feeding or displace birds from feeding areas (Ward, Stehn and Derkson 1994; Ward et al. 1999). Frequent and persistent disturbance of staging brant causes a reduction in body weight which could affect migration readiness and survival rates (Ward et al. 1994, 1999). Over 90 percent of the Pacific Flyway population of Black Brant migrates from Izembek to western Mexico during a nonstop flight of about 3,300 miles. This transoceanic flight requires about 54 hours and the brant lose more than 30 percent of their body weight (Dau 1992). Adult brant arrive at Izembek after their molt, so they must forage enough to recover from the physiological demands of molt and accumulate sufficient body reserves to allow the completion of an energetically demanding stress of migration (Taylor 1995; Newton 2008). Brant feed almost exclusively on eelgrass, a plant that is flooded by high tides twice daily, limiting the times available for feeding. Disturbance that displaces brant from their feeding areas has greater consequences to this species than it would for other species that feed on a wider variety of food resources. Brant are a popular subsistence and sport harvest species and are preferred by many hunters on the refuge. Increased human access to previously remote staging areas could interrupt foraging activities and displace staging birds from feeding areas, compromising migration readiness and survival.

Wintering waterfowl in Kinzarof Lagoon probably spend a considerable portion of their daily activity foraging to meet energetic demands of wintering in such a harsh environment (Nilsson

1970; Goudie 1984; Fox and Mitchell 1997). Winter conditions on the southern Alaska Peninsula are very dynamic. Winters have variable amounts of snow and temperatures can average below freezing, above freezing, or alternate between these conditions (Putkonen and Roe 2003; Wilson et al. 2012). Ice may or may not be present on freshwater lakes, coastal lagoons, and along beaches. Coastal waters are more likely to freeze on the Bering Sea side of the peninsula than on the Pacific Ocean side. Wintering waterfowl have adapted to these dynamic environmental conditions through nomadic and opportunistic movements when preferred areas become iced-over. It is this network of various lagoons, estuaries, and bays that allows these birds to overwinter successfully in the harsh environment of the southern Alaska Peninsula.

The risk of wintering in such a harsh winter environment is that the birds live on the edge of the threshold between sufficient resources or not enough to survive through until spring green up and warmer weather. Therefore, collectively wintering birds are much more vulnerable to disturbances than less physiological demanding periods of their annual life cycle. Adjusting foraging intensity with temperature is one survival mechanism. For example, some smaller ducks increase foraging intensity with drops in ambient temperature, while other waterfowl species may opt for limited or no feeding during extreme cold as for these species it is energetically economical, reducing exposure and energetic costs of feeding in the cold (Nilsson 1970; Frederick and Klass 1982; Jorde, Krapu and Crawford 1983; and Jorde et al. 1984). These considerations for wintering Black Brant and other physiologically stressed species highlight that human-related disturbances places them at risk and possibly increased mortality.

A site-specific assessment of potential waterfowl disturbance, focusing on Black Brant was conducted by ABR (2010), reviewing academic, agency and peer-reviewed literature, evaluated potential waterfowl disturbances associated with road construction, operation, and maintenance. The ABR (2010) report yielded the following: despite a large body of research literature it remains difficult to accurately predict the specific effects for the subject road as studies occurred in different habitats and with different species. The responses of wildlife to disturbance varies by type of disturbance; distance from the disturbance; disturbance frequency, intensity, duration, and predictability; environmental conditions (influencing how far sound will carry and at what intensity); group (flock) size; season; and species. Finally, there is the variation of individuals with some more tolerant than others to any given disturbance. All these factors conclude that responses to disturbance are difficult and unpredictable. ABR (2010) did note trends among all the research reviewed. Large, unusual, or loud vehicles (e.g., heavy equipment and earth-moving types), as well as slow, stopping or stopped vehicles, elicited stronger responses from waterfowl than constantly moving passenger vehicles.

Using a 0.5 mile (2,680 foot) radius from the road corridor in the intertidal area, most of the road would be visible from areas used by Black Brant and Emperor Geese in Kinzarof Lagoon, but the noise level from passenger-type vehicles would be less than the background noise level (ABR 2010). The Alternative 2 road proposes an alignment located 0.5 mile (2,680 feet) to 1 mile (5,280 feet) north of Kinzarof Lagoon, thereby minimizing road disturbances for staging or wintering birds along this route.

Summary of Road Construction, Operation, and Maintenance Effects

The direct and indirect effects to Black Brant, Emperor Geese, and other staging and/or wintering birds would include the permanent loss of 107 acres of tundra habitat for the road corridor footprint. Intermittent short-term physiological and behavioral stress caused by noise, heavy equipment movement and proximity, and human presence may be minimized at least during construction as this is planned for May to November annually, for 2 years, and outside the core period for migration staging or overwintering by Black Brant, Emperor Geese, and other birds.

Road operation and maintenance, particularly snow removal, is long-term and may cause physiological and behavioral stress through noise, vehicle movement and proximity, and presence of humans. Intensity of road operation and maintenance effects would be intense along or adjacent to the road corridor and decreasing with increasing distance from the road. It is suggested by ABR (2010) that most effects would be confined with a 0.5 mile radius from the road corridor, thereby reducing the habitat suitability of 11,840 acres for the length of the road (18.5 miles). However, human disturbance is a major factor restricting the numbers of Black Brant (Einarsen 1965; Schroder 1984). Increased human access into areas during critical feeding periods for migrating and/or wintering waterfowl and species would greatly expand the effects radius beyond 0.5 miles of the road. This area was previously not readily accessible by humans and it is predictable that increased human presence would include pedestrian and all-terrain vehicle traffic and subsistence and hunter activity in an area rich with game species (See Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1).

Mitigation Measures

All mitigation measures listed above under Common Mitigation Measures, except restricting vegetation clearing to outside the bird nesting period, would reduce adverse impacts to Brant, Emperor Geese, and other migrating/wintering birds. These measures would reduce the level of, but not completely avoid, adverse impacts to these species.

Cumulative Effects

In addition to the effects from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time, as discussed above under General Impacts, the cumulative effects for Alternative 2 to Black Brant, Emperor Goose, and Other Migrating/Wintering Birds include the future noise and traffic associated with road operation and maintenance that may cause additional impacts, most likely affecting the habitat quality of 11,840 acres (0.5 miles either side of the road corridor for its entire length of 18.5 miles), based on recommendations by ABR (2010). However, this may be considered a minimal impact affected area, as human access into an area with previously little if any intrusions may be greatly expanded, reducing the habitat quality for a larger area.

Izembek Lagoon and adjacent coastal areas may only increase in importance to the global Black Brant population under projected climate change scenarios in which more individuals would winter as opposed to moving farther south to California and Mexico for the winter. For that segment of the population that continues long-distance migration to and from the Izembek area, it would remain an essential staging area where energy reserves are acquired prior to fall flight or regain lost energy during spring movements. The fact would remain that Black Brant travel great distances, or would remain to winter because of abundant food resources, primarily lagoon eelgrass beds, making Izembek National Wildlife Refuge a unique asset in the their life history.

More importantly are the combined and cumulative effects that may create conditions conducive for an ecological trap and population sink for Black Brant and Emperor Goose, and possibly other migratory and/or wintering species. These combined impacts include noise, projected traffic patterns along the proposed road, and anticipated increase in human access to the area, including all-terrain traffic and humans on foot creating trails and frequently accompanied by domestic dogs, and increased subsistence and sport harvest of wildlife.

The indirect effects caused by road construction, operation and maintenance should be considered a major contribution to coumulative effects for Black Brant and Emperor Goose.

Summary

The sum of total effects for Alternative 2 on birds are dependent on many factors including how birds are currently using the project area – breeding, migration, or wintering, and for some, all of these seasonal activities. The birds are reliant on the resources that the habitat provides – food of varying quality and quantity, shelter from weather, escape and protection from predators, a place of convergence before relocating elsewhere. Included among these factors are the species and the individual tolerance to a range of disturbances.

A site-specific analysis of road construction, operation, and maintenance effects indicated that disturbances would be limited to within 0.5 miles (2,680 feet), or alternatively, 1.0 miles (5,280 feet), with intensity of disturbances greater within and immediately parallel to the road corridor and progressively decreasing with distance from the road. These distances effectively describe areas of 11,840 acres and 23,680 acres, respectively. This also delineates the area degraded or unsuitable for use, or possibly abandoned, by a wide variety of birds, depending on species-specific or individual tolerance to disturbance(s).

The cumulative effects from road construction, operation, maintenance activities, plus anticipated off-road vehicle use and new human use patterns including increased harvest of subsistence and/or game species, poses a greater risk to birds and their habitats by creating conditions conducive to a population sink and/or ecological trap.

Therefore, cumulative impacts to the project area for Black Brant, and Emperor Goose would be considered major. This does not discount that other species, particularly waterfowl and shorebirds would be affected, but to a lesser degree.

Conclusion

Direct and indirect effects to Brant, Emperor Geese, and other migrating/wintering birds from Alternative 2 would be low to high intensity, based on their preferred use of habitats in the vicinity of the proposed corridor. The actions would be permanent duration (behavioral disturbance and habitat loss) lasting beyond the life of the project, local in extent (affecting limited geographic area), and would affect unique resources (Brant), important resources (Emperor Goose), and common resources (other migrating/wintering species), resulting in major (Brant and Emperor Goose) to moderate (other species) impacts to these resources. Because the Izembek National Wildlife Refuge plays such an important role in the life history of the entire population of Pacific Flyway Brant, this species is considered unique in the effects analysis. Emperor Goose seasonal and annual survival rates are below those compared with other goose species (Schmutz, Cantor, and Petersen1994, Hupp, Schmutz, and Ely 2008a). Compounding population stability, Emperor Geese have a relatively low reproductive potential with females not breeding until 3 or 4 years old (Petersen 1992). Further, over 33 percent of females failed to breed in any given year in the Yukon-Kuskokwim Delta Emperor Goose colony (Petersen 1992). It is for these reasons that this species is considered important in the effects analysis.

Alternative 2 would have a major contribution to cumulative effects on Brant, Emperor Geese, and other migrating/wintering birds. The summary impact of Alternative 2 on Brant, Emperor Geese, and other migrating/wintering birds is considered major (Brant and Emperor Goose) to moderate (other species).

Seabirds

Seabirds are those species that spend the majority of their time in marine environments, principally foraging in the open ocean of varying depths and may include murres, puffins, and auklets (Family Alcidae), and fulmars and other tubenoses (Family Procellaridae). These species typically nest on isolated islands and mainland cliffs, none of which occur within the project area. Occurrence of seabirds within the project area may be considered incidental and opportunistic. These species are widespread and are considered common resources in this effects analysis. Gulls and terns (Family Laridae) may also be considered seabirds, but many of these species breed in the Izembek National Wildlife Refuge area and are considered with Tundra Swan and other breeding birds in this analysis.

Direct and Indirect Effects from Construction

The effects of the construction of Alternative 2 on seabirds would be limited to occasional disturbance as they fly over the project area, as they are not expected to nest or forage in the project area. If seabirds encounter the noise and human activity associated with construction they would likely avoid the area.

Direct and Indirect Effects from Operation and Maintenance

The effects of the operation and maintenance of Alternative 2 on seabirds near the road would be limited to occasional disturbance. Seabirds are not expected to spend any extended time within the project area as foraging and nesting for this suite of species is not land-based and typically off shore in ocean waters. If they do encounter vehicles or humans on the road they would likely avoid the area. Seabirds may experience fewer disturbances in marine waters than under current conditions if the operation of the road results in fewer flights and boat operations between the communities of Cold Bay and King Cove. A reduction in aircraft flights and boat traffic could reduce seabird disturbance.

Summary of Road Construction, Operation, and Maintenance Effects

Direct and indirect impacts to seabirds associated with Alternative 2 would be negligible because, although the duration would be long-term, the intensity of the disturbances would be low, and the extent would be local for these common seabirds.

Mitigation Measures

All the mitigation measures listed above under Common Mitigation Measures, except restricting vegetation clearing to be done outside the bird nesting period, would reduce adverse impacts to seabirds. These measures would reduce the level of, but not completely avoid, adverse impacts to seabirds.

Cumulative Effects

Reasonably foreseeable future actions in the vicinity of the project area include an increase in the number of fisheries observers coming to the community of King Cove, upgrades to the Cold Bay Airport, and the completion of the road to the Northeast Termial that would be connected to the southern road alignment under Alternative 2. As these would be all land based activities, such as the transport of the additional fisheries personnel to King Cove over the proposed road corridor, the effects of these activities would be expected to have negligible or no effect on seabirds within the project area. Therefore, direct and indirect impacts to seabirds associated with Alternative 2, as well as from reasonably foreseeable future actions, would have a negligible contribution to cumulative effects. A possible negligible beneficial effect for seabirds would be a reduction in the number of disturbances from marine vessels that would occur if a road alternative is implemented.

Summary

Cumulative impacts to seabirds associated with Alternative 2 would be negligible.

Conclusion – All Bird Species

The sum of total effects for Alternative 2 on birds are dependent on many factors including how birds are currently using the project area – breeding, migration, or wintering, and for some, all of these seasonal activities. The birds are reliant on the resources that the habitat provides – food of varying quality and quantity, shelter from weather, escape and protection from predators, a place of convergence before relocating elsewhere. Included among these factors are the species and the individual tolerance to a range of disturbances.

Road construction impacts include the direct loss of 107 acres of tundra habitat. Construction activities are projected to occur between May and November annually for a minimum of 2 years which corresponds to the core of the Arctic breeding season and also include staging for early migrants. Construction activities may include the physical risk of wildlife-vehicle collisions, especially for chicks or young, or nests along road edges. Physiological or behavioral stress may be caused by noise of varying intensity, frequency, and duration; movement of earth-moving machinery and heavy equipment; and proximity to human presence. The most predictable response is that birds would simply avoid the area.

Road operation and maintenance, including periodic road grading and snow removal, is long-term with continuous physical risk to wildlife-vehicle collision, particularly to chicks or young birds and nests along road edges, especially during inclement weather or periods of low visibility. Additional physiological or behavior stress caused by traffic noise, vehicle movement and proximity, and human presence. The strongest response is projected to be from vehicles that stop on the road or situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for birds to habituate to any single or multiple disturbance(s).

Finally, the cumulative effects from road construction, operation, maintenance activities, plus anticipated off-road vehicle use and new human use patterns including increased harvest of subsistence and/or game species, poses a greater risk to birds and their habitats by creating conditions conducive to a population sink and/or ecological trap.

Therefore, road construction, operation, and maintenance plus cumulative impacts to the project area for Tundra Swan, Black Brant, Emperor Goose, and most likely other waterfowl and shorebird species would be considered major because the intensity of the proposed action would be high (measurable change in resource condition) within the Izembek isthmus (an area critically important for several species) the duration would be permanent (lasting beyond the life of the project), the extent would be local (limited geographically) for these important (Emperor Goose) and unique (Black Brant and Tundra Swan) species. However, for cumulative effects the extent would include the entire range of each species (extended) because the habitat loss on a species' breeding grounds, staging area, or wintering grounds, would be additive to the total habitat loss for each species throughout their range. For seabirds, which only occur in the area incidentally and opportunistically, road construction, operation, and maintenance and cumulative effects would be negligible.

Emperor Goose is considered important species for this analysis because of their relatively low reproductive potential and low seasonal and annual survival rates. Black Brant are considered unique because the Izembek National Wildlife Refuge plays such an important role in the life history of the entire population of Pacific Flyway Brant, and Tundra Swan are considered unique because Tundra Swans at the Izembek National Wildlife Refuge are the only known wild, non-migratory population of Tundra Swans in North America.

4.3.2.5 Land Mammals

Alternative 2 would involve the construction of 18.5 miles of single lane gravel road, including 136 turnouts for passing, through a corridor across the narrowest segment of the Izembek isthmus. An additional 0.9 miles would require no new construction but would be included in subsequent operation and maintenance. An estimated 201 acres would be conveyed from the Service to the State of Alaska. This route is referred to as the southern road alignment, and is the more southerly of the 2 proposed road alternatives considered. The construction footprint would cover 107 acres of tundra habitat. The road would be maintained and remain open throughout most of the year. Alternative 2 would also exchange several other parcels of land, between the State of Alaska, the King Cove Corporation and the Service.

Road construction and operations in previously undisturbed environments are generally recognized to have several effects on land mammals as well as other species. Trombulak and Frissell (2000) outlined these general effects to include mortality from road construction, mortality from collision with vehicles, modification of animal behavior, alteration of the physical environment, alteration of the chemical environment, spread of exotics, and increased use of areas by humans. Specific to large mammals, roads alter animal behavior by causing changes in home ranges, movement, reproductive success, escape response, and physiological state. Roads also promote increased hunting, fishing, and passive harassment of animals.

The effect of the southern road alignment on land mammals depends on many factors, including how the mammals are currently using the project area, the seasonality of construction activities, and the mitigation measures used to reduce potentially adverse effects on mammals.

Alternative 2 effects are analyzed based on the types of impacts: construction, operation and maintenance, and cumulative. Additionally, this analysis is broken down by major groupings of land mammals: large mammals (both big game and predator species), furbearers, and small mammals. Within these groupings selected species will be reviewed in detail (caribou, brown bear, and wolf). To avoid repetitive narratives general information is presented first followed by species-specific analyses.

General Impacts – All Mammals

Direct Effects and Indirect Effects from the Land Exchange

No effects on land mammal resources have been identified as a result of the of the proposed land exchange because no activities in the reasonably foreseeable future have been identified that would alter land mammal populations or land mammals or their habitat. The land mammal populations and habitats with associated resource values, as described in the affected environment (Chapter 3) would remain the same, before and after the proposed land exchange. Other effects of the proposed land exchange, such as Land Ownership and Management, Public Use and Subsistence management are addressed in Section 4.3.3.1, Section 4.3.3.6, and Section 4.3.3.7.

Direct and Indirect Effects from Construction

Road construction impacts of Alternative 2 for all mammals would include the direct loss of 107 acres of tundra habitat due to road corridor footprint. Road construction activities may include physiological and behavioral stress caused by noise, movement of heavy equipment or machinery, and/or the presence of humans between May and November annually for a minimum of 2 years. Additionally, there may be a risk of wildlife-vehicle collision. As high winds are frequently common in the project area, disturbed soils may cause periods of dust that could reduce visibility and increase the potential for wildlife-vehicle collisions.

The general effect of roads on wildlife has been well-studied (Trombulak and Frissell 2000; Transportation Research Board 2002; Environment and Natural Resources Institute. 2004; Fahrig and Rytwinski 2009; Kociolek and Clevenger 2011) but remains difficult to accurately predict for any given project or environmental conditions. While some mammals may become habituated to predictable use of the road by vehicles, behavior changes are more likely to be caused by: noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Construction activities (noise, movement, etc.) would not be routine and predictable; therefore, mammals would likely not habituate to construction disturbance(s).

Behavioral disturbance would be caused by construction activities and human presence along the proposed road corridor which is currently relatively undisturbed by human activities or visitation. Construction activities occurring between May and November each year would overlap with calving or pupping season for many mammals as well as overlap early migration or fall movements for some species.

Behavioral changes or preclusion from important habitats may lead to reduced individual fitness for some mammals. Each species has their own species-specific and individual tolerance levels for disturbance from construction activities and avoidance of disturbed areas. The predictable and most likely response of mammals to road construction would be to avoid the area.

While the disturbance of actual construction would be relatively short-lived (minimum of 2 years), the modification or loss of habitat would be permanent. In addition to the 107 acres lost to the road footprint, construction activities may cause the incremental loss of habitats closest to the construction zone decreasing the total suitable habitat available for some species. Construction disturbances would be greatest within and parallel to the road corridor and decreasing outward to a threshold at which physiological or behavioral response by mammals is no longer beneficial or warranted.

Direct and Indirect Effects from Operation and Maintenance

Road operation and maintenance effects for Alternative 2 on mammals would include the long-term physical risk of wildlife-vehicle collision resulting in injury or mortality. The risk of vehicles colliding with mammals may be low due to the anticipated slow speed limit and low number of daily/annual vehicles on the road. However, it is probable that vehicles may collide with mammals, especially during inclement weather or periods of poor visibility, or if traffic speeds or volume exceeds those projected and analyzed. Overall, the number of mammals potentially affected by wildlife-vehicle collisions is expected to be small.

The effect of the road operation and maintenance, including periodic grading and snow removal, on mammals is difficult to accurately predict, although it is well-studied generally. While some mammals may become habituated to predictable traffic patterns and flow, physiological and behavior stress are more likely to be caused by noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Road operation and maintenance effects would be long-term within the project area. Disturbances would be most frequent and intense, although intermittent and unpredictable within and immediately parallel to the road corridor. Disturbances would also cause incremental loss or reduced habitat suitability for areas adjacent to, and for the entire length of, the road corridor.

While some mammals may become habituated to predictable use of the road by vehicles, behavior changes are more likely to be caused by: noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for mammals to habituate to any single or multiple disturbance(s).

An indirect effect of road operation and maintenance that may have the greatest adverse impact on mammals is the potential increase in human access into the project area. Off-road vehicles, particularly all-terrain vehicles, are a common mode of transportation in Cold Bay, King Cove, and other area villages, so the potential for illegal off-road access is high with the construction of a new maintained, gravel-surface road with 136 turnouts for passing. The increase of all-terrain vehicle usage has brought heightened awareness and concern regarding public lands resources in the context of the proposed road corridors. Areas once protected by their remoteness, or at a minimum, difficulty for human access, are no longer inaccessible, and the associated noise, higher speed horizontal movement, and typically exposed human silhouette are more likely to startle and stress wildlife. Peer-reviewed literature from field studies regarding the negative impacts of all-terrain vehicles on wildlife and their habitats is extensive. All-terrain vehicle impacts include: damage to soils and vegetation reducing forage and escape/thermal cover; physiological stress or behavioral responses that require energy reserves at times when recovery may be difficult, displaces wildlife from normal routines, most notable breeding; may preclude use of high traffic areas or frequently used trail networks; and contributes to the over-exploitation by humans of resources (Berry 1980; Bury 1980; Webb and Wilshire 1983; Sinnott 1990; ADF&G 1996; Happe, Shae and Loya 1998; Beale 2007; among others). The extensive military off-road vehicle use surrounding Cold Bay during World War II is evident through extensive scars still visible 70 years later.

Site-specific documentation of increasing all-terrain vehicle use in areas immediately adjacent to Cold Bay and King Cove indicates what may and most likely would occur adjacent to the proposed road corridors upon completion (Sowl and Poetter (2004), Sowl (2008, 2011f). Also see Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1.

Common Mitigation Measures

The following elements of a Fish and Wildlife Protection Plan (MM-M) would be used to reduce adverse effects to land mammals.

- All solid or putrescible waste generated during the project activity shall be removed or otherwise disposed of by a method approved by the Alaska Department of Environmental Conservation. All efforts will be made to prevent bears and other wildlife from being attracted to or having access to food or garbage during construction and operation of any transportation link.

- Project personnel, their contractors, and others will not use construction project access to hunting and trapping areas that are not available to the general public to support harvest opportunities.

The goal of the next 2 mitigation measures is to prevent uncontrolled vehicle access to the Izembek Wilderness or important wildlife concentration areas in upper Cold Bay.

- Effective Barriers (MM-V) to motorized vehicles will be installed and maintained at the Northeast Terminal to prevent motorized vehicles from leaving the terminal area or road. The applicant shall place signs at the Northeast Terminal site advising the public that motorized vehicles are restricted in Izembek Wilderness.

The following additional mitigation measures identified in the Act would also be implemented.

- Motorized vehicle access beyond the roadway corridor would be prohibited. Barriers (MM-V), either bollard and chain, or bollard only, will be placed on each side of the roadway to physically prevent all-terrain vehicles and other motorized vehicle access. Signs that explain the access restrictions and the reasons for them will be posted at each end of the road.

- Most commercial use of the road would be prohibited [Non-Commercial Use (MM-U)]. Guides would not be allowed to use the road for guided hunts or commercial wildlife viewing.

These measures would only be effective in reducing impacts if they are enforced. In the absence of enforcement, unauthorized access is likely to occur.

Large Mammals

Direct Effects and Indirect Effects from Construction, Operation and Maintenance

Caribou

The project area lies in an important wintering area and migration corridor for the Southern Alaska Peninsula Caribou Herd, supporting high densities (Skoog 1968; Valkenburg et al. 2003). Caribou migrate through the project area between calving areas northeast of the project area and wintering grounds on the western side of Cold Bay. The Izembek isthmus is the narrowest point of the migratory corridor, specifically the isthmus between Izembek and Kinzarof Lagoons. The southern road alignment was selected to minimize road construction, operation, and maintenance effects for migrating caribou.

Caribou and human development have a long history of coexistence in northern latitudes. Generally, caribou quickly adapt to physical structures or buildings (Murphy and Lawhead 2000; National Research Council 2003). Conflicts occur with degree of disturbance based on frequency, intensity, duration, and seasonality. Individual responses to disturbance may range from increased vigilance demonstrated through alert posture in preparation for the next level response, immediate and temporary abandonment of a location followed by return to normal behaviors, to the permanent avoidance or abandonment of a location(s) by individuals or herd (Young 1997; Wolfe et al. 2000; Vistnes and Nellemann 2001; Vistnes et al. 2001; Miller 2003). Energy expenditure as a response to disturbance and the ability to replace that energy loss and/or recover from a disturbance appear to be key factors in tolerating some types of disturbances (Harrington 2003).

As caribou and other ungulates perceive humans as predators, they elicit a greater cardiac and behavioral response than other forms of stimuli (Eckstein et al. 1979; MacArthur et al. 1982; Freddy, Bronaugh and Fowler 1986; Simpson 1987; Andersen et al. 1996). Ungulates actively avoid and increase energy expenditures in response to human presence (Richens and Lavinge 1978; Eckstein et al. 1979; Furguson and Keith 1982; Freddy, Bronaugh and Fowler 1986).

Causal factors in strong elicited caribou response to human presence are twofold: the silent approach (compared with machines), and sudden appearance, resulting in closer proximity before detection and "flight" response (Anderson et al. 1996). In contrast, approaching machine noises such as a vehicle may be tracked by the caribou audibly from a long distance before the individual animal reacts. The closer the stimulus for response – a human walking quietly and unseen, results in the strongest response based on flight distance and heart rate before returning to normal behavior (Andersen et al. 1996). Subtle noises that are difficult to pinpoint are more likely to be generated by potential predators (Jakimchuk 1980).

Repeated caribou disturbance by humans on foot, results in adult caribou moving farther, and remaining away longer, from the point of disturbance. During winter months, the energy expenditure from repeated disturbance may not be replaced if individuals are forced from preferred sites to forage on less suitable sites. The combination of noise and human disturbance, e.g., all-terrain vehicle traffic, could have adverse effects and displace caribou from the road alignments.

Caribou would be affected most directly from the operation and maintenance of the road if it becomes a barrier to their movement, either physically or behaviorally. Any disruption of caribou movement could be detrimental to cow and calf survival because of increased dangers along new routes chosen and the delay of pregnant cows in reaching the calving grounds (Miller et al. 1972).

The barriers installed along both sides of the road could physically prevent caribou from moving across it. Two types of barrier are proposed; a chain barrier and a bollard barrier (see Figure 2-7). The bollard barrier, consisting of 4-foot high bollards spaced 3 feet apart, would allow caribou to walk through without having to jump over or crawl through. The chain barrier, consisting of 4-foot high bollards spaced 10 feet apart with a steel chain between them from 10 to 30 inches high, would allow passage, but the caribou would have to either step or jump over the chain, or pass under it. Caribou could easily jump the chain barrier and would not be reluctant to cross as long as they can see where they are going (Demma 2011). While caribou are capable of jumping over or passing under the chain, the excess energy they expend to do so may reduce their fitness for the energy demands of migration. Calves may have more trouble getting over the chain than the adults, and this may increase their risk of predation (Butler 2011). While the bollard-only barrier would be easier for caribou to cross, it may create a visual barrier when viewed from certain angles or distances, making caribou reluctant to cross (Butler 2011). The barrier may enhance snow drifts, making it more difficult for caribou to cross, especially if they could not see over the drifts (Butler 2011).

Another potential effect of the barrier is that caribou may use the bollards as rubbing posts for their antlers. This could attract more caribou to the road and cause them to spend more time there, thus increasing their risk of collision with vehicles and encounters with humans or predators. The bollards could become damaged by this behavior, which would reduce their effectiveness in controlling off-road access.

Caribou migration behavior may also change as a result of the presence of vehicles or pedestrians on the road. The isthmus is 3 to 10 miles wide in this area (Figure 3.2-22). In a geographically restricted area such as the lower Alaska Peninsula, disturbance induced avoidance of critical migration routes could adversely impact rural subsistence use and herd movements (Service 1987). If the herd did not cross the isthmus to reach their normal wintering/calving areas, it may have a long-term adverse effect on the entire Southern Alaska Peninsula Caribou Herd. This herd is just now recovering from a population low. Several studies have shown that human developments, roads, and vehicle traffic are disruptive at some level to traditional caribou movements and habitat use (Sowl and Poetter 2004). If caribou are reluctant to cross the road, reduced use of the habitat south of the roadway could result.

Several factors determine how caribou respond to roads: (1) traffic density and human activities associated with the road– more vehicles and human activities cause more of a barrier; (2) time of year with the most likely to cross during migration; (3) degree of visual obstruction – caribou are reluctant to cross when they cannot see the other side; and, (4) reproductive status, with cow/calf pairs more reluctant to cross than single adults. As the proposed road is projected to have low traffic density (10 to 35 vehicles per day) at low speeds, and the topographic relief is open good visibility, the road corridor is not likely to act as a major barrier to caribou.

Forman et al. (2003) analyzed numerous studies on caribou response to roads and concluded that, caribou are highly sensitive to traffic but appear to be relatively insensitive to the road itself. Therefore roads that are used only infrequently may not be a large threat to caribou, but roads with regular traffic can have major effects on caribou density and distribution. There is evidence that the physical presence of linear developments may not act as an avoidance barrier to caribou movements (Bergerud 1974; Bergerud et al. 1984; Edmonds 1986 cited in Oberg 2001). Miller et al. (1972) found that caribou were persistent in their attempts to cross a study area even though human-made barriers and humans were present. He suggests that migration routes are learned behavior patterns and found that groups would follow an experienced leader even over and through fences. Demma (2011) has seen caribou cross busy highways in Alaska, and expects that caribou would not avoid a low volume road.

Caribou may be attracted to the plowed road during the winter as with snow cover removed, it may provide an easier access to foraging and thus, saving them energy. Because the habitat in the project area is open, providing fairly easy travel, the benefit of the road as a travel corridor is less than it would be if the road went through a more wooded area. While this effect may be beneficial, it would also put them at greater risk for vehicle collisions and predation, and could alter their traditional migration routes. Due to the low traffic volume of the road and low road prism, it is expected that caribou would continue their annual migration despite the new road.

Discussion to this point has focused on the physical road, barrier, and projected traffic for operation and maintenance, and presumes the absence of humans except as encapsulated within vehicles and more or less, out of sight to caribou. However, the opening of the road would introduce new human presence not experienced in this area as it was remote from human habitation and difficult to access. The Izembek isthmus is a rich and diverse ecosystem with abundant wildlife species and the proposed road corridor would put humans and wildlife in close proximity. Dispersed along the 18.5 miles of the proposed road corridor are 136 turnouts for passing that would encourage visitors to stop and view wildlife, hunters to access high density game and subsistence species, or just stop and get out of vehicles. The greatest response for wildlife would be situations where vehicles stop and/or vehicles stop and people get out of vehicles. The daily proposed traffic volume is expected to be low, 10 to 35 vehicles per day. During August and October caribou, including cows with calves (young-of-the-year) would be moving through the area to wintering grounds west of Cold Bay, which also overlaps peak waterfowl hunting and coho fishing seasons. The combination of road construction and subsequent road operation and maintenance as an indirect effect may be that caribou avoid the road due to increased human presence.

Additionally, predators also may use the road as an easy access to hunting areas. James and Stuart-Smith (2000) found that mortalities of caribou from both human harvest and natural predation (wolves) increased in areas closer to roads (571 to 669 feet, respectively), primarily due to increased accessibility of the caribou to their predators. Dyer (1999) found that caribou avoided human developments and that the level of avoidance appeared to be related to the level of human activity. He found the maximum avoidance distance for roads was 820 feet. Barren-ground caribou have been shown to avoid roads with regular traffic around the Prudhoe Bay complexes in Alaska (Smith and Cameron 1983; Dau and Cameron 1986; Murphy and Curatolo 1987, cited in Dyer 1999). Despite concerns, demographic effects have generally not been observed as a result of avoidance and displacement (Smith and Cameron 1983; Mercer et al. 1984; Dau and Cameron 1986; Murphy and Curatolo 1987, cited in Dyer 1999). Dyer (1999) observed caribou crossed roads significantly less than expected during all time periods except calving. He found no studies that have specifically tested the effects of different levels of vehicle traffic on caribou crossing success and no information is available on possible thresholds to levels of traffic. His results suggest that even lightly used roads are barriers to caribou movements.

The road would provide subsistence and sport hunters access to large concentrated numbers of caribou moving west and east between Izembek and Kinzarof lagoons at the narrowest point (3 to 4 miles.It is assumed that the average hunt using center-fire ammunition is conducted at distances of average hunt ranges using center-fire ammunition, typically 300 to 350 yards (900 to 1,050 feet) in open habitat (such as that included in the project area). This distance, over the length of the proposed road, defines a footprint of 4,036 acres using 900 feet on either side of the proposed road or 4,710 acres using 1,050 feet either side of the road. Significantly increasing this footprint is the ability to "glass" the areas adjacent to the road using spotting scopes, binoculars, or range-finders and then travel by foot or all-terrain vehicle beyond the road corridor. The ability to reach the middle of the narrowest point of the major migratory corridor in the area (the isthmus between Bering Sea/Izembek Lagoon and Pacific Ocean/Kinzarof Lagoon) would be expected to increase the sport and subsistence harvest in that area, especially the potential of over-exploitation. As the caribou have no option for moving farther from the road to avoid human presence due to the lagoons bordering the isthmus, caribou would be driven by their instincts to move through the area, further creating conditions conducive to a population sink and ecological trap.

Human harvest for subsistence or sport hunting may affect herd social structure and hierarchy through removal of large males, skewing ratios sex ratios and dominant individuals, which can alter reproduction and calving (Reynolds et al. 2001; Mysterud, Coulson and Stenseth 2002; McLoughlin, Taylor and Messier 2005; Bischof, Mysterud and Swenson 2008; Milner, Nilsen and Andreassen 2007; Anderson and Hard 2009). Such alterations in herd hierarchies, reproduction, and calving may affect population fluctuations in the future, increasing the frequency of populations high and low densities.

Compounding the potential over-harvesting of caribou and additive to their exploitation is access by wolf and other predators to concentrated herds, not the least would be olfactory attraction to concentrated caribou gut-piles left by hunters. Road corridors that receive little use by humans are attractive to wolves as easy travel corridors (Theil 1985; Mech et al. 1988; Fuller 1989; Fuller et al. 1992 cited in Oberg 2001). James and Stuart-Smith (2000 cited in Oberg 2001) calculated wolf locations to be closer than random locations to linear corridors and telemetry data showed wolves traveling on linear corridors in areas with limited activity. If caribou are also attracted to the road due to ease of travel, that may put them at greater risk of predation.

Avoidance of the road and adjacent habitats could cause caribou to lose the use of high quality suitable habitat. Studies in Denali National Park found that wildlife including caribou and brown bear have become habituated to traffic and human presence on the park road (Burson et al. 2000; Yost and Wright 2001). Habituation to traffic could explain the reduction in adverse responses of animals between 1973 and 1974 and 1995 and 1997 studies (Burson et al. 1999). It was noted that fewer people have been getting off buses at wildlife stops and drivers have attempted to minimize human noise. In the earlier studies (Singer and Beattie 1986) avoidance responses to the road increased when visitors were out of their vehicles versus when vehicles alone were present. Yost and Wright (2001) concluded that caribou and brown bear distributions in Denali National Park indicated no pattern of traffic avoidance. An important factor determining if caribou would avoid the road is whether or not they are hunted near the road. Rather than becoming habituated to the road as a harmless part of the landscape, when caribou experience hunting pressure near roads, roads are perceived as a threat to be avoided. Typically, hunted wildlife populations exhibit stronger disturbance reactions to people along roads than do wildlife in protected areas (Jalkotzy et al. 1997). Demma (2011) predicted that while the traffic volume would not likely cause caribou to avoid the road, hunting from the road could.

Another potential effect that could cause caribou to avoid the road and adjacent habitats is a change in vegetation. If the road construction causes changes in the surrounding vegetation, through altering the hydrology or introduction of invasive species, or the production of high quantities of fugitive dust, it could adversely affect caribou, especially if the amount of lichen were reduced. Walker and Everett (1987) found that road dust along the Dalton Highway and the Prudhoe Bay Spine Road in Northern Alaska eliminated lichens near the road in areas of particularly high dust fall.

The loss of, or displacement from, caribou grazing habitat in an extended road effect zone parallel to the proposed road is the greatest potential effect to this species. Caribou would be vulnerable to overharvest by subsistence and sport hunters during fall migration when caribou are concentrated not only in migratory herds but when the animals are confined within the three mile wide isthmus between the Izembek and Kinzarof lagoons. Additionally the increase in human presence, whether for wildlife viewing, pedestrian traffic, or all-terrain vehicle would reduce the quality and availability of suitable habitat near the proposed road corridor. In the Arctic caribou were displaced up to 1.2 miles (6,336 feet) from roads with moderate to heavy traffic for a 2-3 week period near the calving period (Dau and Cameron 1986). Further, the same study estimated relative caribou abundance within 1.2 miles (6,336 feet) of the roads declined by over 66 percent following construction. Displacement from forage during post-calving could reduce nutrition of lactating females, affecting body condition for subsequent reproduction and winter survival as well as reducing fitness of calves (Nellemann and Cameron 1996). While calving may not occur along the proposed roads and caribou at other times of the year may be more mobile and possibly more adaptable, displacement from suitable forage habitat is an impact at any time of the year (Ballard, Cronin and Whitlaw 2000; Murphy and Lawhead 2000).

Increased human harvest pressure, plus the potential for increased predation mortality could alter traditional migration patterns through loss of social structure and integrity which includes herd memory maintained in experienced older individuals (Skoog 1968; Bergerud 2000; Miller 2003; Padilla 2010; Mattoli 2011). Overall, populations of caribou are undergoing global declines due to climate change most notably trophic cascades and trophic mismatch, where plants emerge and green up to peak spring nutritional value, or alternatively, loose fall nutritional value, before caribou arrive at seasonal ranges to utilize these resources (Vors and Boyce 2009; Arctic Biological Assessment 2010; Joly el al. 2011). These considerations are additive to the direct and indirect road disturbances caused by operation and maintenance, including direct loss of 107 acres plus degradation or displacement from suitable habitat from an underdetermined, but at a minimum 0.5 mile radius from the road, or 23,680 acres. Combined all these factors create conditions conducive to an ecological trap and population sink for caribou. Due to the combination of all these considerations, road maintenance and operation, and cumulative effects would produce adverse effects to the Southern Alaskan Peninsula Caribou Herd.

Direct and indirect impacts to caribou would be medium intensity (changes would be observable), long-term behavioral disturbance duration (occurring throughout the life of the project), and permanent habitat alteration duration (continuing even if the road was no longer used), that could extend to an area larger than the road corridor (regional extent), and would affect important resources. Caribou are considered important in this analysis because the population of the Southern Alaska Peninsula Caribou Herd is below population objectives. The summary impact of Alternative 2 on caribou is considered moderate. An exception to this impact level determination would be if the road proves to be a barrier to caribou migration. In that case, the impact level for caribou would be major. However, the likelihood of that outcome is judged to be low.

Brown Bear

The project area occurs within medium to high density brown bear habitat. Bears are present during spring, summer, and fall. The Joshua Green River watershed on the northeast side of Cold Bay is a key brown bear natal area that supports the highest densities of bears on the lower Alaska Peninsula. The lower elevation areas in the project area are important foraging and natal areas. Sowl and Poetter (2004) analyzed the impacts of roads and all-terrain vehicle trails on brown bears and other wildlife on the Izembek National Wildlife Refuge.

The published literature documents extensive negative impacts for roads and human activities on brown bear behavior and mortality (Schallenberger 1980; Mattson et al. 1987; McLellan and Shackleton 1989; Kasworm and Manley 1990; and Gibeau et al. 2002, cited in Sowl and Poetter 2004). Bears tend to avoid human developments and roads, especially females with young-of-the-year cubs, unless they have learned to access human-produced food sources. Human activity can cause severe alterations in behavior, displace bears from preferred habitats, and disrupt foraging activities (Mattson et al.

1987). Further, these disturbances have the greatest negative impact during post-denning in the spring and prior to denning in the fall (Mattson et al. 1987). Human disturbance at den sites during the fall can also cause bears to abandon their dens (Quimby 1974 cited in Sowl and Poetter 2004). Adult females are the most likely group to avoid human disturbances, even if it means avoiding high quality habitats, and thus, these females are at higher risk of mortality and likely to have lower reproductive rates (Mattson et al. 1987; Mace et al. 1996; Gibeau et al. 2002 cited in Sowl and Poetter 2004). Increased human-bear interactions frequently lead to increased human-caused mortality of bears (Suring and Del Frate 2002 cited in Sowl and Poetter 2004).

Bears distribute themselves across landscapes in relation to other bears, with males dominating the landscape, often displacing adult females, females with young, and subadults. Adult males are exploitive of the ecosystem and seek-out receptive females during the breeding season. Compression of natural bear spacing into smaller areas may lead to increased, potentially injurious or fatal interactions among the crowded bears, particularly displacing females with young into marginal or unsuitable habitats. Because of their sensitivity to human disturbance, road construction and subsequent operation and maintenance on the east side of Cold Bay would adversely affect the brown bear population, including the potential abandonment of traditional foraging areas and denning sites.

Compounding this potential scenario is the expected increase in human access to areas outside the road corridor for wildlife viewing and/or subsistence and sport hunting of trophy-class bears. Such intrusions into remote areas previously experiencing only limited human access, would be additive to road construction, operation, and maintenance effects. Human activities occurring off-road, such as hiking, fishing, and berry picking have been shown to alter the bear behavior and displace bears within 1.9 miles (10,032 feet) of the activity (Schleyer et al. 1984 cited in Sowl and Poetter 2004). Increased human access would also increase the projected harvesting, including the potential for over-exploitation of bear and increase the frequency of adverse human-bear interactions. Human activities associated with the existing roads in the Cold Bay area have already altered the density, distribution, and population composition of brown bears in this area (Dau 1989 cited in Sowl and Poetter 2004).

Increased bear harvest could result from redistribution of current hunters, greater hunter success, or an increase in the total number of hunters attracted by the new road. Whichever the mechanism, harvest would continue to be managed by the Alaska Department of Fish and Game. Dau (1989 cited in Sowl and Poetter 2004) reported that as a result of local harvest pressure, brown bear densities near Cold Bay have been lower than in adjacent areas of the Alaska Peninsula. Most bears observed in the Cold Bay area are adult females, females with cubs, and subadults. Adult males are uncommon in and near Cold Bay. Improved access and increased human activities and presence within the isthmus area, would most likely worsen this situation. Because the road would be located through the narrowest section of the isthmus between Izembek Lagoon and Kinzarof Lagoon, bears may be deterred by the road and associated human activities, leading to isolation from high quality habitat to the north and south of the isthmus. Given sufficient time, gene flow between adjacent populations could be impeded, leaving isolated, more vulnerable populations on either side of the road.

Frequent low overcast and high wind conditions common to Izembek area and limit the Service and Alaska Department of Fish and Game to routinely conduct aerial wildlife surveys. Therefore, effects to wildlife populations (such as brown bears) by the proposed action may avoid timely monitoring or recognition. With the low reproductive potential and inability to monitor the population closely for effects, adverse effects could easily reach threshold levels before being detected for agency response.

Changes in bear behavior described in the Sowl and Poetter (2004) analysis could occur as a result of road operation and maintenance under Alternative 2. Prior experience has shown that brown bears can be displaced from prime feeding and denning areas by road construction and use (Service 1998b). Road density is widely documented to be a useful measure of habitat suitability for large carnivores; as road density increases, habitat suitability declines (Noss et al. 1996). Studies have demonstrated a strong relationship between road construction and increased bear mortality on Chichagof Island (Titus and Beier 1991). In general, roads are detrimental to bears because they increase opportunities for human-bear interactions (Elgmork 1978; Zager 1980; Archibald, Ellis and Hamilton 1987; McLellan and Shackleton 1988; Schoen 1990).

Consistent with other locations throughout Alaska where bear habitats intersect with human use activities, human encounters with brown bear in the project area often result in the destruction of the bear. Increases in human presence along and outside of the road corridor would most likely include improper disposal of trash, including fish, waterfowl, and caribou entrails and blood. Improperly cleaned or disposed of items attract bear, leading to a habituated behavior associating humans with food. Mattson (1990) found that adult females and subadults tend to occupy areas near humans (including roads) more than adult males, and theorized that the proximity to humans provided more opportunity to access higher quality foods that would have been preempted by dominant adult males under natural conditions. Consequently, subadult males and adult females are more often killed by humans.

The Izembek isthmus currently experiences very low hunting and trapping pressure due to remoteness and difficulty to access. Improved access via the proposed road corridor, including all-terrain vehicles or humans on foot would also increase bear harvest by sport or subsistence hunters within the vicinity of the road.

Long-term indirect effects of road operation and maintenance may include increased human activities such as all-terrain vehicle travel beyond the barrier (discussed in section 4.3.2.2), wildlife viewing, hiking, subsistence and sport hunting and fishing, berry gathering. Additionally, humans are frequently accompanied by domestic dogs, which are perceived as a predator by many species of wildlife and leave distinct olfactory markings that may interfere with social structure and hierarchy of resident wildlife. These disturbances would have the greatest adverse impact during spring emergence from denning and fall pre-denning and denning. The proposed road would cross important foraging habitat including wetlands that are used frequently by foraging brown bears moving from one lagoon to the other during tide cycles.

All these considerations suggest the most predictive and likely response of brown bears to the proposed road corridor would result in physiological and behavioral stress, displacement of bears from suitable habitat and/or degrading preferred foraging habitats. Overall, the combined disturbances would most likely reduce the overall carrying capacity of bears for the project area.

Direct and indirect impacts to brown bears would be high intensity within the vicinity of the road corridor (local) because the change in resource condition and habitat function is measurable and observable, but intensity would be medium throughout the project area (regional) because the change in resource condition would be detectable. The effects would be long-term (behavioral disturbance) and permanent (habitat alteration) in duration for this important resource. Bear habitat within the State's Izembek Controlled Use Area is considered an important resource. The impact of Alternative 2 on brown bear is considered major.

Wolf

In 1990, refuge staff estimated that there are 100 wolves in 16 packs on the refuge (Taylor and Sowl 2008). Several wolf packs inhabit the area surrounding Cold Bay. Wolves may occur in the project area year-round and likely use the area for hunting, specifically caribou.

Direct and indirect effects of road construction, operation and maintenance on wolves would include the loss of 107 acres of tundra habitat, risks from wildlife-vehicle collision, noise, movement and proximity to vehicles, and long-term physiological and behavioral stress caused by increased human presence along and outside the road corridor. Physiological stress and behavioral alterations may include changes in daily, seasonal, and annual habitat use and hunting behavior.

Predators are known to use roads to gain easier access to prey species, especially during the winter when snow is routinely removed. Wolves studied in southcentral Alaska were found to frequent roads with little human presence, but avoided areas that were humans were present (Thurber et al. 1994). Wolves appear to benefit from residing in landscapes with roads, as long as human density is low (Musiani and Paquet 2004), because roads can be used as efficient travel corridors (James et al. 2004). Wolves may also scavenge wildlife killed along road corridors. While these behavioral changes may be beneficial to wolves, the road would also increase risks for wildlife-vehicle collisions with wolves and place them in close proximity to humans with adverse effects to them. If the road construction, operation and maintenance may alter caribou or brown bear behavior and habitat use, it would also affect wolves. Currently, the Alaska Department of Fish and Game reports little wolf hunting in the project area (Butler 2009c). This is likely due to the limited accessibility of the area. Easier access to the project area may increase wolf hunting and trapping opportunities.

The risk of vehicle collisions is expected to be low due to the slow speed of vehicles and low daily volume of vehicles expected. However, it is possible that wildlife-vehicle collisions may occur during inclement weather or periods of low visibility. The number of wolves potentially affected by collisions is expected to be small. However, the risks are long-term even if traffic is intermittent.

Direct and indirect impacts to wolves would be low to medium intensity (because the change in resource condition may be measurable), long-term (behavioral disturbance) to permanent (habitat alteration) duration, could extend to an area larger than the road corridor (regional extent), and would affect a common resource. Wolves are considered to be common because they are not rare in the area and are not protected by legislation. The impact level of Alternative 2 on wolves is considered moderate.

Summary of Effects from Road Construction, Operation and Maintenance on Large Mammals

Road construction impacts of Alternative 2 for all mammals would include the direct loss of 107 acres of tundra habitat due to road corridor footprint. Road construction activities may include physiological and behavioral stress caused by noise, movement of heavy equipment or machinery, and/or the presence of humans between May and November annually for a minimum of 2 years. Additionally, there may be a risk of wildlife-vehicle collision.

Road operation and maintenance effects for Alternative 2 on mammals would include the degradation or displacement from suitable habitat from an underdetermined, but at a minimum 0.5 mile radius from the road, or 23,680 acres. Also, there would be long-term physical risks of wildlife-vehicle collision resulting in injury or mortality. The risk of vehicles colliding with mammals may be low.

The effect of the road operation and maintenance on mammals is difficult to accurately predict, although it is well-studied generally. While some mammals may become habituated to predictable traffic patterns and flow, physiological and behavior stress are more likely to be caused by noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Disturbances would be most frequent and intense, although intermittent and unpredictable, within and immediately parallel to the road corridor. Disturbances would also cause incremental loss or reduced habitat suitability for areas adjacent to, and for the entire length of, the road corridor.

An indirect effect of road operation and maintenance that may have the greatest adverse impact on mammals is the potential increase in human access into the project area. Increased human access would result in increased human harvest pressure, plus the potential for increased predation mortality that could alter traditional migration patterns.

Combined, these factors create conditions conducive to an ecological trap and population sink that would produce moderate adverse effects to the Southern Alaskan Peninsula Caribou Herd.

Increased human presence and activities such as all-terrain vehicle travel beyond the barrier would result in long-term indirect effects on brown bear. Disturbances would have the greatest adverse impact during spring emergence from denning and fall pre-denning and denning. Overall, the combined disturbances would most likely reduce the overall carrying capacity of bears for the project area resulting in a major adverse effect.

The road construction, operation and maintenance effects on wolf would be long-term, but wolves are generally more adaptive in foraging behavior, tolerance to disturbances than either caribou or bear, with higher rates of reproduction and recovery from population loss. The resulting effect for wolf would be moderate.

Mitigation Measures

Common mitigation measures that would minimize the impact of construction, operation, and maintenance of Alternative 2 on land mammals are described above.

Additional recommended mitigation measures specific to caribou include:

- Monitor the effect of the road on caribou [Fish and Wildlife Protection Plan (MM-M)]; if adverse effects are observed, then additional mitigation measures may be implemented such as limiting the number or timing of vehicle use, or plowing breaks through roadside snow drifts (immediately adjacent to the road and within the exchange parcel) to facilitate caribou passage.
- During construction, caribou behavior during migration would be monitored [Fish and Wildlife Protection Plan (MM-M)]. If caribou are present and appear reluctant to move through the area, construction may be temporarily shut down until they have moved through.

Cumulative Effects

Cumulative effects from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time include an increase in the number of fisheries observers coming to the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human activity in the area and an increase in human disturbance to land mammals. The majority of visitors to Izembek National Wildlife Refuge use the western, road networked portion of the refuge. Alternative 2 would contribute incrementally to disturbance by human activities on large mammals from the Cold Bay road and two-track trail system and existing pedestrian trails (Sowl and Poetter 2004; Sowl 2008c, 2011f). The effects of the proposed road would add to the existing level of human presence in the project area. Additional direct and long-term indirect effects on large mammals would include the loss of 107 acres of tundra habitat for the road corridor footprint, the low risk to wildlife-vehicle collisions during construction and during operation and maintance, and behavioral stress that would be expected in caribou, bear, and wolves due to noise intensity, duration, and frequencyof movement of earth-moving machinery, and presence of humans. Disturbances would be most intense within an immediately adjacent to the road corridor and decreasing outward with increasing distance to a threshold that large mammal response is absent and this would vary upon species and individual. The most likely and predictable response from large mammals would be to avoid the area. Disturbances are expected to be greatest within 0.5 mile (2,680 feet) either side of the road for its entire length, totaling 11,840 acres, with some species and individuals more sensitive to disturbance than others.

Off-road vehicles, particularly all-terrain vehicles, are a common mode of transportation in Cold Bay, King Cove, and other area villages, so the potential for illegal off-road access is high with the construction of a new maintained, gravel-surface road producing numerous indirect effects, increasing over time, in the reasonably foreseeable future. This area that was once protected by remoteness, or at a minimum, difficulty for human access, would no longer be inaccessible, and the associated noise, higher speed horizontal movement, and typically exposed human silhouette are more likely to startle and stress wildlife. Site-specific documentation of increasing all-terrain vehicle use in areas immediately adjacent to Cold Bay and King Cove indicates what may and most likely would occur adjacent to the proposed road corridors upon completion (Sowl and Poetter 2004; Sowl 2008c, 2011f; see discussion under Social Environment).

Historic and current conditions that have and may continue to contribute to the cumulative effects on large mammals in the project area include subsistence and sport hunting, wildlife viewing, and wildlife management. Because the project area is within the National Wildlife

Refuge System, historic and present management of human activities has been purposely limited. Very limited, if any, landscape disturbing activities have occurred since establishment of the refuge. Some past actions have been undertaken to manage large mammals. The Joshua Green River watershed was established as a Controlled Use Area in 1993 to protect brown bears. The Alaska Department of Fish and Game has managed wolves under intensive management guidelines within the caribou calving grounds adjacent to the refuge to improve caribou calf survival and recruitment – removing 28 wolves in 2008, another 8 wolves in 2009, and 2 in 2010.

Increased access to caribou for hunting may be an incremental cumulative effect that would alter herd composition, social hierarchy and herd behavior (Reynolds et al. 2001; McLoughlin, Dunford and Boutin 2005a; McLoughlin, Taylor and Messier 2005b; Milner et al. 2007; Proaktor, Coulson, and Milner-Gulland 2007; Allendorf and Hard 2009). Given that the southern Alaska Peninsula caribou herd is just recovering from a major decline, this could be a management issue for herd stability in the future.

Climate change is another factor that may contribute to cumulative effects on large mammals in the project area. There has been concern that declining numbers of caribou in the last decade were associated with climate change through changes in vegetation phenology, spatiotemporal changes in species overlap and increased frequency of extreme weather events (Joly et al. 2007; Vors and Boyce 2009). Increasing information is becoming available regarding climate change reducing caribou reproduction success and calf recruitment through trophic mismatch in timing of peak forage nutritional value and availability with critical events such as calving and lactation (Joly et al. 2007; Post and Forchhammer 2008; Post et al. 2008; Post et al. 2009). However, caribou trophic mismatch is not without controversy, with opponents stating there is no clear link between herd declines and climate has been established (Russell and Gunn 2011). The Alaska Department of Fish and Game (Butler 2009a) reported that no weather anomalies or changes in vegetative patterns have been observed that would affect caribou populations in this portion of the state.

Icing events on the southern Alaska Peninsula are frequent which precludes forage availability and the narrow peninsular setting mimics insular conditions with no options for caribou for relocate to meet nutritional requirements and if icing is prolonged may cause increased herd mortality (Putkonen and Roe 2003; Stein et al. 2010; Hansen et al. 2011; Wilson et al. 2012). Icing events are likely to increase in the future under climate change conditions. This compounds caribou herd disturbance considerations by adding to physiological stress of the proposed road corridor and further contributing to cumulative effects on caribou.

Summary: Cumulative Effects

The combinations of direct habitat loss from the constructed road footprint, the 11,840 acres of unusable habitat due to disturbance from vehicle traffic within 0.5 miles on both sides of the road, the potential for vehicle collisions, and the potential disturbance from increased human access provided by the road, there would be a moderate contribution to cumulative effects for caribou, brown bear and wolf.

Conclusion for Large Mammals

Road construction would result in the direct loss of 107 acres of tundra habitat for the road corridor footprint. There is a low risk of wildlife-vehicle collisions during construction and subsequent road operation and maintenance. Road construction, operation and maintenance effects would include: short and long-term noise; short-term movement of heavy equipment and earth-moving machinery; long-term movement of vehicles; and, short and long-term human presence. Construction activities would overlap spring and fall movements of caribou and bear. Physiological and behavior stress is projected to be most intense along the road corridor and decreasing with distance from the road. The predicted and most likely response of wildlife would be to avoid the road corridor. Avoidance, or displacement, reduces the total habitat area available to mammals and could result in an area reduced value or abandoned that may range from 11,840 acres to nearly 30,000 acres, depending on species and individual tolerance to disturbance.

The most notable effect of road operation and maintenance is the anticipated and predictable increase in human presence and activities in an area that has actively managed to limit such intrusions because of its value to wildlife. Due to the narrow confines of the isthmus, there are no alternative routes for migrating or resident large mammals to use to move through the project area. Increased human presence would most likely include subsistence and hunting of harvestable species, creating conditions conducive to a population sink or ecological trap.

The intensity of these effects would be medium to high with the greatest intensity near the road, the duration would be long-term because they would exist thorought the life of the project, the extent would be regional due to the large home range of these species, and the context would be important for caribou and brown bear and common for wolves. Caribou are considered important because the current population of the Southern Alaska Peninsula Herd is below management objectives and brown bear are considered important because the project is within the State's Izembek Controled Use Area. The overall effect would be major for brown bear and moderate for caribou, wolves and other large mammals.

Over time, the increased human presence in the project area in a reasonably foreseeable future would include habitat degradation through new trail networks created by all-terrain vehicles, pedestrian trails, and displacement of wildlife from their habitats exceeding road operation and maintenance effects. Cumulative effects for caribou and brown bear would be moderate.

<u>Furbearers</u>

Furbearing mammals are valued for their pelts and as such, are a harvestable as subsistence and sport species, including but not limited to, North American river otter, red fox, and short-tailed weasel (see Chapter 3 Existing Environment). These and other species occur in the project area, with most preferring upland habitats, although some would routinely travel and forage near coastal or pond shorelines. Most are predatory in habit and exploitive, and may explore edge habitats such as the road corridor or may follow roads.

Direct Effects and Indirect Effects from Construction

Construction effects include the loss of 107 acres of tundra habitat for the road corridor footprint. Effects of construction activities may be limited as these are planned to occur between May and November annually for a minimum of 2 years. There may be a low risk to wildlife-vehicle collisions during construction, especially during inclement weather or periods of low visibility, with higher risk due to the relative small size of most furbearers compared to big game species. Short-term physiological and behavioral stress may be expected for furbearers due to noise intensity, duration, and frequency; movement of heavy equipment and earth-moving machinery, and presence of humans. Construction disturbances would be most intense within and immediately adjacent to the road corridor. Disturbance would decrease with increasing distance from the road, eventually reaching a point where furbearer response is minimal or absent; this threshold would vary by species and individual. The most likely and predictable response from large mammals would be to avoid the area.

Direct Effects and Indirect Effects from Operation and Maintenance

Road operation and maintenance, including periodic road grading, snow removal, and other road improvements may affect furbearers through long-term physiological and behavioral stress caused by: noise intensity, frequency and duration; vehicle movement and proximity, and human presence. The strongest response most likely by furbearers is from situations where vehicles stop on the road, or when vehicles stop and people get out of their vehicles. As road traffic is expected to be intermittent and unpredictable, it may be harder for furbearers to habituate to any single or multiple disturbance(s). Road operation and maintenance disturbances are expected to be greatest within and immediately adjacent to the road corridor.

The risk of vehicles colliding with furbearers may be low due to the planned slow speed limit and low number of daily/annual vehicles on the road. However, due to their smaller size it is probable that wildlife-vehicle collisions may occur, especially during inclement weather or periods of poor visibility, or if traffic speeds or volume exceeds the projections in this analysis. Younger animals would be at a disadvantage and vulnerable. Overall, the number of furbearers potentially affected by wildlife-vehicle collisions is expected to be small.

The greatest effect of road operation and maintenance on furbearers may be the increased human presence on and near the road corridor, and either on foot or on all-terrain vehicles. Increased access may be translated into increased subsistence and sport hunting and trapping opportunities. Directly associated with increased opportunities and that both King Cove and Cold Bay are dependent on subsistence lifestyles, there is the potential for over-exploitation of furbearers in the project area. Increased human access and presence may also degrade the overall suitability of the surrounding habitat and displace furbearers. Wolverines may be particularly affected by increased human interactions causing fragmented distributions due to their low population densities and low tolerance for human disturbance. May et al. (2006) suggests that wolverines are the most sensitive mustelid species with regard to habitat alteration and human disturbance.

Behavioral changes for all furbearers may include avoidance of the road corridor and adjoining areas vehicles and/or humans are present, which would reduce the overall suitable habitat available.

Smaller predatory furbearers may use the road to access prey species but while this may ease access, it also places individuals at risk to wildlife-vehicle collisions.

The proposed road corridor is within the National Wildlife Refuge System and designated wilderness which has been managed historically and currently to limit human access for the purpose of conserving fish, wildlife, and their habitats with associated resource values. Very limited, if any, landscape disturbing activities have occurred since establishment of the refuge.

Therefore, increased human access facilitated by the proposed road corridor operation and maintenance would have the greatest adverse effect on furbearers. While some species are fairly tolerant of benign human activities, for example wildlife viewing, once the element of hunting and pursuit are added, wildlife quickly adapt to be alert to, wary of, and react strongly to human presence. Further, increased human access increases the road effect zone (Forman et al. 1997) far beyond the road footprint corridor through increased tangent pedestrian trails and all-terrain vehicle two-tracks, habitat degradation due trail-related loss of vegetation and erosion, humans with domestic dogs, and increased harvesting of subsistence and/or sport species.

This area once protected by its remoteness, or at a minimum, difficulty for human access, would predictably experience louder noise, higher speed horizontal movement, and typically exposed human silhouette on an all-terrain vehicle, and more disturbance to wildlife. Increased human access also infers an increased harvest capacity for subsistence and hunted species along with the potential for over-exploitation.

Summary of Effects from Road Construction, Operation and Maintenance on Furbearers

Road construction impacts of Alternative 2 for furbearers would include the direct loss of 107 acres of tundra habitat due to road corridor footprint. Road construction activities may include physiological and behavioral stress caused by noise, movement of heavy equipment or machinery, and/or the presence of humans between May and November annually for a minimum of 2 years. Additionally, there may be a risk of furbearer-vehicle collision during construction.

Road operation and maintenance effects for Alternative 2 on furbearers would include the displacement from suitable habitat from an underdetermined distance from the road. Also, there would be the long-term physical risks of wildlife-vehicle collision resulting in injury or mortality. Overall, the number of furbearers potentially affected by wildlife-vehicle collisions is expected to be small.

While some furbearers may become habituated to predictable traffic patterns and flow, physiological and behavior stress are more likely to be caused by noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Disturbances would be most frequent and intense, although intermittent and unpredictable, within and immediately parallel to the road corridor. Disturbances would also cause incremental loss or reduced habitat suitability for areas adjacent to, and for the entire length of, the road corridor.

An indirect effect of road operation and maintenance that may have the greatest adverse impact on furbearers is the potential increase in human access into the project area. Increased human access would result in increased trapping pressure.

The loss of 107 acres of habitat and associated disturbances from vehicles along with increased human presence in the area of the road would result in effects that are low intensity because the the change in resource condition may not be noticable, the duration would be long-term (occurring throughout the life of the project), and local in scope because of the small home range of individual species, for resources that are considered common. The resulting effect would be minor.

Mitiagtion Measures

Mitigation measures discussed above under Common Mitigation Measures would minimize the impact of construction, operation, and maintenance of Alternative 2 on furbearers.

Cumulative Effects

Cumulative effects on furbearers from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time are similar to those described above for large mammals. They include an increase in the number of fisheries observers coming to the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human activity in the area and an increase in trapping and other human disturbance to furbearers. Historic and current conditions that have and may continue to affect furbearers in the project area include subsistence and sport hunting, wildlife viewing, and wildlife management.

Cumulative effects may include condition conducive to a population sink or ecological trap, as described above, which may include rarer, highly-valued species (pelts), such as wolverine.

Summary: Cumulative Effects

Contributions to cumulative effects include the combinations of direct habitat loss from the constructed road footprint, unusable habitat due to disturbance from vehicle traffic, the potential for vehicle collisions, and the potential disturbance from increased human access provided by the road. Direct and indirect impacts on furbearers from Alternative 2 would be low to medium intensity (effects can be noticeable to readily detectable), long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent duration for habitat alteration (lasting even if the road is no longer used), local to regional extent (based on the home range of the species), and would affect common resources (not rare in the locality and not protected by special legislation) resulting in a minor contribution to cumulative effects for furbearers.

Small Mammals

Small mammals in the proposed project area include: Arctic ground squirrel; meadow jumping mouse; collared and brown lemming; root vole; northern red-backed vole; North American porcupine; Alaska hare; cinereus shrew; and, dusky shrew (MacDonald and Cook 2009) (see Chapter 3 Existing Environment for complete description). Small mammals provide a wide and abundant prey base for a range of mammalian and avian predators, and perform a critical ecological role in nutrient cycling. Many populations are subject to periodic irruptions of high densities interspersed with low densities at regular time intervals. Depending on species, small mammals occupy a wide range of habitats. Only a few of the larger small mammals, primarily hare, are used as a subsistence or sport harvest species, and there is some overlap with furbearer species, but the latter is typically associated with pelt value as opposed to food value.

Direct Effects and Indirect Effects from Construction

Construction effects include the loss of 107 acres of tundra habitat for the road corridor footprint. Effects of construction activities may be limited as these are planned to occur between May and November annually for a minimum of 2 years. There may be a low risk to wildlife-vehicle collisions during construction, especially during inclement weather or periods of low visibility, with higher risk due to small mammal size. Short-term physiological and behavioral stress may be expected for small mammals due to noise intensity, duration, and frequency; movement of heavy equipment and earth-moving machinery, and presence of humans. Construction disturbances would be most intense within and immediately adjacent to the road corridor. Disturbance would decrease with increasing distance from the road, eventually reaching a point where small mammal response is minimal or absent; this threshold would vary by species and individual.

Direct Effects and Indirect Effects from Operation and Maintenance

Road operation and maintenance, including periodic road grading, snow removal, and other road improvements may affect small mammals through long-term physiological and behavioral stress caused by: noise intensity, frequency and duration; vehicle movement and proximity, and human presence. As road traffic is expected to be intermittent and unpredictable, it may be harder for small mammals to habituate to any single or multiple disturbance(s). Road operation and maintenance disturbances are expected to be greatest within and immediately adjacent to the road corridor.

The risk of vehicles colliding with small mammals may be low due to the planned slow speed limit and low number of daily/annual vehicles on the road. However, due to their smaller size it is probable that wildlife-vehicle collisions may occur, especially during inclement weather or periods of poor visibility, or if traffic speeds or volume exceeds the projections in this analysis. Younger animals would be at a disadvantage and vulnerable. Overall, the number of small mammals potentially affected by wildlife-vehicle collisions is expected to be small but greater than any other group of mammals due to their relative abundance and wide distribution.

The greatest effect of road operation and maintenance on small mammals may be the increased human presence on and off the road corridor. Increased human access and presence may also degrade the overall suitability of the surrounding habitat and displace small mammals.

Behavioral changes may include avoidance of the road corridor and adjoining areas where vehicles and/or humans are present, which would reduce the overall suitable habitat available for small mammals.

Summary

Road construction impacts of Alternative 2 for small mammals would include the direct loss of 107 acres of tundra habitat due to road corridor footprint. Road construction activities may include physiological and behavioral stress caused by noise, movement of heavy equipment or machinery for a minimum of 2 years. Additionally, there may be a risk of small mammal-vehicle collision during construction.

Road operation and maintenance effects for Alternative 2 on small mammals would include the displacement from suitable habitat from an underdetermined distance from the road. Also, there would be the long-term physical risks of wildlife-vehicle collision resulting in injury or mortality. Overall, the number of small mammals potentially affected by wildlife-vehicle collisions is expected to be small.

While some small mammals may become habituated to predictable traffic patterns and flow, physiological and behavior stress are more likely to be caused by noise intensity, frequency, and duration. Disturbances would be most frequent and intense, although intermittent and unpredictable, within and immediately parallel to the road corridor.

The loss of 107 acres of habitat and associated disturbances would result in effects that are low intensity because the the change in resource condition may not be noticable, the duration would be long-term (occurring throughout the life of the project), and local in scope because of the small home range of these species, for resources that are considered common. The resulting effect would be minor.

Mitigation Measures

Mitigation measures discussed above under Common Mitigation Measures would minimize the impact of construction, operation, and maintenance of Alternative 2 on small mammals.

Cumulative Effects

Cumulative effects on small mammals from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time are similar to those described above for large mammals. They include an increase in the number of fisheries observers coming to the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in road traffic resulting in additional small mammal-vehicle collisions and an increase in human activity in the area. Historic and current conditions that have and may continue to affect small mammals in the project area include subsistence and sport hunting, wildlife viewing, and wildlife management. The proposed road corridor is within the National Wildlife Refuge System and Izembek Wilderness which has been managed historically and currently to limit human access for the purpose of conserving fish, wildlife, and their habitats with associated resource values. Very limited, if any, landscape disturbing activities have occurred since establishment of the refuge.

Natural small mammal population fluctuations (irruptive cycles) would likely continue into the future with road construction, operation and maintenance.

Therefore, increased human access facilitated by the proposed road corridor operation and maintenance would have the greatest adverse effect on small mammals. Increased human access increases the road effect zone (Forman et al. 1997) far beyond the road footprint corridor through increased tangent pedestrian trails and all-terrain vehicle two-tracks, habitat degradation due trail-related loss of vegetation and erosion, humans with domestic dogs, and increased harvesting of subsistence and/or sport species.

Summary: Cumulative Effects

Contributions to cumulative effects include the combinations of direct habitat loss from the constructed road footprint, unusable habitat due to ongoing disturbances over time from vehicle traffic, and the potential for vehicle collisions, Direct and indirect impacts on small mammals from Alternative 2 would be low to medium intensity (effects can be noticeable to readily detectable), long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent duration for habitat alteration (lasting even if the road is no longer used), local extent (because of the small home range of these species), and would affect common resources (not rare in the locality and not protected by special legislation) resulting in a minor contribution to cumulative effects for small mammals.

Conclusion – All Land Mammals

Historic and current conditions that have and may continue to affect all land mammals in the project area include subsistence and sport hunting, wildlife viewing, and wildlife management. The proposed road corridor is within the National Wildlife Refuge System and designated wilderness which has been managed historically and currently to limit human access for the purpose of conserving fish, wildlife, and their habitats with associated resource values. Very limited, if any, landscape disturbing activities have occurred since establishment of the refuge.

Although there is a net gain to Izembek National Wildlife Refuge under the proposed land exchange, this exchange is not for the purpose of mitigation. Existing wildlife, habitats and associated values are currently undisturbed and under no potential threat of development or alteration, and would remain so with or without the exchange. Therefore, there are no effects due to the land exchange.

Road construction would result in the direct loss of 107 acres of tundra habitat for the road corridor footprint that would affect all land mammals. Road construction, operation and maintenance effects would include: seasonal, short-term (between May and November annually; minimum 2 years) and long-term (continuous but intermittent, life-of-the-project duration) noise of varying intensity, frequency, and duration; short-term movement of heavy equipment and earth-moving machinery; long-term movement of vehicles; and, short and long-term human presence. Construction activities would overlap spring and fall movements of caribou and bear post-denning and pre-denning behavior. Physiological and behavior stress is projected to be most intense along the road corridor and decreasing with distance from the road alignment. The predicted and most likely response of wildlife would be to avoid the road corridor. Avoidance, or displacement, reduces the total habitat area available to all land mammals and could result in an area reduced suitability or abandonment that may range from a minimum of 11,840 acres for most species, to nearly 30,000 acres for caribou. An overall disturbance footprint may vary depending upon species and individual tolerance to disturbances.

The risk of wildlife-vehicle collision with all land mammals during construction and subsequent, operation and maintenance may be considered low due to the planned slow speed limit and low number of daily/annual vehicles on the road. However, smaller and/or younger mammals may be more at risk than larger mammals, and all land mammals would be at higher risk to wildlife-vehicle collisions during inclement weather or periods of poor visibility, or if traffic speeds or volume exceeds that projected and here analyzed. Overall, the number of land mammals potentially affected by wildlife-vehicle collisions is expected to be small.

While some species are fairly tolerant of benign human activities, for example wildlife viewing, once the element of hunting and pursuit are added, wildlife quickly adapt to be alert to, wary of, and react strongly to human presence. Further, increased human access increases the road effect zone (Forman et al. 1997) far beyond the road footprint corridor through increased tangent pedestrian trails and all-terrain vehicle two-tracks, habitat degradation due trail-related loss of vegetation and erosion, humans with domestic dogs, and increased harvesting of subsistence and/or sport species.

Therefore, the most noteworthy indirect effect of road operation and maintenance is the anticipated and predictable increase in human presence and activities in an area that has been actively managed to limit such intrusions because of its value to wildlife. Due to the narrow confines of the isthmus, there are no alternative routes for migration or resident occupation by territorial mammals to use in the project area. Increased human presence would most likely include proportionate increase in subsistence and hunting of harvestable species, creating conditions conducive to a population sink or ecological trap. Over time, the increased human presence in the project area in a reasonably foreseeable future would include habitat degradation through pedestrian trail and all-terrain vehicle two-track networks, and displacement of wildlife from their habitats, exceeding road operation and maintenance disturbance effects.

The intensity of these effects for caribou, brown bear and wolf would be medium to high with the greatest intensity near the road, the duration would be long-term because they would exist thorought the life of the project, the extent would be regional due to the large home range of these species, and the context would be important for caribou and brown bear and common for wolf. Caribou are considered important because the current population of the Southern Alaska Peninsula Herd is below management objectives and brown bear are considered important because the project is within the State's Izembek Controled Use Area. The overall effect would be major for brown bear and moderate for caribou, wolf, and other large mammals.

The intensity of the effect on furbearers would be low because the the change in resource condition may not be noticable, the duration would be long-term (occurring throughout the life of the project), and local in scope because of the small home range of individual species, for resources that are considered common. The resulting effect would be minor for furbearers.

For small mammals the loss of 107 acres of habitat and associated disturbances would result in effects that are low intensity because the the change in resource condition may not be noticable, the duration would be long-term (occurring throughout the life of the project), and local in scope because of the small home range of these species, for resources that are considered common. The resulting effect for small mammals would be minor.

Cumulative effects for caribou, brown bear and wolf would most likely be moderate. Except for those species most sensitive to disturbances or potentially over-exploited through harvest, the cumulative effects for furbearers is projected to be minor. Natural small mammal population fluctuations (irruptive cycles) would likely continue into the future with road construction, operation and maintenance; therefore, cumulative effects on small mammals would be considered minor.

4.3.2.6 Marine Mammals

The primary actions considered and analyzed under Alternative 2 for their effects on marine mammals include a proposed land exchange between the federal government, State of Alaska, and King Cove Corporation, as described in the Proposed Action (Section 1.2) and the southern road alignment for construction of a road between the communities of King Cove and Cold Bay. The road corridor would be located approximately ½ mile to 1 mile north of Kinzarof Lagoon.

Fourteen species of marine mammals inhabit the North Pacific Ocean adjacent to Cold Bay, the Bering Sea adjacent to Izembek Lagoon, along the Alaska Peninsula and in the vicinity of Sitkinak Island in the Kodiak Archipelago (see Section 3.2.6). Of these, harbor seals, killer whales, harbor porpoise, and gray whales occur with some regularity in the EIS project area, and will be evaluated as to potential effects from the proposed alternatives. Northern sea otters and Steller sea lions are discussed in Section 4.3.2.7, Threatened and Endangered Species. Pinnipeds (harbor seals) and cetaceans (killer whales, harbor porpoise, and gray whales) are analyzed together. Although harbor seals use both terrestrial and marine habitats and the cetaceans are restricted to marine habitats and are less commonly sighted in the project area, many of the impact conclusions are the same. Where differences occur, they are noted.

Direct Effects and Indirect Effects of the Land Exchange

Harbor seals commonly occur near, and haul out on, 2 of the parcels included in the proposed land exchange: the Kinzarof Lagoon and the Sitkinak Island lands (Section 3.2.6.5). The Kinzarof Lagoon parcel would be transferred to the Izembek National Wildlife Refuge and be included as designated wilderness. Upon completion of the land exchange, state lands and water in the vicinity of Kinzarof Lagoon would become part of the Izembek State Game Refuge, as directed by the Izembek State Game Refuge Land Exchange Bill. The parcels on Sitkinak would be transferred to the State. It is unclear what effect the transfer would have on regulations and use of the area, although it is unlikely that changing management entities will result in any measureable effects on harbor seals that haul out in the area. Harbor seals are afforded protection under the Marine Mammal Protection Act, so use of parcels near major haul outs would have to abide by the federal protection measures. Killer whales, harbor porpoise, and gray whales may occur in marine waters adjacent to coastal parcels under consideration for exchange (Section 3.2.6.5), but not on the parcels themselves. See Chapter 3 for a more complete description of marine mammals and their habitats associated with the proposed exchange parcels.

No effects on marine mammal resources have been identified that would result from the proposed land exchange, because no activities in the reasonably foreseeable future have been identified that would alter marine mammal populations or marine mammal habitat. The marine mammal populations, their habitat conditions and values, as described in the affected environment section (Chapter 3) would remain the same, before and after the proposed land exchange. Other effects of the proposed land exchange, such as Land Ownership and Management, Public Use and Subsistence management are addressed in Section 4.3.3.1, Section 4.3.3.6, and Section 4.3.3.7.

Direct Effects and Indirect Effects from Construction

The road from the Northeast Terminal across the Izembek isthmus would range from ½ to 1 mile from Kinzarof Lagoon. No direct impacts to harbor seals from the physical construction of the road are expected. Some noise disturbance to harbor seals in Kinzarof Lagoon is possible. ABR (2010) estimated that noise from most construction equipment would be just above the background noise level at Kinzarof Lagoon at ½ mile away and would be indistinguishable from Kinzarof background levels at about 1 mile away. Harbor seals using Kinzarof Lagoon may detect construction noises, but most would likely be far enough away that the sounds would be indistinguishable from background noise.

Mitigation measures alleviate or prevent impacts to coastal habitats during construction of the road. Please refer to Section 4.2.2.6 for details.

Killer whales, harbor porpoise, and gray whales would not be directly or indirectly affected by construction of the road as proposed under Alternative 2. Noise disturbance from onshore road construction activities to marine waters of upper Cold Bay, outer Kinzarof Lagoon, and Izembek Lagoon are unlikely.

Summary

The land exchange and construction of the southern alignment road is unlikely to affect harbor seals, killer whales, harbor porpoise, or gray whales. Noise disturbance to harbor seals is possible, but would likely be extremely low intensity due to the distance from construction activities. Any disturbance would be localized and long-term but intermittent, persisting for the life of the construction period, for these important resources (protected under the Marine Mammal Protection Act). The summary impact level is considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Some disturbance effects from the operation and maintenance of the road are possible. Harbor seals using Kinzarof Lagoon might be able to hear road traffic along the isthmus part of the road at its nearest points to Kinzarof Lagoon. Harbor seals would likely experience minimal to no disturbance effects from this noise, unless they were pupping or nursing in that area. The sounds of passenger vehicles are estimated to be less than Kinzarof background noise at a distance of more than 300 feet. Heavy trucks would likely be similar to construction vehicles and reach levels just above ambient at ½ mile from the road (ABR 2010). Harbor seals using Kinzarof Lagoon may detect road noises, but most would likely be far enough away that the sounds would be indistinguishable from typical background noise.

The new road could provide increased access for waterfowl hunting. Hunters shooting toward marine habitat, and the presence of people and all-terrain vehicles along the shoreline could potentially disturb harbor seals.

Killer whales, harbor porpoise, and gray whales would not be directly or indirectly affected by operation or maintenance of the road as proposed under Alternative 2. Noise from vehicular traffic on the road would be undetectable from marine waters of upper Cold Bay, outer Kinzarof Lagoon, and Izembek Lagoon.

Summary

Operation and maintenance of the southern alignment road is unlikely to affect killer whales, harbor porpoise, and gray whales. An increase in noise may affect pupping or nursing harbor seals. Noise from the road would be most likely to disturb pupping or nursing harbor seals within ½ mile of the road corridor. Any noise disturbance would be low intensity and long-term duration (intermittent but persistent for the life of the project), localized, and would affect important resources (protected under the Marine Mammal Protection Act). The summary impact level is considered minor for harbor seals.

Mitigation Measures

The applicant will develop a comprehensive Marine Mammal Protection Plan (MM-N) that will detail specific measures to be implemented to avoid potential disruption to the normal behavior of marine mammals in the project area during project construction and operation.

Cumulative Effects

Past, present and reasonably foreseeable future actions and their respective effects on harbor seals, killer whales, harbor porpoise, and gray whales are the same as described in Section 4.2.2.6. Implementing Alternative 2 would not contribute to cumulative effects on killer whales, harbor porpoise, and gray whales, but could cause a minor increase in noise disturbance to harbor seals.

Conclusion

Killer whales, harbor porpoise, and gray whales would not be affected by implementation of Alternative 2. The direct and indirect effects of Alternative 2 on harbor seals would be minor. Use patterns of the 4 species would not likely be changed by the land exchange. The effects, if any, from the road construction, operation, and maintenance would apply only to harbor seals. Effects would be of low intensity, long-term duration (intermittent but persistent for the life of the project), and localized. Harbor seals, killer whales, harbor porpoise, and gray whales are federally protected under the *Marine Mammal Protection Act* and are, therefore, considered important in context. Cumulative effects would be minor for harbor seals. Alternative 2 would not affect killer whales, harbor porpoise, and gray whales. The summary impact of Alternative 2 on harbor seals is minor.

4.3.2.7 Threatened and Endangered Species

The primary actions under Alternative 2 considered for analysis of effects on threatened and endangered species include a proposed land exchange between the federal government, State of Alaska, and King Cove Corporation, as described in the Proposed Action (Section 1.2) and the southern road alignment option for construction of a road between King Cove and Cold Bay. The road corridor would be located approximately ½ mile to 1 mile north of Kinzarof Lagoon.

The 3 threatened and endangered species included in this EIS—Steller's Eiders, northern sea otters, and Steller sea lions—are addressed separately below. Because the effects on 2 candidate species, Yellow-billed Loon and Kittlitz's Murrelet, are similar to those expected to occur to Steller's Eiders, the analysis of effects for these species have been combined. Although Yellow-billed Loon and Kittlitz's Murrelet have no legal protection under the *Endangered Species Act* at this time, they could become listed before the project is completed. All 5 species, with the exception of Kittlitz's Murrelets during the breeding season, are found exclusively or almost exclusively in marine habitats in this region.

If a proposed alternative involving land exchanges and new construction is selected and measures are taken to implement it, *Endangered Species Act* Section 7 consultations would have to be conducted with the Service (listed birds and sea otter) and the National Marine Fisheries Service (Steller sea lion). These consultations may require the development of Biological Assessments and Biological Opinions concerning these *Endangered Species Act* listed species. These documents would likely contain required and recommended mitigation measures to reduce the impacts to the listed species. It is not clear what these measures might be and whether they would be different from the measures discussed in the following analyses.

<u>Steller's Eider, Yellow-billed Loon and Kittlitz's Murrelet</u>

Direct Effects and Indirect Effects of the Land Exchange

The exchange of land parcels would occur prior to construction. Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets do not occur on terrestrial habitats included in the proposed land exchange, although they may occur in nearshore and estuarine environments adjacent to the parcels. The Kinzarof Lagoon parcel abuts an important high density wintering habitat for Steller's Eiders in Kinzarof Lagoon and northern Cold Bay. The transfer of the submerged lands and waters of Kinzarof Lagoon (including eelgrass habitat and intertidal shorelines) to the Izembek State Game Refuge would result in management under the *Izembek State Game Refuge Plan*. The waters of Cold Bay adjacent to Mortensens Lagoon is moderate density wintering habitat for Steller's Eiders, but the lagoon itself is unlikely to have much use by Steller's Eiders other than in the entrance channel. Small numbers of Steller's Eiders have been reported in Sitkinak Lagoon during winter months.

No effects on Steller's Eider, Yellow-billed Loon and Kittlitz's Murrelet have been identified that would result from the proposed land exchange, because no activities in the reasonably foreseeable future have been identified that would affect these species or their habitats within these parcels. These birds and their habitats, as described in the affected environment section (Chapter 3) would remain the same, before and after the proposed land exchange.

Direct Effects and Indirect Effects from Construction

Potential effects on Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet from construction of the southern road alignment across the Izembek isthmus would be mostly from disturbance effects of noise. The road from the Northeast Terminal across the Izembek isthmus would range from ½ to 1 mile from Kinzarof Lagoon. ABR (2010) evaluated waterfowl disturbance buffers for three possible road alignment scenarios, with offset distances from the lagoon of ¼ mile, ½ mile, and approximately 1 mile, and ambient background noise levels measured at Kinzarof Lagoon and empirical noise data for vehicles. They estimated that noise from most construction equipment would be just above the background noise level at Kinzarof Lagoon at a distance of a ½ mile and would be indistinguishable from Kinzarof background levels at about 1 mile away. The sound of pile drivers would travel farther. Based on these analyses, Steller's Eiders using Kinzarof Lagoon may detect construction noises, but most would likely be far enough away that the sounds would be indistinguishable from background noise. No direct habitat loss would be associated with the road corridor, since Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets do not use the terrestrial habitats potentially affected by the road.

Effects of road construction would be moderated by the seasonal occurrence of Steller's Eiders and Yellow-billed Loons. Road construction activities during the summer months could eliminate most direct disturbance impacts to Steller's Eiders and Yellow-billed Loons that are absent from the area at that time. Kittlitz's Murrelets would be present in the area during the construction season and could therefore be affected by noise disturbance, although their frequency occurrence nearshore and likelihood of co-occurrence with construction activities are low. Noise from construction activities during the fall could, however, potentially disturb molting eiders or loons in September and October.

Behavioral reactions of molting, staging, and wintering Steller's Eiders or of wintering Yellow-billed Loons to construction activities are unknown. Except when molting, Steller's Eiders are highly mobile during the nonbreeding season and could abandon a preferred staging or foraging area if disturbed. They may be more sensitive to disturbance during physiologically demanding times of the year, such as during the molt or just prior to the spring migration to the breeding grounds. Mitigation measures included in the fish and wildlife protection plan, the seasonality of most of the construction activities, and the distance over which received sound levels reach Kinzarof Lagoon background levels should minimize disturbance to Steller's Eiders and Yellow-billed Loons. Kittlitz's Murrelets are not expected to nest near the proposed road alignment; therefore, they are unlikely to be disturbed except if or when they fly over the area.

Eider, loon, or murrelet habitat could be affected if construction activities impact important feeding areas or prey. Mitigation measures reduce or prevent impacts to coastal habitats during construction of the road.

Summary

Steller's Eiders and Yellow-billed Loons may experience some noise disturbance effects from road construction activities occurring during the fall construction period (August to November); they are absent from the area during most of the summer construction period, so would not be affected during that time. Kittlitz's Murrelets may experience disturbance effects throughout the construction season, but the disturbance would occur only if or when they fly over the area.

Effects would be of low to medium intensity (perceptible and measurable, but would not alter resource function in the ecosystem), temporary duration (persisting through the construction period), local extent, and would affect important resources (threatened and endangered species and candidate species). The direct and indirect impact of road construction is considered negligible to minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Some disturbance effects from the operation and maintenance of the road are possible. Noise generated by road use could be audible to Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets using north Kinzarof Lagoon or the southern edge of Izembek Lagoon. Noise levels and distances to which sounds are audible depend on the species being evaluated and the vehicle type and wind direction and strength. The sounds of passenger vehicles are estimated to be less than Kinzarof Lagoon background noise at a distance of more than 300 feet and eliminated by 1,300 feet (¼ mile). Heavy trucks would create noise similar to construction vehicles and reach levels just above ambient at ½ mile from the road (ABR 2010). Steller's Eiders fly across the isthmus when traveling between Izembek and Kinzarof lagoons. During the fall, movements appear to be dictated by prevailing winds and tidal conditions. Birds will move to leeward areas to find shelter from strong winds and they move to areas where foraging conditions are more favorable due to differences in tidal conditions (tides are not synchronous between the two sides of the peninsula). During winter, when ice conditions are extremely dynamic, birds will move to one side of the peninsula or the other according to ice cover. This frequent movement back and forth across the isthmus exposes them to higher risks of disturbance from activities on the road.

Impacts of road use on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets using the nearby habitats depends on time of year, traffic level, vehicle type, frequency and predictability of disturbance, and the ability to habituate to disturbances (ABR 2010). Road use during summer months would not affect eiders or loons since they are absent from the area. Behavioral reactions of Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets to vehicular traffic are unknown. Chronic disturbances could cause some displacement from areas of Izembek Lagoon and Kinzarof Lagoon closest to the road corridor. Izembek Lagoon and offshore waters to the north are designated critical habitat for Steller's Eiders. Eiders are flightless for approximately 3 weeks during wing molt in the fall, leaving them particularly vulnerable to disturbance (Taylor and Sowl 2008). Steller's Eiders show high site fidelity to molting areas, so repeated disturbance could cause long-term displacement or abandonment of traditional use areas (Flint et al. 2000). Energetic costs from disrupted foraging could be a concern, as wintering eiders in the EIS project area spend much of the time foraging to meet energetic demands (Laubhan and Metzner 1999).

Increased access to Izembek Lagoon (designated as critical habitat for Steller's Eider) and Kinzarof Lagoon for hunting, fishing, subsistence activities, and for recreation could introduce additional sources of human disturbance on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets. The proposed barriers along the roadside would limit some all-terrain vehicle access, but not all activities that could cause disturbance or displacement. New roads facilitate human access and activities into once remote areas (Trombulak and Frissell 2000). Evidence exists of all-terrain vehicles accessing previously inaccessible areas along the east and northeast sides of Kinzarof Lagoon from the newly constructed road to the Northeast Terminal (Sowl 2008c). A tendency to follow visible trails, even those posted as closed to vehicular traffic, has increased damage to habitats along existing road corridors (Sowl 2004). The southern road alignment could lead to substantial increases in waterfowl hunting pressure in Izembek or Kinzarof lagoons due to improved access for foot and all-terrain vehicles travel (see Brant in Section 4.4.2.4). Izembek Lagoon (critical habitat) is an important molting area for thousands of Steller's Eiders in the fall, coinciding with the timing of waterfowl hunting for Brant and other species. A substantial increase in disturbance from gunshots, all-terrain vehicles, and human presence at this time would likely cause molting (flightless) eiders to swim away from preferred feeding areas. This would interrupt their feeding and cause them to expend energy, decreasing their ability to recover from molting, especially if disturbance levels are high and chronic. It may also cause some birds to abandon preferred foraging areas, at least while hunters are present. It may also increase the chance of eiders being shot accidentally (no hunting is allowed on this species). These indirect effects of the road could be much greater than the direct effects of the road.

Summary

Operation and maintenance of the southern road corridor could result in disturbance effects on Steller's Eiders and Yellow-billed Loons during the fall through spring. Eiders are particularly vulnerable to disturbance during pre-migration staging in the spring and the molt in the fall. Disturbance effects could be of medium intensity if traffic and noise volumes remain low. Increased traffic volume or frequent and repeated use by loud vehicles could lead to longer term displacement. Disturbance effects would be long-term in duration (intermittent but persistent for the life of the project), localized in extent (the isthmus area), and would affect important resources (threatened and endangered species and candidate species). Kittlitz's Murrelets could be disturbed during the breeding season, but the disturbance would be limited to occasional flyovers as they do not nest near the road corridor. The direct and indirect impact is considered moderate for Steller's Eiders and minor for Yellow-billed Loons and negligible to minor for Kittlitz's Murrelets.

Mitigation Measures

A Fish and Wildlife Protection Plan (MM-M) described in Appendix F would mitigate disturbance effects associated with Alternative 2. Additional measures to limit human access to important Steller's Eider habitat north and south of the road corridor may be required.

Cumulative Effects

Past, present and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Disturbance effects associated with implementation of Alternative 2 would result in a moderate contribution to cumulative effects on Steller's Eider, and a negligible to minor contribution to cumulative effects for Yellow-billed Loon and Kittlitz's Murrelet.

Conclusion

Due to the seasonality of Steller's Eiders and Yellow-billed Loons use and the timing of the proposed construction activities, effects of road construction on Steller's Eiders and Yellow-billed Loons would be of low to medium intensity (perceptible and possibly measurable), temporary (existing during the 2-year construction period), and localized (within the area of the Izembek isthmus). The road construction would have similar impacts to Kittlitz's Murrelet because it is not expected to nest near the road corridor. Year round operation and maintenance of the road would coincide with Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelet presence in the area and could result in effects that are medium intensity (observable), long-term duration (intermittent but persistent for the life of the project), and localized (within the area of the Izembek isthmus). Steller's Eiders are federally protected under the *Endangered Species Act*, so they are considered important in context. Yellow-billed Loons and Kittlitz's Murrelets are considered important in context due to their candidate status and declining populations. The land exchange would not affect use patterns by Steller's Eiders, Yellow-billed Loons, or Kittlitz's Murrelets. The contribution to cumulative impacts would be moderate for Steller's Eiders and negligible to minor for Yellow-billed Loons and Kittlitz's Murrelets. The overall impact of Alternative 2 on Steller's Eiders, would be moderate, because eiders are particularly vulnerable to disturbance during pre-migration staging in the spring and the molt in the fall, and the effects on Yellow-billed Loons, and Kittlitz's Murrelets is considered negligible to minor.

Northern Sea Otter: Southwest Alaska Distinct Population Segment

Direct Effects and Indirect Effects of the Land Exchange

The exchange of land parcels would occur prior to construction. Northern sea otters do not use the terrestrial habitats included in the proposed land exchange, although they may occur in nearshore and estuarine environments adjacent to the parcels. The Kinzarof Lagoon parcel abuts an important high density sea otter concentration area that is designated critical habitat in Kinzarof Lagoon and northern Cold Bay (Figure 3.2-26). The nearshore environment of Mortensens Lagoon is used by otters. Waters adjacent to the parcels considered for exchange on Sitkinak Island are within sea otter critical habitat (Figure 3.2-24). The transfer of the submerged lands and waters of Kinzarof Lagoon (including eelgrass habitat and intertidal shorelines) to the Izembek State Game Refuge would result in management under the provisions of the *Izembek State Game Refuge Plan*.

No effects on northern sea otters have been identified that would result from the proposed land exchange, because no activities in the reasonably foreseeable future have been identified that would affect northern sea otters or their habitats within these parcels. Northern sea otters and their habitat, as described in the affected environment section (Chapter 3) would remain the same, before and after the proposed land exchange.

Direct Effects and Indirect Effects from Construction

Potential effects on northern sea otters from construction of the southern road alignment across the Izembek isthmus would be mostly from disturbance effects of noise. The road from the Northeast Terminal across the Izembek isthmus would range from ½ to 1 mile from Kinzarof Lagoon, an important habitat for sea otters. Both Kinzarof and Izembek lagoons are designated critical habitats for northern sea otters. ABR (2010) estimated that noise from most construction equipment would be just above the background noise level at Kinzarof Lagoon at a distance of ½ mile and would be indistinguishable from Kinzarof background levels at about 1 mile away. The sound of pile drivers would travel farther. Sea otters using Kinzarof Lagoon may detect construction noises, but it is not known whether they would react to this disturbance. Possible reactions could include displacement from areas most impacted by noise. No direct habitat loss would be associated with the road corridor, since sea otters do not use the terrestrial habitats of the road corridor.

A Fish and Wildlife Protection Plan (MM-M) and the Marine Mammal Protection Plan (MM-N) provide measures to alleviate or prevent impacts to coastal habitats during construction of the road.

Summary

Construction of the southern alignment road could elicit disturbance responses from sea otters using northern Kinzarof Lagoon during the summer months. If disturbance were to occur, it would be of low to medium intensity (perceptible and measurable, but would not alter resource function in the ecosystem), temporary (during the 2-year construction period), and localized (within the area of the Izembek isthmus). The southwest Alaska distinct population segment of the northern sea otter is federally protected under the *Endangered Species Act* and the *Marine Mammal Protection Act* so is considered an important resource. The direct and indirect impact is considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Disturbance effects from the operation and maintenance of the road are possible. Noise generated by road use could be audible to sea otters using north Kinzarof Lagoon. Noise levels and distances to which sounds are audible depend on vehicle type and wind direction and strength. The sounds of passenger vehicles are estimated to be less than Kinzarof Lagoon background noise at a distance of more than 300 feet and eliminated by 1,300 feet (¼ mile). Heavy trucks would create noise similar to construction vehicles and reach levels just above ambient at ½ mile from the road (ABR 2010).

Specific behavioral responses of resting, foraging, or nursing sea otters and pups to vehicular traffic are not known, but vehicle disturbance is expected to be low. Predictable low-level traffic volumes could lead to habituation to vehicle noise. Periodic loud vehicles or other inconsistent noises may elicit disturbance responses. Chronic disturbance and displacement are unlikely.

Sea otters have been observed crossing the isthmus between Izembek Lagoon and Kinzarof Lagoon in winter during periods of dense sea ice concentrations in the southern Bering Sea (USACE 2003). Crossing the road would leave otters vulnerable to being hit by passing vehicles. The chance of a passing vehicle coinciding with otters crossing the road is extremely low, but if it were to occur, mortality could result.

The new road could provide increased access for waterfowl hunting. Hunters shooting toward marine habitat could potentially disturb sea otters. The extent of added disturbance depends on the level of increase in hunting along the road corridor. The new road would also allow increased access by Alaska Native hunters to the sea otters using Kinzarof Lagoon, potentially increasing the number of sea otters that are harvested.

Summary

Operation and maintenance of the southern road corridor may result in disturbance effects on northern sea otters in northern Kinzarof Lagoon. Disturbance effects from vehicle noise are not known, but could be of low to medium intensity (perceptible and measurable, but would not alter resource function in the ecosystem), if displacement occurs, long-term in duration if traffic and noise volumes remain low (intermittent but persistent for the life of the project), local extent (within the area of the Izembek isthmus), and would affect an important resource (federally protected under the *Endangered Species Act* and the *Marine Mammal Protection Act).* Although very unlikely, injury or mortality of a sea otter crossing the road during winter could occur and the resulting effects would be of high intensity, long-term to permanent duration, local extent, and would affect an important resource. The direct and indirect impact is considered minor.

Mitigation Measures

Protective measures stipulated in the Fish and Wildlife Protection Plan (MM-M) and the Marine Mammal Protection Plan (MM-N), (Appendix F) could help alleviate impacts of human disturbance associated with construction, operation, and maintenance of the road. Slow speeds of travel and barriers to prevent off road vehicle access could mitigate some disturbance effects. Additional measures to limit human access to important sea otter habitat north and south of the road corridor may be required.

Cumulative Effects

Past, present and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Implementation of Alternative 2 would result in a negligible to minor contribution to cumulative effects on northern sea otters.

Conclusion

Effects of road construction on northern sea otters would be of low to medium intensity (perceptible and measurable, but would not alter resource function in the ecosystem), temporary (during the 2-year construction period) and localized (within the area of the Izembek isthmus). There is the potential for a low-level increase in noise disturbance to sea otters whenever they are in close proximity to the road corridor during operation and maintenance of the road. Although noise disturbance would be intermittent, it would be long term (persist for the life of the road) and would affect a species that receives federal protection under the both the *Endangered Species Act* (as a southwest Alaska distinct population segment) as well as the *Marine Mammal Protection Act*. Although very unlikely, injury or mortality of a sea otter crossing the road during winter could occur. Cumulative effects would be limited to a minor increase in noise disturbance of sea otters. The land exchange would not affect use patterns by sea otters. The summary impact of Alternative 2 on northern sea otters would be minor.

Steller Sea Lion: Western Distinct Population Segment

Direct Effects and Indirect Effects of the Land Exchange

The exchange of land parcels would occur prior to construction. Several of the parcels under consideration for exchange are terrestrial habitats that are not used by Steller sea lions. Steller sea lions may occasionally occur near Kinzarof and Mortensens lagoons. A Steller sea lion haul out site exists offshore of Cape Sitkinak on the east end of Sitkinak Island. Although waters offshore of the exchange parcels on Sitkinak are included in Steller sea lion critical habitat (Figure 3.2-24), Steller sea lions do not use the parcels. There would be no effect on Steller sea lion as a result of the proposed land exchange.

Direct Effects and Indirect Effects from Construction

Construction of a road along the southern alignment route is unlikely to have any effect on Steller sea lions. There are no known haul outs near the Izembek isthmus and Steller sea lions are only occasionally seen in upper Cold Bay near Kinzarof Lagoon. Any potential nearshore marine habitat impacts during construction would be mitigated through the imposition of mitigation measures.

Summary

Steller sea lions are uncommon in the marine environment nearest to the land across which the road would be constructed, so would not be directly or indirectly affected by the road construction.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance of a road along the southern alignment route is unlikely to have any effect on Steller sea lions. There are no known haul outs near the Izembek isthmus and Steller sea lions are only occasionally seen in upper Cold Bay near Kinzarof Lagoon.

Summary

Steller sea lions are uncommon in the marine environment nearest to the land across which the road would be constructed, so would not be directly or indirectly affected by operation and maintenance of the road.

Mitigation Measures

Protective measures stipulated in the Fish and Wildlife Protection Plan (MM-M) and the Marine Mammal Protection Plan (MM-N) (Appendix F) could help alleviate impacts of human disturbance associated with construction, operation, and maintenance of the road. In addition, elements of an Erosion and Sediment Control Plan (MM-A), Storm Water Pollution Prevention Plan (MM-B), Hazardous Material and Petroleum Product Control Plan (MM-C), and Fuel Handling and Spill Response Plan (MM-D) would mitigate potential habitat impacts during construction or minimize potential, albeit unlikely, disturbance to Steller sea lions.

Cumulative Effects

Past, present and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Implementation of Alternative 2 would not contribute to cumulative effects on Steller sea lions.

Conclusion

The land exchange and southern road alignment construction, operation and maintenance under Alternative 2 would have no direct or indirect effects on Steller sea lion in the EIS project area.

Overall Conclusion

Construction and operation of the southern road corridor could disturb Steller's Eiders and Yellow-billed Loons during the fall through spring. Eiders are particularly vulnerable to disturbance during pre-migration staging in the spring and the molt in the fall. Kittlitz's

Murrelets could be disturbed during the breeding season, but the disturbance would be limited to occasional flyovers as they are not expected to nest near the road corridor. Construction and operation of the southern alignment road could elicit disturbance responses from sea otters using northern Kinzarof Lagoon during the summer months. There would be no effect to sea lions, as they do not normally occur in the project area. The overall effect to other threatened and endangered species would be minor, except for Steller's Eiders, which would experience moderate effects.

4.3.3 Social Environment

4.3.3.1 Land Ownership and Management

Baseline assumptions for analysis of land ownership and management are described in Section 4.2.3.1. The ANILCA purposes of the refuge are described and general information about existing conditions of land ownership and management is provided. Additional information is also provided in Section 3.3.1.

Alternative 2 would change land ownership in and around Izembek National Wildlife Refuge, which in turn would alter land uses on refuge, state, and Native corporation lands in the area. This section summarizes the predicted land uses that would arise from increased access to refuge lands and the ability of the refuge to meet its ANILCA refuge purposes under Alternative 2.

The effects of Alternative 2 on land ownership and land management include the exchange of parcels with the acreage described below. In addition, these parcels are characterized by important wetlands, habitat, and human use patterns, such as subsistence, public use (i.e., recreation) and wilderness. The exchange of these parcels would result in changes in ownership and management regimes for these resource values. The analysis of effects to the biological environment, Section 4.3.2, focused on the ecosystem characteristics of the parcels in the project area, and the effects of the proposed action on ecosystem characteristics. In this section, the focus is on the exchange of parcels, taking into account their resource characteristics.

Direct Effects and Indirect Effects of Land Exchange

Effects on Land Ownership

Under Alternative 2, the land exchange between the federal government, State of Alaska, and King Cove Corporation would proceed for the purpose of creating a corridor for the construction and operation of a road connecting the communities of King Cove and Cold Bay. Provisions of the land exchange include the following changes in ownership and land selections:

- King Cove Corporation would convey its interest in the surface estate of approximately 10,696 acres (the Mortensens Lagoon and Kinzarof Lagoon tracts) to the U.S. King Cove Corporation would also relinquish its ANCSA village selection of 5,430 acres within the Izembek Wilderness, and select this acreage elsewhere within an area established by the Service and Bureau of Land Management for the purpose of meeting ANCSA selection entitlements (Figure 3.3-1). The Aleut Corporation would retain its ownership of the subsurface estate in the approximately 8,092 acres of the Mortensens Lagoon tract. The subsurface of the new selection by King Cove Corporation would be conveyed to The Aleut Corporation when the new selection is conveyed to King Cove Corporation.

- The State would convey the surface and subsurface estates of the uplands of 2 townships containing approximately 41,887 acres to the federal government, for inclusion as wilderness in the Alaska Peninsula National Wildlife Refuge. No tidelands or submerged lands are included in the proposed land trade.

- The U.S. would convey approximately 201 acres of refuge lands for the proposed road corridor (southern alignment) from the Izembek National Wildlife Refuge, and 1,619 acres on Sitkinak Island in fee simple to the State of Alaska.
- The addition of state-owned tideland and submerged lands of Kinzarof Lagoon to the Izembek State Game Refuge would be finalized.

As part of the exchange, the King Cove Corporation would convey its interest in the surface estate of approximately 10,696 acres (the Mortensens Lagoon and Kinzarof Lagoon tracts) to the U.S. The relinquished selection rights to 5,430 acres east of Cold Bay would be replaced by an equivalent selection in an area in the Alaska Peninsula National Wildlife Refuge established by the Service and Bureau of Land Management (see Figure 3.3-1) with no net change in the corporation's entitlement.

As part of the exchange, the State of Alaska would convey surface and subsurface rights to 41,887 upland acres (Nelson Lagoon and Moffet Lagoon) as described in the *Bristol Bay Area Plan*.

As part of the land exchange for Alternative 2, the Izembek National Wildlife Refuge would be reduced in size by 201 acres for the road corridor, but would be enlarged by the addition of 2,604 acres from the King Cove Corporation Kinzarof Lagoon Parcel, and the selection of 5,430 acres would be relinquished, so that this acreage would not be removed. The net effect would be an increase in the Izembek National Wildlife Refuge of 7,833 acres taking into account the retention of the acreage for which the selection right is relinquished. With the King Cove Corporation Mortensens Lagoon parcel and the State parcel, a total of 49,979 acres would be added to the Alaska Peninsula National Wildlife Refuge, while 5,430 acres would be removed for the new selection by the King Cove Corporation. This represents a net addition for the Alaska Peninsula National Wildlife Refuge of 44,549 acres.

On Sitkinak Island, the exchange would result in the addition of 1,619 acres to the nearly 56,700 acres presently owned by the State of Alaska on Sitkinak Island. This would bring the entire island under State of Alaska ownership.

Effects on Land Management

Under Alternative 2, creation of a road corridor connecting the communities of King Cove and Cold Bay and the associated land exchange involving federal, state, and King Cove Corporation lands would have an effect on land use and land management. Federal lands underlying the road corridor and on Sitkinak Island would be transferred to state ownership for management under state area plan or state game refuge provisions. State owned land would be transferred to federal ownership and King Cove Corporation selected lands would be retained in federal ownership for management under wildlife refuge or wildlife refuge wilderness provisions. The King Cove Corporation would make an equivalent selection in an area in the Alaska Peninsula National Wildlife Refuge established by the Service and Bureau of Land Management (see Figure 3.3-1) with no net change in the corporation's entitlement. The resource characteristics and the specific management changes for each parcel are summarized in Table 4.3-7. See Section 3.3.1 and 3.3.10 for a more detailed description of the various management plans and regimes involved. Specific changes are discussed by exchange parcel and other affected parcels.

Road Corridor

The road corridor parcel includes 201 acres of federal land with notable resource values in wetlands, caribou migration corridors, brown bear habitat, Tundra Swan nesting, and existing trails. The road corridor would be removed from management as Izembek National Wildlife Refuge and Izembek Wilderness and would be transferred to the State of Alaska to be managed primarily as a transportation corridor within Izembek State Game Refuge. The proposed road corridor would cross the Izembek National Wildlife Refuge, Izembek Wilderness, Alaska Peninsula National Wildlife Refuge, lands withdrawn by the Federal Aviation Administration, and lands owned by the King Cove Corporation. A single lane gravel road would be constructed within the corridor. The *Izembek State Game Refuge Management Plan* (ADF&G 2010i) discussed the possibility of a road connecting King Cove and Cold Bay on page 11 of the plan:

> Construction of a road through the State Game Refuge to connect King Cove to Cold Bay may be authorized under terms and conditions of a Special Area Permit, pursuant to current statutory and regulatory authority, or as amended by future state legislation.

The road corridor would no longer be managed for subsistence uses under the provisions of Title VIII of ANILCA, but rather under state management regulations.

In addition, the Service would execute a boundary adjustment between the Izembek National Wildlife Refuge and the Alaska Peninsula National Wildlife Refuge in the vicinity of Blinn Lake, so that the isolated parcel of Alaska Peninsula National Wildlife Refuge that contains the Federal Aviation Administration withdrawal and the area that lies to the north of the Cold Bay Airport would become part of the Izembek National Wildlife Refuge.

Since the road corridor would be owned by the State of Alaska, the road could be built without determining if it is compatible with the surrounding national wildlife refuge lands. Determining refuge compatibility is a management standard mandated by the National Wildlife Refuge Improvement Act for refuge lands, not for state or other inholdings within refuge boundaries. Izembek National Wildlife Refuge, however, would have to manage refuge resources and the impacts on wildlife populations, habitats, and wilderness character caused by the road.

Izembek National Wildlife Refuge

The road corridor would pass through the Izembek National Wildlife Refuge. Although the *Izembek National Wildlife Refuge Comprehensive Conservation Plan* and the *Izembek State Game Refuge Management Plan* have similar and cooperative goals for the protection of the area's natural resources, only the state plan specifically recognizes and accommodates the proposed road corridor. The road would pass through areas currently designated as wilderness, where vehicle travel is generally prohibited, with exceptions as described in Section 1.6.1.2. It would differ substantially from the surrounding land use in an area where no improved or maintained roads currently exist and only limited vehicle use is authorized. It would also bisect the isthmus of the Izembek National Wildlife Refuge with a continuous manmade feature. The *Izembek National Wildlife Refuge Comprehensive Conservation Plan* discusses the transportation corridor as potentially detrimental to wildlife populations and habitats, wilderness values, and subsistence use, but reserves a final compatibility determination until a specific proposal with congressional approval is presented.

Under the exchange, the size of Izembek National Wildlife Refuge and Izembek Wilderness would expand with the addition of 8,034 acres of King Cove Corporation lands (the Kinzarof Lagoon parcel and the relinquished selection). These parcels include notable resource values such as caribou winter use, high density brown bear habitat, and harbor seal haulouts in the Kinzarof Lagoon parcel. The King Cove Corporation selection that would be retained in Izembek Wilderness includes notable resource values including caribou winter use, high density brown bear habitat, Tundra Swan nesting. The road corridor parcel, described above, would result in a concurrent reduction of 201 acres in the Izembek National Wildlife Refuge. The net effect is an expansion of 7,833 acres.

Limiting all-terrain vehicle access off the state-owned road corridor would be the foremost challenge for the State of Alaska and Izembek National Wildlife Refuge. Although all-terrain vehicles are generally not allowed for recreational use on refuges, Title VIII of ANILCA permits "appropriate use for subsistence purposes of snowmobiles, motor boats, and other means of surface transportation traditionally employed for such purposes by local residents, subject to reasonable regulations."

To close additional areas of the Izembek National Wildlife Refuge to all-terrain vehicle use by local subsistence users, the Service could conduct a study of historic uses of all-terrain vehicles. If it found that all-terrain vehicles were not traditionally used by local residents for subsistence purposes prior to the establishment of Izembek National Wildlife Refuge in 1960 it could publish this finding and promulgate regulations that close the refuge to all-terrain vehicle use by subsistence users. Or, the Service could close the area to all-terrain vehicle use if it determined that such use is causing or is likely to cause an adverse impact on "resource protection, protection of historic or scientific values, subsistence uses, conservation of endangered or threatened species, or other purposes and values for with the refuge was established" (50 CFR 36.12). In either situation, the Service must promulgate regulations and publish the findings and determination locally. The Service could also close the area to the use of all-terrain vehicles under the authority of 50 CFR 36.12 if the situation is determined to be an emergency. Regardless of the process, resource damage is likely to occur based on documented all-terrain vehicle use within the area currently closed to all use of such vehicles adjacent to the Northeast Terminal. Enforcement of the current closure and any additional closures would continue to be an ongoing management challenge to the small staff and limited resources of the Izembek National Wildlife Refuge.

Easy access to Izembek National Wildlife Refuge through the isthmus may also increase conflicts between subsistence and recreational user groups, particularly if harvest numbers increase notably for such species as Black Brant, Emperor Geese, Southern Alaska Peninsula Caribou Herd, or brown bears.

<u>Alaska Peninsula National Wildlife Refuge</u>

The road corridor would enter the Alaska Peninsula National Wildlife Refuge in the vicinity of Blinn Lake. The *Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan* (Service 1985b) classifies this area as enhanced public use, focusing on protection of fish and wildlife populations and habitats and public use and access. Here, land use is generally undeveloped; unimproved roads from World War II remain in the area. A road would not be prohibited by either federal or state management plans. Should construction of the road be approved, a boundary adjustment, as described above, would be implemented prior to the land exchange with the state.

Under the exchange, the Alaska Peninsula National Wildlife Refuge would expand with the addition of 49,979 acres of King Cove Corporation lands (Mortensens Lagoon) and State of Alaska lands. The King Cove Corporation Mortensens Lagoon parcel (8,092 acres) includes notable resource values such as caribou winter use, Tundra Swan nesting, and habitat for numerous other wildlife species. Following the exchange, this parcel would be managed as part of the Alaska Peninsula National Wildlife Refuge, with subsistence provisions under Title VIII of ANILCA. The state parcel includes 41,887 acres with notable resource values such as caribou calving, high density brown bear habitat, Tundra Swan nesting, and habitat for numerous other wildlife species. With the conclusion of the land exchange, this parcel would be managed as designated wilderness within the Alaska Peninsula National Wildlife Refuge, and subject to the subsistence provisions of ANILCA Title VIII. The alternate selection for King Cove Corporation would concurrently result in removal of 5,430 acres west of Mortensens Lagoon. The net effect is an expansion of 44,549 acres.

Federal Aviation Administration Lands

The westerly terminus of the road corridor would pass through lands withdrawn from the Alaska Peninsula National Wildlife Refuge by the Federal Aviation Administration for use in the maintenance of air navigation facilities. Aside from this use, the management policies of the Alaska Peninsula National Wildlife Refuge apply. Here, the proposed road corridor would connect with and follow the existing road system south of Blinn Lake to the boundary with state lands, and would be similar to and compatible with the roads and air navigation facilities already allowed in this area.

Sitkinak Island

Sitkinak Island is owned almost entirely by the State of Alaska and the proposed exchange lands constitute an inholding of the federal government. The spit that separates Sitkinak Lagoon from Sitkinak Strait is managed by the Service under the *Alaska Maritime National Wildlife Refuge Comprehensive Conservation Plan*. The conservation plan classifies these lands as minimal management, which is directed at the protection of existing fish and wildlife populations and habitats, and restoration of endangered and other species to natural levels. Generally, no facilities are allowed and public use is dispersed and focused on activities requiring no development. The larger portions of land on the main island were withdrawn from Service lands by the Coast Guard and contain an airstrip, road, and various buildings. Although the Coast Guard has primary management authority, these facilities have not been used for many years and the Coast Guard has indicated a desire to relinquish the land to the Service. This process requires Coast Guard cleanup of hazardous materials before the Service will accept the land for full management as part of the refuge.

As part of the exchange 1,619 acres of federal lands on Sitkinak Island, currently managed by the Alaska Maritime National Wildlife Refuge and the U.S. Coast Guard, would be transferred to the State of Alaska for management under the *Kodiak Area Plan*, including any plan amendments. The parcels on the main island would be classified as Grazing and Settlement. The spit would likely be classified as General Use or Wildlife Habitat. The management approaches for these lands are further described in the Resource Allocation Table on page 3-134 of the *Kodiak Area Plan* as follows:

> T-04A … unit is to be managed for grazing operations. Development authorizations granted by DNR [Department of Natural Resources] should protect access to the black-tail deer population and the prehistoric heritage site. The area of the old Coast Guard base is to be managed separately; see T-04B.
>
> T-04B… This small 80 acre site (plus any other adjacent area that might be appropriate for inclusion) is appropriate for disposal for settlement or development during the planning period, assuming that this state selected land is conveyed to the state. Other forms of development or disposal include commercial, industrial, and institutional uses, any of which are considered appropriate. Note: When the unit is conveyed to the state, a more detailed description of the 80-acre tract may exist. It is intended that the Settlement designation apply to this area and to any contiguous area that is functionally necessary for settlement or other forms of development.

The state and federal management regimes would be similar in that the natural resource values of the spit would be protected while the main island areas would be used for other human purposes (Coast Guard base changed to cattle grazing/settlement). State management classifications would not introduce new land uses to the area and they would be consistent with the management categories in effect throughout the balance of the island.

The resources values of this federal land include habitat for mule deer, river otter fox, beaver and other small mammals, as well as harbor seal haulouts.

<u>State Parcels</u>

The state parcels proposed for exchange (41,877 acres) are located on the Alaska Peninsula adjacent to the Alaska Peninsula National Wildlife Refuge, and are currently managed by the State of Alaska under the *Bristol Bay Area Plan* (ADNR 2005). The area plan classifies these lands as General Use, which allows a variety of activities including motorized and non-motorized travel across state land, hunting, fishing, trapping, harvesting, and access improvements for noncommercial use (ADNR-DMLW 2011). The area plan considers these lands generally unsuitable for intensive development.

As part of the exchange implemented by Alternative 2, the Alaska Peninsula National Wildlife Refuge would expand northeasterly of the current Izembek National Wildlife Refuge with the addition of the 41,877 acre parcel. These lands would be become part of the North Creek Unit of the Alaska Peninsula National Wildlife Refuge, managed by the Izembek National Wildlife Refuge as designated wilderness and subject to the subsistence provisions of Title VII of ANILCA. Submerged lands within the parcel would be retained by the state and subject to the access to inholding provisions of Title XI of ANILCA. Management of this newly designated wilderness would focus on maintaining wilderness values and qualities as guided by the *Wilderness Act* and the purposes of ANILCA for the Alaska Peninsula National Wildlife Refuge and. Direct and indirect impacts of Alternative 2 related to wilderness are discussed more fully in Section 4.3.3.10.

The parcel includes notable resource values such as caribou calving, high density brown bear habitat, Tundra Swan nesting, and habitat for numerous other wildlife species.

Federal management of these lands as wilderness would be similar to but more restrictive than the existing state management regime. It would maintain existing goals for protection of wildlife and natural habitats, but place greater emphasis on maintaining wilderness character. If this land becomes part of the Alaska Peninsula National Wildlife Refuge and designated wilderness, it would be managed under the wilderness guidelines in the *Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan*.

Kinzarof Lagoon Tidelands and Submerged Lands in Izembek State Game Refuge

The transfer of state-owned tidelands and submerged lands and waters of Kinzarof Lagoon (including eelgrass habitat and intertidal shorelines) to the Izembek State Game Refuge would result in management under the provisions of the *Izembek State Game Refuge Plan*. While the designation of additional lands and waters as part of the Izembek State Game Refuge would afford additional protections beyond those of general state lands, they are subject to less protection than the lands within National Wildlife Refuges.

In general, a Special Area Permit would be needed for an activity that may damage refuge resources, disturb wildlife or disrupt existing public uses. In contrast, most uses on a National Wildlife Refuge require both a Compatibility Determination, and an Section 810 evaluation in addition to a special use permit, where needed. A special use permit for the Izembek National Wildlife Refuge also requires compliance with NEPA which could include the preparation of an environmental assessment or environmental impact statement. The State Game Refuge is currently open to new locatable mineral entry, mineral prospecting and mineral leasing, although the *Izembek State Game Refuge Management Plan* recommends that the Alaska Department of Fish and Game in cooperation with the Alaska Department of Natural Resources close the State Game Refuge to new locatable mineral entry, mineral prospecting, and mineral leasing. National Wildlife Refuges are closed to new mineral entry by law. (For the full discussion of impacts to wetlands under Alternative 2, see Section 4.3.2.2.)

King Cove Corporation Lands

King Cove Corporation would convey the Mortensens Lagoon parcel and the Kinzarof Lagoon parcel to the U.S. A parcel of selected lands would be relinquished and an alternate selection conveyed. The eastern terminus of the road would be constructed on King Cove Corporation lands subject to the provisions of ANCSA 22(g). Each of these parcels is described below.

Mortensens Lagoon Parcel. The Mortensens Lagoon parcel is currently owned by the King Cove Corporation and lies within the boundaries of the Alaska Peninsula National Wildlife Refuge. The King Cove Corporation ownership of the Mortensens Lagoon parcel predates the establishment of the Alaska Peninsula National Wildlife Refuge, and so it is a private inholding within the boundary, but not subject to the management policies, of the Alaska Peninsula National Wildlife Refuge. Because the Alaska Peninsula National Wildlife Refuge was created after ANCSA, the 22(g) provisions do not apply and these properties are not subject to compatibility determinations. No management plan is currently in effect for this parcel.

The Mortensens Lagoon parcel (8,092 acres) includes notable resource values such as caribou winter use, Tundra Swan nesting, and habitat for numerous other wildlife species. Following the exchange, this parcel would be managed as part of the Alaska Peninsula National Wildlife Refuge, with subsistence provisions under Title VIII of ANILCA.

As part of the exchange implemented by Alternative 2, the Mortensens Lagoon Parcel would be transferred to the Service and managed under the Alaska Peninsula National Wildlife Refuge. They would be classified as enhanced public use management, a category described in Attachment B to the Record of Decision for the *Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan* as follows:

> **Enhanced Public Use**
> Refuge lands in this category would be managed to provide opportunities for hunting, fishing, trapping, wildlife observation, and associated guiding and outfitting services. All types of motorized access, including off-road vehicles, would be permitted in designated areas. Permanent public use facilities, such as campsites, trails, and boat docks, may be provided to serve visitors. Resource management activities would be directed at ensuring adequate protection of fish and wildlife populations. Emphasis would be place on monitoring resources and the effects of public uses on fish and wildlife.

When the comprehensive conservation plan for the area is revised, the enhanced public use category will be replaced with another management category as the Service has eliminated the enhanced public use category. Future management direction for these lands would be determined when the Service completes a revised comprehensive conservation plan; a process that would include substantial public involvement. The land exchange would introduce a management regime on this property where none currently exists today.

Kinzarof Lagoon Parcel. The Kinzarof Lagoon parcel, owned by the King Cove Corporation, lies within the boundaries of Izembek National Wildlife Refuge and Izembek Wilderness. This parcel is subject to the provisions of ANCSA 22(g), which requires that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes. As, a result, the incremental conservation benefit of transferring this parcel to the U.S. for management as part of the Izembek National Wildlife Refuge is less than if this parcel were not subject to ANCSA 22(g).

As part of the exchange proposed in Alternative 2, these lands would be managed by the Service as part of the Izembek National Wildlife Refuge and designated as wilderness. Incorporation of these lands into the Izembek Wilderness would result in a land management regime more restrictive than the current management policies that apply to the property. It would also allow consistent management of all lands surrounding Kinzarof Lagoon under a common set of management policies through inclusion in the Izembek Wilderness.

The transfer of the Kinzarof Lagoon Parcel to the Izembek National Wildlife Refuge would also be beneficial to wetlands management by providing additional protection of important habitat for several species. (For the full discussion of impacts to wetlands under Alternative 2, see Section 4.3.2.2.)

The Kinzarof Lagoon parcel (2,604 acres) includes notable resource values such as wetlands, caribou winter use, high density brown bear habitat, and harbor seal haulouts. Following the land exchange, this parcel and these resource values would become part of the Izembek Wilderness, with the same habitat values, new application of the subsistence provisions of ANILCA Title VIII, and management as designated wilderness.

King Cove Corporation Selected Lands. Under Alternative 2, the configuration of Izembek National Wildlife Refuge would not change with the retention of 5,430 acres of land selection relinquished by King Cove Corporation on the east side of Cold Bay. King Cove Corporation would make a new selection of equivalent size likely from lands within Alaska Peninsula National Wildlife Refuge on the west side of Cold Bay.

Although the acres of the King Cove Corporation selected lands and the proposed replacement selection on the west side of Cold Bay would be equivalent, and the wildlife values could be similar, management of the two parcels are and would be different for technical reasons. The alternate land selection in the Alaska Peninsula National Wildlife Refuge (5,430 acres) would likely include resource values such as caribou winter use and brown bear habitat. The relinquishment of the King Cove Corporation and the alternate selection would cancel each other out in terms of the acreages involved. Under Alternative 2, the alternative land selection would be removed from refuge management. Since this parcel likely would be located in the Alaska Peninsula National Wildlife Refuge, the special compatibility regulations of 22(g) of ANCSA would not apply.

The King Cove Corporation selected lands east of Cold Bay are currently managed by the federal government and lie entirely within the Izembek National Wildlife Refuge and are designated as wilderness. This parcel was selected by the King Cove Corporation and formal conveyance of ownership is pending. This parcel, if conveyed to the corporation, would be subject to the provisions of ANCSA 22(g) reservation. This provision requires that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes. As a result, the incremental conservation benefit of transferring this parcel to the U.S. for management as part of the Izembek National Wildlife Refuge is less than if this parcel were private land not subject to ANCSA 22(g).

The King Cove Corporation selection (to be relinquished under Alternative 2) includes notable resource values such as caribou winter use, high density brown bear habitat, and Tundra Swan nesting. The parcel is located within designated wilderness and would be retained in Izembek Wilderness. The selected lands are managed by the refuge (until, and if conveyed to the Native corporation) and are subject to Title VIII of ANILCA subsistence provisions. However, there are no foreseeable plans for development of this parcel and since any development (if the parcel were conveyed to King Cove Corporation) would be subject to 22(g) of ANCSA, the additional conservation value of adding this parcel to the Izembek National Wildlife Refuge is limited.

Eastern Terminus of Road Corridor. The easterly terminus of the road corridor would pass through lands owned by the King Cove Corporation. Although privately owned, these properties lie within the boundary of Izembek National Wildlife Refuge and the Izembek Wilderness. Similar to the King Cove Corporation selected parcel discussed in the preceding paragraphs, these lands are subject to the provisions of ANCSA 22(g). This provision requires that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes, as described in Section 3.3.1.1.

Summary of Effects on Land Management

The direct and indirect impacts of these land exchanges on land ownership and management is assessed in terms of the magnitude, extent, duration, and context of lands exchanged, along with changes in the land management regimes. The comparative resource values of the exchanged parcels are evaluated within the limits of available information under other resource topics, including terrestrial and aquatic plant communities, wetlands, birds, land mammals, threatened and endangered species, subsistence, and wilderness.

Alternative 2 would result in changed land use and land management conditions for all exchange parcels. The exchange would facilitate construction of a single lane road within the Izembek National Wildlife Refuge including the Izembek Wilderness, consolidate all lands on Sitkinak Island under state ownership, place large areas of King Cove Corporation and state lands into federal ownership, and relinquish the King Cove Corporation selection within the Izembek Wilderness that would otherwise become privately owned. King Cove Corporation would select an alternate land selection within the Alaska Peninsula National Wildlife Refuge.

When considered in relation to total acreage, the changes in ownership under the land exchange would be of low magnitude for the federal and state governments, since a relatively small total acreage is affected. For the King Cove Corporation, the change may be rated high in magnitude, since the exchange represents a reduction of 10.8 percent of the corporation's total land holding.

In addition, the Service would execute a boundary adjustment between the Izembek National Wildlife Refuge and the Alaska Peninsula National Wildlife Refuge in the vicinity of Blinn Lake, so that the isolated parcel of Alaska Peninsula National Wildlife Refuge that contains the Federal Aviation Administration withdrawal and the area that lies to the north of the Cold Bay Airport would become part of the Izembek National Wildlife Refuge.

The direct and indirect impacts of this alternative on land use and management for the Izembek National Wildlife Refuge would be high in magnitude because the construction of a road through the Izembek National Wildlife Refuge would introduce a transportation use with a different character amidst surrounding lands managed for wilderness and resource protection purposes. The impact to management from the addition of 41,887 acres from the State to the Alaska Peninsula National Wildlife Refuge would consolidate management in the North Creek and Pavlov units, while the addition of the Mortensens Lagoon parcel would add 8,092 acres to the Alaska Peninsula National Wildlife Refuge south of the community of Cold Bay. For the State of Alaska, the management requirements for the road corridor would represent a high magnitude change, while the additional of acreage on Sitkinak Island would consolidate management. The additional responsibilities for management of Kinzarof Lagoon submerged lands and tidelands as part of Izembek State Game Refuge would represent a low magnitude change. For the King Cove Corporation, the exchange would remove the Kinzarof Lagoon and Mortensens Lagoon parcels from corporate management, and create a new management responsibility for the new selection site west of the corporation's land holding at Old Man's Lagoon, on the west side of Cold Bay.

Effects on Land Use

Road construction and the resulting opening of new areas on the Izembek National Wildlife Refuge and Izembek Wilderness to access by all-terrain vehicle users (legal or illegal) would be the primary impacts of Alternative 2. The effects analysis for the proposed road was conducted assuming mitigation was implemented. It was assumed one of the two barrier options (bollards only or bollards with chain) would be installed to keep vehicles in the road corridor. However, it was also assumed that the barrier would be breached from time to time and that there was the potential for impacts prior to installation of the barriers during the construction period based upon what happened during and since construction of the King Cove Access Project. Aerial surveys done in 2007 and 2008 document an increase in the number of new all-terrain vehicle routes in the refuge since construction of the Northeast Terminal (Sowl 2008c, Siekaniec 2012). Therefore, the analysis of potential effects from all-terrain vehicles presented in the EIS reflects those anticipated impacts if Alternative 2 or 3 were implemented.

To assess the change in land use caused by this increased access by motorized vehicles, the Service analyzed the Izembek isthmus for existing roads and trails (Figure 4.3-2), and unauthorized all-terrain vehicle routes that have been developed between 2005 and 2008 (Figure 4.3-3). The Service then assessed potential all-terrain vehicle travel corridors that could originate from the southern alignment proposed for Alternative 2. Probable all-terrain vehicle routes under Alternative 2 were modeled and mapped based on the following criteria and widely accepted path selection and route preference in human navigation which assumes a goal of minimizing resources (i.e., shortest route, quickest route, or using the least amount of energy resources):

1. Popular destinations modeled are subsistence hunting sites, cabin sites, and recreational hunting locations within Izembek Wilderness.
2. Starting points from the road were selected to minimize the distance to the selected destination.
3. Travel corridors were identified to follow relatively uniform elevations and to provide the most direct route over the tundra.
4. Travel corridors were selected to avoid wetlands as much as possible.
5. Connectivity to and from the road to existing all-terrain vehicle routes.

In addition, to assess the likelihood of increased all-terrain vehicle use, two assumptions were made.

1. Current use patterns of all-terrain vehicles in and around the communities of King Cove and Cold Bay would continue.
2. Identified use trends developed since the completion of the hovercraft landing pad at the Northeast Terminal in 2006 would continue. A documented effect of the construction of the hovercraft landing pad are new all-terrain vehicle routes originating from the Northeast Terminal and traveling into the Izembek Wilderness.

Figure 4.3-4 combines these criteria and assumptions to model potential travel corridors. The result is a web of possible all-terrain vehicle corridors. These corridors are only one representation of potential routes that may develop over time. The model illustrates dozens of routes could potentially radiate from the proposed road across the Izembek isthmus. Predicted changes in land use depicted are further described by parcel, under the new land ownership pattern proposed by Alternative 2.

Figure 4.3-2 Existing Roads and Trails

t:\cartos\McGee\ nz\KC Exchange\Work Orders\2012-12-06 (Analyze Potential ATV Trails)\18-0138 Map 1 (Existing Roads and Trails).mxd

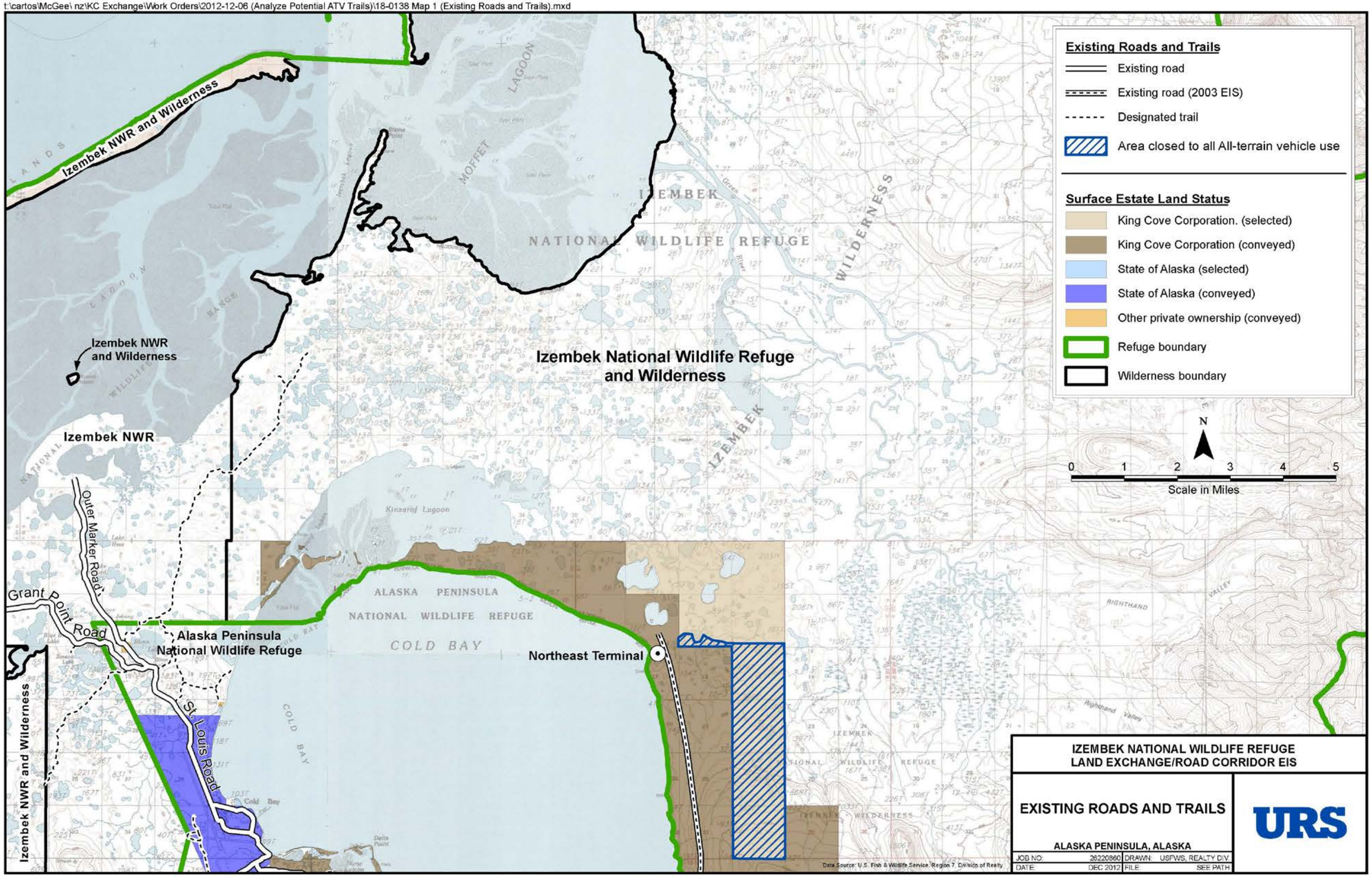


Figure 4.3-3 Evidence of Unauthorized All-Terrain Vehicle Use Between 2005 and 2008.

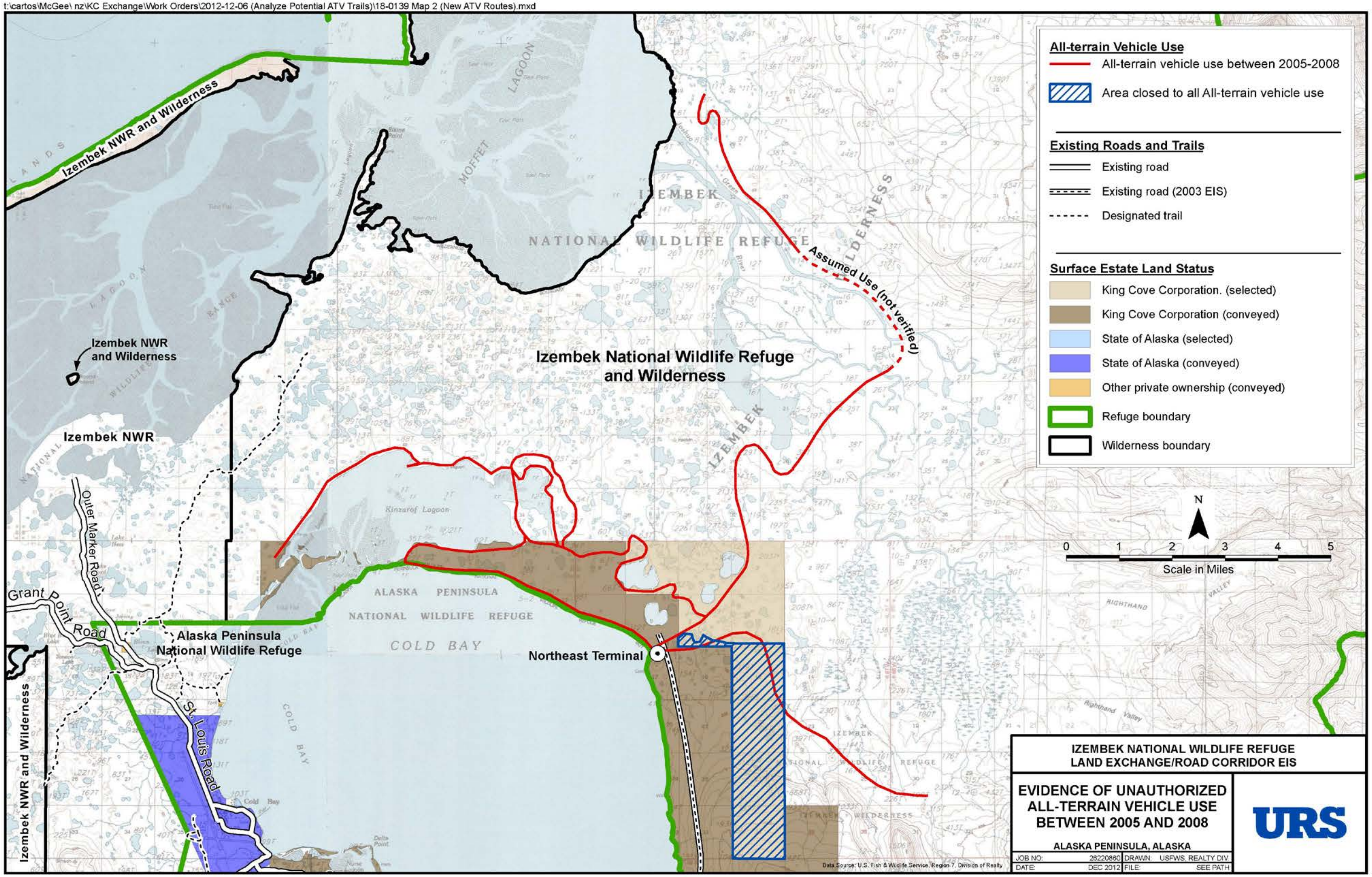
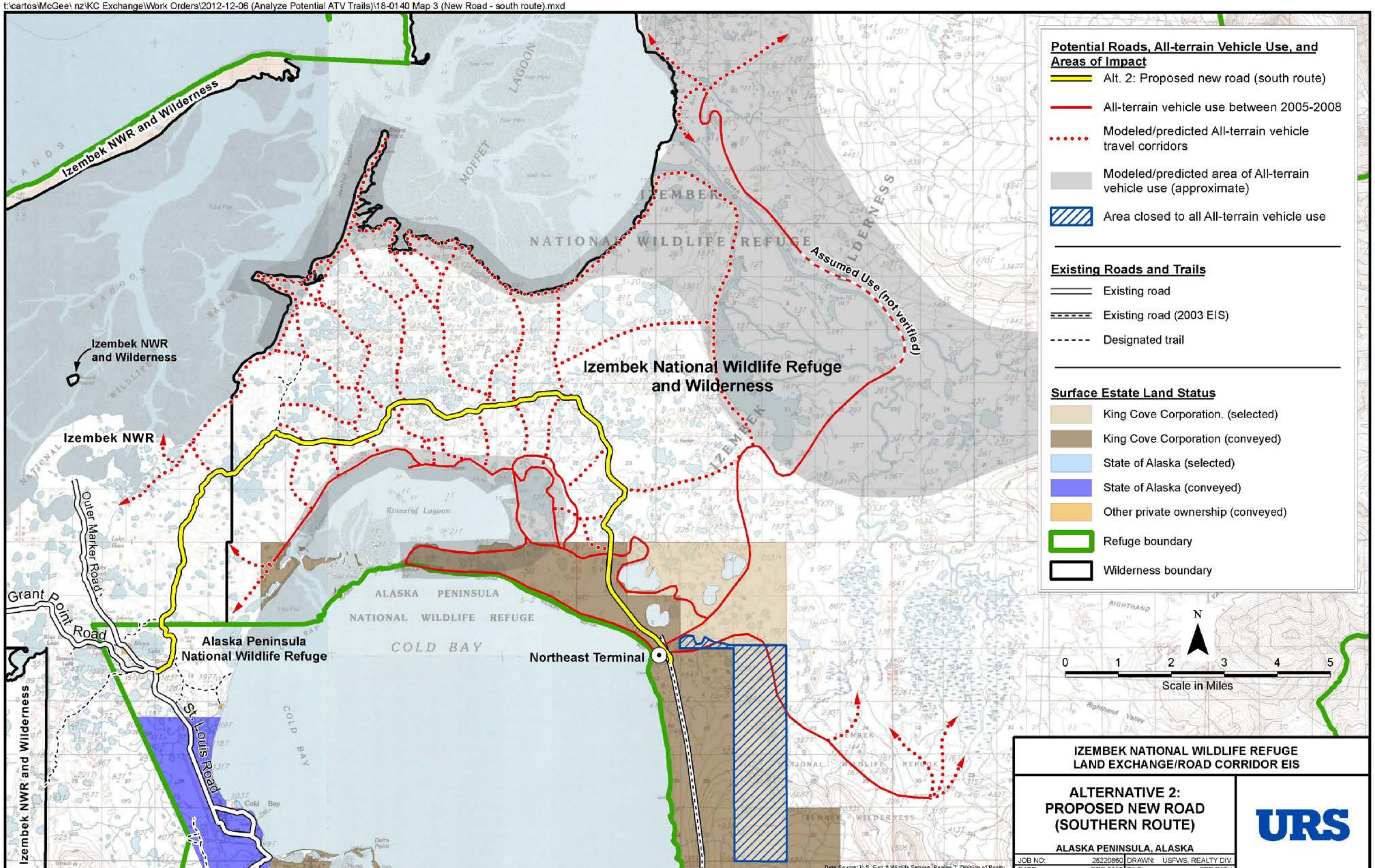


Figure 4.3-4 Alternative 2: Proposed New Road (Southern Route) and Predicted All Terrain Vehicle Use

t:\cartos\McGee\ nz\KC Exchange\Work Orders\2012-12-06 (Analyze Potential ATV Trails)\18-0140 Map 3 (New Road - south route).mxd



Changes in Land Use for Izembek National Wildlife Refuge and Alaska Peninsula National Wildlife Refuge

Three parcels would be transferred to the U.S. to be managed as part of Izembek National Wildlife Refuge and Alaska Peninsula National Wildlife Refuge: Kinzarof Lagoon, Mortensens Lagoon, and the State Parcel. The King Cove Corporation selected land would be retained by the Service and an alternate selection would be made within the Alaska Peninsula National Wildlife Refuge.

The Kinzarof Lagoon and Mortensens Lagoon parcels would become open to public access and use under federal management. Uses on the Kinzarof Lagoon parcel would be restricted to those compatible with wilderness management objectives for Izembek Wilderness and uses compatible with the provisions of ANCSA 22(g). Uses on the Mortensens Lagoon parcel would not be subject to the provisions of ANCSA 22(g). Refer to Section 4.3.3.6 for additional discussion on effects to public use from implementation of Alternative 2.

Current use of the State Parcel is light because access is limited to small airplanes and boats along the coast. Some increase of all-terrain vehicle use is expected over time under Alternative 2 as routes taking off from the road extend past the isthmus to the State Parcel. Under Alternative 2, the State Parcel would be designated wilderness and subject to federal subsistence regulations. Public use is expected to remain light due to the remote location of the parcel.

The new road corridor would pass through adjacent areas currently designated as wilderness, where vehicle travel is generally prohibited, with exceptions as described in Section 1.6.1.2. Uses in the road corridor would differ substantially from the surrounding land use in an area where no improved or maintained roads currently exist and only limited vehicle use is authorized. The road would also bisect the isthmus of the Izembek National Wildlife Refuge with a continuous manmade feature.

Low vegetation, limited topographical relief, and easy access to fish and wildlife resources make the isthmus an attractive location for all-terrain vehicle use once road access is available. The popularity of all-terrain vehicles in the communities of King Cove and Cold Bay and current analysis indicate that if the road is constructed, all-terrain vehicle use in the Izembek Wilderness would increase. From the proposed corridor, nearly the entire wilderness area is within a 20-mile range of most all-terrain vehicles.

Improved access, favorable topography, and shrub vegetation coupled with a harsh climate and slow rates of recovery for soils and vegetation predispose that all-terrain vehicle use would increase quickly and cause erosion which can degrade habitats. The road corridor proposed under this alternative would serve as a starting point for all-terrain vehicle access by subsistence and recreational users from the communities of King Cove and Cold Bay. Based on documented use trends, it is estimated that all-terrain vehicle use would increase with improved road access (illegal and legal) and would be difficult to manage and control.

Damage caused by all-terrain vehicles can be seen as distinct scars in the landscape from great distances. Aerial photography shows scarring of the landscape from all-terrain vehicle use, and as use progresses, these all-terrain vehicle routes have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid wet areas. Upon completion of the hovercraft landing pad in 2005-2006, easy access from the water, and a developed staging area led to marked increase in all-terrain vehicle use in the refuge by 2007 (Siekaniec 2012). Following the pioneering of the future road to the midpoint between the Northeast Terminal and Lenard Harbor, there was noticeably increased all-terrain vehicle use in the refuge by 2011 (Sowl 2008c). Additionally, the road corridor is highly sensitive to disturbance due to the abundance of fish and wildlife which attracts both recreational hunting and subsistence harvest, international importance for several migratory bird species, being the primary route of caribou migration, and its proximity to extremely high bird concentrations on the isthmus.

Under Alternative 2, a web of trails is modeled to grow across the 4-mile wide isthmus providing access to beaches on the Bering Sea/Izembek Lagoon and Pacific Ocean/Kinzarof Lagoon coasts, connecting routes and high points throughout the isthmus and into the Joshua Green watershed and other focal points within the refuge. Under the current situation, these areas are not easily accessible by all-terrain vehicles. Habitat fragmentation and damage would likely occur due to the increase in transecting all-terrain vehicle routes that would develop from the road. Additionally, the southern road alignment would pass through the highest concentration of bird populations on the isthmus, and could be expected to substantially increase wildlife harvest due to ease of access. Increased use could degrade habitats, disturb and displace fish and wildlife populations.

Construction of a road through the isthmus and connecting the communities of King Cove and Cold Bay, as proposed under Alternative 2, would not only connect the two communities, but would likely increase off-road access to refuge lands and fish and wildlife populations along the road corridor.

<u>Changes in Land Use for Parcels Conveyed to the State of Alaska</u>

Road Corridor. Alternative 2 is the proposed southern route for the road corridor, along the south side of the isthmus near Kinzarof Lagoon (see Section 2.4.2). The road would provide continuous, and unprecedented, year-round access adjacent to and into the Izembek Wilderness.

Sitkinak Island. Use of the island is limited because of the expense of access and is not expected to increase in the near future under Alternative 2. The former sites used by the Coast Guard would be managed by the State of Alaska under the *Kodiak Area Plan* for general use, wildlife habitat, or grazing operations. The current plan also includes an option for land disposal for settlement.

<u>Changes in Land Use for Parcels Conveyed to King Cove Corporation</u>

Alternate Land Selection in Alaska Peninsula National Wildlife Refuge. Under Alternative 2, King Cove Corporation would select lands identified for deficiency selections for under-selected ANCSA Corporations. These deficiency lands are west of Cold Bay and are currently managed as part of the Alaska Peninsula National Wildlife Refuge. Once conveyed to King Cove Corporation, this parcel would no longer be managed under refuge regulations and all-terrain vehicle use could be allowed.

Summary

Taking changes in land ownership and land management together, the magnitude of impact would be high for the Service, having a low impact on ownership but a high impact on management, due to the predicted management implications for all-terrain vehicle impacts. For the State, the magnitude would be medium, with low magnitude on land ownership, but a high magnitude change in management responsibilities for the new road corridor. For the King Cove Corporation, the magnitude would be high, due to a larger change in ownership, and a low magnitude change in management. Impacts would be of permanent duration since the change in ownership and management would be permanent. The impacts would have a regional extent since the land exchange would involve changes in ownership and management on large areas of land in multiple locations. The impacts would occur in a unique context since the road would be constructed within the Izembek Wilderness and the parcel fills a unique role in the integrity of the wilderness. The exchange parcels would be designated a wilderness in the Alaska Peninsula National Wildlife Refuge.

The summary impact of Alternative 2 on land use and management would be considered major.

See Sections 4.3.3.6 and 4.3.3.10 for impact summaries of Alternative 2 related to Public Use and Wilderness.

Mitigation Measures

No mitigation measures are proposed for Alternative 2, other than the terms of the land exchange outlined in the Act. In exchange for 201 acres of refuge land and 1,619 acres of federal land on Sitkinak Island, the federal government would receive 41,887 acres of state land and 10,696 acres of King Cove Corporation land. In addition, King Cove Corporation would relinquish its selection of 5,430 acres within the Izembek Wilderness and exercise the same selection right within the Alaska Peninsula National Wildlife Refuge. Under Alternative 2, the federal government would receive more acreage in the exchange than it would convey. Much of the land conveyed to the Service would be designated as wilderness.

Although the road design would include physical barriers and management controls to reduce unauthorized use, these are not assumed to be 100 percent effective. In addition, commercial traffic use of the road would be restricted. Revisions of the Izembek and/or Alaska Peninsula National Wildlife Refuge comprehensive conservation plans would update management guidelines associated with lands acquired in the exchange and adjacent lands.

Cumulative Effects

Relevant past actions would include the entitlement and selection of King Cove Corporation land under ANCSA and the enactment of ANILCA that redesignated the Izembek National Wildlife Refuge and designated the Izembek Wilderness. No other present or reasonably foreseeable future land exchanges or other activities would induce more extensive changes to ownership patterns or altered land management practices.

Past actions that affect land management include all-terrain vehicle use because the road to the Northeast Terminal reaches near the boundary of the Izembek National Wildlife Refuge. Based on history of previous all-terrain vehicle use in the area, it may be assumed that new all-terrain vehicle routes would originate from that point. Eventually, an all-terrain vehicle route could reach the State Parcel from this location. Unauthorized all-terrain vehicle access to the refuge would continue to be a management challenge and could potentially increase under Alternative 2.

While no new personnel are anticipated to be hired to monitor impacts or provide law enforcement, additional demands on these resources are anticipated. Given the nature and implications of the ownership change under Alternative 2, the incremental contribution to cumulative effects related to land ownership is considered major (indeterminate). Due to potential increases in unauthorized all-terrain vehicle use, Alternative 2 could also have a major adverse contribution to cumulative effects on land management.

Effects to Refuge Purposes

To assess the combined impacts of a land exchange upon a national wildlife refuge and determine if the land exchange is generally beneficial for the refuge, the exchange must result in a configuration of refuge lands that improves the ability of the Service to meet the purposes of the refuge and the mission of the National Wildlife Refuge System over the existing ownership pattern. Although the Act allows the Secretary of the Interior to conduct a land exchange for a road corridor across Izembek National Wildlife Refuge, the legislation also states that prior to making a decision the Secretary of the Interior must analyze the impacts of the proposed land exchange and the potential construction of the road.

This section will examine the primary purposes of the Izembek and Alaska Peninsula National Wildlife Refuges as mandated in ANILCA, the Wilderness Act, and assess whether these purposes are achieved under the land configuration resulting from Alternative 2. To do this, the EIS summarizes potential impacts of the proposed land exchange and road construction that specifically influence the Service’s ability to achieve each of the ANILCA refuge purposes. (The pre-ANILCA purposes of the Izembek National Wildlife Refuge and the mission of the National Wildlife Refuge System are effectively covered by the ANILCA purposes and will not be analyzed separately.)

<u>Refuge Purpose (i): to conserve fish and wildlife populations and habitats in their natural diversity, including, but not limited to; the following: ...;</u>

> [Izembek National Wildlife Refuge Unit:] *“waterfowl, shorebirds and other migratory birds, brown bears and salmonoids” [sic]*
>
> [Alaska Peninsula National Wildlife Refuge:] *brown bears, the Alaska Peninsula caribou herd, moose, sea otters and other marine mammals, shorebirds and other migratory birds, raptors, including bald eagles and peregrine falcons, and salmonoids [sic] and other fish.*

Under Alternative 2, the road would pass through the narrow isthmus of the refuge which serves as a land bridge and large mammal corridor connecting the eastern portion of the refuge to the western end of the Alaska Peninsula. For birds, the isthmus is also a corridor, but to be flown over in a north-south fashion at low elevation to connect the eelgrass beds of Izembek Lagoon on the Bering Sea to the eelgrass of Kinzarof Lagoon on the Pacific Ocean. Year-round and increased human access radiating off the road corridor via all-terrain vehicles or pedestrian traffic coupled with the physical damage caused by all-terrain vehicle use on wet soils would have profound effects on wildlife use and habitats of the narrow and mostly undeveloped isthmus of the refuge and on the ability of the refuge to meet the first purpose of ANILCA.

Waterfowl corridor and vulnerability to harvest. Black Brant, Emperor Geese and other waterfowl flying between Izembek and Kinzarof lagoons would be much more accessible to harvest because of easy access off the road either by hunters on foot or all-terrain vehicle-supported (legal or not). Subsistence hunters from King Cove and Cold Bay and recreational waterfowl hunters from Cold Bay would have much easier access to preferred waterfowl habitats on Kinzarof Lagoon and the small peninsulas jutting into Izembek Lagoon. The resident Tundra Swan population will be particularly vulnerable to increased disturbance. Enforcement of hunting regulations, potential conflicts between subsistence and recreational hunters, and monitoring of migratory bird populations would be much more challenging for the refuge under Alternative 2.

Degradation of wet habitats and disturbance by people and all-terrain vehicles. Tundra Swan nesting along Kinzarof Lagoon and the road corridor would be particularly vulnerable to disturbance by people. The road and the predicted spread of all-terrain vehicle routes could effectively remove thousands of acres from potential nesting use by Tundra Swans (see cumulative effects in Alternative 4.3.2.4).

Large mammal corridor. The Southern Alaska Peninsula Caribou Herd, brown bears, and wolves pass through the isthmus as part of their range. These animals would be vulnerable to increased harvest while using the isthmus because of the easy access and visibility off the road. Regardless of regulations, all-terrain vehicle use has been proven very difficult to regulate effectively. Avoidance of the road and all-terrain vehicle corridors by large mammals reduces habitat use and could over time segregate their populations into distinct sub-units.

Expansion of Alaska Peninsula National Wildlife Refuge by Addition of State Lands. Alternative 2 would expand the lands managed by Izembek National Wildlife Refuge with the addition of 41,877 acres in the North Creek Unit of the Alaska Peninsula National Wildlife Refuge. Although these lands offer good habitat for brown bears and caribou and as a result support the first purpose of both Alaska Peninsula and Izembek National Wildlife Refuges, the area of expansion into State Lands would be taken at the expense of impacts caused by the road bisecting the center of the Izembek National Wildlife Refuge. From the creation of the Izembek National Wildlife Range in 1960, the State Parcel was never recommended for inclusion in the Izembek National Wildlife Refuge. The new configuration of lands in Alternative 2 which include the expansion into the State Lands parcel does not offset the impacts of the construction of a road through the center of the Izembek National Wildlife Refuge and the problems that the refuge would encounter in meeting the first purpose of the Izembek National Wildlife Refuge.

<u>Refuge Purpose (ii): to fulfill the international treaty obligations of the U.S. with respect to fish and wildlife and their habitats;</u>

Izembek National Wildlife Range was created in 1960 with a Public Land Order (PLO 2216, 12/6/1960) “as a Refuge, breeding ground, and management area for all forms of wildlife.” The early recognition of the productivity and diversity of wildlife habitats in the Izembek area by the federal government was reinforced also in 1960 by the new State of Alaska, which focused on the importance of the wetlands to migratory birds and created the Izembek State Game Refuge within the boundaries of the Izembek National Wildlife Range.

Since 1960, the Service and the State of Alaska have cooperated on managing the waterfowl and other water birds using the eelgrass beds and wetland habitats surrounding Izembek Lagoon. Particularly noteworthy are Black Brant with more than 98 percent of the world’s population using Izembek Lagoon as a staging area prior to their fall migration to Mexico.

Cooperation between the two entities concerning waterfowl is largely conducted under the framework of the *Migratory Bird Treaty Act of 1918*. Following treaty amendments in 1997, regulations for subsistence bird harvests were established under the purview of the Alaska

Migratory Bird Co-Management Council, operating under authority of the *Migratory Bird Treaty Act* (1918), as amended. Under the *Migratory Bird Treaty Act*, takings are prohibited unless expressly authorized or exempted. Losses from habitat impacts are considered takings under the definition of taking.

Further recognition of the wetlands of the Izembek area came in 1986 under the Ramsar Convention, when the Service and the State of Alaska recommended the Izembek area be designated as a Wetland of International Importance, meeting 6 of the 8 scientific criteria needed to qualify (only 1 criterion is needed for designation). The specific criteria that were met were: 1) volume of waterfowl use; 2) diversity of waterfowl; 3) major flyway populations; 4) outstanding example of wetland types (largest eelgrass beds in North America); 5) scientific research (long-term); and 6) practicality of conservation and management (Service 1986c). The Ramsar Convention promotes wetland conservation throughout the world. It is an intergovernmental treaty with a stated mission of “the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world” (Ramsar Convention 2010).

Under the second ANILCA-mandated purpose, the Service is directed ‘to fulfill international treaty obligations with respect to fish, wildlife and their habitats.’ Regardless of the alternative, the Service will continue to manage to protect the waterfowl and wetlands of the Izembek National Wildlife Refuge. However, the construction of a road through the isthmus separating Izembek and Kinzarof lagoons, the anticipated increase use of the area by humans and especially the habitat damage and easy access caused by all-terrain vehicle use makes this ANILCA purpose more difficult for the Service than under the current situation. The Service would report the change in the condition of the area and potentially conduct a reconsideration of the designation of the area as a Wetland of International Importance.

<u>Refuge Purpose (iii): to provide, in a manner consistent with the purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and</u>

The third purpose of ANILCA for Izembek and Alaska Peninsula National Wildlife Refuges concerns the opportunity for continued subsistence uses. Section 810 of ANILCA requires that the Service evaluate the effects on subsistence uses and needs in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands on National Wildlife Refuges in Alaska. As a result a Section 810 Analysis of Subsistence Impacts can be found in Appendix D and will not be repeated here.

<u>Refuge Purpose (iv): to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the Refuge.</u>

Under Alternative 2, road construction and the subsequent pioneering of all-terrain vehicle trails on largely undeveloped environments would not affect water quantity, but would increase erosion and degrade water quality streams along the road corridor. Direct and indirect effects to hydrologic processes would occur as a result of fill placement in approximately 3.8 acres of wetlands, and the installation of an estimated 162 drainage structures along the road. Indirect effects may occur from the uncontained release of hazardous materials and from stream turbidity generated by streambank construction activities. These effects on water quality would be of high intensity, permanent duration, and local to regional in scope. Since there are no water quality or quantity issues currently on the Izembek National Wildlife Refuge, localized erosion issues along the road and all-terrain vehicle corridors would become a management concern under this alternative.

The addition of new lands into the refuge from the State Parcel and Kinzarof Lagoon parcel and Mortensens Lagoon parcel would bring some additional benefits to the refuge in its ability to manage water quality and necessary water quantity. However, the State of Alaska is reserving submerged lands on the State Parcel and not including them in the land exchange under Alternative 2. Although navigability of the streams and large water bodies on the State Parcel have not yet been determined, it is probable that some streams and adjacent riparian habitats in the State Parcel would remain in State ownership. As a result, the addition of the State Parcel to the refuge under Alternative 2 would provide limited additional benefits to the refuge in meeting the purpose of the refuge to manage water quality and quantity.

Izembek Wilderness Purposes:

(i) *to secure an enduring resource of wilderness;*

(ii) *to protect and preserve the wilderness character of areas within the National Wilderness Preservation System; and*

(iii) *to administer [the areas] for the use and enjoyment of the American people in a way that will leave them unimpaired for futures use and enjoyment as wilderness.*

This section summarizes the ability of the Service to meet the wilderness purpose of the Izembek National Wildlife Refuge. A detailed description and discussion of the nature of wilderness resources and the specific impacts on the Izembek Wilderness are found in Section 4.3.3.10.

For the Service to secure an “enduring resource of wilderness”, the agency must manage the area” to protect and preserve the wilderness character” in order to leave it “unimpaired for futures use and enjoyment as wilderness” by the American people.

Although Alternative 2 withdraws 131 acres from the Izembek Wilderness for a road corridor, it substantially increases acreage to the Izembek Wilderness and a new wilderness in Alaska Peninsula National Wildlife Refuge with the additions of the State Parcel and the Kinzarof Lagoon parcel totaling 44,491 acres. It should be noted that the State of Alaska would not convey the submerged lands in the State Parcel and this potentially could lead to development of these lands within the wilderness. Nonetheless, the addition of 2 new parcels to the existing wilderness clearly supports the first wilderness purpose to secure an enduring resource of wilderness and would be a beneficial effect of Alternative 2.

However, the remaining two wilderness purposes cannot be measured by acres added to the National Wilderness Preservation System. The implementation of Alternative 2 allowing construction of a road through the existing wilderness and the predicted increase access to the wilderness via all-terrain vehicles (legal and illegal) would result in major impacts to the four indicators of wilderness character: untrammeled quality, natural quality, undeveloped quality, and opportunities for solitude or primitive and unconfined recreation. Under Alternative 2, it would be considerably more difficult for the Service to manage the Izembek Wilderness to meet the wilderness purpose of the Izembek National Wildlife Refuge to offset these impacts on wilderness character than under the current land configuration.

The four indicators of wilderness character being used to assess physical impacts to wilderness also serve to represent impacts to the nonuse values associated with wilderness. These 'nonuse' values discussed in detail in Section 4.3.3.10 are considered the 'preservation benefits' associated with the contribution of wilderness to individual and societal well-being and include cultural and historic preservation, spiritual pleasure, personal growth, and bequest values. The 'bequest value' is the 'unimpaired for future uses and enjoyment of the American people' language in the third wilderness purpose listed above. It is assumed that impacts to the four indicators would translate to impacts on nonuse wilderness values. As a result, the effect of Alternative 2 on the ability of the refuge to meet its wilderness purposes as defined by 'nonuse' values is considerably more difficult than under the current land ownership pattern.

Furthermore, because the improved access would eventually affect the wilderness character of the more remote State Parcel, Alternative 2 would clearly not result in a land configuration that would maintain or improve the existing wilderness character of the Izembek Wilderness.

Conclusion

Alternative 2 would have a high magnitude impact on land ownership in the area surrounding Cold Bay, with a reduction in land ownership by the King Cove Corporation, and the State of Alaska, and net increases in land management by the Izembek National Wildlife Refuge and the Alaska Peninsula National Wildlife Refuge. On Sitkinak Island, the land exchange would consolidate state ownership of the island and would have only a low intensity effect on that area. Alternative 2 would result in high intensity impacts on land management, particularly for the Izembek National Wildlife Refuge, which would manage lands adjacent to a road corridor, and the State of Alaska, which would own and manage the road corridor itself. These effects would be regional in nature, permanent in duration, and would affect resources that are unique in context, in that designated wilderness lands would be affected, including the road corridor parcel which fills a unique role in the integrity of the wilderness. The contribution to cumulative effects on land use and management would be major, although mitigated to some degree via restrictions on commercial use of the road and barriers to off-road travel. The overall impact of Alternative 2 related to land use and management is considered major (indeterminate). The summary impact of Alternative 2 on land ownership and land management is a case in which the assessment as beneficial or adverse depends not on a single analytic factor. For the purpose of the EIS, this impact is rated indeterminate and the evaluation of beneficial or adverse will be determined by the decision-maker. For conditions under Section 6406 of the Act which would void the land exchange and return ownership to its status prior to the exchange, see Section 1.2.

Alternative 2 would diminish the ability of the Service to meet the first, second, and fourth of the refuge purposes identified in Public Land Order 2216 and ANILCA. These purposes are:

(i) To conserve fish and wildlife populations and habitats in their natural diversity...;

(ii) to fulfill the international treaty obligations of the U.S. with respect to fish and wildlife and their habitats;

(iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the Refuge.

Alternative 2 would also diminish the ability of the Service to meet the second and third of the refuge purposes identified in the Wilderness Act:

(iv) to protect and preserve the wilderness character of areas within the National Wilderness Preservation System; and

(v) to administer [the areas] for the use and enjoyment of the American people in a way that will leave them unimpaired for futures use and enjoyment as wilderness.

Table 4.3-7 Land Use, Land Management, and Resource Values Comparison for Alternatives 2 and 3

		Existing Condition				Under Alternatives 2 and 3			
Parcel	**Acres**	**Ownership**	**Management Plan(s)**	**Management Regime**	**Resource Values**	**Ownership**	**Management Plan**	**Management Regime**	**Resource Values**
Proposed Road Corridor	Alternative 2: 236 (total) 201 (federal) Alternative 3: 262 (total) 227 (federal)	Federal/Service	Izembek and Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plans	Minimal Management & Enhanced Public Use	No wetlands within the 100' corridor; within Ramsar designation area Caribou migration corridor (winter range) High density brown bear habitat Tundra Swan nesting Habitat for numerous other species Existing roads/trails Federal lands, subject to subsistence provisions of Title VIII of ANILCA Subsistence use area for residents of Sand Point, Cold Bay, False Pass, King Cove	State	Izembek State Game Refuge Plan	Road Corridor in Izembek State Game Refuge	No wetlands filled for road construction; within Ramsar designation area; maximize use of existing footprints Chain/bollard barriers along road may affect wildlife movement Road traffic may disturb wildlife and birds Upgrade to transportation (road) infrastructure and activity increased Road corridor acreage no longer federal, no longer subject to subsistence provisions of Title VIII of ANILCA Public use recreation impacts include greater access and more motorized traffic on road
		Federal/Service		Wilderness	Wetlands within the 100' corridor: 13 acres for Alternative 2 and 9 acres for Alternative 3; Ramsar designation Federal lands, subject to subsistence provisions of Title VIII of ANILCA Wilderness recreation plus the above wildlife values and existing trail and harvest area for subsistence users Subsistence use area for residents of Sand Point, Cold Bay, False Pass, King Cove Unfragmented wilderness; characteristics unaltered No transportation corridor				Wetland acres filled for road construction: 2.7 for Alternative 2 and 1.3 for Alternative 3; Ramsar designation re-evaluated Road corridor acreage removed from designated wilderness New transportation (road) infrastructure; existing trails reconstructed as roads; new activity introduced, including transportation Road corridor acreage no longer federal, no longer subject to subsistence provisions of Title VIII of ANILCA Wilderness characteristics altered. Public use recreation impacts include greater access and motorized traffic on road
		Federal/Federal Aviation Administration	None	Federal Withdrawal for Aviation	No wetlands within the 100' corridor Federal lands, subject to subsistence provisions of Title VIII of ANILCA Transportation (existing road)				No wetlands filled for road construction New transportation (road) infrastructure and activity introduced
	Alternative 2 and Alternative 3 35 acres	King Cove Corporation	None	Private	2 acres of wetlands within the 100' corridor; within Ramsar designation area Recreation uses, plus the above wildlife values and subsistence harvest area				1.1 acres of wetlands filled for road construction (either alternative); within Ramsar designation area New transportation (road) infrastructure and activity introduced
Sitkinak Island	1,619	Federal/Service	Alaska Maritime National Wildlife Refuge Comprehensive Conservation Plan	Minimal Management	No wetlands Harbor seal haulout	State	Kodiak Area Plan	Grazing, Settlement	No wetlands Harbor seal haulout
		Federal/Coast Guard	None	Coast Guard Base	980 acres of wetlands Airstrip, access road and fuel tank site Habitat for mule (Sitka black-tailed) deer, river otter fox, beaver and other small mammals				980 acres of wetlands Airstrip, access road and fuel tank site Habitat for mule (Sitka black-tailed) deer, river otter fox, beaver and other small mammals

		Existing Condition				Under Alternatives 2 and 3			
Parcel	**Acres**	**Ownership**	**Management Plan(s)**	**Management Regime**	**Acres**	**Ownership**	**Management Plan(s)**	**Management Regime**	**Acres**
State Parcels	41,887	State	Bristol Bay Area Plan	General Use	8,571 acres of wetlands Caribou calving High density brown bear habitat Tundra Swan nesting Habitat for numerous other wildlife species	Federal/ Service	Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan	Wilderness	8,571 acres of wetlands Caribou calving High density brown bear habitat Tundra Swan nesting Habitat for numerous other wildlife species Acreage added to federal management and subject to subsistence provisions of Title VIII of ANILCA New designated wilderness
Mortensens Lagoon Parcel	8,092	King Cove Corporation	None	Private	Caribou winter use Tundra Swan nesting Habitat for numerous other wildlife species	Federal/ Service	Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan	Minimal Management	Caribou winter use Tundra Swan nesting Habitat for numerous other wildlife species Acreage added to federal management and subject to subsistence provisions of Title VIII of ANILCA
Kinzarof Lagoon Parcel	2,604	King Cove Corporation	None	Private, subject to provisions of ANCSA 22(g)	Caribou winter use High density brown bear habitat Harbor seal haulout	Federal/ Service	Izembek National Wildlife Refuge Comprehensive Conservation Plan	Wilderness	Caribou winter use High density brown bear habitat Harbor seal haulout Acreage added to federal management and subject to subsistence provisions of Title VIII of ANILCA Acreage added to Izembek Wilderness
King Cove Corporation Selected	5,430	Federal/Service	Izembek National Wildlife Refuge Comprehensive Conservation Plan	Wilderness	Wilderness/selected for conveyance Acreage subject to federal management subsistence provisions of Title VIII of ANILCA Caribou winter use High density brown bear habitat Tundra Swan nesting	Federal/ Service	Izembek National Wildlife Refuge Comprehensive Conservation Plan	Wilderness	Wilderness/no pending land selection Acreage subject to federal management subsistence provisions of Title VIII of ANILCA Caribou winter use High density brown bear habitat Tundra Swan nesting
Alternate Land Selection in Alaska Peninsula National Wildlife Refuge	5,430	Federal/Service	Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan	Minimal Management	Caribou winter use	Private	None	Private	Caribou winter use Acreage removed from federal management, no longer subject to subsistence provisions of Title VIII of ANILCA
National Wildlife Refuge Boundary Adjustment near Blinn Lake	2,514	Federal Aviation Administration and Service	Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan	Federal Aviation Administration and National Wildlife Refuge	Caribou winter use Road/transportation use	State/Federal Aviation Administration	Izembek State Game Refuge Plan	Road Corridor in Izembek State Game Refuge	Caribou winter use Existing Road upgraded No change in federal management status, so acreage remains subject to subsistence provisions of Title VIII of ANILCA, except for acreage of exchange parcel for road corridor.
RCA Parcel (Alternative 3 only)	23	RCA Alaska Communications Incorporated	None	Private	Caribou winter use Road/transportation use	Private/ Transportation Easement	Undetermined	Easement on Private Land for Public Road	Caribou winter use Existing Road upgraded
Kinzarof Lagoon	4,320	State	Bristol Bay Area Plan	General Use	High density staging/wintering for Emperor Goose, Brant and numerous other waterfowl and shorebirds. Critical Habitat for Steller's Eider and northern sea otter	State	Izembek State Game Refuge Plan	State Game Refuge	High density staging/wintering for Emperor Goose, Brant and numerous other waterfowl and shorebirds. Critical Habitat for Steller's Eider and northern sea otter

4.3.3.2 Socioeconomics

Direct Effects and Indirect Effects from the Land Exchange and Construction

The land exchange is not anticipated to have direct or indirect employment effects. Land is owned by the State of Alaska, King Cove Corporation, and the Service. State and federal staffing levels and on-site management by the corporation would remain at a low level.

Construction activities under Alternative 2 would require approximately 30 short-term workers including a contractor's crew and Alaska Department of Transportation and Public Facilities construction administration field staff. These positions would represent about 12 percent of the total resident wage and salary jobs of both communities; however, employment would be temporary and last for the construction period of 200 days total, spread over 2 construction seasons (May to November, 2014 and 2015). Therefore, Alternative 2 would have negligible direct employment effects from construction.

The capital cost for road construction under this alternative is estimated at about $21.7 million (see Chapter 2). Theoretically, the road construction expenses could create additional indirect jobs and income in the local support sector. The extent of the multiplier effect depends on several factors, including the residency of the workers, the value and type of goods and services purchased locally in support of the road construction and most important, the level of development of the local service and supply sector. Given the undeveloped nature of the project area economy, a very small multiplier effect would be expected. Furthermore, most goods and services required in the construction of the road would likely be provided by non-local businesses. Therefore, negligible indirect and induced employment effects from road construction activity would be expected.

The construction activities would be short-term and likely camp-supported. Some construction workers would be residents and would not generate impacts on population. Some construction workers would be nonresidents, but it would be unlikely they would move their families to the area for a short construction season. Because of the short-term nature of the construction jobs, no effect on population is expected from construction of Alternative 2.

The fiscal impacts during construction activities to local governments depend on the source of funding, which could include the State of Alaska or the Federal Highway Administration. For purposes of this analysis, it is assumed that 100 percent of the road construction is funded by grants from the federal government, as is typical in road projects. Therefore, no fiscal effects to local governments from construction are expected.

Summary

Constructing the road would generate short-term employment opportunities in the region, but is not expected to have a permanent impact on population.The effect would be temporary, lasting only the duration of the construction period and low intensity, with less than 5 percent increase or decrease in social indicators (such as employment or housing). Because the cost of constructing the road is assumed to be funded by federal agencies, construction is not expected to affect the Aleutians East Borough from a fiscal perspective. During construction of the road, air travel between the cities of King Cove and Cold Bay would increase according to the transport of construction workers and materials.

Direct Effects and Indirect Effects from Operation and Maintenance

This section discusses the impacts resulting from operations and maintenance of Alternative 2 from several perspectives: a) employment and economic activity, b) population and demographics, and c) fiscal impacts to local governments.

Passenger Trips and Travel Costs

The southern road alignment would provide year round access between the communities of King Cove and Cold Bay, but it could be closed for short durations during winter storms. Freight and most other commercial uses of the road would be prohibited; only passenger trips between the communities would be allowed under the alternative. Taxis, transportation vans, and shared rides are exempted from the commercial prohibition of using the road.

It is important to note that the road would not be completed until 2016, so costs would not change until that time. To make comparisons across alternatives, estimates of construction-based air travel trips (shown in Table 4.2-4) assumed in 2014 and 2015 are not included in the estimate of travel costs in order to allow cost comparisons across all alternatives. Construction-related trips would create a temporary increase in travel demand, which would not be representative of local travel demands.

Table 4.3-8 summarizes the estimated baseline trips and travel cost by mode and group under Alternative 2. In years 2013 – 2015, passengers would only use the air taxi service because no other option would be available for regular travel.

Travel via the southern road would begin in 2016. It is assumed 75 percent of baseline trips would use the road while 25 percent would continue to use the air taxi service. It is also assumed that 100 percent of the 2,000 seafood processing workers, plus 50 other fishery related trips would use the road, because of relatively inexpensive, publicly-available taxi or shuttle options that would likely commence in response to demand. Another 350 remaining fishery trips would be assumed to continue to use the air taxi because of the shorter travel times. Resident and non-fishing related trips using the road would average 2,572 trips between the years 2016 and 2020, or approximately 68 percent of the baseline trips made by this group.

Alternative 2 is estimated to induce additional trips, according to newly created economic activities, and new demand for less expensive inter-community travel. Induced trips are assumed to equal 6 percent of the trips that are forecast for the road. The induced trips and travel costs are shown in Table 4.3-9 along with estimates of total trips and travel costs (i.e., total = baseline + induced). Between 2016 and 2020, induced trips would average 462 per year. Because these trips are optional, the induced trips are viewed as a benefit of the alternative from an economic perspective.

Table 4.3-8 Estimated Baseline Trips and Travel Cost by Travel Mode and Group under Alternative 2, 2013 – 2020 and 2025

Overall Trips and Travel Costs	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Trips and Travel Cost for Passengers using the Southern Road									
Resident and Non-Fishing Road Passengers	-	-	-	2,551	2,561	2,572	2,582	2,592	2,625
Fishery Related Road Passengers	-	-	-	2,050	2,050	2,050	2,050	2,050	2,050
Total Estimated Road Passengers	-	-	-	4,601	4,611	4,622	4,632	4,642	4,675
Total Cost of Road Trips ($ 2010)	-	-	-	142,935	143,381	143,872	144,318	144,764	146,236
Additional Cost of Ground Vehicle Travel ($ 2010)	-	-	-	-	-	-	-	-	-
Estimated Trips and Travel Cost for Passengers using the Air Taxi									
Resident and Non-Fishing Air Trips	3,701	3,710	3,720	1,183	1,187	1,190	1,194	1,197	1,209
Fishery Related Air Trips	2,400	2,400	2,400	350	350	350	350	350	350
Total Estimated Air Trips	6,101	6,110	6,120	1,533	1,537	1,540	1,544	1,547	1,559
Total Cost of Air Trips ($ 2010)	597,935	598,807	599,737	150,243	150,646	150,931	151,298	151,650	152,777
Additional Cost of Ground Vehicle Travel ($ 2010)[1]	47,310	47,372	47,438	12,861	12,890	12,910	12,936	12,961	13,042
Estimated Trips and Travel Cost for Passengers using the Both Modes									
Total Trips Both Modes	**6,101**	**6,110**	**6,120**	**6,134**	**6,148**	**6,162**	**6,176**	**6,189**	**6,234**
Total Cost of Trips for Both Modes ($ 2010)	**645,245**	**646,179**	**647,176**	**306,040**	**306,917**	**307,713**	**308,552**	**309,375**	**312,055**

Note: Trips induced by construction and new demand are excluded. Trips for air travel decline after road construction is complete in 2016. Compiled from ground and air passengers and costs presented in Tables 4.2-4 through 4.2-7. Numbers are rounded. Passenger trips apportioned according to capacity and cost of ground vehicles used by fishery or non-fishery related passengers.

[1] Cost for ground travel to and from the airport terminal from the City of King Cove.

Source: NEI 2012

Table 4.3-9 Induced and Total Trips and Travel Cost under Alternative 2, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Induced Trips and Travel Cost for Passengers Using the Southern Road									
Induced Trips by Resident and Non-Fishing Road Passengers	-	-	-	460	461	462	463	464	468
Cost per Trip ($ 2010)	-	-	-	44.60	44.60	44.60	44.60	44.60	44.60
Travel Costs of Induced Trips ($ 2010)	-	-	-	20,519	20,566	20,612	20,658	20,704	20,853

Note: Numbers are rounded. Passenger trips apportioned according to capacity and cost of ground vehicles used by non-fishery related passengers.

Source: NEI 2012

In order to estimate the costs shown in Tables 4.3-8 and 4.3-9, the type, capacity, and cost of vehicle that fishery or non-fishery related travel would use was assumed. The following shows those elements of the discussion. The number of processor crew related trips in and out of the community of King Cove would not increase in any noticeable way under any of the alternatives, nor would the number of trips increase over time. For the purposes of analysis, it is assumed that processing crew would use hired buses and vans to travel between the City of King Cove and Cold Bay Airport. It is assumed that on average, 20 processing crew members could be transported per trip, and therefore these buses and vans would make 100 round-trips per year on the road. Not including any profits to the shuttle operator, the average cost per bus passenger is estimated to be $13.13 (see Table 4.3-10).

Table 4.3-10 Processing Crew Transportation by Shared Rides in Alternative 2 - 2016

Processing Crew Travel and Cost Under Alternative 2	
Estimated one-way processing crew trips per year	2,000
Average one-way cost per bus passenger ($ 2010)	13.13
Total cost of transporting processing crews by bus ($ 2010)	26,260

Note: Numbers are rounded.
Source: NEI 2012

For the most part, seafood processing managers and technicians will choose to use air taxi services between the City of King Cove and Cold Bay Airport because of their speed and convenience. Air service would be unavailable (due to weather or mechanical delays) about 12.5 percent of the trips. Seafood company managers and technicians (because of their high opportunity costs of time) would likely continue to travel by air between the City of King Cove and Cold Bay Airport, except when air service is unavailable or inconvenient (assumed at 12.5 percent of trips). When the managers and technicians travel by road, it is assumed they would use a sport-utility car service that is presumed to become available once the road is opened. The cost of a hired car between the communities of King Cove and Cold Bay is calculated to be about $70.03 per trip (Table 4.2-6).

An estimated 200 fishing crew and observer trips per year would be taken, with about 25 road trips and 175 air trips between the City of King Cove and Cold Bay Airport under Alternative 2. A large portion of the fishing crew and observer trips are estimated for air taxi servies due to the speed and convenience. When they travel by road, fishing crew and observers are assumed to use shuttles between the two communities at a cost of $46.00 per person. Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 2 are shown for 2016 in Table 4.3-11.

Under Alternative 2, residents and other persons not associated with fisheries are estimated to take an average of 2,551 trips of their 3,734 baseline trips via the road in 2016, the first year the road is open. The remaining 1,183 baseline trips would continue to use the air taxi service. Under Alternative 2, trips via the road for the group are assumed to be split among for-hire cars and private vehicles.

Table 4.3-11 Resident and Other Non-Fishery Transportation in Alternative 2 - 2016

	Travel and Cost Under Alternative 2		
	Road	Air	Both Modes
Estimated one-way resident & non-fishery trips per year	2,551	1,183	3,734
Average one-way cost on primary mode ($ 2010)	44.60	98.00	--
Total cost on primary travel mode ($ 2010)	113,775	115,943	229,718
Additional cost of ground vehicle travel ($ 2010)	0	8,282	8,282
Total cost of travel on all modes ($ 2010)	**113,775**	**124,225**	**238,000**
Total cost per passenger ($ 2010)	**44.60**	**105.00**	**--**

Note: Numbers are rounded. Passenger trips apportioned according to capacity and cost of ground vehicles used by non-fishery passengers. Road travel to airport terminals from the City of King Cove.
Source: NEI 2012.

Employment Effects

Total direct employment is estimated between 1 to 2 jobs for maintaining 17.6 miles of road between the King Cove Airport and the Northeast Terminal area plus the length of the southern road alignment (18.5 miles). Routine road maintenance could be performed year round by the Alaska Department of Transportation and Public Facilities. Alternative 2 is also assumed to create opportunities to expand small scale transportation services with taxis or shuttle services transporting passengers to and from the Cold Bay Airport. Given that the majority of the travel is generated from the City of King Cove to the Cold Bay Airport, it is likely that users of the road would be concentrated around the times of flight arrivals and departures. This provides an ideal situation for shuttle and taxi services to benefit from economies of scale. Between 5 and 9 jobs for drivers of buses, vans, shuttles, and taxis would be generated because of the alternative. The estimated total direct employment effect would be between 6 and 11 full or part-time jobs.

Expenditures on ground transportation services and any realized transportation cost savings residents spend locally would likely generate additional full or part time jobs, such as mechanics or jobs in retail sales. Using IMPLAN, an estimated 1 indirect job would start in 2016, during the operation of the road. Along with the additional demand for ground transportation services, a decrease in the demand for passenger air taxi services between the communities of Cold Bay and King Cove would be expected. Because of the prohibition of moving commercial goods and products over the road, the demand for air transportation of cargo is likely to continue. Because fewer passengers would offset costs, an upward pressure on freight charges is likely. In theory, the savings generated by less expensive ground passenger transportation could be used to cover higher cargo and freight charges. Because of the need to continue to fly cargo and freight, and some passengers (albeit a smaller number of passengers), the number of jobs in air taxi service is not expected to decline dramatically, although there could be a reduction in the number of hours worked. It should be noted that these jobs are currently based in the City of Cold Bay, and any reduction in jobs there may be important given that baseline employment is less than 40 and is trending downward.

Population and Demographics Effects

No effects on population would be expected if the estimated 6 to 12 new full or part-time jobs created as a result of the road were filled by permanent residents. If they were filled by nonresidents, the alternative could lead to an increase in population between 17 and 34 people, assuming the average household size of 2.8 persons in King Cove. This would represent less than a 5 percent change in the total population of both communities.

Fiscal Impacts to Local Governments

It is assumed the State of Alaska would be responsible for the cost of maintaining the road between cities of Cold Bay and King Cove. Therefore, there would be no fiscal effect on the Aleutians East Borough or the local communities.

Summary

Once the road is operational in 2016, the majority of passengers would likely shift from air services to ground transportation between the communities of King Cove and Cold Bay. Each trip by ground would cost a little less than half the cost of air transportation, which would result in cost savings on an annual basis. A low level but permanent net increase in employment in transportation services is expected. It is likely job increases associated with ground transportation services and road maintenance would likely outweigh any job reductions associated with air transportation. The new jobs are generally expected to be filled by local residents and no effect would be expected in population or demographics. Assuming the Aleutians East Borough would not be responsible for maintenance of the new portions of the road, there would be no fiscal impact of the alternative on local governments.

Mitigation Measures

No socioeconomic mitigation measures would be required under this alternative.

Cumulative Effects

The reasonably foreseeable implementation of North Pacific Fishery Management Council regulations would likely increase by 10 the number of observers in the Gulf of Alaska groundfish and halibut fisheries coming through the City of King Cove. Each observer would stay in group quarters at Peter Pan for an average of 2 months during the course of the year. In arriving and leaving, these observers would generate 20 additional person trips per year by any mode. This increase in traffic, combined with the traffic generated by the alternative, would have a negligible contribution to cumulative effects on socioeconomic indicators.

Conclusion

Socioeconomic conditions in the project area, including effects from past actions, are described in Chapter 3 (Section 3.3.6.1). Alternative 2 would reduce consumer transportation costs. There would be few effects to any other socioeconomic indicators. Effects to employment, population, and demographics would be permanent, estimated to last for the life of the project. These effects would be of low intensity, with less than 5 percent change in social indicators (such as housing and employment) and only affect the local area with an estimated increase of 6 to 12 new jobs. Consumer transportation costs would be reduced by an estimated $60.40 per trip between King

Cove and Cold Bay after the Alternative 2 road became operational in 2016, which is less than half the current cost. No fiscal effects to local governments would be anticipated under this alternative. The overall effects to socioeconomic indicators would be minor (beneficial).

4.3.3.3 Transportation

Direct Effects and Indirect Effects from Construction

Under Alternative 2 an 18.5-mile, single lane road would be constructed from the terminus of the permitted road in the Northeast Terminal (under construction) area westward to the boundary of state lands near the community of Cold Bay.

About 1 mile of the route would follow existing roads and 6 miles of new road would be constructed over existing roads and trails. The remainder (12.5 miles) would require a new road footprint. Two temporary barge site landings would likely be required to transport materials, equipment, and supplies into the project area from outside the region. Construction activities would include mobilization, clearing and grubbing, excavation and fill, placement of culverts, and waste disposal using heavy equipment.

Construction of the road could begin in 2014, and take place over approximately two 200-day construction seasons. The estimated $21.7 million project would directly employ approximately 30 construction workers, including those locally hired. Indirect employment would likely temporarily increase slightly, as suppliers build capacity to transport workers, equipment, and materials, as discussed in Section 4.3.3.2, Socioeconomics. This activity would slightly increase road and air traffic in the communities, to and from the barge landing sites, and to and from the airport over the construction period. The road system is limited, and some instances of temporary congestion could occur. Table 4.3-12 reflects an increase in air traffic during projected construction years 2014 and 2015.

During construction, there would be an increased potential for access to Izembek National Wildlife Refuge and other areas by all-terrain vehicles, because the barriers would not be installed at the initial stages of pioneering the road alignment. Potential impacts may be mitigated, as discussed below.

Summary

As described in Chapter 3, surface traffic levels in the communities of Cold Bay and King Cove are relatively low, and the existing road system is limited. Traffic congestion or disruption would occur occasionally during construction. Impacts would be of temporary duration because construction would occur seasonally and end after 2 years.

Direct Effects and Indirect Effects from Operation and Maintenance

The road described in Alternative 2 would be a single lane road with spaced turnout areas, connecting the City of King Cove road system with the existing City of Cold Bay road system near Blinn Lake. The road is expected to be available for year round vehicular traffic access beginning in 2016. Some road closures are expected due to inclement weather. The speed limit would be 20 mph. As shown in Table 4.2–9, the estimated travel time for Alternative 2 is 130 minutes from the City of King Cove to the Cold Bay Airport. Estimated annual Operation and maintenance costs would be $670,000. The lifecycle cost of the road is estimated at about $34.2 million. The useful life of the road, if maintenance continues, could be indefinite, as would be any environmental consequences associated with its presence.

Consumer considerations and cost estimates are shown in Section 4.3.3.2. The travel time of trips is an important parameter for consideration, because it would affect the time that an emergency response would require. It also may influence trip displacements among transportation modes and could be weighed by residents as importantly as cost. Under Alternative 2, over 2 hours would be required to travel between King Cove and the Cold Bay Airport, more time than a hovercraft, aircraft, or ferry for (Table 4.2–8). This alternative would be about half the cost of air travel at about $49 per passenger, and more reliable (98 percent; see Table 4.2-9).

Table 4.3–12 reflects a 10 percent increase in induced demand, and about 500 air taxi trips per year associated with construction in 2014 and 2015. It is anticipated that taxis and private vehicles would increase in the project area, as people take maximum advantage of the lower cost access to the Cold Bay Airport from the City of King Cove. It is unlikely that all air traffic would cease, as the connection time with flights in Cold Bay is also a controlling factor. The estimate assumes the road would displace about 75 percent of air passengers, many of whom would be seafood industry workers (see Section 4.3.3.2, Socioeconomics). However, shipment of air freight would continue at current levels, given that the road would be closed to commercial traffic. By 2020, road passengers in Alternative 2 are estimated at 5,106 annually and air taxi passengers at 1,547. It is likely that vehicle storage and services would be necessary at the Cold Bay Airport, possibly on a fee basis, which could create revenue for a provider near the airport and offset maintenance costs.

Table 4.3-12 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 2

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Alternative 2 Southern Road Route		**Construction**		**Operation**					
Air Taxi Passengers	6,101	6,610	6,620	1,533	1,537	1,540	1,544	1,547	1,559
Road Travelers	0	0	0	5,061	5,072	5,084	5,095	5,106	5,143

Source: NEI 2012.

Summary

Alternative 2 operations and maintenance would result in distinctive changes in transportation options, providing a mostly reliable, nearly always available, and lower cost mode of transportation between the communities of King Cove and Cold Bay. Under Alternative 2, over 2 hours would be required to travel between King Cove and the Cold Bay Airport, more time than a hovercraft, aircraft, or ferry for (Table 4.2–8). This alternative would be about half the cost of air travel at about $49 per passenger, and more reliable (98 percent; see Table 4.2-9). Annual maintenance costs are estimated at $670,000. The 35-year life cycle cost is estimated to be $34.2 million.

Mitigation Measures

As indicated in the Act, Alternative 2 requires the installation of Barriers (MM-V) along both sides on the road to deter vehicular access to the Izembek National Wildlife Refuge. The alternative also requires regular maintenance of the road to ensure safety. Other than taxis and shared rides, no commercial uses of the road would be allowed [Non-Commercial Use (MM-U)], so no displacement of freight from other transportation modes would occur.

Construction practices would be stipulated and enforced to mitigate the effects of construction consequences to the environment. All construction activities would be conducted within a clearly demarcated corridor, and designated staging areas. A construction manager would be on site at all times to ensure implementation and compliance with all environmental mitigation requirements, including public access to the construction site [Compliance/Oversight (MM-R)].

Cumulative Effects

Additional fishery observers operating out of King Cove would increase demand for travel between the King Cove and Cold Bay communities. Direct, indirect, and external demand for access could lead to more surface vehicles on the roads and increase traffic in both communities over the long-term. Additional traffic could instigate further road improvements and new construction within the communities of King Cove and Cold Bay. The contribution of Alternative 2 to cumulative effects on transportation is considered major (beneficial).

Conclusion

Alternative 2 would result in distinctive changes in transportation options, providing a mostly reliable, nearly always available, and lower cost mode of transportation between the cities of King Cove and Cold Bay. The effects of operation of a new mode of transportation are considered high in intensity due to these distinctive changes in the transportation options and costs. The duration of effect is considered permanent because it is estimated that the road would continue to be operated in perpetuity. The extent of the changes is at a regional level, affecting two communities. The context of effects is unique, providing beneficial effects to minority or low income communities. The effects to transportation are considered major (beneficial).

4.3.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

The primary indicators for public health and safety directly impacted by construction in Alternative 2 are related to incidences of potential illnesses, injuries, and fatalities for workers in the EIS project area, and the capability of local clinics to treat workers.

Direct impacts to public health and safety during construction of the road could include illnesses, injuries, and fatalities to road workers. The Occupational Safety and Health Administration reports yearly non-fatal recordable injuries and illnesses by industry type (OSHA 2011). The Occupational Safety and Health Administration reported 4.6 non-fatal recordable injuries and illnesses per 100 equivalent full time employees per year for highway, street, and bridge construction workers in 2009 (OSHA 2009a). It is estimated it would take about 30 full time workers about 200 days to construct the road. This is approximately equal to 16.4 equivalent full time employees per year. Using the Occupational Safety and Health Administration 2009 non-fatal recordable injury and illness incidence of 4.6 per 100 equivalent full time employees per year, approximately 1 non-fatal recordable incident is predicted for construction of the road. Road work has traditionally been associated with relatively high fatality rates (Pegula 2010). The Occupational Safety and Health Administration reports yearly fatalities by industry type. In 2009, there were 72 fatalities (OSHA 2009b) among approximately 312,300 full time highway, street, and bridge construction workers (OSHA 2009a). This Occupational Safety and Health Administration 2009 data corresponds to a fatality incidence of 0.00023 per full time worker per year. Therefore, a 0.4 percent chance of a fatality is predicted for the 16.4 equivalent full time employees per year for construction of the road.

The need to treat more injuries than usual could directly affect operations of the medical clinics in the City of King Cove and City of Cold Bay, which could affect public health and safety in those communities. Indirect effects on public health and safety could include an increased use of limited local medical facilities by out-of-town workers mobilized to build the road thereby reducing the availability of medical professionals and facilities to community residents and/or straining existing medical infrastructure.

Summary

Construction of the proposed road in Alternative 2 could directly affect public health and the safety of road workers and other persons in the EIS project area. Alternative 2 has the potential to impact a small number of people (road and health care workers) in communities throughout the project area, including the City of King Cove which meets the definition of a minority community and a medically underserved area.

Adverse direct effects of the construction phase of Alternative 2 on public health and safety would be low in intensity, potentially affecting a small number of road and health care workers. Effects would be temporary in duration, lasting only the duration of the construction period. Effects would be regional in geographic extent (extending throughout the EIS project area), and unique in context, affecting a minority community and a medically underserved area. The direct and indirect effects of the construction phase of Alternative 2 on public health and safety would be considered negligible (adverse).

Direct Effects and Indirect Effects from Operation and Maintenance

The operation and maintenance phase for this alternative involves the use and maintenance of 18.5 miles of single lane gravel road. The primary indicators for public health and safety directly impacted by operation and maintenance in Alternative 2 are related to (1) safe, reliable, available, and affordable transportation to facilities with advanced medical care not available to the King Cove community, including for emergency medical evacuations and (2) incidences of injuries and fatalities during use and maintenance of the road.

Under Alternative 2, persons in the City of King Cove who require specialized medical care would have more opportunities to travel to the Cold Bay Airport than by marine or air transport, even assuming the road would be closed occasionally due to snow. Under normal conditions, the trip to the Cold Bay Airport would take approximately 130 minutes (assuming a driving speed of 20 mph), as shown in Table 4.2-8. Hazardous conditions would likely slow transit time and lead to occasional closure of the road, possibly a few days per year. Under Alternative 2, medical evacuation patients could reach the Cold Bay Airport with few delays, depending upon weather conditions, and the transportation process could be safer when the road is used. When there are no delays and weather conditions are not adverse, the other current types of medical evacuation transport (air) could be just as safe, but faster, than predicted for motor vehicle transport.

Persons in the King Cove community would benefit from the availability of relatively safe and reliable transportation mostly 24 hours a day, 7 days a week throughout the year via the southern road alignment, but would not be precluded from using the other forms of medical evacuation transport. Depending on the weather, and the availability of the various modes of transportation, the best mode of transportation (road, plane, boat, and helicopter) could be selected for each specific medical evacuation incident. In addition, the road would allow emergency crews and vehicles from the City of King Cove and the City of Cold Bay to assist one another.

The National Highway Traffic Safety Administration provides yearly estimates of fatalities that occur on rural roads in Alaska. In 2008, 48 fatalities occurred from driving on rural roads in Alaska (reported as 2.01 fatalities per 100 million miles driven on rural roads, which corresponds to about 1 fatality per 50 million miles) (NHTSA 2011). In 2010, there were 64 medical evacuations (10 medical emergencies and 54 urgent referrals to Anchorage for care that were not emergencies) from the King Cove Clinic to the Cold Bay Airport (EAT 2010). If the driving distance from the King Cove Clinic to the Cold Bay Airport via the southern road alignment is assumed to be 43 miles (86 mile round trip), then 64 medical evacuations per year would require about 5,530 miles of driving per year. At that rate, medical evacuations would need to be conducted for approximately 9,042 years to drive 50 million miles (the distance of driving on rural roads in Alaska associated with a single fatality in 2009). Non-fatal accidents are much more common.

Alternative 2 could have a direct beneficial impact on public health (e.g., for specialized medical care referrals and public safety (e.g., for those who transport patients during medical evacuations). Alternative 2 would primarily impact the City of King Cove which meets the definition of a minority community and medically underserved area.

The road may also be used for purposes other than medical evacuations. The potential direct impacts of these other uses of the road on public health and safety (i.e., primarily related to injuries and fatalities from driving) would depend on how often the road is used, whether people drive on the road at a safe speed, whether the road would be patrolled, and how much road maintenance is required. A small percentage of drivers exceeding the safe operating speed is common for most roads. The incidence of motor vehicle accidents would likely increase if people use the road to travel between the City of King Cove and the City of Cold Bay, instead of traveling by sea or air. If a maximum annual average of 35 vehicles traveled on the road each day, as estimated in the 2003 EIS for a round trip distance of about 86 miles, that number of vehicles and distance would correspond to about 3,024 miles driven per day and over 1.1 million miles driven per year. Some maintenance of the road would also be necessary, including routine maintenance (periodic inspections and repair of the road and associated structures, including bridges, culverts, barrier, and signage) and snowplowing which could impact public safety if workers are injured. The need to treat more injuries than typical could directly affect operations of the medical clinics in the City of King Cove and City of Cold Bay, which could affect public health and safety in those communities.

Residents of the City of King Cove have stated that improved access to the Cold Bay Airport would enhance their quality of life by providing reliable access to needed medical services. Road access would provide peace of mind, particularly during extended periods of inclement weather that prevent marine and air travel to Cold Bay Airport. The residents believe that a road would give them a sense of control and independence, because they could transport injured friends or relatives by motor vehicle if other forms of transportation were not available.

As discussed in Chapter 3, the City of King Cove has a small police department. The City of Cold Bay does not currently have a police force and there are no state troopers or federal law enforcement officers based in the communities of King Cove or Cold Bay. While no new personnel are anticipated to be hired to monitor impacts or provide law enforcement, additional demands on these resources are anticipated.

Summary

Alternative 2 would meet the overall project purpose of a long-term, available, safe and reliable, year round transportation link between the cities of King Cove and Cold Bay. The operation and maintenance phase of Alternative 2 could beneficially directly impact public health and safety for persons who need specialized (non-emergency) or emergency medical care not available in the City of King Cove. Increased travel by road between the communities of Cold Bay and King Cove could increase the incidence of motor vehicle accidents. This in turn could directly impact local medical care facilities and law enforcement agencies. There is no federal, state nor local law enforcement in Cold Bay, and the only law enforcement is the City of King Cove.

Operation and maintenance of the proposed road in Alternative 2 could directly affect public health and the safety in the EIS project area by providing a mostly reliable, year around alternative to access the Cold Bay Airport.

Direct effects of the operations and maintenance phase of Alternative 2 on public health and safety would be medium in intensity, with observable changes in access to medical care not available in the City of King Cove and a potential increase in motor vehicle accidents during the operation phase. Effects are considered permanent in duration, with operation of the road anticipated in perpetuity. The geographic extent of effects would be regional (affecting two or more communities), and unique in context (affecting a minority community and medically underserved area). The direct and indirect effects of the operation and maintenance phase of Alternative 2 on public health and safety would be considered major (beneficial).

Mitigation Measures

Standard Health and Safety Practices (MM-T) would help mitigate the potential public safety impacts to workers during construction of the road. Practices related to construction such as inter-visible turnouts for passing (i.e., turnouts that are located the required distance apart where a driver in a vehicle in a turnout can visibly identify a vehicle in the other turnout and vice versa), proposed cut slopes flattened throughout to mitigate snow drifting, limited maximum road grades, maintenance (periodic inspections and repairs of the road and associated structures, including bridges, culverts, barrier, and signage), and use (20 mph speed limit) of the road would help mitigate the incidence of motor vehicle accidents [Road Design (MM-W)]. Regular patrols of the southern road alignment by law enforcement would also help mitigate the incidence of motor vehicle accidents that are due to specific driver behaviors, such as drunk driving or speeding. However, no new personnel are anticipated to be hired to monitor the proposed road.

Cumulative Effects

Past and present actions affecting public health and safety are described in Chapter 3 (Section 3.3.4). No reasonably foreseeable future actions would affect public health and safety. Driving in the project area is currently limited to local roads in the cities of King Cove and Cold Bay. The addition of 12 miles of the King Cove Access Road access and potentially 18.5 miles of new road through the southern road alignment could add to the amount of driving occurring in the King Cove and Cold Bay communities, and could increase the number of motor vehicle accidents.

The City of King Cove has a small police department, and the City of Cold Bay does not currently have a police force. At this time, there are no other law enforcement to patrol and respond to accidents on the 12 miles of access road (under construction) to the Northeast Terminal area, and the proposed 18.5 miles of new road through the southern road alignment. While no new personnel are anticipated to be hired to provide law enforcement, additional demands on these resources are anticipated.

Conclusion

Alternative 2 would result in direct and indirect effects of the construction phase on public health and safety. Standard practices related to worker health and safety could help mitigate the public safety impacts to road workers.

The operation and maintenance phase of Alternative 2 would benefit the King Cove community due to the availability of mostly safe and reliable transportation to advanced medical services.

Adverse impacts to public safety associated with Alternative 2 include a potential increase in motor vehicle accidents in the project area. Specific practices in road construction, maintenance, and use would help mitigate motor vehicle accidents. Regular patrolling of the southern road alignment would also help mitigate motor vehicle accidents due to specific driver behaviors, such as drunk driving or speeding. While no new personnel are anticipated to be hired to provide law enforcement, additional demands on these resources are anticipated.

Effects of Alternative 2 on public health and safety would be medium in intensity, with observable changes in access to medical care not available in the City of King Cove and a potential increase in motor vehicle accidents during the operation phase. Effects are considered permanent in duration, with operation of the road anticipated in perpetuity. The geographic extent of effects would be regional (affecting two or more communities), and unique in context (affecting a minority community and medically underserved area). The overall impact of the operation and maintenance phase of Alternative 2 on public health and safety would be considered major (beneficial).

4.3.3.5 Environmental Justice

Direct Effects and Indirect Effects from Construction

Construction of the road under Alternative 2 could result in some illness, injury, or fatality of road workers and indirectly affect residents from increased use of limited local medical facilities during the construction phase of the project. Impacts to subsistence resources would occur within the road corridor due to the presence of heavy equipment and construction noise for the two seasons of construction. The small scale of the road construction project would not increase the permanent population of subsistence and non-subsistence users; therefore there would be no increase in competition for subsistence resources.

Summary

Construction associated with Alternative 2 could result in illness, injury, or fatality of road workers. Construction might also impact subsistence resources within the road corridor due to the presence of heavy equipment and construction noise.

Direct Effects and Indirect Effects from Operation and Maintenance

Public health and safety indicators for Alternative 2 include reliability and consistency of the transit method, travel times, and incidences of injury or fatality during use and maintenance of the road. King Cove residents would receive relatively safe and reliable transportation mostly 24 hours a day, 7 days a week throughout the year via the southern road alignment, but would not be precluded from using the other forms of medical evacuation transport. The travel time using the southern road alignment is greater than non-road alternatives, but the road would be a reliable and consistent transit method with road closures only occurring a few days per year.

The presence of a road barrier could alter caribou movement, but this would not result in a noticeable change in rates of harvest. The road would provide subsistence access improvements while also increasing competition for resources from non-subsistence (sport) hunters.

Summary

Operation and maintenance associated with Alternative 2 would have direct and indirect effects on human health by increasing the reliability and consistency of transit to Cold Bay Airport, with access to advanced medical facilities. Operation and maintenance would improve subsistence access.

Mitigation Measures

Standard practices of Road Design (MM-W), worker Standard Health and Safety Practices (MM-T) during road construction would help mitigate the incidence of motor vehicle accidents.

In consultation with regional subsistence resource users, limiting construction during specific days would allow for subsistence harvests and using safety guards would help reduce impacts to subsistence access [Access to Subsistence Harvest Areas During Construction (MM-Q)].

Cumulative Effects

The addition of 12 miles of the King Cove Access Road access and potentially 18.5 miles of new road through the southern road alignment would create a road network offering a mostly reliable, year round mode of access to Cold Bay Airport, with access to advanced medical facilities. Together these projects would have a positive effect on public health.

Past, ongoing, and reasonably foreseeable future actions are estimated to have a minor impact on subsistence resources and use patterns. Alternative 2 could contribute cumulative effects to subsistence by displacing subsistence resources, improving access to subsistence resources, and increasing competition for subsistence resources.

Conclusion

Alternative 2 would provide a more reliable mode of transport than Alternative 1 that would be available year-round with few exceptions. Additionally, Alternative 2 would improve subsistence access for the minority and low-income communities of King Cove and Cold Bay. Alternative 2 would have no disproportionate adverse impact to minority or low-income communities.

4.3.3.6 Public Use

Direct Effects and Indirect Effects from the Land Exchange

Road Corridor

Under Alternative 2, the land exchange would transfer 201 acres of the Izembek National Wildlife Refuge (131 acres of which is designated wilderness) to the State of Alaska. The majority of the exchange parcel consists of an undeveloped setting for public uses; the western reaches of the corridor presently accommodate low density dispersed public uses from existing roads and trails (Section 3.3.6). The setting and public uses on the undeveloped portions of the parcel would be notably altered with the implementation of Alternative 2; the setting would become a roaded environment and the frequency of public use in the parcel would increase substantially due to road access. Refer to Section 4.3.3.10 for a description of effects to wilderness and wilderness visitors and to Section 4.3.3.7 for more detailed information about the effects to subsistence users.

The setting in the western reaches of the corridor would also be altered, but public uses would likely be similar to the current situation because modes of public access would not be substantially changed in this area. There may be some increase in the amount of use as residents of King Cove would have road access to the entire Izembek National Wildlife Refuge road and trail system. As commercial use of the road would not be allowed, there would be no increase in commercial recreation (e.g., guided hunting, fishing, or wildlife observation related to the road).

Sitkinak Island

Lands within the Alaska Maritime National Wildlife Refuge would be transferred to the State of Alaska (see Section 4.3.3.1). Under current Coast Guard management, no public use of the Sitkinak Island parcels is permitted. However, under state management, public access would be allowed and the lands would be managed to support grazing and a variety of public uses, including recreation. Given the remote location and difficulty to access, little, if any, public use, beyond the uses already occurring on Sitinak Island would be anticipated.

State Parcels

The state-owned parcels (41,887 acres) are remote, and generally not considered suitable for development by the State of Alaska, and are managed for general use. Not included as a part of the parcels are tidelands and submerged lands along the coast and the beds of inland navigable waters within and adjoining the parcels. After the land exchange, the new refuge lands would be designated as wilderness within the Alaska Peninsula National Wildlife Refuge. Current public use includes hunting, trapping, and some fishing; and other related recreational activities (Meehan 2010). These public uses would be allowed under federal ownership and management. These uses have been found to be compatible with refuge purposes and the mission of the National Wildlife Refuge System. Access to the parcels would not be affected by Alternative 2; the frequency, density, and types of public uses would not be altered. While refuge and wilderness designation would not affect the types of uses currently occurring, future options for public use, such as opportunities to use off road vehicles for general public access and other uses that are not appropriate in wilderness would not be allowed.

Corporation Lands

Land owned by King Cove Corporation is currently accessible to King Cove Corporation shareholders and others holding a permit. Transfer of ownership to the Service would open access to all. Hunting, trapping, fishing, and other recreational activities would not require a permit or fee. Special use permits for hunting guides, commercial air taxis, filming, and research could be authorized.

The Mortensens Lagoon parcel (8,092 acres) would be transferred to the Alaska Peninsula National Wildlife Refuge. The cabins that would be acquired along with land at Mortensens Lagoon (Section 3.3.7) may continue to be used. In accordance with regulations in 50 CFR 36.33, the Service would consider: permits to use the cabins for subsistence purposes, establish the cabins for public use, use the cabins for administrative purposes, or remove the cabins. Some of these cabin options would require amending the Izembek National Wildlife Refuge Comprehensive Conservation Plan.The most popular areas for public uses would likely be those in close proximity to existing roads and trails.

The Kinzarof Lagoon parcel (2,604 acres) and King Cove Corporation selected parcel (5,430 acres) would be added to or retained in (respectively) Izembek Wilderness. Future public use of these lands would be similar to that described for the Mortensens Lagoon parcel. The most popular areas for public use would likely be those in close proximity to existing roads and trails.

An alternate selection of approximately 5,430 acres would be conveyed to the King Cove Corporation from Alaska Peninsula National Wildlife Refuge. Use of those lands would be at the discretion of the King Cove Corporation if they are conveyed.

Summary

The change from state and private to federal ownership represents approximately 52,583 additional acres available for public use under federal refuge management. In addition, the King Cove Corporation selected parcel (5,430 acres) would be retained as part of the Izembek Wilderness and continue to be available for general public use. The corporation would select other lands (non-wilderness) within the Alaska Peninsula National Wildlife Refuge, which would not be available for public use without authorization from King Cove Corporation.

The transfer of over 40,000 acres of state lands to federal management would not make additional lands available for public access and would not result in changes in current uses, but the management of activities on those lands would change. Over 10,000 acres of private lands would be transferred to federal management and would become available for general public use. The transfer of state and private lands to federal management would restrict activities to those allowed in a wilderness or national wildlife refuge, but the types of activities would be similar to existing activities on these lands (e.g., berry picking, hunting, fishing, wildlife viewing, photography, and hiking).

The transfer of federal lands to the state would shift public use of undeveloped lands to public use of the transportation corridor. The change to a transportation corridor would be a high intensity impact because it would provide road access to an area that is currently unroaded and would change the wilderness character of the area. Wilderness recreation opportunities would no longer be available in the immediate area of the road, clearly changing the type of public use. While the activities would be similar (e.g., hunting, fishing, and wildlife observation), the setting would be completely altered. While currently a wilderness; if the land exchange is approved and a road is constructed, the area would provide a roaded setting with the sights and sounds of humans prevalent and opportunities for primitive recreation and solitude no longer available in proximity to the road corridor. Based on an analysis of potential impacts from all-terrain vehicles (Section 4.3.3.1), refuge visitors would likely experience the sights and sounds of all-terrain vehicles and their tracks throughout the isthmus and into the refuge with ever increasing areas of disburance and further diminishing the wilderness setting.

The transfer of all lands is assumed to be a permanent action, with the road operated in perpetuity. (The Act contains reversion clauses for the land transfer if a road is not constructed within specified time limits.) Impacts are considered extended in context for public use, as implementation of Alternative 2 would affect populations beyond the region or EIS project area. Refuge visitors include residents of the local communities, other Alaska residents, and visitors from throughout the nation and world. The affected resource is considered important in context for public use, as the affected resource is managed as a national wildlife refuge, and the isthmus area fills a rare ecosystem role in the area. The direct and indirect effects on public use from the land exchange would be major (indeterminate).

Direct Effects and Indirect Effects from Construction

During construction, the road corridor proposed for exchange would be temporarily inaccessible to the public for all uses. Similar disruptions in public use were reported during road construction to the Northeast Terminal area on King Cove Corporation lands. The Aleutians East Borough reported that added security and construction timing work to avoid disruption of subsistence activities (e.g., berry picking) near the road (AEB 2011b) mitigated some adverse effects to public use. Public use of the other parcels proposed for exchange would not be affected during construction within the southern road alignment.

Construction of the road under Alternative 2 would disrupt public use activities, such as berry picking, hunting, and wildlife observation and photography during the period of construction. As discussed in previous Chapter 4 sections, effects to public use on lands adjacent to the corridor would include construction noise, the presence and operation of construction equipment, dust, erosion and run-off, disruption of fish and wildlife and wilderness values. The effects of noise and the presence of dust would be localized to areas adjacent to the road corridor. Visitors seeking a wilderness experience would be affected by the sight of dust, and the presence and operation of heavy equipment which would be visible from a greater distance. Wildlife disruption, erosion, and run-off would temporarily impact hunting, trapping, fishing and general recreation.

Summary

The direct and indirect effects to public use from construction of Alternative 2 would include temporary displacement of users in the vicinity of the road corridor. Other effects related to the presence of the road would be permanent. Effects would be at a medium intensity, potentially affecting favored times for access favored sites in the vicinity of the road corridor. Important resources, including traditionally accessed public use sites, could be affected but impacts would be local, limited to discrete portions of the project area. Effects to public use could be reduced through implementation of mitigation measures.

Direct Effects and Indirect Effects from Operation and Maintenance

During road operation, the public use of the road corridor lands would change from public recreation use (e.g., waterfowl hunting, wildlife observation) to transportation use. The southern road alignment would not eliminate these activities, but would geographically displace the activities, alter the experience, and provide new access to Kinzarof Lagoon by foot. The increased public access provided by the road would increase frequency and density of public use in the vicinity of the road corridor, including the surrounding Izembek Wilderness. It would also increase the potential for access by all-terrain vehicles as described in Section 4.3.3.1. Public use of the other parcels proposed for exchange would not be affected by operation and maintenance of the southern road alignment.

Summary

The direct and indirect effects to public use from operation and maintenance of Alternative 2 would include permanent displacement of former public uses from the road corridor and introduction of transportation use. The setting and resource condition would be permanently altered. Wilderness-oriented visitors would find settings altered within and adjacent to the road corridor. Those visitors desiring increased access would find opportunities to visit areas of the refuge previously difficult to reach, accessible. All users would likely be affected by increased use of all-terrain vehicles from the road corridor. Those seeking traditional wilderness experiences would have to travel further away from the road corridor and potential network of unauthorized all-terrain vehicle routes to avoid the sights and sounds of vehicles.

Mitigation Measures

Issues of trespass or inappropriate use of the southern road alignment would be mitigated by the Road Design (MM-W) and maintenance of the road through use of signs and Barriers (MM-V), but it is acknowledged that this will not be sufficient to keep all vehicles on the road.

Additional mitigation measures to address the need for monitoring of vehicle trespass in the Izembek National Wildlife Refuge and Izembek Wilderness and other illegal actions on federal lands are unlikely in view of budget constraints.

Construction work could be timed and security provided to accommodate traditional activities (e.g., berry picking) near the construction corridor [Access to Subsistence Harvest Areas During Construction (MM-Q)].

Cumulative Effects

Past and present actions affecting public use are described in Chapter 3 (Section 3.3.6).

Public use of all-terrain vehicles on the isthmus between Kinzarof Lagoon and Izembek Lagoon has been documented in a photographic survey by the U.S. Geological Survey (Anthony n.d.) and by refuge staff (Sowl 2004, 2008, 2011). This is discussed in Chapter 3. It is assumed, based on historic trends, that an indirect effect of Alternative 2 would be increased use of all-terrain vehicles in restricted areas during road construction, operation, and maintenance. The level or intensity at which this would occur is unknown, but the extent of the disruption would likely be throughout much of the refuge as described in Section 4.3.3.1. The public uses that could be affected include berry picking, fishing, hunting, photography, bird watching, and general wilderness-oriented recreation. The contribution to cumulative effects would be minor (indeterminate).

Conclusion

The presence of a road provides continuous and unprecedented access across the isthmus, and would have widespread permanent impacts to public use of the refuge and surrounding lands. The immediate area of the new road would change from undeveloped wilderness to a non-wilderness road corridor. Wilderness users would likely be displaced or find their experiences vastly different within the road corridor and for some distance from the road corridor. In addition to the sights, sounds, and increased access from the road, visitors would likely encounter all-terrain vehicles or evidence of their presence (trails and tracks). People seeking a wilderness experience would find these impacts adverse. People desiring easier access to the refuge would find the presence of a road a benefit and would likely view it positively. While the road would improve access within the region, particularly between the communities of King Cove and Cold Bay, the road is not likely to cause an increase in the number of visitors accessing the area from outside the region because the road would not connect with other surface transportation modes. Residents of the City of Cold Bay would have road access to more of the refuge; conversely residents of the City of King Cove would have road access to parts of the refuge previously inaccessible to them unless they traveled first to the City of Cold Bay. It is anticipated that increases in recreational use of the road corridor would largely come from local residents using the road for access. The land exchange and subsequent operation of the road would cause permanent changes to public use throughout much of the refuge.

The transfer of over 40,000 acres of state lands to federal management would not likely affect public access to these lands. However, the management of activities on those lands would change. Over 10,000 acres of private lands would be transferred to federal management and would become available for public use. The types of public uses on the lands transferred from state and private ownership would be similar to existing activities on these lands (e.g., berry picking, hunting, fishing, wildlife viewing, photography, and hiking). Approximately 5,430 acres would be retained for public use as Izembek Wilderness and not conveyed to the King Cove Corporation; the corporation would select other lands (non-wilderness) within the Alaska Peninsula National Wildlife Refuge which would not be available for public use without permission from King Cove Corporation.

Alternative 2 would alter public use throughout much of the refuge with the most intense changes occurring within and immediately adjacent to the road corridor. Increased all-terrain vehicle access to the refuge would likely affect public use opportunities along the routes identified in Figure 4.3-4. The effects on public use from the land exchange would be major (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.3.3.7 Subsistence

Direct Effects and Indirect Effects from the Land Exchange and Construction

Under Alternative 2, the southern road alignment, direct impacts would occur to subsistence resources and uses as a result of construction of the 18.5-mile single lane gravel road segment from the Northeast Terminal to the state land boundary just north of the community of Cold Bay. Approximately 6.0 miles of road construction on the western portion of the alignment would include existing roads and trails. Construction of the road under this alternative would likely extend over 2 seasons. The road construction could occur between May and November, with specific construction windows dictated by permit stipulations and mitigation requirements. During construction, subsistence resources (especially waterfowl and caribou) could potentially be displaced by the presence of heavy equipment and construction noises. Salmon could be temporarily displaced during culvert placement. Access to subsistence resources for harvest could be limited during construction to protect public safety. However, mitigation measures could allow for specific days to be established when construction activities are limited to allow for subsistence harvests. Alternatively, security personnel or a safety guard could be used to ensure safe access to resources during construction.

The proposed road construction would not be expected to increase competition for subsistence resources, since the scale of the proposed road is such that a small workforce, assumed to include local hires as much as possible, would not be expected to bring a new permanent workforce to the region. Construction activities are likely to displace subsistence users during the construction period. The impact would be low in intensity (perceptible, but at low level) and temporary in duration, lasting only the length of the construction periods. The effects would be local (limited to discrete portions of the project area) to regional (throughout the project area) in extent, and affecting resources that are common to important in context. The estuarine waters of Izembek and Kinzarof lagoons provide food and shelter for many avian migrants, including the spring and fall staging areas for almost the entire world population of Pacific Black Brant. The habitat value of these lagoons led to the establishment of the Izembek National Wildlife Refuge, and to designation as a Wetland of International Importance under the Ramsar Convention in 1986. These resources would be rated important in context.

Also under Alternative 2, the execution of the land exchange would result in changes in ownership and management, and these changes in land status also affect the associated subsistence management programs as described in Section 4.3.3.1 and summarized below:

- King Cove Corporation would convey its interest in the surface estate of approximately 10,696 acres (the Mortensens Lagoon and Kinzarof Lagoon tracts) to the U.S. These parcels would become federal public lands and would come under the federal subsistence management program (further described in Section 3.3.7.1), and represent an addition to the current acreage under the federal subsistence management program.
- The King Cove Corporation selection of 5,430 within the Izembek Wilderness would be relinquished and replaced by an equivalent selection of acreage elsewhere in the Alaska Peninsula National Wildlife Refuge. This represent no net change in acreage under federal management and therefore under federal subsistence management.

- The State would convey the surface and subsurface estates of the uplands of 2 townships containing approximately 41,887 acres to the federal government, for inclusion as wilderness in the Alaska Peninsula National Wildlife Refuge. As additions to federally managed lands, this acreage would come under federal subsistence management.
- The U.S. would convey approximately 201 acres of refuge lands for the proposed road alignment (southern alignment), and these lands would become state managed lands, subject to state subsistence management.

In all, the land exchange would result in a net addition of 52,382 acres to federal management by the Izembek and Alaska Peninsula National Wildlife Refuges, and this new acreage would be subject to the federal subsistence management program under Title VIII of ANILCA. The state subsistence management system treats non-commercial harvest by all Alaskans as a subsistence use, while the federal subsistence priority provides a priority for rural residents. This difference is most important in regions of the state where subsistence resources are subject to considerable competition between urban and rural users. In those cases, the federal subsistence priority on federal public lands can provide an important advantage to rural subsistence users. In a remote area like the Cold Bay region, the distance from urban centers means generally that few urban residents come to the region to harvest wildlife, and there is less competition for resources. The parcels proposed to become federal lands and qualify for federal subsistence management are likely to see negligible changes in subsistence use patterns as a result of the land exchange.

Fall waterfowl harvests in the Cold Bay vicinity could be a partial exception, in that the waterfowl resource is an important draw for non-local hunters. Under a different federal regime based on the *Migratory Bird Treaty Act*, local rural residents have longer seasons, and the land exchange would cause minor, if any, effects on harvest patterns.

Summary

The land exchange and construction phase of Alternative 2 would have low intensity, with durations from temporary for construction (lasting only the length of the construction periods) to permanent for changes in land status. The geographic extent of impacts would range from local for construction to regional for the changes in land status, and affecting resources that are common to important in context (due to the habitat values of these lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar convention in 1986). The impact of the land exchange and construction activities to subsistence would be considered minor and indeterminate since the effects could be both beneficial and adverse depending on which parcels subsistence hunters may currently use. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

Direct Effects and Indirect Effects from Operation and Maintenance

Effects on Subsistence Resources

Under this alternative, operation and maintenance of the road could result in displacement of subsistence resources, and reduced availability for subsistence harvest (less abundant and dislocation of resources) in this area for residents of the King Cove, Cold Bay, False Pass, and Sand Point communities. Road traffic and increased use of the area could displace subsistence resources such as caribou and waterfowl. (For more detailed discussion of disturbance effects on various wildlife species, see Section 4.3.2.) The displacement of these subsistence resources could have an adverse impact to the concentrated subsistence use areas for caribou and waterfowl, which are known to be used by residents of the King Cove, Cold Bay, False Pass, and Sand Point communities. A barrier is required by the Act to be installed along the length of the roadway on both sides to prevent vehicles from accessing the Izembek National Wildlife Refuge and Izembek Wilderness lands adjacent to the road. Two barrier types are being analyzed for this project: a chain barrier and a bollard barrier. The barriers could alter the movement of caribou within the project area and this could result in changes in subsistence harvest areas. However, it is likely that subsistence harvest areas would see only slight alteration. There would not be a noticeable change in rates of harvest to an extent that would make resources unavailable for harvest.

Routine road maintenance would be performed year round by Alaska Department of Transportation and Public Facilities and would include periodic inspections of the road and associated structures, including bridges, culverts, barrier, and signage.

The impacts to subsistence resources from road operations, maintenance, and the road barrier would be of low intensity (perceptible, but at a low level) and long-term in duration. Effects would be local to regional in extent (from discrete portions of the project area to extending throughout the project area), and affecting resources that are common to important in context. The resources that are important in context include the migratory waterfowl and wetlands/habitat values of Izembek and Kinzarof lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar Convention in 1986.

Effects on Access to Subsistence Resources

The operation of the southern road alignment under Alternative 2 would not restrict access to subsistence resources, but instead would result in minor improvements in access to subsistence waterfowl and salmon resources near Kinzarof Lagoon and increased opportunities for caribou harvest (when allowed) as caribou migrate through this area. This alternative would provide King Cove and Cold Bay community residents who traditionally used this area with easier access. However, the road would be designed and managed to prevent vehicle traffic from leaving the road, so hunters would have to leave vehicles and conduct the subsistence activities on foot. (No parking areas are planned in the road corridor.) The road alignment runs approximately ½ mile to 1 mile north of Kinzarof Lagoon, so these distances could be traversed by foot, but this may not be a common practice. Less fuel and travel time would be expended to access this area and as a result there could be a beneficial impact to subsistence users as a result of this alternative.

At present, allowed subsistence access to this area includes boat, foot, snowmachines, or other surface transportation means traditionally used (as authorized under Section 811 of ANILCA). However, the barriers along the proposed road would restrict vehicles from accessing the refuge from the road; the barriers are intended to keep vehicles on the road. As there has not been road access to much of the area, limiting vehicles to the road would not likely restrict subsistence access. Continued access to established trails where subsistence use has been allowed near the community of Cold Bay will likely continue unless the off road use of vehicles is determined to be causing or likely to cause unacceptable impacts to refuge resources.

As noted above, the land exchange would result in a net addition of 52,382 acres to federal management by the Izembek and Alaska Peninsula National Wildlife Refuges, and this new acreage would be managed under the federal subsistence management program. However, overall increases in subsistence harvests are likely to be minor. The impact of increased access to subsistence resources could be of low intensity, long-term in duration, local to regional in extent, and affecting resources that are common to important in context. The resources that are important in context include the migratory waterfowl and wetlands/habitat values of Izembek and Kinzarof lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar convention in 1986.

Increased Competition for Subsistence Resources

There could be increased competition for resources from non-subsistence users (sport hunters) who could more easily access the area via the road. Waterfowl hunting by residents of the cities of King Cove and Cold Bay and by hunters from outside the local area could increase. Kinzarof Lagoon is known as a concentrated subsistence use area for waterfowl harvesting by residents of King Cove, False Pass, and Sand Point. At present, subsistence access to this area includes boat, foot, snowmachines, or other surface transportation means traditionally used (as authorized under Section 811 of ANILCA); however the barriers along the proposed road would be designed to restrict use of vehicles. If increased harvest by sport hunters occurs, waterfowl and caribou subsistence harvests by local residents could be adversely impacted. The impact of increased competition for subsistence resources could be of low to medium intensity, long-term duration, and local to regional in extent and affect resources that are common to important in context. The resources that are important in context include the migratory waterfowl and wetlands/habitat values of Izembek and Kinzarof lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar convention in 1986.

As a result of the proposed land exchanges that would be implemented under this alternative, approximately 52,583 acres of former state and Corporation owned lands would be placed under federal management subject to the provisions of ANILCA Title XIII, and 201 acres would be removed from federal management, for a net change of 52,382 acres added to federal management. These additional parcels in federal management would be subject to the federal subsistence management program, providing a priority for harvesting subsistence resources to rural residents from the communities of King Cove, Cold Bay, False Pass, Nelson Lagoon, and Sand Point. Not all of the lands that would be added to the refuge system are used by the five communities, according to the subsistence use area maps displayed in Section 3.3.7. For the King Cove Corporation parcels (Kinzarof Lagoon and Mortensens Lagoon), the communities of King Cove, Cold Bay, False Pass (in the 2007 data displayed in Figure 3.3-25) and Sand Point have mapped uses. For the King Cove Corporation relinquished parcel, the residents of King Cove, False Pass, and Sand Point (based on the 2007 data displayed in Figure 3.3-25) have mapped uses. For the large State of Alaska parcel to the northeast of Izembek National Wildlife Refuge (41,887 acres) the most recent subsistence maps show that none of the 5 communities have mapped subsistence uses. An earlier map for False Pass (Figure 3.3-25) shows a very extensive area for trapping, vegetation gathering, and caribou hunting, including the southern half of the large State of Alaska parcel. A historic cabin, the Buddy Bendixen Camp (Figure 3.3-22) was also located within this parcel. The more recent map (Figure 3.3-26) depicts use patterns that extend only as far to the northeast as the waters offshore of Izembek Lagoon. The net beneficial effect of this action would be negligible, as the general pattern of subsistence uses is likely to change little if the land exchange occurs.

Summary

Direct and indirect effects from implementation of Alternative 2 during operation and maintenance could include displacement of subsistence resources, increased access to the area around Kinzarof Lagoon, and increased competition for resources in that area. Impacts would be of low to medium intensity (perceptible but at a low level to noticeable change in the resource condition) for a long-term in duration (lasting the life of the project). Effects would be local to regional in extent (from discrete portions of the project area to extending throughout the project area) and affect resources that are common to important in context. The resources that are important in context include the migratory waterfowl and wetlands/habitat values of Izembek and Kinzarof lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar convention in 1986. The impact of operation and maintenance activities to subsistence would be considered minor.

Mitigation Measures

Access to Subsistence Harvest Areas During Construction (see mitigation measure MM-Q) would reduce impacts to subsistence access.

Cumulative Effects

Past and ongoing actions related to subsistence are described in Chapter 3 (Section 3.3.7). Alternative 2 would result in minor improvements in access to subsistence resources. The only reasonably foreseeable future actions that would affect subsistence in the project area are likely additional closures of refuge lands to subsistence use of all-terrain vehicles. Closures, if any, would be implemented following the process outlined in ANILCA with additional analysis and opportunities for public hearings and comments. Even with potential closures, implementation of Alternative 2 would contribute little to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources as subsistence activities are unlikely to increase above present levels. As a result, the project components of this alternative would make a minor (indeterminate) contribution to cumulative effects on subsistence resources or harvest patterns.

Conclusion

Implementation of Alternative 2 would have minor (indeterminate) direct and indirect effects on subsistence, since as noted above, they are of minor intensity, long-term duration, regional geographic extent, and affecting resources that are common to important in context. Alternative 2 would make a minor (indeterminate) contribution to cumulative effects on subsistence. Effects include displacement of subsistence resources in the vicinity of the road corridor, increased access to the area around Kinzarof Lagoon, increased competition for resources in the Kinzarof Lagoon area, and an increase in lands available under federal subsistence provisions. It is likely that the adverse effects would be balanced by increased access to subsistence resources. Only minor overall effects on subsistence resources, uses, and access are anticipated.

4.3.3.8 Cultural Resources

Criteria and procedures for evaluation of adverse effects to cultural resources are defined in federal regulations in 36 CFR 800.5, and 36 CFR 60.4. For cultural resources determined eligible for the National Register of Historic Places (defined as “historic properties” [36 CFR 800.15(l)]), adverse effects are defined as any action which directly or indirectly alters the characteristics that qualify the property for inclusion in the National Register in a manner that would diminish the property’s integrity. As discussed in Section 3.3.8, cultural resources, some eligible for the National Register, have been identified in the vicinity of the land exchange areas that may be subject to ground-disturbing activities (Kinzarof Lagoon parcel). Additionally, it can be anticipated that ground disturbing activities could encounter previously unknown prehistoric artifacts and ephemeral sites within the areas of road construction.

Direct Effects from Land Exchange and Construction

Under Alternative 2, a road corridor connecting the communities of King Cove and Cold Bay would be created through an associated land exchange involving federal, state, and King Cove Corporation lands. Potential direct physical impacts to known and unknown cultural resources could occur during the construction of the southern road alignment. Direct effects to cultural resources include those activities that physically impact the condition or integrity of the resource. Specifically, ground disturbing activities associated with the construction of the road, staging areas, and material sites could result in direct effects to surface or subsurface prehistoric or historic archaeological sites. Depending on the precise alignment of the road, road construction could damage the two World War II camps identified in the August 2012 field survey immediately adjacent to the road (Section 3.3.8.4 and Appendix H). Direct effects to the World War II landscape of the Kinzarof parcel would also accrue from alterations to the single lane, light duty road built in World War II.

Exchanging lands out of federal ownership is defined in 36 CFR 800. 5 which further notes that an adverse effect arises from “Transfer, lease or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long term preservation of the properties historic significance.” However, because the proposed land exchange would transfer the road parcels from the Service to the State of Alaska, historic properties within those parcels would still receive consideration under the *Alaska Historic Preservation Act*, AS 41.35, would apply. This statute requires the state to assess potential adverse effects to historic properties and develop appropriate measures to avoid, minimize, or mitigate effects that may result from any public construction or public improvement projects. AS 41.35 provides “adequate and legally enforceable” conditions for protection of historic properties that are located within the exchange parcels. The change from federal to state management of the parcels under the land exchange would therefore have no direct adverse effects on historic properties.

Indirect Effects from Construction

As identified in correspondence with the Alaska State Historic Preservation Officer, the area of indirect effects is considered to extend up to a mile beyond the actual exchange parcel. This range covers most of the isthmus between Izembek and Moffett lagoons and Kinzarof Lagoon. Indirect effects to cultural resources would come from changes as a result of the road and increased traffic, secondary access, including pedestrian access to previously remote settings, noise, and visual impacts. Indirect effects to cultural resources include the inadvertent destruction or intentional looting of archaeological sites caused by the introduction of increased access and local activity and visual impacts to the World War II landscape (Appendix H). Improved access to remote areas could increase the likelihood of uncontrolled excavation and looting or other damage to archaeological properties outside of the immediate project area, during the construction phase of the project.

The area of potential indirect effects (i.e. the proposed corridor and adjacent area) has been subjected to pedestrian survey of surface features. Additional indirect effects could occur at a distance from the proposed corridor, in areas that people would reach due to the increased access. An unknown potential remains for disturbance to surface and subsurface cultural resources. Depending on the characteristics of cultural resources impacted by disturbance and unauthorized excavation, the indirect effects of construction on cultural resources could vary from low to high intensity or magnitude, (i.e., perceptible to major alteration in the resource) . Effects could range from temporary (only a single season) or permanent (beyond the life of the project) in duration and from local (discrete portions of the project area) to regional (throughout the project area) in geographic extent. Since the scientific importance of undiscovered cultural resources cannot be estimated, the indirect impacts could affect resources ranging from important (rare) to unique (protected by legislation or unique in function) in context. The resources that are unique or important in context include World War II remains, and ephemeral archaeological and historic resources located within or adjacent to the proposed road. Indirect effects at the level of high intensity, permanent duration, regional extent, and unique context would be a very high consequence event although of very low probability.

Summary

Due to effective cultural resource protection measures in State of Alaska management of construction activities, no direct effects are predicted. However, potential indirect effects of construction on cultural resources are considered moderate to major as they range from low to high in intensity, permanent in duration, local to regional in extent, and important to unique in context.

Direct Effects and Indirect Effects from Operation and Maintenance

Under Alternative 2, potential direct and indirect effects to cultural resources could also occur during the operation and maintenance of the southern road alignment, including inadvertent damage. Improved access to remote areas could increase the likelihood of uncontrolled excavation or looting or other damage to archaeological, historic, and cultural properties. Unanticipated discoveries of cultural resources within the road corridor during the operations phase would be subject to cultural resource protection measures, and direct impacts are unlikely. However, as with the construction phase, indirect impacts to undiscovered cultural resources outside the road corridor would vary widely. The indirect impact to cultural resources could be of low to high intensity, long-term in duration, local to regional in extent, and affect resources that are common to important. The resources that are important or unique include prehistoric archaeological artifacts and sites, historic cabins, and remains associated with World War II in the vicinity of the proposed road.

Summary

Direct effects during operations would be negligible due to effective cultural resource protection measures. However, potential indirect effects of operations and maintenance on cultural resources would be considered moderate to major as they range from low to high in intensity, permanent in duration, local to regional in extent, and important to unique in context.

Mitigation Measures

Direct impacts during construction and operations phases are unlikely due to Cultural Resources (MM-P) mitigation measures that include inventory and evaluation prior to construction, and a protocol for protection of resources inadvertently discovered during project activities. Indirect effects to cultural resources outside of the exchange parcels remain a possibility; however, such effects can be mitigated by regular monitoring and interpretation where appropriate. Therefore, with these mitigation measures, no impacts or only minor impacts to archaeological resources are anticipated.

Cumulative Effects

Cumulative effects would arise from activities not associated with the project. No specific reasonably foreseeable future activities have been identified as likely to contribute to unauthorized excavation or looting. At least 1 site discovered in 2012 may be suitable for interpretation. If the site is developed with interpretive signage, then this would increase visitation and foot traffic at this site which will ultimately alter its character. Monitoring of an interpreted site would be effective mitigation for any adverse impacts. As a result of the analysis of likely direct and indirect effects, the project components of this alternative are expected to make a minor contribution to cumulative effects on cultural resources.

Conclusion

Due to prior field studies to identify and avoid cultural resources and cultural resources protection measures for both federal and State of Alaska land managers, implementation of Alternative 2 would have no direct effects on cultural resources. Indirect effects on cultural resources from improved access and unauthorized disturbance or excavation of undocumented cultural resources are not fully predictable, but would likely be minor, as described above. Impacts would be low to high intensity (perceptible to major alteration in the resource), long-term in duration, local to regional in extent (discrete portions of the project area to extending throughout the project area), and affecting resources that are common to unique in context. The resources that are unique or important in context include World War II remains, and ephemeral archaeological and historic resources located within or adjacent to the proposed road. Indirect effects at the level of high intensity, permanent duration, regional extent, and unique context would be a very high consequence event although of very low probability. This alternative is expected to make a minor contribution to cumulative effects on cultural resources.

4.3.3.9 Visual Resources

This section discusses potential impacts to visual resources that may result from implementing Alternative 2. The proposed southern road alignment would be designed to follow the existing contour of the landscape and have a design speed of 20 mph. Road grades would be limited to 12 percent, with grades over 9 percent limited to approximately 0.2 miles of the total 18.5 miles of new road construction.

Direct Effects and Indirect Effects from Construction

Minor direct impacts to visual resources are expected to result from construction of Alternative 2. The anticipated increase in barge traffic, construction vehicles (trucks, excavators, cranes, etc.), and personnel would introduce structure to the landscape that would create weak to moderate contrast against the existing landscape character through the introduction of angular lines, color, and movement. Construction-related actions are expected to alter existing landforms within the proposed road corridor through contouring of the ground plane (and associated removal/fill), vegetation removal, and culvert/bridge installation. Such actions could expose bare ground or topsoil that would contrast in form, line, color, and texture to surrounding undisturbed areas. Disposal sites, until restored, are expected to create similar visual contrast against undisturbed areas, particularly if stockpiled in discrete piles. Construction-related impacts are expected to be greatest when viewed from closer and more direct vantage points, or for prolonged time periods. Consequently, viewers situated on the roadway within the refuge would experience greater impacts (stronger contrast) than viewers situated farther from the roadway (weak contrast) (i.e., those located in the communities of Cold Bay and King Cove). Viewers located in higher elevation locations are expected to detect moderate contrast, as views would not be eclipsed by topography. Direct impacts expected to result from construction activities are considered to be medium intensity, temporary in duration, local in extent, and affecting an important resource. Potential construction-related impacts to visual resources may indirectly affect visitors to the area, as they may select against a portion of the refuge affected by construction activities. Like direct effects, potential indirect effects are considered minor as they would be temporary, local, and affecting an important resource.

Summary

Direct effects and indirect effects of construction on visual resources are considered minor as they would be medium in intensity (observable changes in visual character of the area), temporary in duration (lasting for the duration of construction; the permanent nature of the road is described under operation and maintenance), local in extent (affecting discrete portions of the project area), and unique in context (affecting visual resources of the isthmus of Izembek Wilderness, a rare visual setting within the locality).

Direct Effects and Indirect Effects from Operation and Maintenance

Views of the Proposed Roadway

Moderate direct effects to visual resources are expected to result from implementation of Alternative 2. The proposed roadway is designed as a Rural Minor Collector characterized as a single lane gravel road with turnouts. Although implementation of Alternative 2 would transform the landscape by introducing a road to a currently roadless area, the proposed roadway (and bridge) design is expected to be compatible with the existing landscape character. A slight reduction in the baseline scores in Section 4.2.3.9, for intactness and unity could result; however, it is not expected that vividness of the landscape would change; thereby maintaining the classification of the area as having very high scenic quality.

Moderate direct effects to visual resources are expected when viewed from close proximity, or from higher elevation positions located adjacent to the project area (i.e., Grant Point Observatory, ferries on the Alaska Marine Highway), and when weather conditions are clear. Moderate contrast in color and line is expected to be observed, as the proposed corridor would follow the natural curving lines of existing waterbodies and landforms. Contrast in line could be considered strong if the bollard or chain barrier reflects against existing sunlight. Because the roadway is expected to traverse the landscape following existing contours, it is expected the hilly topography would limit views of the roadway from ground-level locations to small, discontinuous segments, thereby resulting in a low contrast between the roadway and the surrounding landscape. Most viewers situated in the refuges, or the communities of King Cove or Cold Bay, would be situated at a similar elevation as the proposed project. Consequently, views of the roadway would be discontinuous and the perceived contrast would be weak. Where seen, the gravel roadway is expected to impart strong visual contrast in color and texture against the surrounding landscape. Overall weak contrast in landform is expected as a result of the proposed project. Direct effects to visual resources are expected to be of low to medium intensity. It is assumed that this change in visual quality would be detectable; however, the overall experience is not likely to be diminished as a result of the proposed action. No change in overall visual quality is expected to result from implementation of Alternative 2. Expected contrast of the alignment and associated features is expected to be weak to moderate. Vividness is expected to be maintained and only minor impacts to intactness and unity would result; consequently, scenic quality of the analysis area would remain very high. Impacts are assumed to be long-term or permanent, localized in context, and affecting a unique resource (Izembek Wilderness).

Views from the Proposed Roadway

Beneficial indirect effects to visual resources are expected as result of Alternative 2, as access to new and different viewing experiences, particularly in the vicinity of Kinzarof Lagoon, would be afforded to individuals engaged in recreation, tourism, and subsistence. This change is expected to be of medium intensity (observable changes in visual character of the area), permanent (the roadway is anticipated to be operated in perpetuity), regional in geographic extent (affecting visual resources associated with two communities and spanning the isthmus area), and affecting a unique resource (visual resources of the isthmus of Izembek Wilderness, a rare visual setting within the locality).

Summary

Direct effects and indirect effects of operation and maintenance on visual resources would be considered moderate (indeterminate), as they would be medium in intensity (observable changes in visual character of the area), permanent in duration (the roadway is anticipated to be operated in perpetuity), regional in extent (affecting visual resources associated with two communities and spanning the isthmus area), and unique in context (visual resources of the isthmus of Izembek Wilderness, a rare visual setting within the locality).

Mitigation Measures

The following mitigation measures could reduce potential impacts to visual resources that may occur as a result of the proposed project:

- Minimize road cuts by following existing contour [Road Design (MM-W)];
- Restore areas of exposed dirt with native vegetation [Erosion and Sediment Control Plan (MM-A)]; and
- Manage all-terrain vehicle use to prevent proliferation of trails [Barriers (MM-V)].

Cumulative Effects

Past and present actions affecting visual resources are described in Chapter 3 (Section 3.3.9) and under Alternative 1 (Section 4.2.3.9). It is expected that the potential direct and indirect effects that may result from implementation of Alternative 2 would be additive to those associated with the King Cove Access Road. Alternative 2 is expected to have a moderate (indeterminate) contribution to cumulative effects on visual resources; visual resources in the isthmus area of Izembek Wilderness would be noticeably affected. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

Conclusion

Direct impacts to visual resources due to the implementation of Alternative 2 would be medium intensity (observable changes in visual character of the area), permanent in duration (the roadway is anticipated to be operated in perpetuity), and regional extent (affecting visual resources associated with two communities and spanning the isthmus area). The unique resources of the Izembek Wilderness would be affected, including the isthmus area, a rare visual setting within the locality. The summary impact level for visual resources is expected to be moderate (indeterminate); visual resources in the isthmus area of Izembek Wilderness would be noticeably affected. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.3.3.10 Wilderness

Alternative 2 is a land exchange between the federal government, the State of Alaska, and the King Cove Corporation for the purpose of constructing a road between the cities of King Cove and Cold Bay. In this section, we consider the effects of each part of the alternative (the land exchange, construction, and operations and maintenance) on the four components of wilderness character: untrammeled quality, natural quality, undeveloped quality, and solitude or primitive and unconfined recreation quality. Also included is a section on the overall effects of the alternative on wilderness values.

Direct Effects and Indirect Effects of the Land Exchange

Under Alternative 2, an estimated 44,491 acres would be added to and managed as designated wilderness (see Section 2.4.2 for complete description of components of the proposed land exchange). The State would convey 2 townships adjacent to the North Creek Unit of the Alaska Peninsula National Wildlife Refuge to the Service to be part of a new wilderness area in the Alaska Peninsula National Wildlife Refuge (41,887 acres). The Kinzarof Lagoon parcel (2,604 acres), owned by the King Cove Corporation, would be transferred to the Service and included in the Izembek Wilderness. The King Cove Corporation would relinquish their current selection of a parcel of land (5,430 acres) within the Izembek Wilderness and would select an equal acreage from non-wilderness lands in the Alaska Peninsula National Wildlife Refuge (Figure 3.3-1). The relinquished selection would remain a part of Izembek Wilderness (Figure 1-1). Alternative 2 would also remove a total of 131 acres from the Izembek Wilderness for a new single lane gravel road to be owned and maintained by the State of Alaska. The road corridor would follow a southern alignment through the isthmus between Kinzarof Lagoon and Izembek Lagoon (Figure 2-2).

The effects to wilderness under Alternative 2 include both removing land from wilderness to construct the proposed road and adding tracts of land to wilderness. Alternative 2 would result in an overall gain of 44,360 acres. All of the lands to be added to designated wilderness meet the basic criteria for wilderness.

Effects of the Land Exchange on Wilderness Character

The addition of the State parcel, Kinzarof Lagoon, and the King Cove Corporation selections to designated wilderness would not affect the untrammeled, undeveloped, or solitude or primitive and unconfined recreation qualities of the current wilderness, and these additions would maintain ecological connectivity with existing Izembek Wilderness. The land exchange would, however, affect the natural quality of the Izembek Wilderness because the Kinzarof Lagoon parcel, while meeting the criteria for designated wilderness, has existing recent damage from the use of all-terrain vehicles (see Section 4.3.3.1).

Implementing Alternative 2 would add 41,887 acres as a new wilderness in Alaska Peninsula National Wildlife Refuge. The parcels are contiguous with Izembek Wilderness and exhibit untrammeled qualities, natural qualities, undeveloped quality, and opportunities for primitive and unconfined recreation. The State parcels include over 40,000 acres of unfragmented land with natural characteristics. The land exchange under Alternative 2 would administratively enhance the wilderness character of the State parcels because they would be managed for the purposes of the refuge, including wilderness purposes. The Kinzarof Lagoon Parcel is bordered on the east edge by the proposed road corridor; the remainder of the parcel is contiguous with the portion of the Izembek Wilderness to the south of the proposed road corridor, Kinzarof Lagoon, and Cold Bay. The land exchange would administratively enhance the wilderness character of the Kinzarof Lagoon parcel because it would be managed to meet refuge purposes, including wilderness purposes. The King Cove Corporation selection is currently managed by the Service as designated wilderness. The land exchange would have no effect on the wilderness character of the selection.

Removing lands along the southern road alignment from designated wilderness would administratively fragment lands on the isthmus by creating different land management ownership patterns and purposes. This change in land ownership would create an inholding within the Izembek Wilderness. Indirectly, changes in land ownership could in turn lead to developments and activities that would adversely affect the area’s untrammeled, natural, undeveloped, and solitude or primitive and unconfined recreation qualities (see below).

Summary

Under Alternative 2, approximately 131 acres would be removed from Izembek Wilderness for the road corridor. Approximately 44,491acres would be added to wilderness through the conveyance of the Kinzarof Lagoon parcel to the Service from King Cove Corporation and conveyance of the State parcels to the Service. The parcel of land (5,430 acres) currently selected by King Cove Corporation would be relinquished and would continue to be managed as part of Izembek Wilderness. The land exchange would have few direct effects on the wilderness character of the exchanged lands and the exchange itself would maintain ecological connectivity with Izembek Wilderness. Indirectly, changes in land ownership could lead to developments and activities that would adversely affect wilderness character.

Direct Effects and Indirect Effects of Construction

Implementing Alternative 2 would result in the construction of an 18.5-mile road through the isthmus between Kinzarof and Izembek lagoons. The road corridor would pass through lands currently designated as wilderness. Under Alternative 2, a total of 131 acres would be removed from wilderness status and transferred to the State of Alaska. The proposed road corridor would span from the Northeast Terminal area to Outer Marker Road, and would bisect existing Izembek Wilderness across the isthmus between Kinzarof Lagoon and Izembek Lagoon.

During construction, heavy equipment would be audible and visible from adjacent wilderness lands. Noise and construction activities would be a dramatic change from the current condition. The construction phase would produce noise above ambient levels (50 dBA) that would be audible within Izembek Wilderness (USACE 2003). Noise levels would be expected to be highest during the construction phase, and would continue over 2 seasons.

Additionally, road construction would transform the visual landscape of Izembek Wilderness by introducing a road into a currently roadless area (see Section 3.3.9, Visual Resources). A contrast in color and line would be created between the road and the existing landscape. As it is being constructed, there would be discontinuous views of the road, construction equipment, staging areas, and material stockpiles from within Izembek Wilderness.

Effects of Construction on Wilderness Character

The construction of a road through Izembek Wilderness is a manipulation of the biophysical environment. Constructing a road would have a major effect on the untrammeled, natural, and undeveloped qualities of the Izembek Wilderness and the Kinzarof Lagoon parcel, and would also affect solitude or primitive and unconfined recreation.

The road would be a new, man-made feature in an undeveloped and wild landscape. As it is constructed, the road would intrude substantially on the natural landscape and soundscape. Where seen, the gravel roadway, bollard/chain barrier, construction equipment, and material stockpiles would impart a strong visual contrast in color and texture against the landscape, thereby diminishing the undeveloped quality of wilderness character.

The natural quality of wilderness character focuses on the overall composition, structure, and function of native species and ecological processes in the area. The construction of the single lane gravel road under Alternative 2 would have direct impacts to the natural quality of Izembek Wilderness through ecological fragmentation of previously contiguous wilderness lands. Fragmentation affects large-scale ecological processes, flows of energy and materials, and disturbance regimes (Cole 1994). While the road corridor associated with Alternative 2 was developed to avoid or minimize impacts to wetlands and to minimize the number of stream crossings, the presence of a road would still create impacts to the natural flow of streams and other hydrologic processes (see Section 3.2.2, Wetlands and Section 3.1.4, Hydrology for a description of hydrological processes). Construction of the road would permanently introduce a physical barrier to the natural hydrologic processes of the Izembek Wilderness, and these effects would extend beyond the exchange parcel. Fill associated with the proposed road would disrupt subsurface flows, which could cause ponding and dewatering along the road corridor, creating a detectable change. This change could ultimately result in a shift in the species composition of vegetation communities immediately adjacent to the road (see Section 4.3.1.3 Soils and Section 4.3.2.1 Terrestrial and Aquatic Plant Communities for a description of potential impacts). Air pollutants from roads have the ability to affect wilderness vegetation, soils, and aquatic systems (see Section 4.3.1.1 Air Quality). Atmospheric pollutants tend to be broadly dispersed across a region, and are capable of altering basic ecosystem functions, including changing water chemistry or reducing nutrient availability in soils (Cole 1994). The overall structure and function of these natural systems would be adversely impacted through human actions. The road would have a major effect on the integrity of the natural quality of the adjacent and surrounding wilderness.

The construction of the road could also present indirect effects to natural quality by creating a pathway for movement of invasive or non-indigenous species into the Izembek Wilderness. Invasive species are located in the community of Cold Bay and are also likely present in the King Cove vicinity (Service 2010b). Construction equipment, vehicles of all sorts, and foot traffic, can contribute to the spread of invasive species.

As a component of wilderness character, solitude is a sense of remoteness from the sights and sounds of people within wilderness, and from occupied and modified areas outside of the wilderness (Landres et al. 2008). Primitive recreation often refers to types of recreation that require primitive travel and living in an environment with minimal facilities (Roggenbuck 2004); this type of recreation typically consists of activities that require self-reliance and no modern conveniences (Landres et al. 2008). Unconfined recreation refers to types of recreation in which visitors experience a high degree of freedom over their own actions and decisions (Hendee and Dawson 2002). Construction of the road would directly affect solitude by imposing the sights and sounds of people into the wilderness lands immediately adjacent to the road corridor. The presence of construction equipment and the formation of a road would remove opportunities for primitive and unconfined recreation in the immediate vicinity of the road.

Summary

Construction of the road would impinge on the natural landscape and soundscape of the surrounding wilderness. Road construction would have a direct effect on the untrammeled, natural, and undeveloped qualities of wilderness. Road construction would remove opportunities for solitude or primitive and unconfined recreation from the wilderness lands adjacent to the road corridor.

The intensity of impacts to wilderness characteristics would be high. The untrammeled, natural, and undeveloped qualities, and the opportunity for solitude or primitive and unconfined recreation would be affected in the Izembek Wilderness and the eastern portion of the Kinzarof Lagoon parcel. The changes to wilderness character would be highly noticeable to visitors. The State parcels would not be affected by the proposed road; the conveyance would create a new wilderness in the Alaska Peninsula National Wildlife Refuge.

The duration of impacts would be permanent; conveyance of the parcels, impacts to wilderness character due to the road, and impacts due to the designation of new wilderness would be expected to continue in perpetuity.

The geographic extent of impacts would be extended; impacts would extend throughout the wilderness. The geographic extent of nonuse values could extend throughout the region and beyond; wilderness issues are generally important to Alaskans, other Americans.

The context of impacts would be unique; the lands in question are protected by legislation and managed for wilderness character. The resources potentially affected in Izembek Wilderness fill unique roles within the locality and the region.

Considering the combination of the impact criteria, high intensity, permanent duration, regional to extended geographic extent, and unique context, the direct and indirect impacts to wilderness character resulting from Alternative 2 would be major (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

Direct Effects and Indirect Effects of Operations and Maintenance

The road would receive daily traffic between the cities of King Cove and Cold Bay. Vehicles on the road would produce noise above ambient levels (50 dBA), and these sounds would be audible within Izembek Wilderness (USACE 2003). The levels of traffic projected for the operation of the road would produce intermittent disturbance over the life of the project, with localized impacts to the soundscape within Izembek Wilderness.

Additionally, the proposed road would transform the visual landscape of Izembek Wilderness by introducing a road into a currently roadless area (see Section 3.3.9, Visual Resources). A contrast in color and line would be created between the road and the existing landscape. There would be discontinuous views of the gravel road from within Izembek Wilderness.

The Kinzarof Lagoon parcel exhibits recent damage from the use of all-terrain vehicles, which access the parcel from the road authorized under the 2003 EIS and that is currently under construction. As this road construction is completed and as the road proposed under Alternative 2 is constructed and maintained, all-terrain vehicle damage would likely continue and would most likely expand (see Section 4.3.3.1). It is highly probable that all-terrain vehicles would travel from the road into the Izembek Wilderness which would result in damage to the vegetation mat; create ruts, trails, and mud bogs; disrupt hydrological processes and drainage patterns; and increase erosion.

Effects of Operation and Maintenance on Wilderness Character

The operation and maintenance of the road corridor through Izembek Wilderness would intrude substantially on the natural landscape and soundscape, resulting in a major impact throughout the wilderness area. The undeveloped quality of wilderness is degraded by the presence of structures, installations, or by the use of motor vehicles, motorized equipment, or mechanical transport that allow people to occupy or modify the environment (Landres et al. 2008). The motorized access and use that would occur within the road corridor would create impacts to both the biophysical characteristics of wilderness and to the wilderness experience of users (Tanner 2004).

Outstanding opportunities for primitive and unconfined recreation currently exist within Izembek Wilderness. The road corridor proposed under Alternative 2 would run along a southern alignment through the isthmus, and would create an impact to primitive and unconfined recreation by creating a physical barrier to travel within Izembek Wilderness on the isthmus if recreation users wished to cross it. Where seen, the gravel roadway and bollard/chain barrier would impart a strong visual contrast in color and texture against the landscape, thereby diminishing the undeveloped quality of wilderness character. The hilly topography of the area could limit views of the roadway from ground-level locations, but segments of the road could still be visible by users of Izembek Wilderness at higher elevations. Additionally, its existence would be present in the mind of the visitor, thus detracting from their sense of remoteness and self-reliance. The changes to the visual landscape and natural soundscape that would result from the operation and maintenance of the road would affect all four qualities of wilderness character and would result in permanent impacts to a unique resource.

The operation and maintenance of the road could also present indirect effects to natural character by creating a pathway for movement of invasive or non-indigenous species into the Izembek Wilderness. Invasive species are located in the community of Cold Bay and are also likely present in the King Cove vicinity (Service 2010b). Roads contribute to the spread of invasive species in 2 ways. Invasive vegetation species can grow within the road footprint itself (usually at the edge). Typically these are species adapted to disturbed conditions, and have seeds that spread readily. In addition, roads can act as pathways for invasive vegetation species to be spread from other locations as people or vehicles carry seeds that are deposited along the road and as seeds spread from mature plants.

The road corridor across Izembek Wilderness would allow motorized access through designated wilderness, and increase the potential for unauthorized motorized use within designated wilderness. Low vegetation, limited topographical relief, and easy access to fish and wildlife resources make the isthmus of the Izembek National Wildlife Refuge an attractive location for all-terrain vehicle use once road access to the isthmus is built. Although Alternative 2 would include the installation of a chain barrier or bollard barrier on each side of the road to prevent motorized traffic from traveling into the Izembek Wilderness, it is likely that some traffic would circumvent the barriers and pioneer new trails on the adjacent wilderness landscape. New trails made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (see Section 4.3.3.1) (Sowl 2011f). Efforts to exclude all-terrain vehicles through the use of physical barriers often fail (USACE 2009): guard post and cable barriers can be stretched, cut, and removed; barbed-wire barriers can be cut; steel posts can be pulled up or bent to the ground; and welded pipe fences can be pushed or pulled to the ground allowing all-terrain vehicles to cross. Therefore, motorized access is likely to result, causing indirect effects to soils, vegetation, and habitats, potentially spread invasive species, and negatively affecting wilderness character.

As a result of improved access and favorable topography, all-terrain vehicle use would also be expected to increase quickly. Existing all-terrain vehicle trails observed in the Kinzarof Lagoon area reveal that the vehicles often travel several miles, following drainages or wet graminoid meadows because the terrain is smoother and easier to travel. The road corridor proposed under this alternative would serve as a starting point for all-terrain vehicle access by subsistence and recreational users from King Cove and Cold Bay. It is reasonable to predict, based on documented use trends, that all-terrain vehicle use would increase with improved road access (illegal and legal) and would be difficult to control. Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Under Alternative 2, a web of trails would grow across the 4-mile wide isthmus and provide access to beaches on the Bering Sea/Izembek Lagoon and Pacific Ocean/Kinzarof Lagoon coasts, affecting wilderness character throughout the area. All-terrain vehicle use would result in additional impacts to the untrammeled quality of the Kinzarof Lagoon parcel (see Section 4.3.3.1).

The State parcels would not be directly affected by the operation and maintenance of the proposed road. However, it is projected that all-terrain vehicle trails would eventually make their way onto the State parcels and affect the wilderness character of these lands as well.

Summary

The operation and maintenance of the road would directly and indirectly impact the wilderness character of Izembek Wilderness. The road would bisect the wilderness and create a visible and audible structure. It would affect the untrammeled, undeveloped, and natural qualities of the Izembek Wilderness and would reduce opportunities for solitude or primitive and unconfined recreation. Indirectly, the road would serve as a starting point for all-terrain vehicles to access throughout the Izembek Wilderness damaging its natural and untrammeled qualities and further impinging on solitude or primitive and unconfined recreation.

The intensity of impacts to wilderness characteristics would be high. The untrammeled, natural, and undeveloped qualities, and the opportunity for solitude or primitive and unconfined recreation would be affected in the Izembek Wilderness and the eastern portion of the Kinzarof Lagoon parcel. The changes to wilderness character would be highly noticeable to visitors. The

State parcels would not be affected by the proposed road; the conveyance would create a new wilderness in the Alaska Peninsula National Wildlife Refuge.

The duration of impacts would be permanent; conveyance of the parcels, impacts to wilderness character due to the road, and impacts due to the designation of new wilderness would be expected to continue in perpetuity.

The geographic extent of impacts would be extended; impacts would extend throughout the wilderness. The geographic extent of nonuse values could extend throughout the region and beyond; wilderness issues are generally important to Alaskans, other Americans.

The context of impacts would be unique; the lands in question are protected by legislation and managed for wilderness character. The resources potentially affected in Izembek Wilderness fill unique roles within the locality and the region.

Considering the combination of the impact criteria, high intensity, permanent duration, regional to extended geographic extent, and unique context, the direct and indirect impacts to wilderness character resulting from Alternative 2 would be major (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

Direct Effects and Indirect Effects of Alternative 2 on Wilderness Values

While the proposed land exchange would occur in southwestern Alaska, indirect effects from the decommissioning of a portion of Izembek Wilderness and the designation of the State parcels as wilderness could be felt beyond the region. The *Wilderness Act of 1964* mentions societal benefits to wilderness that go beyond recreational use, and recently, managers have been considering the importance of nonuse values of wilderness during decision-making processes (Schuster, Tarrant, and Watson 2003). Nonuse values are indirect, for the most part not observable, and are not marketable (Cordell et al. 2003). These values have been referred to as *preservation benefits*, and can include, but are not limited to, the contributions of wilderness to individual and social well-being such as air and water quality, cultural and historic preservation, spiritual pleasure, and personal growth (Walsh, Loomis, and Gillman 1984; Schuster, Tarrant, and Watson 2003).

Should Alternative 2 be implemented, some people would become aware that new lands would be designated as wilderness and changes to the Izembek Wilderness would take place. This realization could impact several of the nonuse values of wilderness for the observers, such as their concerns for the wilderness character of the Izembek Wilderness or their satisfaction in knowing additional wilderness lands have been added to the Izembek Wilderness. Wilderness issues are generally important to Alaskans, other Americans, and beyond. The four indicators of wilderness character being used in this analysis to assess physical impacts to wilderness also serve to represent impacts to the nonuse values associated with wilderness. It is assumed that impacts to the four indicators would translate to impacts on nonuse wilderness values.

Mitigation Measures

Several mitigation measures would help to reduce adverse impacts to wilderness character under Alternative 2. These include:

- Barriers (MM-V) (either a chain barrier or bollard barrier) installed along the length of the roadway on both sides to discourage unauthorized motorized vehicle use within Izembek Wilderness (currently included as part of the roadway design under Alternative 2).
- Support facilities (MM-X) for the road shall not be located within the Izembek National Wildlife Refuge to limit the amount of federal land transferred for the corridor.
- Drainage structures, box culverts, and bridges would be installed along the road corridor to cross major streams and small non-fish bearing streams to maintain hydrologic processes and mitigate disruptions to natural water flows (currently included as part of the roadway design under Alternative 2) [Fish and Wildlife Protection Plan (MM-M)].
- An Invasive Species Management Plan (MM-K) implemented to limit the spread of non-native species within Izembek Wilderness.
- Monitoring vehicle trespass in Izembek Wilderness. Committing funds for that purpose is not part of this EIS, and may be unlikely to occur.

Cumulative Effects

Past, present, and reasonably foreseeable future actions that could contribute to cumulative effects to wilderness character within Izembek Wilderness are discussed under Alternative 1. The road corridor proposed under Alternative 2 would ultimately connect with the new King Cove Access Road for travel between the cities of King Cove and Cold Bay, and opportunities for unauthorized motorized use in Izembek Wilderness would increase beyond current levels. Past authorized and unauthorized motorized use in the area has already impacted wilderness resources. Alternative 2 would have a major (indeterminate) contribution to cumulative effects on wilderness character within Izembek Wilderness.

Conclusion

Alternative 2 would remove 131 acres from Izembek Wilderness, add 2,604 acres to Izembek Wilderness, and designate 41,887 acres of new wilderness in the Alaska Peninsula National Wildlife Refuge. The 5,430 acres currently selected by King Cove Corporation would be relinquished by the corporation and would continue to be managed as part of Izembek Wilderness. An alternate selection (5,430 acres) would be conveyed from non-wilderness lands in the Alaska Peninsula National Wildlife Refuge.

While the direct loss or gain of acreage in wilderness is important, the impacts of a road corridor are considerably more than the loss of acreage alone. Alternative 2 would result in direct and indirect impacts to the untrammeled quality, natural quality, undeveloped quality, and solitude or primitive and unconfined recreation quality of the Izembek Wilderness. Alternative 2 would result in a road that would fragment the untrammeled and natural qualities of the isthmus, and ecologically fragment previously contiguous lands. The road would provide access into the Izembek Wilderness by all-terrain vehicles, resulting in numerous trails and their resulting damage to the natural, undeveloped, and untrammeled qualities of Izembek Wilderness. The impacts would be highly noticeable to visitors and would influence visitor experience. These permanent effects would extend throughout the project area and beyond – wilderness issues are generally important to Alaskans and other Americans. The intensity of impacts to wilderness character would be substantial. The lands in question are protected by legislation and managed for wilderness character, and the resources potentially affected in Izembek Wilderness fill unique roles within the locality and the region.

The implementation of mitigation measures discussed above could somewhat reduce adverse impacts to the natural quality, the undeveloped quality, and the solitude or primitive and unconfined recreation quality of Izembek Wilderness character. However, implementation of mitigation measures would not eliminate adverse impacts. Overall, the effect of Alternative 2 on wilderness quality would be major (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.4 Alternative 3 – Land Exchange and Central Road Alignment

4.4.1 Physical Environment

4.4.1.1 Air Quality

Direct Effects and Indirect Effects from the Land Exchange and Construction

The methodology used for determining emissions during roadway construction is described above in Section 4.3.1.1 for Alternative 2. Although the overall length of new road construction in Alternative 3 is slightly greater (20 miles, as compared to 18.5 miles for Alternative 2) the average footprint width of this alignment is less, therefore, the central road alignment has a slightly smaller construction footprint (100 acres). The same construction schedule is expected for both alternatives: over 2 seasons, between May and November, for a total of 14 months. Emissions from combustion equipment are expected to be approximately the same as those presented for Alternative 2.

Table 4.4-1 shows the emission estimates associated with the construction of this alternative. These are considered to be directly related to the project construction and have the potential to affect air quality in the vicinity of the specific construction activity. As with Alternative 2, indirect effects of this construction may be increased due to the use of other resources (such as roadways and rock crushing operations used for construction materials). These activities would also be temporary, and are expected to have minimal emissions, not likely to exceed the direct construction emissions.

Summary

Based on Table 4.4-1, the estimated emission rates for Alternative 3 construction activities would be: 7.61 tons of nitrogen oxide per year; 4.51 tons of carbon monoxide per year; 0.01 tons of sulfur dioxide per year; 6.38 tons per year of particulate matter less than 10 micrometers in diameter; 1.02 tons per year of particulate matter less than 2.5 micrometers in diameter; 1.07 tons per year of volatile organic compounds; and 892 tons per year of carbon dioxide equivalents. The direct and indirect effects on air quality from the construction of Alternative 3 are expected to produce localized emissions of air pollutants. Many emissions would persist 24 hours or less. These effects to air quality would occur in the local vicinity of the construction activity and would be temporary in duration. Over the period of construction, emissions of air pollutants would be spread out over the road footprint area (100 acres). Therefore, the overall direct and indirect effect on air quality during construction should be minor.

Table 4.4-1 Estimated Emission Rates for Alternative 3 Construction Activities

Construction Equipment	Hours/ Day	Number of Units	Estimated Pollutant Emission Rates													
			NOx		CO		SO2		PM10		PM2.5		VOC		CO_2e	
			Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy
Diesel Construction Equipment																
Grader (175 horsepower)	5	2	2.70	1.91	1.48	1.05	0.003	0.002	0.16	0.11	0.14	0.10	0.35	0.25	248	175
Excavator (175 horsepower)	5	2	2.22	1.59	1.34	0.96	0.003	0.002	0.13	0.09	0.12	0.09	0.29	0.21	225	160
Dozer (250 horsepower)	5	2	3.88	2.82	1.15	0.84	0.004	0.003	0.16	0.11	0.14	0.10	0.41	0.30	333	241
Backhoe/ Loader (120 horsepower)	4	2	1.13	0.65	0.72	0.41	0.001	0.001	0.10	0.06	0.09	0.05	0.18	0.10	104	59.2
Vehicles with On Road Engines																
Pickup Truck	8	4	0.006	0.02	0.086	0.21	0.0001	0.0004	0.001	0.003	0.001	0.002	0.005	0.012	15.4	37.0
Flatbed	8	2	0.029	0.04	0.017	0.02	0.00004	0.00005	0.002	0.002	0.002	0.002	0.002	0.002	4.15	5.11
Worker Vehicles	2	20	0.019	0.06	0.242	0.75	0.0005	0.0014	0.004	0.012	0.003	0.009	0.017	0.052	49.8	149
Dump Truck	8	2	0.431	0.53	0.225	0.28	0.0005	0.0006	0.030	0.037	0.027	0.034	0.121	0.149	52.3	64.4
Fugitive Dust																
Heavy Construction				--		--		--		5.96		0.60		--		--
TOTAL (tons per year)				**7.61**		**4.51**		**0.01**		**6.38**		**1.02**		**1.07**		**892**

NOTES:

Pollutants: NOx - nitrogen oxides; CO – carbon monoxide; SO2 – sulfur dioxide; PM10 – particulate matter less than 10 micrometers in diameter; PM2.5 - particulate matter less than 2.5 micrometers in diameter; VOC – volatile organic compounds; CO_2e – carbon dioxide equivalents.

Construction equipment assumed for typical road construction activity.

Unit Hours per Day estimated based on typical load factors for construction equipment and vehicle use over an 8 hour day.

Number of Units based on best estimate for road construction project of this size over 14 month time frame.

Unit pound per hour (lb/hr) emission rates conservatively assumed to be double (2x) California Air Resources Board OFFROAD Mobile Source Emission Factors for diesel equipment (2010 data) and EMFAC2007 model for on road vehicles (with assumed mileage based on road construction project) (California Air Resources Board 2011a,b).

Total Tons per Year (tpy) emission rates based on Unit lb/hr rate times operating hours. Construction expected to occur for 8 hours per day, 22 days per month, and 7 months per year.

CO_2e is assumed to be composed of the following GHG components: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emission factors are equal to the sum of each of these components times their individual Global Warming Potential (GWP) factors. The GWP for these are: CO_2 = 1; CH_4 = 21; and N_2O = 310 (EPA 2009b).

Fugitive Dust emissions based on the emission factor of 1.2 tons/acre/month for total suspended particulate (EPA 1995), with a factor of 0.1 applied to account for ratio of PM10 to total suspended particulate, construction activities occurring for 22 days per month (as opposed to 30), and the local climate conditions (relatively wet as compared to the semi-arid conditions that the emission factor is based on). The annual rate is determined from the total project area of 100 acres spread out over the total construction period of 14 months to give 7.1 acres/month, annualized over 7 months.

Emissions of PM2.5 estimated to be 10 percent of PM10 emissions based on gravel road emission ratio estimates (EPA 2006b).

Due to rounding, the total tpy may differ slightly from the sum of the individual tpy emission rates.

Direct Effects and Indirect Effects from Operation and Maintenance

The methodology used for determining emissions during operations and maintenance activities is described above in Section 4.3.1.1 for Alternative 2. Due to the increased length of road construction with this alternative (20 miles, as compared to 18.5 miles for Alternative 2), the travel time between King Cove Airport and Cold Bay Airport through the central road alignment roadway is slightly longer, estimated at 124 minutes per trip. This does not include the distance between the City of King Cove and the King Cove Airport; it is the additional increment that would be traveled beyond the existing airport to reach the Cold Bay Airport. For the emissions calculations, the same number of annual trips was used as for Alternative 2, which is substantially greater than the number of trips calculated in this EIS. This provides an upper limit estimate of potential emissions. Table 4.4-2 shows the direct emission estimates for the vehicular travel along the central road alignment. As with Alternative 2, estimates for particulate matter emissions from fugitive dust are conservatively high and are based on the estimating methodology from EPA. Indirect effects of this alternative may include increased use of other resources, such as existing roadways, as described for Alternative 2. Due to the relative low expected use of the roadway, and generally low population of the area, indirect effects on air quality are expected to be minor.

Summary

Based on Table 4.4-2, the estimated emission rates for Alternative 3 operation and maintenance activities would be: 22.8 tons of nitrogen oxide per year; 4.91 tons of carbon monoxide per year; 1.50 tons of sulfur dioxide per year; 28.7 tons per year of particulate matter less than 10 micrometers in diameter; 4.34 tons per year of particulate matter less than 2.5 micrometers in diameter; 1.94 tons per year of volatile organic compounds; and 882 tons per year of carbon dioxide equivalents. The total estimated annual emissions are a compilation of very small emission sources, operating intermittently, and spread out over a relatively large area. Isolated occurrences of increased particulate matter due to fugitive dust (on dry days) may have an effect on air quality, and these reoccurring short-term events would take place intermittently over the long-term. Overall effects to air quality from operation and maintenance of the road are anticipated to be minor because of the size of the emission sources, intermittent nature of operations and the relatively large area over which the emissions occur.

Mitigation Measures

Due to the predicted minor effects on air quality, no mitigation measures would be required for Alternative 3. Due to the relatively wet climate of this area, and the low road use, additional mitigation of dust suppressants or road watering for reduction of particulate matter would likely not be needed.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting air quality in or adjacent to the EIS project are few; they are described under Alternative 1 in Section 4.2.1.1. The contribution of this alternative to cumulative effects is considered to be minor.

Conclusion

Implementing Alternative 3 would have minor direct and indirect effects on air quality from both construction and operations and maintenance. This alternative would also result in minor cumulative effects on air quality. In relation to Alternative 1, air emissions under Alternative 3 would be a new incremental effect. The total estimated annual emissions would consist of small emission sources, operating intermittently, and spread out over a relatively large area. Seasonal occurrences of increased particulate matter due to fugitive dust may have a minor effect on air quality. Thus, the overall conclusion is that Alternative 2 would have minor direct, indirect, and cumulative effects on air quality.

Table 4.4-2 Estimated Air Pollutant Emission Rates for Alternative 3 Operations and Maintenance Activities

Source/Activity	Usage	Emission Rates (tons per year)						
		NOx	CO	SO2	PM10	PM2.5	VOC	CO_2e
ROAD COMBUSTION SOURCES								
Average Vehicle Engine	10,761 MMBtu/yr	23.7	5.11	1.56	1.67	1.67	1.94	882
FUGITIVE DUST								
Gravel Roadway	380,000 VMT/yr	--	--	--	27.0	2.67	--	--
TOTAL (tons per year)		**22.8**	**4.91**	**1.50**	**28.7**	**4.34**	**1.94**	**882**

NOTES:

Pollutants: NOx - nitrogen oxides; CO – carbon monoxide; SO2 – sulfur dioxide; PM10 – particulate matter less than 10 micrometers in diameter; PM2.5 - particulate matter less than 2.5 micrometers in diameter; VOC – volatile organic compounds; CO_2e – carbon dioxide equivalents.

Usage value for combustion emissions for road operations based on project description: Vehicle travel is assumed at 20 miles per hour; with a conservative estimate of 10 miles per gallon on average; this equates to 2.0 gallons fuel per hour (gal/hr). Estimated annual travel is 19,000 one-way trips (NEI 1999), with the Alternative 3 one-way trip time of 124 minutes between the City of King Cove and Cold Bay Airport, for a total of 78,533 gal/yr. Assume diesel fuel with heating value of 19,300 million British Thermal Units per pound of fuel (MMBtu/lb), and a density of 7.1 lb/gal fuel, for an annual usage rate of 10,761 MMBtu/yr.

Usage value for fugitive emissions based on project description: Estimated annual travel is 19,000 one-way trips (NEI 1999), with the Alternative 3 road length at 20.0 miles, for a total of 380,000 vehicle miles travelled per year (VMT/yr).

Fuel combustion emission factors for engines less than 600 horsepower (vehicles and smaller hovercraft service power engines) in lb/MMBtu are from EPA 1996a, Table 3.3-1. Assume PM2.5=PM10.

Fugitive dust PM10 and PM2.5 emission factors are from EPA 2006b, equations 1b and 2. Equation parameters are from Tables 13.2.2-1, -2, and -4, and Figure 13.2.2-1 for PM10 and PM2.5, and for public roads. Silt content conservatively estimated from industrial plant road for sand and gravel processing (Table 13.2.2-1). Mean vehicle speed assumed to be 20 miles per hour. Moisture content conservatively estimated at 20 percent. Emission factors are then calculated to be 0.142 lb PM10/VMT, and 0.014 lb PM2.5/VMT.

CO_2e is assumed to be composed of the following GHG components: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emission factors are equal to the sum of each of these components times their individual Global Warming Potential (GWP) factors. The GWP for these are: CO_2 = 1; CH_4 = 21; and N_2O = 310 (EPA 2009b).

Due to rounding, the total tpy may differ slightly from the sum of the individual tpy emission rates.

4.4.1.2 Climate

Direct Effects and Indirect Effects from Construction

Effects to climate from constructing the central road alignment (Alternative 3) would be similar to those for constructing the southern road alignment (Alternative 2).

Summary

Even though climate change effects are considered to be long-term, extended, and affect important resources, the greenhouse gas emissions from construction of Alternative 3 are estimated to account for 0.02 percent of the state-wide annual total (3.6 million metric tons). Therefore, the construction-related direct and indirect effects are considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

The effects of Alternative 3 associated with climate change would be the same as Alternative 2, except for a small difference in carbon dioxide equivalent emissions (Table 4.4-3). Alternative 3 would emit approximately 35 tons per year more carbon dioxide equivalent than Alternative 2 because this alignment is 1.5 miles longer. However, when compared at the state level, Alternatives 2 and 3 would contribute the same approximate 0.02 percent of the State of Alaska's estimated emissions from on-road vehicles and less than 0.01 percent of the total transportation emissions in 2010 (CCS 2007). This amount is not expected to be perceptible. As with Alternatives 1 and 2, impacts to climate would be long-term over a broad geographic extent. Indirect effects could result from more recreationists and wildlife viewers visiting the area due to better access to sites. However, new visitation is expected to be low due to the project's remote location, and the indirect impacts to climate change would be negligible (see the discussion under Alternative 1). Potential impacts associated with soot from engine exhaust, such as heat absorption and reduction in sunlight reflection, would be the same as Alternative 2.

Table 4.4-3 Summary of Annual Greenhouse Gas Emissions for Alternative 3

Activity	Frequency	Estimated Annual Emissions of Carbon Dioxide Equivalent (tons/year)
Vehicular Traffic	19,000 one-way trips/year	882
Total		**882**

Note: Refer to Section 4.4.1.1 for complete details and assumptions regarding emissions calculations.

As with Alternative 2, climate change could also have an effect on Alternative 3 through increases in storm frequency and duration, rising sea levels, and increased rates of coastal erosion. This could impact the viability of long-term operation as well as maintenance activities associated with the proposed road alignment.

Summary

Alternative 3 would contribute 882 tons per year of carbon dioxide equivalent, which is 882 tons more per year than Alternative 1. When compared at the state level, Alternative 3 would contribute approximately 0.02 percent of the State of Alaska's estimated emissions from on-road vehicles and less than 0.01 percent of the total transportation emissions in 2010 (CCS 2007).

This amount is not expected to be perceptible, and the magnitude for direct effects to climate from Alternative 2 is considered low.

Mitigation Measures

The impacts to climate from Alternative 3 are expected to be negligible, so no mitigation measures are proposed.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting climate change are the same as Alternative 1, described in Section 4.2.1.2. Due to the extended amount of time that greenhouse gases remain in the atmosphere, any amount of greenhouse gas emissions can be reasonably expected to contribute to future climate change impacts. Annual carbon dioxide emissions from Alternative 3 would roughly equal average annual carbon dioxide emissions from approximately 183 U.S. passenger cars (EPA 2007). Although the amount of carbon dioxide is measurable, on a global scale, annual emissions from 183 U.S. passenger cars is a negligible amount to global cumulative effects to climate change.

Conclusion

Alternative 3 would directly emit approximately 882 tons of carbon dioxide per year, which is 35 tons per year more than Alternative 2. In relation to Alternative 1, the greenhouse gas emissions under Alternative 3 would be a new incremental effect. However, Alternative 3 is expected to have negligible direct and indirect effects. Global climate change effects currently have a high enough intensity that perceptible changes around the globe have occurred as described in Section 4.2.1.2. However, when compared to other global actions, Alternative 3 is expected to have a negligible contribution to cumulative effects. The overall contribution to climate change would be negligible.

4.4.1.3 Geology and Soils

Direct Effects and Indirect Effects from Construction

Direct impacts from Alternative 3 are similar to those in Alternative 2. As a result of Alternative 3, disturbance of geologic resources and soils would occur along 20 miles of road. The road would be constructed using a balanced cut and fill methodology throughout the proposed corridor. In addition, competent bedrock and unconsolidated sand and gravel deposits may be produced at 1 or more material sites from within the project area to be used for road base, installation of a bridge, 1 box stream crossing culvert or small bridge, and 171 intermittent cross culverts. Organic soils disturbed during construction would be staged and stockpiled then re-used for finishing graded back slopes and reclaiming abandoned sections of existing roads and trails. Table 2.4-2 presents a summary of disturbed land acreage and volumes of excavation and fill proposed for Alternative 3.

This alternative would disturb 100 acres of common surface and shallow subsurface soil (primarily inceptisol andepts) along the road corridor and 1 acre at the barge landing areas adjacent to the Northeast Terminal and Cross Wind Cove. Approximately 99,000 cubic yards of material would be excavated during cut and fill activities. Approximately 32,000 cubic yards of crushed rock is planned for road construction. Approximately 231,000 cubic yards of fill would be imported from the material site near the Northeast Terminal impacting 7 acres of King Cove Corporation lands. Direct impacts from construction activities would disturb vegetation and expose new soil and rock; this in turn could lead to the channelization of runoff and soil erosion.

Direct impacts on soils as a result of Alternative 3 would be permanent and localized. The types of soils impacted are common in the region. Soil impacts would include excavation, grading, compaction, and the direct loss of soil cover by exposure in the area of the new road, and exposure of soils to localized runoff and erosion.

Potential direct and indirect effects could also result from the uncontained release of fuel or other hazardous materials into soils. Pollution from oil and other hazardous substances are regulated by the Alaska Department of Environmental Conservation in accordance with Alaska Administrative Code, Title 18, Chapter 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75) (ADEC 2008). The risk and impact of an uncontained release is reviewed in Section 4.4.1.5 as are the measures to reduce this risk.

If the project was to use rocks with a high concentration of sulfide minerals to fill wetlands or is otherwise placed at the surface of water, it could result in acid rock drainage. Since the actual type of rock planned for use during construction is not known, precautionary measures should be conducted to determine the usability of the geologic resource. Without assessing the usability of the rock, this action may propagate the generation of acid rock drainage which would impact the quality of the water bodies in which the rock would be placed.

Summary

Direct effects on geology and soils would include the disturbance of about 108 acres (100 acres in the road corridor, 1 acre at the barge landing sites, and 7 acres at the material site). Additionally, this alternative has potential for accidental release of fuel or other hazardous materials during the construction process, which could contaminate soils at the site of the spill. Effects from a spill are addressed under Hazardous Materials in Section 4.4.1.5. Effects on geology and soils from Alternative 3 are considered moderate because, while the intensity would be high (obvious changes to the resource) and there would be permanent changes in the character of the geology and soils along the road corridor; these changes would be in a confined area (the road corridor) and no unique or important soils would be affected.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct impacts from Alternative 3 are similar to those in Alternative 2 and would be less during operation and maintenance activities than during construction. Approximately 10,000 cubic yards of material (gravel) would be processed and stockpiled within the material site for future road maintenance. Maintenance activities such as road grading and the filling of potholes could result in fugitive dust, most of which would settle on vegetation and soils next to the road bed.

Examples of indirect impacts may be the planned reuse of organic soils for finishing graded back slopes and reclaiming abandoned sections of existing roads and trails. The chemical and physical characteristics of the soil used for reclaiming may impede potential agglomeration with soils existing at the planned reclaimed areas, resulting in dead zones for vegetative growth and/or high susceptibility to erosion during intense periods of storm runoff. The increase in sediment load from runoff would impact the quality of receiving surface water bodies.

Direct and indirect effects would continue as a result of operation and maintenance as stockpiled materials are distributed on the road surface, and as re-vegetation efforts continue.

Summary

Direct and indirect effects on soils would occur as a result of operation and maintenance as stockpiled materials are distributed on the road surface and as re-vegetation efforts continue post-construction. These effects would be substantially less (10,000 cubic yards of material) than those incurred during the construction phase of Alternative 3 (99,000 cubic yards of cut and fill excavated on site and 231,000 cubic yards of material from the materials site). As with effects to soils from construction, these would be considered moderate due to the permanent nature and obvious (high intensity) changes over a relatively small area (the road surface) and not affecting unique or important soils.

Mitigation Measures

Mitigation measures are the same as those identified for Alternative 2.

Cumulative Effects

Cumulative effects would be similar to those discussed under Alternative 2. In addition to the past, present and reasonably foreseeable future activities discussed under Alternative 1, Alternative 3 would result in additive, incremental, cumulative effects. Mobilization of equipment, fuel, and supplies; excavation, grading, and compaction; and resulting erosion of soil due to potential channelization of runoff would add to the cumulative effects on geology and soil resources. The implementation of Alternative 3 could directly result in disturbance of ground cover on up to 100 acres of regionally common soils plus one acre barge landing sites and an additional 7 acres of disturbance at the material site. The area subject to excavation would total 99,000 cubic yards of cut and fill operations within the corridor and 231,000 cubic yards of material from the material site. These additive incremental effects attributable to implementation of Alternative 3 would be considered moderate because they are permanent, obvious (high intensity) yet confined to a relatively small area and not affecting unique or important soils.

Conclusion

Soil removal/excavation and road construction would result in direct and indirect impacts to 100 acres of geologic resources and soils along the 20-mile road corridor, 7 acres at a material site, 1 acre at a barge sites, and the excavation of 99,000 cubic yards of cut and fill materials within the corridor. About 231,000 cubic yards of additional materials will be obtained from the materials site and 10,000 cubic yards of materials would be stockpiled within the material site for road operation and maintenance activities. As noted in the sections above the overall effects on geology and soils are considered moderate because of the obvious and permanent nature over a relatively small area without unique or important soils.

4.4.1.4 Hydrology/Hydrologic Processes

Direct Effects and Indirect Effects from Construction

Direct impacts from Alternative 3 are similar to those in Alternative 2. As part of Alternative 3, disturbance of hydrologic resources would occur along 20 miles of road. The road would be constructed using a balanced cut and fill methodology throughout the proposed corridor. As part of the road construction, approximately 2.4 acres of hydrologic resources in the form of wetlands would be impacted with up to 15,000 cubic yards of fill. Additionally, 1 bridge, 1 stream crossing culvert or small bridge, and an estimated 171 intermittent and small stream pipe cross culverts would be placed among hydrologic resources in the project area. At the construction staging area less than 0.2 acres of state owned tidelands would be filled with up to 625 cubic yards of fill. Table 2.4-2 presents a summary of disturbed hydrologic resources and tideland acreage and volumes of fill proposed for Alternative 3.

Quantities of water would be needed for embankment compaction and dust control during construction. The area's typically wet weather should keep road materials moist; therefore, water requirements would be relatively low. Project water sources include 2 lakes and 1 creek. The creek water source would be at stream system #283-34-10700, located approximately 2 miles north of the Northeast Terminal. Intake would be limited to 600 gallons per minute. Source lakes include a 33-acre lake on the western side of Alternative 3 that is not connected to any anadromous streams, and Blinn Lake, a 150- acre lake not connected to anadromous streams that is located at the western terminus of Alternative 3. Locations and preliminary estimates of quantities are shown in Appendix E.

One box culvert or small bridge and 1 large bridge would be located on fish bearing streams. The large bridge would be placed across a stream that drains a watershed of approximately 7,500 acres. The smaller stream where the box culvert or small bridge would be constructed drains a watershed of approximately 620 acres. Both streams drain into Kinzarof Lagoon.

Direct effects on hydrologic resources and processes as a result of Alternative 3 would be permanent. Hydrologic impacts would be both local and throughout the project area. Effects would include crossings of streams (including anadromous streams) and infilling wetlands in the area of the new road. The project would also result in localized, temporary, sediment discharges into water resources during excavation and construction activities.

Another potential effect to water resources and water quality could arise from an uncontained release of fuel or other hazardous materials. Alaska waters are regulated by the Alaska Department of Environmental Conservation in accordance with Alaska Administrative Code, Title 18, Chapter 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75) (ADEC 2008). The risk and impact of an uncontained release is reviewed in Section 4.4.1.5 as are the measures to reduce this risk.

An example of indirect effects would be a decrease in water quality or impacts to eelgrass beds within the area's lagoons due to an increase in turbidity (sediment load) generated by the disturbance of stream shorelines or the discharge of excavated material during emplacement of the project's drainage structures.

Summary

Direct and indirect effects to hydrologic processes would occur as a result of fill placement in approximately 2.4 acres of wetlands, and the installation of an estimated 173 drainage structures along the road. Indirect effects may occur from the uncontained release of hazardous materials and from stream turbidity generated by streambank construction activities. These moderate effects would be obvious (high intensity), permanent (the resource would not be anticipated to return to previous conditions), some of which would affect unique resources such as Ramsar designated wetlands and Essential Fish Habitat. Mitigation measures identified below would contain the effects to the local area reducing the possibility of affecting eelgrass beds downstream.

Direct Effects and Indirect Effects from Operation and Maintenance

Although direct impacts from Alternative 3 would be highest during construction, effects could continue during the period following project completion. Direct effects from construction activities and excavation could increase the sediment load in surrounding streams as they move through the project area.

Indirect effects on hydrologic resources would also occur under this alternative, as the increase in sediment load from runoff would impact the quality of receiving surface water bodies. Effects might also include sedimentation and pollution from vehicles and other anthropogenic sources. Many of these effects would be mitigated to some degree through design considerations and mitigation measures, but some impact would be unavoidable. For example, particularly harmful spring breakups and historical flood events cannot be predicted. Some of these events would be expected to surpass design standards. Culverts would be designed for the 50-year storm event and analyzed for the passage of the 100-year storm event where drainage structures are located in a flood zone.

An indirect effect of the road is that all-terrain vehicles could establish routes from the roadway into adjacent areas. These routes could erode from use and increase sedimentation in streams. As a result of improved access through the proposed road corridor, some traffic is likely to circumvent the barriers and pioneer new trails (USACE 2009). Increased incursions into the Izembek Wilderness by all-terrain vehicles, previously documented by Sowl (2011f), will likely increase. Effects would be intermittent, localized, and long-term. Unique water resources, specifically those with Essential Fish Habitat designation, could be affected.

Direct and indirect effects at the staging area near the Northeast Terminal would be highest during construction, but would continue at a reduced level during operation and maintenance activities. Effects would be in isolated areas where surface water runoff, concentrated by erosion control methods, discharges into areas near the staging area.

Summary

Direct and indirect effects would continue during the operation and maintenance stage of the alternative. Effects would include the continued movement of sediment once hydrological processes are reestablished after construction and newly introduced sediment from eroding trails caused by all-terrain vehicles that might proceed past the barriers. These effects would be permanent and localized to the area within and near the road corridor. These effects would be medium intensity (noticeable) for this unique resource (Ramsar designated wetlands and

Essential Fish Habitat), resulting in an overall moderate effect on hydrology and hydrologic processes.

Mitigation Measures

Mitigation measures are the same as described under Alternative 2.

Cumulative Effects

The incremental effects from Alternative 3 on hydrologic processes would be additive to past, present and reasonably foreseeable future activities in Alternative 1 (Section 4.2.1.4). The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway which would have a direct effect on hydrology in that local area. No other reasonably foreseeable future actions are in the immediate vicinity that would affect hydrology or hydrologic processes. Long-term maintenance of stream crossings would be additive to those impacts derived during construction activities. Effects could include potential non-point source pollution and unlawful stream crossings along the margins of the road corridor by the general public. The contribution to cumulative effects would be moderate.

Conclusion

Construction, operation, and maintenance of Alternative 3 would result in direct and indirect impacts to hydrologic resources, including water quality that would be medium to high in intensity (noticeable or obvious), permanent in duration (because the condition would not be expected to return to previous condition), limited to a local extent through the proper application of mitigation measures, and affect resources that are unique in context. The impact would be moderate, with the implementation of identified mitigation measures. Indirect effects would include potential non-point source pollution and unlawful stream crossings along the margins of the road corridor by the general public. The contribution to cumulative effects would be moderate.

4.4.1.5 Hazardous Materials

Direct and indirect impacts as a result of the land exchange, as they relate to hazardous materials, under Alternative 3 are the same as under Alternative 2.

Direct Effects and Indirect Effects from Construction

Direct and indirect impacts as a result of construction under Alternative 3 are the same as under Alternative 2.

Summary

Direct and indirect effects from hazardous materials could occur during construction from the uncontrolled release of fuel, battery acid, or hydraulic fluid. However, with preventive mitigation discussed below, the risk of an accidental release into the environment (physical and biological resources) is comparatively low, resulting in negligible effects. The intensity of the spill could be high, medium or low (depending on the quantity spilled) but the duration would be temporary with the proper application of a spill response plan, the spill would be in a confined area (local) with low risk for unique or important resources to be affected.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect impacts from Alternative 3 would be the same as those in Alternative 2.

Summary

Direct and indirect effects from hazardous materials could occur during operation and maintenance from the uncontrolled release of fuel, battery acid or hydraulic fluid. However, with preventive mitigation measures (as described under Alternative 2), the risk of an accidental release into the environment (physical and biological resources) is comparatively low and the potential for adverse effects would be negligible. The negligible conclusion is based on an intensity that would be high, medium or low (depending on the quantity spilled), with a duration that would be temporary (with the proper application of a spill response plan), a spill that would be in a confined area (local) with low risk for unique or important resources to be affected.

Mitigation Measures

Mitigation measures would be the same as described under Alternative 2.

Cumulative Effects

Cumulative effects resulting from Alternative 3 would be the same as described for Alternative 2 above.

Conclusion

With standard containment designs and operational response measures included as features of the proposed project, potential impacts from hazardous materials would be expected to be low. The greater risk comes in refueling transportation to and from the staging area to the equipment staging areas along the road corridor. Risk of spills during fuel transport to the project staging area could occur during 2 construction seasons between May and November, and equipment refueling activities would also occur during those times. If a spill were to occur on land, the impact would be short in duration and localized. If a spill occurred in wetlands or a water body, the impact would be long-term, cover a larger geographic extent, and have a greater effect on physical and biological resources. However, with preventive mitigation discussed, the risk of an accidental release into the environment (physical and biological resources) is estimated to be negligible.

4.4.1.6 Noise

Direct Effects and Indirect Effects from Construction

The methodology used for determining noise levels during roadway construction is described above in Section 4.3.1.6 for Alternative 2. Although the overall length of the new road construction in Alternative 3 is slightly greater (20 miles, as compared to 18.5 miles for Alternative 2), the average footprint width of this alignment is less; therefore, the central road alignment has a slightly smaller construction footprint (100 acres). The same construction schedule is expected for both alternatives: over 2 seasons, between May and November, for a total of 14 months. The noise levels from construction equipment are expected to be approximately the same as the conservative case presented for Alternative 2. As with Alternative 2, the indirect effects of this construction may be an increased use of other resources (such as roadways and rock crushing operations used for construction materials). These activities would also be temporary. The indirect noise effects are expected to be negligible, and would occur at different locations than the actual construction activities.

Summary

Noise effects would come from noise generating equipment and operations. At a distance of 1,000 feet from the construction activity, the noise level from construction equipment has an estimated equivalent sound level (L_{eq}) of 58.2 dBA, which is 8.2 dBA more than existing noise levels (see Section 3.1.6). The direct effects on noise from the construction of Alternative 3 would be very similar to Alternative 2. Effects would have medium intensity (noticeable), but would have an intermittent and temporary duration. The noise would be localized (several hundred feet from the construction activity) but the area affected would include both the state owned corridor (extent common) and wilderness (context unique). Therefore, for those receptors that are within a designated wilderness, the effects may be greater. Noise effects on wildlife are discussed within the Biological Environment (Section 4.4.2). Effects would occur only during actual construction, and in the immediate vicinity of the construction activity. Indirect noise effects in any populated area would not occur; other indirect effects on noise would be negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

The methodology used for determining noise levels during operations and maintenance activities is described above in Section 4.3.1.6 for Alternative 2. This alternative would be 2.2 miles longer than Alternative 2. However, the total number of trips is expected to be the same, along with the vehicle class breakdown and speeds, therefore, the noise levels due to the road travel are estimated to be the same as those for Alternative 2.

Indirect effects of this alternative may include the use of the roadway by all-terrain vehicles and motorcycles, as discussed for Alternative 2. Due to the relative low use of the roadway, and generally low population of the area, indirect effects on noise are expected to be negligible.

Summary

The predicted noise level at 50 feet from the roadway centerline is 52.5 dBA, plus an additional 4 dBA to account for the gravel surface. The estimated equivalent sound level (L_{eq}) for travel on this roadway is 6.5 dBA more than existing noise levels (see Section 3.1.6). The direct effects on noise from the operation and maintenance of Alternative 3 are expected to be moderately loud, localized, and intermittent throughout the life of the project. Sounds would be able to be heard in designated wilderness. The noise sources from the new road would be a compilation of very small noise emitters (single vehicles), operating intermittently, and spread out over a relatively large area. Isolated occurrences of loud vehicles in certain conditions (specific location and meteorological events such as wind and rain) may have a moderate effect on noise. Overall, the indirect effects of noise from the operation and maintenance of the road are expected to be negligible.

Mitigation Measures

Due to the predicted negligible and minor effects on the noise environment, no mitigation measures are identified for Alternative 3.

Cumulative Effects

Cumulative effects associated with Alternative 3 would be similar to cumulative effects associated with Alternative 2. Past, present, and reasonably foreseeable future actions affecting noise in or adjacent to the EIS project are described in Section 4.2.1.6. A current project that would have the potential to affect noise in the area is the completion of the King Cove Access Project road currently under construction. Reasonably foreseeable future actions in the immediate vicinity include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway. This action could cause a temporary increase in noise from construction. No other reasonably foreseeable future actions are in the immediate vicinity that would affect noise. Alternative 3 would have a minor contribution to cumulative effects on noise.

Conclusion

In relation to Alternative 1, the noise from Alternative 3 would be a new incremental effect. Alternative 3 would have a moderate direct and negligible indirect effect on the noise environment from construction in the immediate vicinity of the central road alignment. During operation and maintenance noise would consist of intermittent episodes, intermittently occurring over the life of the project, spread out over a relatively large area. Direct effects would be minor, indirect effects would be negligible, and overall the alternative would have a minor contribution to cumulative effects on noise.

4.4.2 Biological Environment

As discussed in Section 4.1, the effects to biological resources are based on ecosystem characteristics, not land status. Thus, changes in habitat and population are evaluated for the project area, separate from changes in land status. Changes in land status rarely result in near-term changes in ecological characteristics, although over time, management within a federal conservation unit would provide stronger protection of habitat. Changes in land status, including resource characteristics of lands exchanged, are evaluated in the Social Environment (Section 4.4.3).

4.4.2.1 Terrestrial and Aquatic Plant Communities

Alternative 3 would result in the addition of approximately 52,583 acres of native land cover types (some are non-vegetated) to the National Wildlife Refuge system while relinquishing ownership of an estimated 1,846 acres of native land cover types; a net gain of approximately 50,737 acres. The King Cove Corporation's selected parcel of 5,430 acres would also be retained in Izembek National Wildlife Refuge; however a substitute parcel would be selected from within the Alaska Peninsula National Wildlife Refuge. See Chapter 3 for a more complete description of terrestrial and aquatic plant communities within the proposed exchange parcels.

No effects on terrestrial and aquatic plant communities have been identified that would result from the proposed land exchange, because no activities in the reasonably foreseeable future have been identified that would alter plant communities. Plant communities and values, as described in the affected environment section (Chapter 3) would remain the same, before and after the proposed land exchange. Other effects of the proposed land exchange, such as Land Ownership and Management, Public Use and Subsistence management are addressed in Section 4.3.3.1, Section 4.3.3.6, and Section 4.3.3.7.

Direct Effects and Indirect Effects from Construction

Construction associated with Alternative 3 would consist of 20 miles of new road within a 100-foot wide corridor. Direct effects would include the loss of native plant communities, which is shown in Table 4.4-4. Impact to rare plant species is unknown, as surveys in this area have not been conducted.

Construction of the road would result in a loss of approximately 98 acres of upland moist dwarf scrub and upland moist meadow, 2 acres of lowland wet low sedge/scrub and 1 acre of lowland wet sedge meadow vegetation. The functions and values of these plant communities are discussed above in Alternative 2 (Section 4.3.2.1). Alternative 3 would also result in a loss of approximately 1.0 acre of vegetation for the construction of 2 temporary barge landing sites adjacent to the existing ramps at the Northeast Terminal and Cross Wind Cove.

Indirect effects would result from modifications to the hydrology in areas immediately adjacent to the road. Road fill would disrupt subsurface flows causing some ponding upslope and some dewatering downslope. This change may result in a change in the species composition of vegetation communities immediately adjacent to the road. The extent of such changes cannot be known prior to construction. Site specific changes would be dependent upon the size of the drainage area, slope, and soil characteristics. Proper siting and maintenance of drainage structures for the proposed road would minimize impacts to hydrology and vegetation species composition.

Table 4.4-4 Land Cover Type Impact for Alternative 3 (Approximate Acres)

Draft EIS Land Cover Types	Corridor[1]	Direct Impacts[2]
Upland Moist Dwarf Scrub/Upland Moist Meadow (Umds/Umm)	220	98
Lowland Wet Low Sedge/Scrub (Lwlss)	4	2
Lowland Wet Sedge Meadow (Lwsm)	2	1
Lakes and Ponds (Lp)	1	0
Lacustrine Margin Meadow (Lmm)	< 1 (approx. 0.1)	0

[1]Includes only National Wildlife Refuge lands within an average 100-foot wide road corridor.

2Includes King Cove Corporation lands and National Wildlife Refuge lands within the construction footprint; note that Table 3.2-3 analyzes a 400-foot wide road corridor.

Summary

The direct effects from construction would result in the loss of approximately 100 acres of native plant communities from construction of the road, and approximately 1 acre of beach and coastal vegetation at 2 temporary barge landing sites. These effects would be moderate because of their high intensity (change in resource condition would be clearly measurable and observable); permanent in duration (change would last beyond the life of the project even if the site was no longer maintained or used as a road); local in extent (limited geographic area); for these unique vegetation communities (unique because of the current wilderness designation and Ramsar designation). There would also be moderate indirect effects from construction that would include changes in the composition of vegetation communities in areas adjacent to the road footprint due to the resulting change in hydrology. These effects would be medium intensity because this change would be measurable as observable; permanent in duration because the change would last beyond the life of the project even if the site was no longer maintained or used as a road; and local in extent because of the limited geographic area; for these unique plant communities.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance activities associated with Alternative 3 would have indirect effects on plant communities, such as road dust on vegetation from the gravel road surface, a possible increase in human traffic in the plant communities, and impacts from invasive plant species. Impacts to vegetation would be similar to the analysis presented for Alternative 2 (Section 4.3.2.1).

Summary

Indirect effects from operation and maintenance include small changes to the plant community in response to dust accumulation from the road, and some eroding of pioneering trails caused by motorized vehicles that manage to circumvent the bollards or chain barrier. The operation of the road may also aid in the spread of invasive species in the Izembek National Wildlife Refuge vicinity. The lands affected as a result of implementation of Alternative 3 are uniquely located adjacent to high quality habitats of Izembek and Kinzarof lagoons, used by thousands of waterfowl and other species and recognized internationally by the Ramsar Convention. The indirect effects to vegetation from operations and maintenance of Alternative 3 would result in alterations to the functions of the plant communities and those changes would be measurable or observable (medium in intensity). The duration would be permanent because the alterations to the plant communities would remain, even if the road was no longer used; and the extent would be local for these unique (Wilderness designated) vegetation resources. The indirect effects to vegetation would therefore be considered moderate.

Mitigation Measures

Barriers (MM-V) (either a chain barrier or bollard barrier) would be installed along the length of the roadway on both sides, as specified in the Act, to prevent motorized vehicles from accessing the Izembek Wilderness.

Additional recommended mitigation measures include an Invasive Species Management Plan (MM-K) to limit the spread of non-native plant species, and pre-construction Rare Plant Surveys (MM-J).

Cumulative Effects

Past actions include impacts to vegetation through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. The completion of the King Cove Access Project (USACE 2003) also contributes to effects on vegetation. In addition, the new route to the Northeast Terminal has already provided access for all-terrain vehicles to that area, resulting in all-terrain vehicle activities within the Izembek Wilderness with impacts to native plant communities. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect vegetation.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the degradation of terrestrial habitats.

The result of implementing Alternative 3 would include the loss of 100 acres of native plant communities along the proposed road corridor and the loss of 1.0 acre of native vegetation at 2 temporary barge landing sites. Alternative 3 would also create the opportunity for invasive species to spread within the Izembek National Wildlife Refuge vicinity.

Alternative 3 would have a moderate contribution to cumulative effects on vegetation.

Conclusion

Direct and indirect effects to vegetation due to implementation of Alternative 3 would be high in intensity (change is clearly observable) for the 100 acres of plant communities that would be removed. The intensity would be medium for plant communities adjacent to the new road, due to changes in plant composition from alterations in hydrology and/or introduction of invasive species. The duration of the impacts would be permanent lasting beyond the life of the project, the extent would be local (near the proposed road) and the context would be unique because of the juxtaposition of the proposed corridor relative to designated wilderness. These vegetation communities are considered to fill a unique ecosystem role within the isthmus of Izembek

Wilderness. The summary impact of Alternative 3 on vegetation would therefore be considered moderate. The analysis considers implementing an invasive species management plan and pre-construction rare plant surveys with annual invasive species monitoring and treatment plans to mitigate impacts.

4.4.2.2 Wetlands

Wetlands are critical components of the landscape within the project area. Refer to Table 3.2-7 and Section 4.2.2.2 for an overview of wetland functions.

The values of wetlands are considered to have been reduced when their functional capacity is eliminated or reduced through either direct or indirect manipulation of the soils, vegetation, or hydrology that supports a particular wetland. Project activities, such as the development of building sites or construction of roads would have direct effects on wetlands within the footprint of a project when the wetland is filled, resulting in the complete loss of habitat, biogeochemical, or hydrologic function. Wetlands located upslope and downslope from a project area may be indirectly impacted through the manipulation of hydrology. Other potential impacts to nearby wetlands may include changes to the vegetative community through the introduction of new plant species or the reduction/elimination of native species through competition, or as a result of operation and maintenance activities. Alterations in the vegetative community of a wetland may influence functions, such as providing food and cover for wildlife, filtration of sediments, or recycling of nutrients.

Direct Effects and Indirect Effects from the Land Exchange

Implementation of Alternative 3 would result in a land exchange between the federal government, State of Alaska, and King Cove Corporation (Table 4.4-5). Approximately 41,887 acres of state land (containing approximately 8,571 acres of wetlands) would be transferred to the federal government; approximately 8,092 acres of the King Cove Corporation owned Mortensens Lagoon parcel (containing 2,920 acres of wetland) and approximately 2,604 acres of the King Cove Corporation owned Kinzarof Lagoon parcel (containing 1,235 acres of wetland) would be transferred to the federal government; approximately 1,619 acres of the federally owned Sitkinak Island parcel (containing 980 acres of wetland) would be transferred to the State of Alaska; approximately 5,430 acres of King Cove Corporation selected lands (containing 1,917 acres of wetland) would be retained in federal ownership, however additional lands (likely including wetlands) would be conveyed from the Alaska Peninsula National Wildlife Refuge (Table 3.2-5). Approximately 227 acres of Izembek National Wildlife Refuge lands would be transferred to the State of Alaska to develop a road along the 21.6 mile long central alignment (containing approximately 9 acres of wetland within the corridor proposed for exchange).

Table 4.4-5 Wetland Acres to be Exchanged

	Wetland Acres to be transferred to the Service	Wetland Acres to be transferred to the State	Wetland Acres to be retained by the Service
State Parcel	8,571		
Mortensens Lagoon Parcel	2,920		
Kinzarof Lagoon Parcel	1,235		
Sitkinak Parcel		980	
Selected Parcel			1,917*
Southern Corridor		9	
Totals	**12,726**	**989**	**Undetermined***

* However, additional wetlands would be conveyed from the Alaska Peninsula National Wildlife Refuge to King Cove Corporation.

The transfer of the Kinzarof Lagoon parcel to the Izembek National Wildlife Refuge and the transfer of submerged lands and waters of Kinzarof Lagoon (including eelgrass habitat and intertidal shorelines) to the Izembek State Game Refuge would result in management under the provisions of the *Izembek State Game Refuge Plan*. While the designation of additional lands and waters as part of the Izembek State Game Refuge would afford additional protections beyond those of general state lands, they are subject to less protection than the lands within National Wildlife Refuges. In general, a Special Area Permit would be needed for an activity that may damage refuge resources, disturb wildlife or disrupt existing public uses. In contrast, most uses on a National Wildlife Refuge require both a Compatibility Determination, and an Section 810 evaluation in addition to a special use permit, where needed. A special use permit for the Izembek National Wildlife Refuge also requires compliance with NEPA which could include the preparation of an environmental assessment or environmental impact statement. In addition, the State Game Refuge is currently open to new locatable mineral entry, mineral prospecting and mineral leasing, although the *Izembek State Game Refuge Plan* recommends that the Alaska Department of Fish and Game in cooperation with the Alaska Department of Natural Resources close the State Game Refuge to new locatable mineral entry, mineral prospecting, and mineral leasing. National Wildlife Refuges are closed to new mineral entry by law. Both the Izembek State Game Refuge and the Izembek National Wildlife Refuge consider proposed activities on a case by case basis.

In summary, the federal government would gain approximately 12,726 acres of wetland while relinquishing ownership of 989 acres of wetland (980 acres on Sitkinak Island and 9 acres in the road corridor). An estimated total of 2.4 acres of wetlands would be filled and two stream crossings would be constructed. See Chapter 3 for a more complete description of wetlands within the proposed exchange parcels.

No effects on wetland resources have been identified that would result from the proposed land exchange, because no activities in the reasonable foreseeable future have been identified that would alter wetlands on these parcels. The wetland functions and values, as described in the effected environment section (Chapter 3) would remain the same, before and after the proposed land exchange. Wetlands, regardless of ownership are protected by the Clean Water Act. Other effects of the proposed land exchange, such as Land Ownership and Management, Public Use, and Subsistence management are addressed in Section 4.3.3.1, Section 4.3.3.6, and Section 4.3.3.7.

Direct Effects and Indirect Effects from Construction

Construction associated with Alternative 3 consists of a 20-mile road segment within an average 100-foot wide corridor. Wetlands would be directly affected as a result of 11,000 to 15,000 cubic yards of deposited fill in less than 2 acres (estimated 1.7) of lowland wet low sedge/scrub and less than 1 acre (estimated 0.7) of lowland wet sedge meadow wetlands, resulting in a total loss of wetland functions for those 2.4 acres. Also, direct effects would occur from the diminished wetland functions when 1,200 cubic yards of fill would be placed in .05 acres of beach wetland for temporary barge landing sites/staging areas. Impacts to wetlands would be similar to analysis presented for Alternative 2 (Section 4.3.2.2).

Approximately 173 drainage structures would be installed, consisting of 1 major stream (riverine wetland) crossing requiring a bridge, 1 minor stream crossing requiring either a box culvert or small bridge, and approximately 171 cross drainage culverts. The alternative would traverse upland hills and ridges for the majority or the route. Connectivity between major watersheds, wetlands, and water bodies would be maintained by a box culvert or bridge in the few places where the route crosses streams and lowland areas. The cross drainage culverts identified above would be placed in upland areas at appropriate locations to maintain the existing localized drainage patterns. Although a complete on-site wetland survey was not completed for this EIS to confirm the jurisdictional wetland designations of these cross drainage sites, it can be presumed that some of these drainage areas would meet wetland criteria.

Indirect effects would result from modifications to the hydrology of adjacent wetlands because road fill would disrupt subsurface flows causing some ponding upslope and some dewatering downslope, and rerouting of surface waters through 171 cross drainage culverts resulting in a change of wetland functional capacity.

Summary

The direct and indirect effects from construction would be high intensity for the 2.4 acres of lowland wet low sedge/scrub and lowland wet sedge wetlands and the 0.5 acre of beach system wetlands due to the loss of hydrologic, biogeochemical, and habitat wetland functions caused by the placement of fill. However, when placed in the context of wetland functions performed by the 4,000-5,000 acre Kinzarof marsh system the magnitude of this loss would be medium. The indirect effect on adjacent wetlands would also be medium due to modifications of wetland hydrology and likely alterations to wetland vegetation. The resulting moderate effects would be permanent and local for these unique wetlands. The wetlands are considered unique because of their designation as Wetlands of International Importance, as well as Essential Fish Habitat under the *Sustainable Fisheries Act*.

These wetland losses would contribute slightly to the continuing overall loss of America's wetlands, which was recently highlighted by the U.S. Department of Interior (USDOI 2011). Also, according to the articles of the Ramsar Convention, the Service would report to the Ramsar Convention the resulting changes to the ecological character of these listed wetlands.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance activities associated with Alternative 3 would have indirect effects on wetlands, such as road dust on vegetation from the gravel road surface, and an increase in human access in wetlands within and adjacent to the project area. All-terrain vehicle trails would likely grow across the 4-mile wide isthmus and provide access to beaches on the Bering Sea/Izembek Lagoon and Pacific Ocean/Kinzarof Lagoon coasts, affecting a variety of wetlands in the area (see Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1). Impacts to wetlands from operation and maintenance of Alternative 3 would be similar to the analysis presented for Alternative 2 (Section 4.3.2.2).

Summary

Indirect effects to wetlands from operation and maintenance would include changes to the plant community in response to dust accumulation from the road and a reduction of wetland function along eroding pioneering trails caused by motorized vehicles that manage to circumvent the bollards or chain barrier. The effects from dust would be minor, but the effects from motorized vehicles would be moderate, because they would be medium in intensity (measurable), permanent (effects of eroding trails would continue even if the road use was discontinued), and local to extended in geographic extent for unique wetlands. The wetlands affected within the proposed corridor as a result of implementation of Alternative 3 are uniquely located adjacent to high quality habitats of Izembek and Kinzarof lagoons, used by thousands of waterfowl and other species. The overall effect as a result of operation and maintenance is therefore moderate.

Mitigation Measures

Barriers (MM-V) (either a chain barrier or bollard barrier) would be installed along the length of the roadway on both sides, as specified in the Act, to discourage motorized vehicles from accessing both wetlands and uplands within the Izembek National Wildlife Refuge and Izembek Wilderness. In addition, the route was designed to avoid wetlands where possible and to minimize impacts to wetlands. Appropriate Mitigation of Wetland Loss (MM-L) including appropriate best management practices, to satisfy Executive Order 11990 (Protection of Wetlands) would be imposed on permits or other authorizations from the Corps and the Alaska Department of Fish and Game when depositing fill into wetlands or installation of stream crossings.

Cumulative Effects

Past actions include impacts to vegetation and wetlands through road and trail development dating back to the 1940s during World War II. The majority of these impact scars have been reclaimed by vegetation.

The completion of the King Cove Access Project (USACE 2003) would also contribute to effects on wetlands. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect wetlands.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the degradation of terrestrial habitats.

As a result of that project, approximately 6 acres of primarily lowland wet sedge meadow wetland have been filled along the segment from King Cove Airport to Lenard Harbor, and 3 acres of depression wetlands were filled at the Northeast Terminal site. The remainder of the project, which consists of a 12-mile long, 14-foot wide access road from the Lenard Harbor site to the Northeast Terminal site (currently under construction), would fill an additional 11 acres of primarily lowland wet sedge meadow wetland. However, as a mitigation measure for wetlands altered by the King Cove Access Project, King Cove Corporation donated 11.9 acres of high value wetlands at the entrance of Kinzarof Lagoon to the United States, which were designated as Special Aquatic Sites under 40 CFR 230.40-A, and are now part of the Izembek Wilderness.

The result of implementing Alternative 3 would include the loss of wetland functions on approximately 2.4 acres along the proposed road corridor, the loss of 0.5 acre of wetland functions at the temporary barge landing site, and the reduction of wetland functions on adjacent wetlands.

Conclusion

Direct and indirect effects to the Kinzarof marsh system from implementation of Alternative 3 would be medium in intensity, due to modifications to local hydrology and/or changes to the vegetative component on less than 5 acres within this 416,193 acre Ramsar site. The duration of the impacts would be permanent, the extent would be local, or beyond if the barriers are ineffective, and the context would be unique, due to the designation as Wetlands of International Importance, Essential Fish Habitat, and the juxtaposition of the proposed corridor relative to designated wilderness. The wetlands are considered to fill a unique ecosystem role within the isthmus of Izembek Wilderness. The resulting effects would be a moderate contribution to cumulative effects on wetlands and the summary overall impact of Alternative 3 on wetland resources would be considered moderate.

4.4.2.3 Fish and Essential Fish Habitat

Alternative 3 would construct 20.0 miles of single lane gravel road through the Izembek isthmus. It is referred to as the central road alignment, and is the more northerly of the 2 road alternatives. Both road alignments were designed primarily to reduce impacts to wetland vegetation and hydrology, bird habitat, and land mammals. Minimizing impacts to fish habitat was also a consideration.

Direct Effects and Indirect Effects from the Land Exchange

Implementation of Alternative 3 would result in a land exchange between the federal government, State of Alaska, and King Cove Corporation. Although some access and usage patterns could be altered as a result, fisheries management would remain under the jurisdiction of Alaska Department of Fish and Game and would not be affected. The anadromous streams (Essential Fish Habitat) within the Mortensens Lagoon, Kinzarof Lagoon and State parcels would not be added to the National Wildlife Refuge System, but retained by the State as submerged lands beneath inland navigable waters. Therefore, it is not anticipated that Alternative 3 would affect fish and Essential Fish Habitat on the other exchange parcels outlined under Alternative 3, and is therefore not analyzed further.

Alternative 3 does not have marine components, except to the extent that barging activities and temporary barge landings would be required during construction.

Direct Effects and Indirect Effects from Construction

The central road alignment's increased length would require more drainage structures overall than the southern alignment, but fewer fish-bearing streams would be crossed. Approximately 173 drainage structures would be installed along the central road alignment, consisting of 1 bridge over a major stream, 1 box culvert or small bridge over a minor stream, and approximately 171 cross-drainage culverts.

The central road alignment involves only 2 stream crossings, which are both anadromous streams. These streams would be crossed by using 1 bridge and 1 box culvert (or small bridge). The streams are classified as Essential Fish Habitat by Alaska Department of Fish and Game and are identified as stream #283-34-10700 and stream #283-34-10600. They are detailed in Table 2.4-4 and shown in Figure 3.2-9. Impacts to fish and Essential Fish Habitat would be similar to analysis presented for Alternative 2 (Section 4.3.2.3).

Quantities of water would be needed for embankment compaction and dust control. The area's typically wet weather should keep road materials moist; therefore, water requirements during road construction would be relatively low. Project water sources include 2 lakes and 1 creek. The creek water source would be at stream system #283-34-10700, located approximately 2 miles north of the Northeast Terminal. Intake would be limited to 600 gallons per minute. Source lakes include a 33-acre lake on the western side of Alternative 3 that is not connected to any anadromous streams, and Blinn Lake, a 150-acre lake not connected to anadromous streams and located at the western terminus of Alternative 3. Locations and preliminary estimates of quantities are shown in Appendix E.

Summary

Anticipated effects from the construction of the central road alignment would be limited to freshwater fish resources in the lower reaches of streams crossed by the alignment. Direct and indirect effects would be of low intensity (no noticeable change to the resource condition with appropriate mitigation measures applied), temporary in duration (lasting only during the 2 year construction period), and local in extent (within the vicinity of the road alignment). The habitat is considered unique, due to its status as Essential Fish Habitat under the *Sustainable Fisheries Act*. Therefore, the direct and indirect effects from construction under Alternative 3 would be negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Impacts to fish and Essential Fish Habitat from operation and maintenance would be similar to the analysis presented for Alternative 2 (Section 4.3.2.3), with the exception of the number of streams affected. For Alternative 3, stream 283-34-10600 (East Kinzarof Stream), has a small or poorly defined run of coho, chum, and sockeye salmon that could be vulnerable to overharvest. Stream 283-34-10700 (Southeast Kinzarof Stream) is a major salmon-producing stream, and would likely be able to support limited harvest.

Summary

No direct effects on fish resources or Essential Fish Habitat would result from the operation and maintenance of the central road alignment. Most unavoidable indirect effects, such as effects to water quality or degradation of fish habitat from all-terrain vehicle use, would be of low to medium intensity (may be observable and measurable), long-term duration (intermittent but persistent for the life of the project), local in extent (limited to the drainages within the isthmus area), and would impact unique resources (Essential Fish Habitat), resulting in a moderate effect. Indirect effects on the fish resources from increased harvest pressure resulting from improved access could also result if the harvest is not monitored and harvest regulations modified when necessary. However, with the additional recommended mitigation measure of harvest regulation adjustments no effects should result from increased harvest. Therefore, the indirect effects from operation and maintenance under Alternative 3 would be moderate.

Mitigation Measures

Mitigation measures for Alternative 3 would be the same as described for Alternative 2 (Section 4.3.2.3).

Cumulative Effects

Cumulative effects for Alternative 3 would be the same as described for Alternative 2 (Section 4.3.2.3).

Conclusion

Effects on fish and Essential Fish Habitat from most aspects of the central road alignment would be of low to medium intensity, long-term to permanent in duration and local in extent for these unique resources. Unavoidable indirect effects such as record storm events and pollution from anthropogenic causes could occur. All-terrain vehicles accessing areas beyond the road could also cause sedimentation or erosion of streambanks along fish bearing streams and/or the loss of riparian and bank vegetation that provides habitat for fish. The potential for overharvesting of anadromous resources facilitated by improved access would be minimized by appropriate adjustments in harvest regulations. The contribution to cumulative effects on fish and Essential Fish Habitat would be moderate, and the combined effects on fish and fish habitat under Alternative 3 would be moderate, because the intensity would be low to medium (may be observable and measurable), with a long-term duration (intermittent but persistent for the life of the project), local in extent (limited to the drainages within the isthmus area), and would impact unique resources (Essential Fish Habitat).

4.4.2.4 Birds

Alternative 3, or central road alignment, would involve the construction of 20 miles of single lane gravel road, including 158 turnouts for passing, through a corridor approximately 0.75 to 2 miles from Izembek Lagoon. The route was designed to avoid or minimize impacts to wetlands and waterfowl nesting habitat while also considering land mammal movements and habitat use of the isthmus. The Alternative 3 alignment would require 227 acres of land from the Izembek National Wildlife Refuge, 26 acres more than the southern road alignment under Alternative 2. The road construction footprint would require 100 acres of tundra habitat. The main difference between this alternative and Alternative 2 is the location of the road. The road alignment under Alternative 3 is located closer to Izembek Lagoon than to Kinzarof Lagoon, while the opposite applies to Alternative 2.

Effects of Alternative 3 would have the same types of effects as Alternative 2. Rather than repeat the same effects analysis, what follows is a brief summary of the effects of Alternative 2 with additions or modifications to the analysis applicable to Alternative 3.

General Impacts – Breeding, Migrating, and Wintering Birds

Alternative 3 effects would be similar to those described in detail under Alternative 2 (Section 4.3.2.4).

Tundra Swan and Other Breeding Birds

The non-migratory Tundra Swan population on Izembek National Wildlife Refuge numbers about 200 individuals based on a mean population size from 1980-2003 (range 57-266 individuals), with a large number of sub-adults and nonbreeding adults, and only an estimated 40 percent of the population is presumed to breed in any given year (Bart et al. 1991; Dau and Sarvis 2002; Meixell 2007; Meixell et al. In press). When 2004 to 2009 Tundra Swan population data is added that of 1980 to 2003, the mean population size drops from 200 to 174 individuals (average mean of 187 individuals) (Sowl 2011d). For the period 1980 to 2003 this represents about 23 to 86 nests per year. Using an estimated 35 breeding pairs in any given year (40% of 187 individuals), one (1) nest may represent 2.9 percent of the total breeding population. Overall, the non-migratory Tundra Swans have lower reproductive success than other North American migratory Tundra Swan populations and there has been a documented 75 percent decline in this population from 1980 to 2003 (Meixell 2007; Meixell et al. In press).

Contributing to the non-migratory Tundra Swan decline is low productivity related to high rates of mortality for eggs and young, up to 95 percent (50 percent less than 10 days age, i.e., eggs through hatching to 10 days; 30 percent 11-30 days age; and 15 percent 31 or more days of age) (Dau and Sarvis 2002; Meixell 2007). Predation is identified as the primary causal factor contributing to mortality (Dau and Sarvis 2002; Meixell 2007). It is speculated that the population persists due to the immigration of individuals from the migratory western population of Tundra Swans (Dau and Sarvis 2002; Meixell 2007), and adult longevity, up to 21 years for an ecological lifespan (Bart et al. 1991; Limpert and Earnst 1994).

Direct and Indirect Effects from Construction

Road construction impacts of Alternative 3 would include the permanent loss of 100 acres of tundra habitat required by the road corridor footprint. Additionally, road construction may include physical risk due to wildlife-vehicle collision but the number of birds potentially affects is expected to be small. The most likely and predictable response of birds to construction noise, equipment movement, and human activities is for birds to avoid the area. Those birds closest to construction activities and most sensitive to disturbance would be those most affected.

Construction effects on Tundra Swans and other breeding birds would include behavioral disturbance associated with noise, heavy equipment movement, and human presence. The central road alignment crosses through high density Tundra Swan habitat with nests documented in close proximity to the proposed road alignment (Figure 4.3-1). Affected individuals, or nesting pairs, would likely be displaced from territories. If nesting is underway when construction activities begin in May, it is probable re-nesting would not occur for the affected pair for that year due to the protracted breeding cycle which extends into the winter for Tundra Swans (Limpert and Earnst 1994; Bowler 2005). Swans demonstrate a strong fidelity to nest sites and would typically attempt at or near the same location as the previous season each year. However, with road construction projected to require 2 years, nesting behavior would be disrupted again and any nesting effort abandoned. Similar disturbances would likely occur to other breeding species due to road construction.

Direct and Indirect Effects from Operation and Maintenance

An analysis of nesting Tundra Swans affected by the central alignment road operation and maintenance across the Izembek isthmus suggests that less than one (1) breeding pair per year (based on unpublished Service swan survey data 1985 to 2005) within a 0.5 mile (2,640 feet) radius of the road (ABR 2012). If a 1.0 mile (5,280 feet) radius is used to estimate the area of disturbance, an average of 2.0 breeding pairs would be disturbed each year, as opposed to 2.5 for the Alternative 2 southern alignment. Based on population estimates with only 40 percent of the population breeding in any given year, 2.0 nests may comprise 5.7 percent of the breeding non-migratory Tundra Swan population, as opposed to 7.1 percent under Alternative 2 (Bart et al. 1991; Dau and Sarvis 2002; Meixell 2007). The ABR (2012) analysis did not address the effects of vehicles that may stop along the road and the potential pedestrian activities within or beyond the corridor barrier. As off-road and pedestrian use would most likely go beyond the alignment barrier, seeking closer wildlife viewing or subsistence or sport hunting opportunities, the disturbance effects may extend well beyond 1 mile (5,280 feet) from the roadway.

The affected area defined over the length of 20 miles is 12,800 acres for 0.5-mile (2,640 feet) on either side of the road, or 25,600 acres for 1.0 mile (5,280 feet) on either side of the road, as opposed to 11,480 acres and 23,680 acres, respectively, for Alternative 2. The area includes habitat that may be degraded or permanently abandoned for Tundra Swan use due to disturbance caused by increased human access and associated disturbances. Using the response distance to humans of 6,600 feet (Monda 1991), the Tundra Swan habitat loss of degradation may include an area of 32,000 acres over the length of the proposed road. Note that Figure 4.3-6, which displays a more conservative 6,000 foot flush distance around Tundra Swan nests encompasses nearly the entire isthmus area.

Given these considerations, plus a lower reproductive success than migratory Tundra Swan populations and a documented 75 percent decline in this population from 1980 to 2003 (Meixell 2007), the indirect effects caused by road operation and maintenance should be construed as a major impact and risk for the non-migratory Tundra Swan population because the intensity would be high (measurable and observable), the duration would be long-term, the extent would be regional for these unique species.

Summary of Road Construction, Operation, and Maintenance Effects

Road construction effects of Alternative 3 for birds would include the permanent loss of 100 acres of tundra habitat caused by the road corridor (footprint) plus risk of wildlife-vehicle collision and behavioral disturbance caused by noise, movement of heavy construction machinery, and human presence at periodic internals between May and November annually for a minimum of 2 years.

In addition to potential risk of wildlife-vehicle collision, the direct and indirect effects of road operation and maintenance to Tundra Swans and other breeding birds would include intermittent but unpredictable noise of varying intensity, frequency, and duration along with vehicle movement and proximity. The greatest response anticipated is to vehicles that stop on the road or situations where people stop and get out of their vehicles.

Further, due to the response distances of breeding Tundra Swans to human presence, up to 32,000 acres of habitat could be unavailable or reduced in value for Tundra Swans. Road use may cause the abandonment of 2.0 territories or nests that may reflect 5.7 percent of the total unique non-migratory breeding Tundra Swan population.

New human access and use patterns along the proposed road, including all-terrain vehicles, subsistence hunting and gathering and/or sport hunting, and wildlife viewing are anticipated to create disturbances to the most sensitive breeding species, beyond the road corridor. Details for impacts are difficult to project, but the expansion of human use and all-terrain vehicle trails in areas closest to resident human populations documents such trends (Sowl and Poetter 2004; Sowl 2008, 2011f; see Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1).

Mitigation Measures

All the mitigation measures listed under Common Mitigation Measures in Alternative 2 are expected to reduce the level of, but not completely avoid, adverse impacts to Tundra Swans and other breeding birds. Clearing the vegetation outside the nesting season would avoid the adverse effect of active nest destruction. Restricting access beyond the roadway would also greatly reduce potential adverse effects to breeding birds, although this measure would be very difficult to monitor and enforce. Even if vehicles remain in the roadway, increases in foot traffic could affect breeding species through disturbance and increased subsistence harvest of birds and their eggs. Direct and indirect habitat loss may not be mitigated as both losses would be permanent and new habitat cannot be created or enhanced elsewhere without displacing other Tundra Swans or impacting other species. Potential impacts to Tundra Swans would not simply displace individuals from usable habitat but preclude its use for reproduction. As a result, Tundra Swan population productivity and recruitment would be adversely impacted.

Cumulative Effects

In addition to the effects from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time, as discussed above under General Impacts, the cumulative effects for Alternative 3 to Tundra Swan and other breeding birds include other physiological and behavioral stress that may be caused by ongoing noise and movement of vehicle traffic, and human presence at periodic intervals.

Indirect effects of increased human access to the isthmus area within the reasonably foreseeable future includes the probability that within the 1.0-mile radius from the road alignment a known minimum of 2 breeding Tundra Swan pairs may be impacted by road disturbances, and Tundra Swans may abandon nesting within this affected area totaling 25,600 acres. Based on population estimates with only 40 percent of the total population breeding in any given year based on an average of 35 pairs annually from 1980 to 2009, 2 nests may comprise 5.7 percent of the total annual recruitment for the non-migratory Tundra Swan (Bart, Earnst and Bacon 1991; Dau and Sarvis 2002; Meixell 2007). Using the response distance to humans of 6,600 feet (Monda 1991), the Tundra Swan habitat loss of degradation may include an area of 32,000 acres over the length of the proposed road.

The indirect effects caused by road construction, operation and maintenance should be considered a major effect and risk for the non-migratory Tundra Swan population with a documented 75 percent decline from 1980 to 2003 (Meixell 2007).

Summary

Using the 6,600-foot response-distance for Tundra Swans to human presence along the length of the road corridor, results in a total of 32,600 acres. This area may be considered less than suitable, or abandoned, by Tundra Swans following construction of the proposed road. However, this area does not consider new disturbances created by human access related to new all-terrain vehicle trails or pedestrian use that may greatly expand disturbances beyond the road corridor. Also, the projected loss of 2.0 nests may affect 5.7 percent of the total breeding population. Therefore the contribution to cumulative effects from Alternative 3 would be major.

Conclusion

The intensity of the effect on Tundra Swan and other breeding birds from road construction, operation, and maintenance of Alternative 3 would be high for Tundra Swans (loss of nesting habitat would be consistently observable) and medium for other breeding birds (the change in resource condition would be detectable), the duration would be permanent (lasting beyond the life of the project due to the improved human access to the nesting area) and local (limited geographically) for this unique resource. Because the Tundra Swans at the Izembek National Wildlife Refuge are the only known wild, non-migratory population of Tundra Swans in North America (Limpert and Earnst 1994; Dau and Sarvis 2002), this species is considered unique in this impact analysis. The resulting effect is considered to be major and the contribution to cumulative effects would be major.

<u>Brant, Emperor Geese, and Other Migrating/Wintering Birds</u>

Izembek Lagoon and adjacent coastal areas support nearly the entire population of Black Brant during spring and fall migrations, where they feed on the extensive eelgrass beds and other marsh plants (Ward et al. 1997; Reed et al. 1998). Increasing numbers of Black Brant are remaining to winter in the Izembek area in recent years, accounting for up to 30 percent of all Black Brant (Collins and Trost 2010), perhaps as a result of the increasing number of ice-free days with climate change and less favorable winds for migration (Ward et al. 2005; Ward et al. 2009a). This trend indicates the increasing future importance of the Izembek area for Black

Brant population not only for fall migratory staging but also a wintering site. Izembek Lagoon is the preferred winter habitat, but it is shallow and will often freeze, thereby becoming unavailable. When displaced from Izembek Lagoon by ice or poor weather and tides, Brant will also use Kinzarof Lagoon, Hook Bay, Bechevin Bay, and other open areas on the Pacific side of the peninsula (Sowl and Poetter 2004; ADF&G 2010i).

The fact that Brant travel great distances to feed and stage for migration at this location, strongly suggests that this is an unusually favorable site. Because the Izembek National Wildlife Refuge plays such an important role in the life history of the entire population of Black Brant, this species is considered unique in the effects analysis.

The Emperor Goose is endemic to the Arctic Pacific Rim, breeding primarily in the Yukon-Koskokwim Delta (where 80 to 90 percent of the world's population breeds annually), northwestern Alaska, and northeastern Russia, while wintering from the Commander Islands to the Alaska Peninsula (Headley 1967; Eisenhauer and Kirkpatrick 1977; Petersen et al. 1994; Schmutz 2005). With its limited distribution, it is possibly the rarest goose species in North America (Wells 2007).

Emperor Goose seasonal and annual survival rates are below those compared with other goose species (Schmutz et al. 1994; Hupp et al. 2008a). Compounding Emperor Goose population stability is the relatively low reproductive potential with females not attaining breeding maturity until 3 or 4 years old (Petersen 1992). Further, over 33 percent of females fail to breed in any given year in the Yukon-Kuskokwim Delta (Petersen 1992). It is for the above reasons that this species is considered important in the effects analysis.

The proposed road corridor is a low density use area for breeding Emperor Geese but primarily as a spring and fall migration staging and/or wintering area with abundant aquatic and terrestrial foraging habitat. The Emperor Goose is primarily vegetarian foraging heavily on lagoon eelgrass beds but may also visit tidal flats and tundra uplands, and crowberries on the tundra uplands (Petersen 1983; Hupp and Safine 2002). When open water bodies are frozen elsewhere on the Alaska Peninsula, Emperor Geese concentrate in the Izembek isthmus and select suitable habitats (bay margins, tidal flats, or uplands) depending tides, ice and weather conditions (Petersen et al. 1994; Hupp et al. 2008a). The isthmus area also serves as a flight corridor between the Izembek and Kinzarof lagoons. The proposed Alternative 3 road alignment would not interfere with Black Brant and Emperor Goose feeding in Kinzarof and Izembek lagoons or other open water.

Direct and Indirect Effects from Construction

Construction the central road alignment under Alternative 3 would affect Black Brant, Emperor Geese, and other migrating and/or wintering birds through the permanent loss of 100 acres of tundra habitat for the road corridor. Actual road construction is planned to occur between May and November annually, which may influence fall staging, particularly the accumulation of energy reserves required for long distance flights. Construction noise, movement, and human presence may increase physiological stress or alter behavior nearest the road corridor and decreasing outward with increasing distance from the road. The greatest response to fall staging birds would be near construction equipment operations and when workers stop and get out of their vehicles. This road alignment is closer to Izembek Lagoon than Kinzarof Lagoon, which is used by higher numbers and diversity of waterfowl species. Therefore, Alternative 3 may affect more waterfowl than Alternative 2.

Direct and Indirect Effects from Operation and Maintenance

The direct and indirect effects of road operation and maintenance to Black Brant and other migrating or wintering birds would include long-term potential wildlife-vehicle collision and intermittent but unpredictable noise of varying intensity, frequency, and duration along with vehicle movement and proximity. While some birds may become habituated to predictable use of the road by vehicles, behavior changes are more likely to be caused by: noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for birds to habituate to any single or multiple disturbance(s).

Black Brant, Emperor Geese, and other migration staging and/or wintering birds may experience long-term behavioral disturbance associated with road traffic (noise, movement, and human presence) and that may preclude use of some terrestrial areas used for feeding and resting and those waters closest to the road. More importantly, human access to high density flocks during fall hunting equates to increased disturbance at locations previously difficult for humans to access. Constant alerts and escape flights may interfere with acquiring body fat reserves for migration or winter survival. As noted, the fact that Black Brant fly so far to feed and stage for migration at this location strongly suggests that this is an unusually favorable site. These effects are described under Alternative 2.

Alternative 3 effects are closer to Izembek Lagoon, where large numbers of birds stage during spring and fall migration and may affect more birds than Alternative 2. Both road alignments are 0.5 miles (2,640 feet) or more from lagoons to minimize disturbance based on a site-specific analysis conducted by ABR (2010). However, the closer approach to Izembek Lagoon with this alternative would enable human access for waterfowl hunters on all-terrain vehicles or on foot. As discussed in detail under Alternative 2, human access is a greater disturbance than road construction, operation, or maintenance (see Figures 4.3-2 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1). Blaine Point is a local favorite hunting location because of its high concentration of Black Brant and other waterfowl species and the improved access may only encourage increased hunting pressure in the fall, typically September through mid-October. Increased subsistence and/or sport hunting and associated disturbances (noise, visual movement, human presence, domestic dogs, etc.) may displace large flocks of Black Brant and other waterfowl. Such disturbances cause birds to maintain high alert behavior and/or cause frequent escape flights, or disrupt feeding and energy uptake, decreasing their ability to recover from the breeding efforts and add fat reserves for migration, potentially reducing survival fitness during migration or wintering grounds. If disturbances are persistent, birds may abandon the area permanently. Such disturbances compromise the purpose of Izembek National Wildlife Refuge.

Summary of Road Construction, Operation, and Maintenance Effects

The direct and indirect effects to Black Brant, Emperor Geese, and other staging and/or wintering birds would include the permanent loss of 100 acres, equal to the road construction footprint. Intermittent short-term disturbance created by noise and heavy equipment movement associated with construction is not expected to significantly alter behavior as construction activities are planned for between May and November annually and outside the use period for migration staging or overwintering by Black Brant, Emperor Geese, and other birds. However, staging behavior for Black Brant and Emperor Geese begins in mid to late-August for some other species.

Road operation and maintenance may alter some behavior due to noise and traffic patterns. These effects would be localized in extent and not projected to impact birds beyond the 0.5 mile (2,640 feet) radius from the road corridor, thereby reducing the habitat suitability of 12,800 acres along the length of the road (20 miles) according to the ABR (2010) recommendations. However, human disturbance is one of the major factors restricting the numbers of Black Brant (Einarsen 1965; Schroder 1984). Increased human access into areas during critical feeding periods for waterfowl and other migrating or wintering birds, previously not readily accessible may alter habitat quality beyond the 0.5 mile (2,640 feet) radius recommended by ABR (2010). Additive to these effects are the expected increase in subsistence and sport harvest of waterfowl species.

Mitigation Measures

All the mitigation measures listed in Alternative 2, except restricting vegetation clearing to be done outside the bird nesting period, would reduce adverse impacts to Brant, Emperor Geese, and other migrating/wintering birds. These measures would reduce the level of, but not completely avoid, adverse impacts to these species.

Cumulative Effects

In addition to the effects from road construction, operation, maintenance activities and numerous indirect effects of past present and reasonably foreseeable future actions over time, as discussed above under General Impacts, the cumulative effects for Alternative 3 to Black Brant, Emperor Goose, and other migrating/wintering birds include the future noise and traffic associated with road operation and maintenance that may cause additional impacts, most likely affecting the habitat quality of 12,800 acres (0.5 miles either side of the road corridor for its entire length of 20 miles), based on recommendations by ABR (2010). However, this may be considered a minimal impact affected area, as human access into an area with previously little if any intrusions may be greatly expanded, reducing the habitat quality for a larger area.

Izembek Lagoon and adjacent coastal areas may only increase in importance to the global Black Brant population under projected climate change scenarios in which more individuals would winter as opposed to migrating farther south to California and Mexico for the winter. For that segment of the population that continues long-distance migration to and from the Izembek area, it would remain an essential staging area where energy reserves are acquired prior to fall flight or regain lost energy during spring movements. The fact will remain that Black Brant travel great distances, or would remain to winter because of abundant food resources, primarily lagoon eelgrass beds, making Izembek National Wildlife Refuge a unique asset in the their life history.

More importantly are the combined and cumulative effects that may create conditions conducive for an ecological trap and population sink for Black Brant and Emperor Goose, and possibly other migratory and/or wintering species. These combined impacts include noise, projected traffic patterns along the proposed road, and anticipated increase in human access to the area, including all-terrain traffic and humans on foot creating trails and frequently accompanied by domestic dogs, and increased subsistence and sport harvesting of wildlife. The indirect effects caused by road construction, operation and maintenance should be considered a major contribution to cumulative effects for Black Brant and Emperor Goose.

Summary

The total effects for Alternative 3 on birds are dependent on many factors including how birds are currently using the project area – breeding, migration, or wintering, and for some, all of these seasonal activities. The birds are reliant on the resources that the habitat provides – food of varying quality and quantity, shelter from weather, escape and protection from predators, a place of convergence before relocating elsewhere. Included among these factors are the species and the individual tolerance to a range of disturbances.

A site-specific analysis suggests that Alternative 3 road corridor effects may be marginalized as the road is more than 0.5 miles (2,640 feet) from any lagoon (ABR 2010). However, this analysis does not assess the increased human access to an area previously with only limited human presence and that the proposed road passes near a local favorite hunting area with high density Black Brant and other waterfowl species. Such seasonal, as well as year-long potential human access, into area that are known to be unique and supports nearly the entire global population of Black Brant compromises the purpose for which Izembek National Wildlife Refuge was created. Further, with climate change, this location may become increasingly important to this and possibly other species that select to winter at this location as opposed to moving to more southern latitudes for the wintering period.

The cumulative effect of increased human access, as hunters or other human movement on foot or all-terrain vehicles increase activity in the area, greatly extends the projected disturbance footprint beyond the suggested 0.5 mile radius from the road corridor (ABR 2010). As noted above in the discussion under Alternative 2 (Section 4.3.3.1), the cumulative impacts of increased human presence are far greater than those of road construction, operation, and maintenance with the combined disturbances potentially creating conditions conducive to an ecological trap or population sink for such species as Black Brant, and Emperor Goose.

Therefore, cumulative impacts to the project area for Black Brant, and Emperor Goose would be considered major. This does not discount that other species, particularly waterfowl and shorebirds would be affected, but to a lesser degree.

Conclusion

Direct and indirect effects to Brant, Emperor Geese, and other migrating/wintering birds from Alternative 3 would be low to high intensity, based on their preferred use of habitats in the vicinity of the proposed corridor. The actions would be permanent duration (behavioral disturbance and habitat loss) lasting beyond the life of the project, local in extent (affecting limited geographic area), and would affect unique resources (Brant), important resources (Emperor Goose), and common resources (other migrating/wintering species), resulting in major (Brant and Emperor Goose) to moderate (other species) impacts to these resources. Because the Izembek National Wildlife Refuge plays such an important role in the life history of the entire population of Pacific Flyway Brant, this species is considered unique in the effects analysis. Emperor Goose seasonal and annual survival rates are below those compared with other goose species (Schmutz, Cantor, and Petersen1994, Hupp, Schmutz, and Ely 2008a). Compounding population stability, Emperor Geese have a relatively low reproductive potential with females not breeding until 3 or 4 years old (Petersen 1992). Further, over 33 percent of females failed to breed in any given year in the Yukon-Kuskokwim Delta Emperor Goose colony (Petersen 1992). It is for these reasons that this species is considered important in the effects analysis.

Alternative 3 would have a major contribution to cumulative effects on Brant, Emperor Geese, and other migrating/wintering birds. The summary impact of Alternative 3 on Brant, Emperor Geese, and other migrating/wintering birds is considered major (Brant and Emperor Goose) to moderate (other species).

Seabirds

Seabirds are those species that spend the majority of their time on the ocean, including murres, puffins, auklets, fulmars, and other tubenoses. These species typically nest on isolated islands and mainland cliffs, none of which are near the project area. These species are widespread and are considered common resources in this effects analysis. Gulls and terns are also considered seabirds, but many species breed in the Izembek area and are considered with Tundra Swan and other breeding birds in the effects analysis. Details of road construction, operation and maintenance effects, mitigation measures, and cumulative effects are provided under the discussion for Alternative 2.

Directs and indirect construction, operation, and maintenance along with cumulative effects to seabirds associated with Alternative 3 would be negligible.

Conclusion – All Bird Species

Road construction effects of Alternative 3 would include the direct loss of 100 acres of tundra habitat for the road corridor footprint. Physiological and behavioral stress due to construction activities on breeding birds over a minimum of 2 years from May to November annually, would include: noise of varying intensity, frequency, and duration; movement of earth-moving machinery and heavy equipment; and proximity to humans. Some species and individuals would be more tolerant to disturbances more than others, with the most predictable and likely response of birds avoiding the area. Other species may be attracted to newly created edge habitats or the gravel surface resulting from road construction. Breeding efforts for some species may be interrupted for duration of the construction but birds demonstrate a strong fidelity of nesting and/or natal sites, and given the relative survival of adult birds, breeding would be initiated once construction has ended.

There is a risk of wildlife-vehicle collision both during construction and road operation and maintenance but anticipated vehicles speeds and traffic volume may reduce this risk unless exceeded. While some birds readily become habituated to predictable use of the road by vehicles, behavior changes due to road operation and maintenance are more likely to be caused by traffic noise, vehicle movement and proximity, vehicles that stop on the road, and situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for birds to habituate to any single or multiple disturbance(s).

In addition to construction, operation, and maintenance effects described immediately above, the combination of these impacts with increased human access into any area previously with only limited, if any, human presence, is predictable although without specific details. This aspect of road operation and maintenance may have the greatest adverse impact on birds. Not only would the road allow more human access to the area and more humans in the area would disturb more birds although the degree of disturbance may vary by species and individual.

These factors would significantly reduce the suitable habitat availability through degradation by disturbance precluding breeding, migrating, or wintering birds, especially breeding Tundra Swans, and migrating-wintering Black Brant and Emperor Geese. Increased human access would most likely include increased subsistence or sport harvesting, establishing trails for humans that are currently relatively undeveloped and experience only limited human access, and increase access by predator species which often follow roads and trail systems. The project area presently only experiences limited human access and anticipated repeated disturbances of these habitats would seriously compromise the purpose for which Izembek National Wildlife Refuge was established.

Finally, the cumulative effects from road construction, operation, maintenance activities; anticipated off-road vehicle use by all-terrain vehicles, and new human use patterns including increased harvest of subsistence and/or game species, poses a greater risk to birds and their habitats by creating conditions conducive to a population sink and/or ecological trap.

Therefore, road construction, operation, and maintenance plus cumulative impacts associated with increased human access to the project area for Tundra Swan, Black Brant, and Emperor Goose, as analyzed above should be considered major because the intensity of the proposed action would be high (measurable change in resource condition) within the Izembek isthmus (an area critically important for several species) the duration would be permanent (lasting beyond the life of the project), the extent would be local (limited geographically) for these important (Emperor Goose) and unique (Black Brant and Tundra Swan) species. However, for cumulative effects the extent would include the entire range of each species (extended) because the habitat loss on a species' breeding grounds, staging area, or wintering grounds, would be additive to the total habitat loss for each species throughout their range. For seabirds, which only occur in the area incidentally and opportunistically, road construction, operation, and maintenance and cumulative effects would be negligible.

Emperor Goose is considered an important species for this analysis because of their relatively low reproductive potential and low seasonal and annual survival rates. Black Brant are considered unique because the Izembek National Wildlife Refuge plays such an important role in the life history of the entire population of Pacific Flyway Brant, and Tundra Swan are considered unique because Tundra Swans at the Izembek National Wildlife Refuge are the only known wild, non-migratory population of Tundra Swans in North America.

4.4.2.5 Land Mammals

Alternative 3, or the central road alignment, would involve the construction of 20 miles of single lane gravel road, including 158 turnouts for passing, through a corridor approximately 0.75 to 2 miles from Izembek Lagoon. Alternative 3 would require 227 acres of land from the Izembek National Wildlife Refuge, 26 acres more than the southern road alignment under Alternative 2. The road construction footprint would require 100 acres of tundra habitat, 7 acres less than Alternative 2. The main difference between this alternative and Alternative 2 is the location of the road. The road alignment under Alternative 3 basically bisects the isthmus lengthwise, being located closer to Izembek Lagoon than to Kinzarof Lagoon, while the opposite applies to Alternative 2. The effect of the central road alignment on land mammals depends on many factors, including how the mammals are currently using the project area, the seasonality of construction activities, and the mitigation measures used to reduce potentially adverse effects on mammals. This route was designed to minimize or avoid impacts to wetlands and waterfowl nesting habitat. However, this alignment increases the potential of adverse effects to migrating caribou, but does not greatly alter the contexts or level of effects of disturbances analyzed under Alternative 2.

Effects of Alternative 3 are generally similar to those under Alternative 2. Rather than repeat the same effects analysis, what follows is a brief summary of the effects of Alternative 2 with additions or modifications to the analysis applicable to Alternative 3.

<u>General Impacts – All Land Mammals</u>

Direct and Indirect Effects from Construction

Road construction impacts of Alternative 3 for all mammals would include the direct loss of 100 acres of tundra habitat due to road corridor footprint. Road construction activities may include physiological and behavioral stress caused by: noise intensity, frequency, and duration; movement of heavy equipment or machinery; and, presence of humans between May and November annually for a minimum of 2 years.

There may be a risk of wildlife-vehicle collision during construction, especially during high winds that would blow dust from disturbed soils that could reduce visibility, inclement weather, or other periods of low visibility.

While construction disturbance is short-term (minimum of 2 years), the modification or loss of habitat would be permanent. Construction activities occurring between May and November each year would overlap with calving or pupping season for many mammals as well as overlap early migration or fall movements or activities for some species, particularly caribou and brown bears.

Construction disturbances would be greatest within and immediately adjacent to the road corridor and decreasing outward to a threshold at which physiological or behavioral response by mammals is no longer elicited, nor beneficial. Construction activities may cause the incremental loss of habitats closest to the construction zone decreasing the total suitable habitat available for some species. The predictable and most likely response of mammals to road construction would be to avoid the area.

Direct and Indirect Effects from Operation and Maintenance

Road operation and maintenance effects for Alternative 3 on all land mammals would include the long-term physical risk of wildlife-vehicle collision resulting in injury or mortality. The risk of vehicles colliding with mammals may be low due to the anticipated slow speed limit and low number of daily/annual vehicles on the road. However, it is probable that vehicles may collide with mammals, especially during inclement weather or periods of poor visibility, or if traffic speeds or volume exceeds those projected and analyzed. Overall, the number of mammals potentially affected by wildlife-vehicle collisions is expected to be small.

The effect of the road operation and maintenance, including periodic grading and snow removal, on mammals is difficult to accurately predict. Road operation and maintenance effects would be long-term within the project area. Disturbances would be most frequent and intense, although intermittent and unpredictable, within and immediately parallel to the road corridor. Disturbances would also cause incremental loss or reduced habitat suitability for areas adjacent to, and for the entire length of, the road corridor.

While some mammals may become habituated to predictable use of the road by vehicles, physiological and behavior stress are more likely to be caused by: noise intensity, frequency, and duration; vehicle movement and proximity; vehicles that stop on the road; and, situations where people stop and get out of their vehicles. Vehicle traffic on the road is expected to be intermittent and unpredictable; therefore, it may be harder for mammals to habituate to any single or multiple disturbance(s).

An indirect effect of road operation and maintenance that may have the greatest adverse impact on land mammals is the potential increase in human access into the project area. Site-specific documentation of increasing all-terrain vehicle use in areas immediately adjacent to Cold Bay and King Cove indicates what may and most likely would occur adjacent to the proposed road corridors upon completion (Sowl and Poetter 2004; Sowl 2008, 2011f; Figures 4.3-4 through 4.3-7 and the discussion of projected all-terrain vehicle use in Section 4.3.3.1).

Common Mitigation Measures

The mitigation measures recommended for Alternative 2 would also reduce the impacts of Alternative 3. No other mitigation measures are needed for Alternative 3.

Large Mammals

The direct and indirect effects of the construction, and subsequent operation and maintenance of Alternative 3 on large mammals are essentially the same as those described under Alternative 2.

Road construction would result in the direct loss of 100 acres of tundra habitat for the road corridor footprint. There is a low risk of wildlife-vehicle collisions during construction and subsequent road operation and maintenance. Road construction, operation and maintenance effects would include: short and long-term noise; short-term movement of heavy equipment and earth-moving machinery; long-term movement of vehicles; and, short and long-term human presence. Construction activities would overlap spring post-calving and fall movements of caribou, and bear post-denning and pre-denning behavior. Physiological and behavior stress is projected to be most intense along the road corridor and decreasing with distance from the road alignment. The predicted and most likely response of wildlife would be to avoid the road corridor.

Avoidance or displacement, reduces the total habitat area available to all mammals and could result in an area reduced suitability or abandonment that may range from a minimum of 12,800 acres (0.5 mile either side of road for its entire length) for most species, to nearly 30,720 acres for caribou (1.2 miles, or 6,636 feet, either side of road for its entire length) (Dau and Cameron 1986). The road alignment passes through the center of the isthmus at its narrowest point (3 to 4 miles) leaving fewer options for caribou to move out and around the road corridor bordered by the Bering Sea/Izembek Lagoon and Pacific Ocean/Kinzarof Lagoon. More important, caribou would be moving through the isthmus at critical periods of spring, post-calving, and fall, with young-of-the-year. For brown bears, spacing of males and females and females with cubs, determines the density of bears on the landscape. Therefore, compressing the bears into less space due to the unavailability or unsuitability of habitat near the road corridor disrupts temporal spacing and would most likely reduce the number of bears in the project area and adjacent landscape.

Summary of Effects on Large Mammals

The most notable effect of road operation and maintenance is the anticipated and predictable increase in human presence and activities in an area that has actively managed to limit such intrusions because of its value to wildlife. Due to the narrow confines of the isthmus, there are no alternative routes for migrating or resident large mammals to use to move through the project area. Increased human presence would most likely include subsistence and hunting of harvestable species, creating conditions conducive to a population sink or ecological trap.

The intensity of these effects would be medium to high with the greatest intensity near the road, the duration would be long-term because they would exist throughout the life of the project, the extent would be regional due to the large home range of these species, and the context would be important for caribou and brown bear and common for wolves. Caribou are considered important because the current population of the Southern Alaska Peninsula Herd is below management objectives and brown bear are considered important because the project is within the State's Izembek Controlled Use Area. The overall effect would be major for brown bear and moderate for caribou, wolves and other large mammals.

Mitigation Measures

Mitigation measures that would minimize the impact of construction, operation, and maintenance of Alternative 3 on large land mammals will be the same as those described for Alternative 2.

Cumulative Effects

Cumulative effects from road construction, operation, and maintenance under Alternative 3 would be the same as the cumulative effects from Alternative 2 described in Section 4.3.2.5.

The combinations of direct habitat loss from the constructed road footprint, the unusable habitat due to disturbance from vehicle traffic within 0.5 miles on both sides of the road, the potential for vehicle collisions, and the potential disturbance from increased human access provided by the road, there would be a moderate contribution to cumulative effects for caribou, brown bear and wolf.

Conclusion for Large Mammals

Direct and indirect impacts to large mammals from the implementation of Alternative 3 would be low to high intensity because the change in resource condition for the various large mammals could be perceptible to measurable; long-term duration (behavioral disturbance) to permanent duration (habitat alteration); with a regional extent due to the large home ranges for these species. The actions would affect common and important resources. Wolves are considered to be common because they are not rare in the area and are not protected by legislation. Caribou are considered important in this analysis because the population of the Southern Alaska Peninsula Caribou Herd is below population objectives, and brown bear are considered important because bear habitat within the State's Izembek Controlled Use Area is considered an important resource. The resulting direct and indirect effects would be major for brown bear and moderate for caribou, wolf, and other large mammals. Cumulative effects for caribou, brown bear, and wolf would be moderate.

Furbearers

Furbearing mammals are valued for their pelts and as such, are a harvestable as subsistence and sport species, including but not limited to, North American river otter, red fox, and short-tailed weasel (see Chapter 3 Existing Environment). These and other species occur in the project area, with most preferring upland habitats, although some would routinely travel and forage near coastal or pond shorelines. Most are predatory in habit and exploitive, and may explore edge habitats such as the road corridor or may follow roads. The direct effects and indirect effects from construction, operation and maintenance on furbearers and the cumulative effects of this alternative on furbearers will be the same as those described for Alternative 2.

Summary of Effects from Road Construction, Operation and Maintenance, and Cumulative effects on Furbearers

Construction effects include the direct loss of 100 acres of tundra habitat for the road corridor footprint. Effects of construction activities may be limited as these are planned to occur between May and November annually for a minimum of 2 years. Short-term physiological and behavioral stress may be expected for furbearers due to noise, movement of heavy equipment and earth-moving machinery, and presence of humans. Construction disturbances would be most intense within an immediately adjacent to the road corridor and decreasing outward with increasing distance to a threshold that furbearer response is minimal or absent and this would vary upon species and individual. The most likely and predictable response from furbearers would be to avoid the area.

The greatest effect of road operation and maintenance on furbearers may be the increased human presence on and off the road corridor: increased all-terrain vehicle use, increased humans on foot, increased human activities and disturbance, specifically subsistence and sport hunting and trapping opportunities. Behavioral changes for all furbearers may include avoidance of the road corridor and adjoining areas when vehicles and/or humans are present. Those rarer, more valued species based on market value of pelts may be susceptible to over-exploitation.

Direct and indirect impacts on furbearers from Alternative 3 would be low to medium intensity (effects can be noticeable to readily detectable), long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent duration for habitat alteration (lasting even if the road is no longer used), local to regional extent (based on the home range of the species), and would affect common resources (not rare in the locality and not protected by special legislation) resulting in a minor impact.

Cumulative effects may include condition conducive to a population sink or ecological trap, as described above, which may include rarer, highly-valued species (pelts), such as wolverine. Except for those species most sensitive to disturbances or potentially over-exploited through harvest, the cumulative effects for furbearers is projected to be minor.

Mitigation Measures

The mitigation measures recommended for Alternative 2 would also reduce the impacts of Alternative 3.

Small Mammals

Small mammals in the proposed project area include: Arctic ground squirrel; meadow jumping mouse; collared and brown lemming; root vole; northern red-backed vole; North American porcupine; Alaska hare; cinereus shrew; and, dusky shrew (MacDonald and Cook 2009) (see Chapter 3 Existing Environment for complete description). Small mammals provide a wide and abundant prey base for a range of mammalian and avian predators, and perform a critical ecological role in nutrient cycling. Many populations are subject to periodic irruptions of high densities interspersed with low densities at regular time intervals. Depending on species, small mammals occupy a wide range of habitats. Only a few of the larger small mammals, primarily hare, are used as a subsistence or sport harvest species, and there is some overlap with furbearer species, but the latter is typically associated with pelt value as opposed to food value. The direct effects and indirect effects from construction, operation and maintenance on small mammals and the cumulative effects of this alternative on small mammals will be the same as those described for Alternative 2.

Summary of Effects from Road Construction, Operation and Maintenance, and Cumulative effects on Small Mammals

Construction effects include the direct loss of 100 acres of tundra habitat for the road corridor footprint. Effects of construction activities may be limited as these are planned to occur between May and November annually for a minimum of 2 years. Short-term physiological and behavioral stress may be expected for small mammals due to noise, movement of heavy equipment and earth-moving machinery, and presence of humans. Construction disturbances would be most intense within an immediately adjacent to the road corridor and decreasing outward with increasing distance to a threshold that small mammal response is minimal or absent and this would vary upon species and individual. As road traffic is expected to be intermittent and unpredictable, it may be harder for small mammals to habituate to any single or multiple disturbance(s). Road operation and maintenance disturbances are expected to be greatest within and immediately adjacent to the road corridor.

The risk of vehicles colliding with small mammals during construction and subsequent operation and maintenance may be low due to the planned slow speed limit and low number of daily/annual vehicles on the road. However, due to their smaller size it is probable that wildlife-vehicle collisions may occur, especially during inclement weather or periods of poor visibility, or if traffic speeds or volume exceeds that projected and here analyzed. Younger animals would be at a disadvantage and vulnerable. Overall, the number of small mammals potentially affected by wildlife-vehicle collisions is expected to be small but greater than any other group of mammals due to their relative abundance and wide distribution.

Direct and indirect impacts on small mammals from Alternative 3 would be low to medium intensity (effects can be noticeable to readily detectable), long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent duration habitat alteration (lasting even if the road is no longer used), local extent (limited geographically), and would affect common resources (not rare in the locality and not protected by special legislation) resulting in a minor impact. Natural small mammal population fluctuations (irruptive cycles) would likely continue into the future with road construction, operation and maintenance. Cumulative effects for small mammals are projected to be minor.

Mitigation Measures

The mitigation measures recommended for Alternative 2 would also reduce the impacts of Alternative 3. No other mitigation measures are needed for Alternative 3.

Conclusion – All Land Mammals

Historic and current conditions that have and may continue to affect all mammals in the project area include subsistence and sport hunting, wildlife viewing, and wildlife management. The proposed road corridor is within the National Wildlife Refuge System and Izembek Wilderness which has been managed historically and currently to limit human access for the purpose of conserving fish, wildlife, and their habitats plus associated resource values. Very limited, if any, landscape disturbing activities have occurred since establishment of the refuge.

Although there is a net gain to Izembek National Wildlife Refuge under the proposed land exchange, this exchange is not for the purpose of mitigation. Existing wildlife, habitats and associated values are currently undisturbed and under no potential threat of development or alteration, and would remain so with or without the exchange. Therefore, there are no effects due to the land exchange.

Road construction would result in the direct loss of 100 acres of tundra habitat for the road corridor footprint that would affect all land mammals. Road construction, operation and maintenance effects for all land mammals would include: seasonal, short-term (May to November annually; minimum 2 years) and long-term (continuous but intermittent, life-of-the-project duration) noise of varying intensity, frequency, and duration; short-term movement of heavy equipment and earth-moving machinery; long-term movement of vehicles; and, short and long-term human presence. Construction activities would overlap spring and fall movements of caribou and post-denning and pre-denning brown bear behavior. Physiological and behavior stress is projected to be most intense along the road corridor and decreasing with distance from the road alignment. The predicted and most likely response of wildlife would be to avoid the road corridor. Avoidance, or displacement, reduces the total habitat area available to all land mammals and could result in an area reduced suitability or abandonment that may range from a minimum of 12,800 acres for most species, to nearly 30,720 acres for caribou. An overall disturbance area may vary depending upon species and individual tolerance to disturbances.

The risk of wildlife-vehicle collision with all land mammals during construction and subsequent operation and maintenance may be considered low due to the planned slow speed limit and low number of daily/annual vehicles on the road. However, smaller and/or younger mammals may be more at risk than larger mammals, and all land mammals would be at higher risk to wildlife-vehicle collisions during inclement weather or periods of poor visibility, or if traffic speeds or volume exceeds that projected and here analyzed. Overall, the number of land mammals potentially affected by wildlife-vehicle collisions is expected to be small.

While some species are fairly tolerant of benign human activities, for example wildlife viewing, once the element of hunting and pursuit are added, wildlife quickly adapt to be alert to, wary of, and react strongly to human presence. Further, increased human access increases the road effect zone far beyond the road corridor through increased tangent pedestrian trails and all-terrain vehicle two-tracks, habitat degradation due to trail-related loss of vegetation and erosion, humans with domestic dogs, and increased harvesting of subsistence and/or sport species.

Therefore, the most noteworthy indirect effect of road operation and maintenance is the anticipated and predictable increase in human presence and activities in an area that has been actively managed to limit such access because of its value to wildlife. Due to the narrow confines of the isthmus, there are no alternative routes for migration or resident occupation by territorial mammals to use in the project area. Increased human presence would most likely include proportionate increase in subsistence and hunting of harvestable species, creating conditions conducive to a population sink or ecological trap. Over time, the increased human presence in the project area in a reasonably foreseeable future would include habitat degradation through pedestrian trail and all-terrain vehicle two-track networks, and displacement of wildlife from their habitats, exceeding road operation and maintenance disturbance effects.

The road alignment passes through the center of the isthmus at its narrowest point leaving few options for caribou to avoid the road corridor. While disturbance effects to wetlands and waterfowl are reduced, it increases effects on caribou and brown bear in a potentially larger area than Alternative 2. Caribou would be moving through the isthmus at critical periods of spring, post-calving, and fall, with young-of-the-year. For brown bears, the road corridor displaces males and females/females with cubs spacing on the landscape, with the result that bears are compressed into less suitable habitat that would most likely reduce the number of bears in the project area and adjacent landscape. Compounding the road effect zone are anticipated and predictable increase in human activities, including: all-terrain vehicle use, subsistence and hunting opportunities, and new human use patterns in an area that has previously experienced only limited human access.

The intensity of these effects for caribou, brown bear and wolf would be medium to high with the greatest intensity near the road, the duration would be long-term because they would exist throughout the life of the project, the extent would be regional due to the large home range of these species, and the context would be important for caribou and brown bear and common for wolf. Caribou are considered important because the current population of the Southern Alaska Peninsula Herd is below management objectives and brown bear are considered important because the project is within the State's Izembek Controlled Use Area. The overall effect would be major for brown bear and moderate for caribou, wolf, and other large mammals.

The intensity of the effect on furbearers would be low because the change in resource condition may not be noticeable, the duration would be long-term (occurring throughout the life of the project), and local in scope because of the small home range of individual species, for resources that are considered common. The resulting effect would be minor for furbearers.

For small mammals the loss of 100 acres of habitat and associated disturbances would result in effects that are low intensity because the change in resource condition may not be noticeable, the duration would be long-term (occurring throughout the life of the project), and local in scope because of the small home ranges of these species, for resources that are considered common. The resulting effect for small mammals would be minor.

Cumulative effects for caribou, brown bear and wolf would most likely be moderate. Except for those species most sensitive to disturbances or potentially over-exploited through harvest, the cumulative effects for furbearers is projected to be minor. Natural small mammal population fluctuations (irruptive cycles) would likely continue into the future with road construction, operation and maintenance; therefore, cumulative effects on small mammals would be considered minor.

4.4.2.6 Marine Mammals

The primary actions under Alternative 3 considered for analysis of effects on marine mammals include a proposed land exchange between the federal government, State of Alaska, and King Cove Corporation, as described in the Proposed Action (Section 1.2) and the central road alignment option for construction of a road between King Cove and Cold Bay.

Direct Effects and Indirect Effects from Construction

The direct and indirect effects of the construction of Alternative 3 on killer whales, harbor porpoise, and gray whales would be the same as described under Alternative 2. The effect on harbor seals would be somewhat less than discussed under Alternative 2 because of the increased distance of the central alignment from Kinzarof Lagoon. The differences in road location and footprint size would not change the level of effects (negligible) on marine mammals. The effect of the exchange of parcels under Alternative 3 would be the same as discussed under Alternative 2 (Section 4.3.2.6).

Summary

Construction of the central alignment road is unlikely to affect harbor seals, killer whales, harbor porpoise, or gray whales. Noise disturbance to harbor seals is possible, but would likely be extremely low intensity due to the distance from construction activities. Any disturbance would be localized and long-term but intermittent, persisting for the life of the construction period, for these important resources (protected under the Marine Mammal Protection Act). The summary impact level is considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects of the operation and maintenance of Alternative 3 on harbor seals, killer whales, harbor porpoise, and gray whales are the same as described under Alternative 2. The differences in road location and footprint size would not change the type or level of effects on marine mammals.

Summary

Operation and maintenance of the central alignment road is unlikely to affect killer whales, harbor porpoise, and gray whales. An increase in noise may affect pupping or nursing harbor seals. Noise from the road would be most likely to disturb pupping or nursing harbor seals within ½ mile of the road corridor. Any noise disturbance would be low intensity and long-term duration (intermittent but persistent for the life of the project), localized, and would affect important resources (protected under the Marine Mammal Protection Act). The summary impact level is considered minor for harbor seals.

Mitigation Measures

The applicant will develop a comprehensive Marine Mammal Protection Plan (MM-N) that will detail specific measures to be implemented to avoid potential disruption to the normal behavior of marine mammals in the project area during project construction and operation.

Cumulative Effects

Past, present and reasonably foreseeable future actions and their respective effects on harbor seals, killer whales, harbor porpoise, and gray whales are the same as described in Section 4.2.2.6. Implementing Alternative 3 would not contribute to cumulative effects on killer whales, harbor porpoise, and gray whales, but could cause a minor increase in noise disturbance to harbor seals.

Conclusion

Killer whales, harbor porpoise, and gray whales would not be affected by implementation of Alternative 3. The direct and indirect effects of Alternative 3 on harbor seals would be minor. Use patterns of the 4 species would not likely be changed by the land exchange. The effects, if any, from the road construction, operation, and maintenance would apply only to harbor seals. Effects would be of low intensity, long-term duration (intermittent but persistent for the life of the project), and localized. Harbor seals, killer whales, harbor porpoise, and gray whales are federally protected under the *Marine Mammal Protection Act* and are, therefore, considered important in context. Cumulative effects would be minor for harbor seals. Alternative 3 would not affect killer whales, harbor porpoise, and gray whales. The summary impact of Alternative 3 on harbor seals is minor.

4.4.2.7 Threatened and Endangered Species

The primary actions under Alternative 3 considered for analysis of effects on threatened and endangered species include a proposed land exchange between the federal government, State of Alaska, and King Cove Corporation (Section 1.2 and 2.4.6), and the central road alignment for construction of a road between the communities of King Cove and Cold Bay.

The 3 threatened and endangered species included in this EIS—Steller's Eider, northern sea otter, and Steller sea lions—are addressed separately below.

If a proposed alternative involving land exchanges and new construction is selected and measures are taken to implement it, *Endangered Species Act* Section 7 consultations would have to be conducted with the Service (listed birds and sea otter) and the National Marine Fisheries Service (Steller sea lion). These consultations may require the development of Biological Assessments and Biological Opinions concerning these *Endangered Species Act* listed species. These documents would likely contain required and recommended mitigation measures to reduce the impacts to listed species. It is not clear what these measures might be and whether they would be different from the measures discussed in the following analyses.

Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet

Direct Effects and Indirect Effects from Construction

Direct and indirect effects of construction of the central road alignment on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets would be similar to that described for the southern road alignment (see Section 4.3.2.7). The increased distance of the road from Kinzarof Lagoon under Alternative 3 would result in less acoustic impacts on northern Kinzarof Lagoon. The central road alignment is closer to Izembek Lagoon, but may be sufficiently far that most construction noise would be at background levels at the southern end of the lagoon.

The parcels under consideration for land exchange under Alternative 3 are the same as Alternative 2, except the central road alignment would be exchanged. Please refer to Section 4.3.2.7.

Summary

Steller's Eiders and Yellow-billed Loons may experience some disturbance effects from road construction activities occurring during August to November; they are absent from the area during most of the summer construction period. Kittlitz's Murrelets may be present during the summer construction period, but their use of the area would be limited. Effects would be of low to medium intensity, temporary duration, local extent, and would affect important resources (threatened and endangered species and candidate species). The direct and indirect impact of road construction is considered negligible to minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects of operation and maintenance of the central road alignment on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets would be similar to that described for the southern road alignment (see Section 4.3.2.7). The central road alignment shifts the road corridor farther north of Kinzarof Lagoon than proposed under Alternative 2. This would decrease noise exposure and disturbance effects on eiders using Kinzarof Lagoon. This alignment may, however, increase potential noise levels and disturbance to eiders in the nearshore areas of southern Izembek Lagoon. Tens of thousands of Steller's Eiders use Izembek Lagoon for molting in the fall and staging for migration in the spring. Increased noise from the road could disturb and displace some of those birds. Steller's Eiders fly across the isthmus when traveling between Izembek and Kinzarof lagoons. During the fall, movements appear to be dictated by prevailing winds and tidal conditions. Birds will move to leeward areas to find shelter from strong winds and they move to areas where foraging conditions are more favorable due to differences in tidal conditions (tides are not synchronous between the two sides of the peninsula). During winter, when ice conditions are extremely dynamic, birds will move to one side of the peninsula or the other according to ice cover. This frequent movement back and forth across the isthmus exposes them to higher risks of disturbance from activities on the road.

In addition, the central road alignment could lead to substantial increases in waterfowl hunting pressure in Izembek Lagoon due to improved access for foot and all-terrain vehicles travel (see Brant in Section 4.4.2.4). New roads facilitate human access and activities into once remote areas (Trombulak and Frissell 2000). Evidence exists of all-terrain vehicles accessing previously inaccessible areas along the east and northeast sides of Kinzarof Lagoon from the newly constructed road to the Northeast Terminal (Sowl 2008c, 2011f). A tendency to follow visible trails, even those posted as closed to vehicular traffic, has increased damage to habitats along existing road corridors (Sowl 2004). Izembek Lagoon is an important molting area for thousands of Steller's Eiders in the fall, coinciding with the timing of waterfowl hunting for Brant and other species. A substantial increase in disturbance from gunshots, all-terrain vehicles, and human presence at this time would likely cause molting (flightless) eiders to swim away from preferred feeding areas. This would interrupt their feeding and cause them to expend energy, decreasing their ability to recover from molting, especially if disturbance levels are high and chronic. It may also cause some birds to abandon preferred foraging areas, at least while hunters are present. It may also increase the chance of eiders being shot accidentally (no hunting is allowed on this species). These indirect effects of the road could be much greater than the direct effects of the road.

Summary

Operation and maintenance of the central road corridor could result in disturbance effects on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets during the fall through spring. Kittlitz's Murrelet could also experience disturbance in the summer, but only during occasional flyovers of the construction area. Eiders are particularly vulnerable to disturbance during pre-migration staging in the spring and the molt in the fall. Disturbance effects could be of medium intensity if traffic and noise volumes remain low. Increased traffic volume or frequent and repeated use by loud vehicles could lead to longer term displacement. Disturbance effects would be long-term in duration (intermittent but persistent for the life of the project), localized in extent (the isthmus area), and would affect important resources (threatened and endangered species and candidate species). The direct and indirect impact is considered moderate for Steller's Eiders and minor for Yellow-billed Loons and negligible to minor for Kittlitz's Murrelets.

Mitigation Measures

Elements of a Fish and Wildlife Protection Plan (MM-M) described in Appendix F would mitigate disturbance effects associated with Alternative 2. Additional measures to limit human access to important Steller's Eider habitat north and south of the road corridor may be required.

Cumulative Effects

Past, present and reasonably foreseeable future actions are similar to those described in Section 4.2.2.7. Disturbance effects associated with implementation of Alternative 3 would result in a moderate contribution to cumulative effects on Steller's Eider, and a negligible to minor contribution to cumulative effects for Yellow-billed Loon, and Kittlitz's Murrelet.

Conclusion

The seasonality of eider and loon use of the area and timing of the proposed construction activities are such that effects of construction of the central road alignment on Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet would be of low to medium intensity (perceptible and possibly measurable), temporary (lasting during the 2-year construction period), and localized (within the area of the Izembek isthmus). Year round operation and maintenance of the road would coincide with eider, loon, and murrelet presence in the area and could result in effects that are high intensity, long-term duration (intermittent but persistent for the life of the project), local extent (within the area of the Izembek isthmus), and would affect important resources, resulting in a moderate impact. The contribution to cumulative impacts would also be moderate. Steller's Eiders are listed as threatened under the *Endangered Species Act*, so are considered important in context. Yellow-billed Loons and Kittlitz's Murrelets are candidate species and are also considered important in context. The land exchange would not likely affect use patterns by Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets. The overall impact of Alternative 3 on Steller's Eider, would be moderate, because Eiders are particularly vulnerable to disturbance during pre-migration staging in the spring and the molt in the fall, and the effects on Yellow-billed Loon, and Kittlitz's Murrelet is considered negligible to minor.

Northern Sea Otter: Southwest Alaska Distinct Population Segment

Direct Effects and Indirect Effects from Construction

Direct and indirect effects of construction of the central road alignment on northern sea otters would be similar to that described for the southern road alignment (see Section 4.3.2.7). The increased distance of the road from Kinzarof Lagoon under Alternative 3 would result in less acoustic impacts on northern Kinzarof Lagoon. The central road alignment is closer to Izembek Lagoon, but may be sufficiently far that most construction noise would be at background levels at the southern end of the lagoon.

The parcels under consideration for land exchange under Alternative 3 are the same as Alternative 2, except the central road alignment would be exchanged. Please refer to Section 4.3.2.7.

Summary

Construction of the central alignment road could elicit disturbance responses from sea otters using northern Kinzarof Lagoon and southern Izembek Lagoon during the summer months. If disturbance were to occur, it would be of low to medium intensity, temporary and localized. The southwest Alaska distinct population segment of the northern sea otter is federally protected under the *Endangered Species Act* and the *Marine Mammal Protection Act* so is considered an important resource. The direct and indirect impact is considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects of operation and maintenance of the central road alignment on northern sea otters would be similar to that described for the southern road alignment (see Section 4.3.2.7). The central road alignment shifts the road corridor farther north of Kinzarof Lagoon than proposed under Alternative 2. This would decrease noise exposure and disturbance effects on otters using Kinzarof Lagoon. This alignment may, however, increase potential noise levels and disturbance to sea otters in the nearshore areas of southern Izembek Lagoon.

Summary

Operation and maintenance of the central road corridor may result in disturbance effects on northern sea otters in northern Kinzarof and southern Izembek lagoons. Disturbance effects from vehicle noise are not known, but could be of medium intensity, if displacement occurs, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect an important resource. The direct and indirect impact is considered minor.

Mitigation Measures

Protective measures stipulated in the Fish and Wildlife Protection Plan (MM-M) and the Marine Mammal Protection Plan (MM-N) (Appendix F) could help alleviate impacts of human disturbance associated with construction, operation, and maintenance of the road. Slow speeds of travel and barriers to prevent off road vehicle access could mitigate some disturbance effects. Additional measures to limit human access to important sea otter habitat north and south of the road corridor may be required.

Cumulative Effects

Past, present, and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Implementation of Alternative 3 would result in a negligible to minor contribution to cumulative effects on northern sea otters.

Conclusion

Effects of road construction on northern sea otters would be of low to medium intensity, temporary and localized. Year round operation and maintenance of the road could result in disturbance effects of medium intensity, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect an important resource, resulting in a minor impact. Although very unlikely, injury or mortality of a sea otter crossing the road during winter could occur and the resulting effects would be of medium to high intensity, long-term to permanent duration, local extent, and would affect an important resource, resulting in a minor impact. The contribution to cumulative effects would be negligible to minor. The land exchange would not likely affect use patterns by sea otters. The summary impact of Alternative 3 on northern sea otters is considered minor.

Steller Sea Lion: Western Distinct Population Segment

Direct Effects and Indirect Effects from Construction

Construction of a road along the central alignment route is unlikely to have any effect on Steller sea lions. There are no known haul outs near the Izembek isthmus and Steller sea lions are only occasionally(seen in upper Cold Bay near Kinzarof Lagoon. Any potential nearshore marine habitat impacts during construction would be mitigated through the imposition of mitigation measures.

The parcels under consideration for land exchange under Alternative 3 are the same as Alternative 2, except for the road corridor parcel. Please refer to Section 4.3.2.7.

Summary

Steller sea lions are uncommon in the marine environment nearest to the land across which the road would be constructed, so would not be directly or indirectly affected by the road construction.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance of a road along the central alignment route is unlikely to have any effect on Steller sea lions. No known haul outs are near the Izembek isthmus and Steller sea lions are only occasionally seen in upper Cold Bay near Kinzarof Lagoon.

Summary

Steller sea lions are uncommon in the marine environment nearest to the land across which the road would be constructed, so would not be directly or indirectly affected by operation and maintenance of the road.

Mitigation Measures

Applicable measures to mitigate potential habitat impacts during construction or to minimize potential, albeit unlikely, disturbance to Steller sea lions are described in Section 4.3.2.7.

Cumulative Effects

Implementation of Alternative 3 would not contribute to cumulative effects on Steller sea lions.

Conclusion

The land exchange and central road alignment construction, operation and maintenance under Alternative 3 would have no direct or indirect effects and no contribution to cumulative effects on Steller sea lions in the EIS project area.

Overall Conclusion

The central road alignment could lead to substantial increases in waterfowl hunting pressure in Izembek Lagoon due to improved access for foot and all-terrain vehicles travel. Izembek Lagoon is an important molting area for thousands of Steller's Eiders in the fall, coinciding with the timing of waterfowl hunting for Brant and other species. The direct and indirect impacts from construction are considered to be negligible to minor. Direct and indirect effects from operation and maintenance are considered moderate for Steller's Eiders and minor for Yellow-billed Loon, and negligible to minor for Kittlitz's Murrelet. Similar to Alternative 2, the effects on sea otters would be minor, with no effects to Steller sea lions.

4.4.3 Social Environment

4.4.3.1 Land Ownership and Management

Changes in land ownership as defined by Alternative 3 would have very similar effects on land use, management and impact on the Service's ability to meet the purposes of the refuges as for Alternative 2 (Section 4.3.3.1). The resource values of the parcels are very similar to Alternative 3. Slight differences in the two alternatives are described in the narrative below. The proposed alignment for Alternative 3 lies farther north of Kinzarof Lagoon and would incorporate more than 3 miles of existing trail in the road alignment that were not included in Alternative 2. Additional refuge lands would be required for the road corridor to accommodate this alignment. In exchange for 227 acres of refuge land along the road corridor, the remainder of the land exchange proposal for Alternative 3 is similar to Alternative 2 including 1,619 acres of federal land on Sitkinak Island exchanged for 41,887 acres of State of Alaska land and 10,696 acres of King Cove Corporation land. The King Cove Corporation would relinquish its selection of 5,430 acres within the Izembek Wilderness, and instead select equivalent acreage from the Alaska Peninsula National Wildlife Refuge. State-owned tidelands and submerged lands of Kinzarof Lagoon would be added to the Izembek State Game Refuge.

Alternative 3 would change land ownership in and around Izembek National Wildlife Refuge, which in turn would alter land uses on refuge, state, and Native corporation lands in the area. Since the impacts of Alternative 3 on land use, management and effect on refuge purposes would be almost identical to Alternative 2 described in Section 4.3.3.1, this section only summarizes the differences.

Direct Effects and Indirect Effects of Land Exchange

Effects on Land Ownership

Under Alternative 3, the land exchange between the federal government, State of Alaska, and King Cove Corporation would proceed for the purpose of creating a corridor for the construction and operation of a road connecting the communities of King Cove and Cold Bay. The only difference between Alternative 3 and Alternative 2 is that the road corridor in Alternative 3 would be located farther north in the isthmus than Alternative 2 and would include 227 acres. (Alternative 2 would cross farther south in the isthmus and encompass 201 acres.)

The road construction and public use of the road would provide continuous, and unprecedented, year round access into the Izembek Wilderness. There would be little difference between the two alternatives in predicted changes in land use caused by pedestrian or all-terrain vehicle use. Predicted all-terrain vehicle trails would have different points of origin, but similar destinations and impacts. As a result the description of changes in land use in Section 4.3.3.1 is also valid for Alternative 3.

Effects on Land Management

Land ownership changes under Alternative 3 and the subsequent human uses that would arise as a result of road construction would alter land management in the area. These changes would be essentially the same as those described for Alternative 2 in Section 4.3.3.1 with only a small increase in acres conveyed by the U.S. to the State of Alaska for the road corridor. Section

4.3.3.1 should be referenced for the description of the impact of changes in land use on land management under Alternative 3.

Effects on Land Use

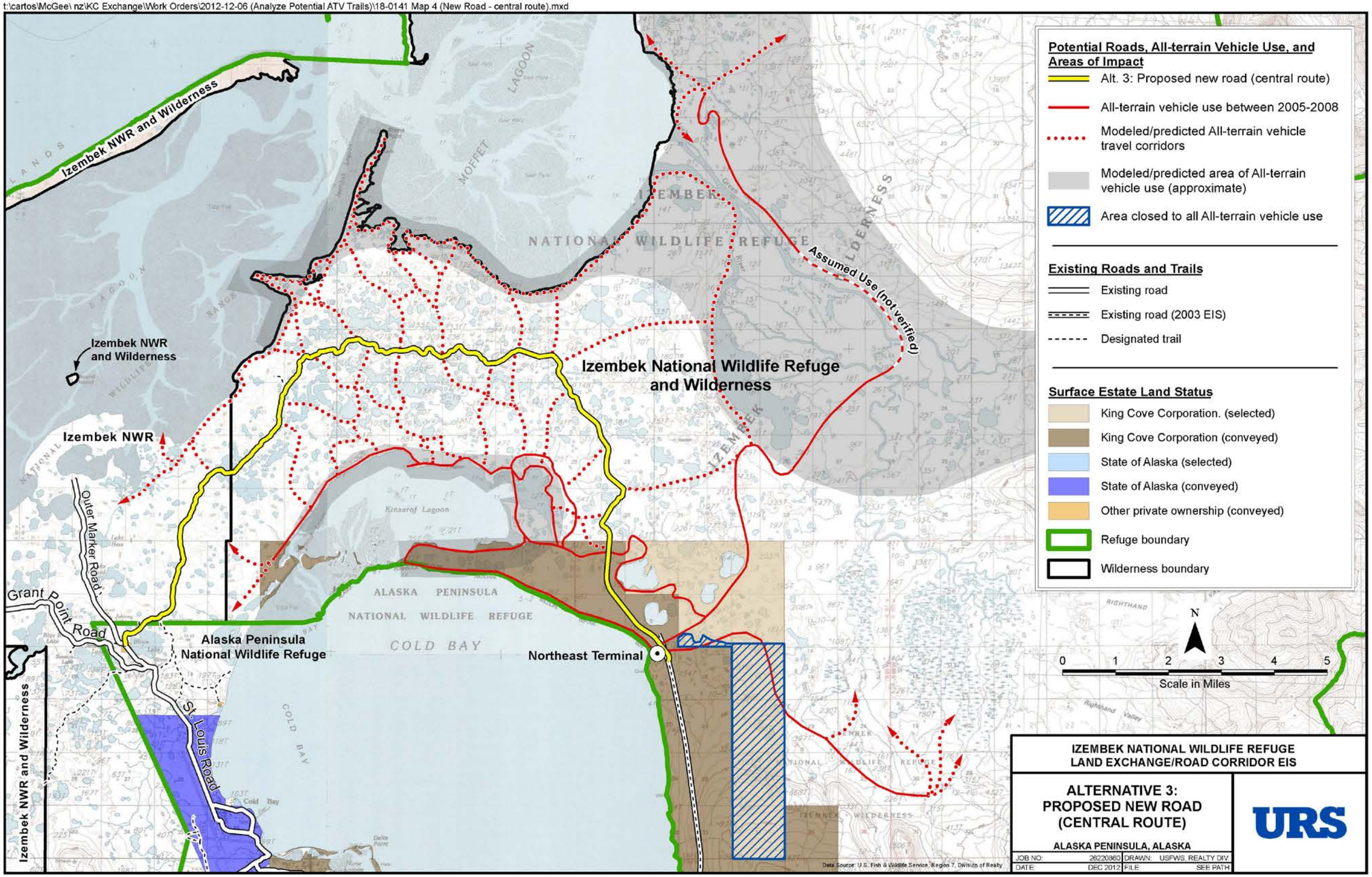
As in Alternative 2, road construction and the resulting opening of new areas on the Izembek National Wildlife Refuge and Izembek Wilderness to access by all-terrain vehicle users (legal or illegal) would be the primary impact of Alternative 3. To assess the change in land use caused by this increased access by motorized vehicles, the Service analyzed the Izembek isthmus for existing roads and trails (Figure 4.3-2), and unauthorized all-terrain vehicle routes that have been developed between 2005 and 2008 (Figure 4.3-3). The Service then assessed potential all-terrain vehicle travel corridors that could originate from the central alignment proposed for Alternative 3. Section 4.3.3.1 describes the assumptions and criteria the Service used to model probable all-terrain vehicle routes for the proposed alternatives. Figure 4.3-5 displays the resulting projection of all-terrain vehicle routes for Alternative 3. These probable all-terrain vehicle corridors are only one representation of potential routes that could develop overtime as dozens of routes potentially radiate and converge across the Izembek isthmus.

Summary

The direct and indirect impacts of this alternative on ownership and management would be nearly identical to Alternative 2 (Section 4.3.3.1) except for the specific location (further north) and size of the corridor parcel (227 acres). The direct and indirect effects of Alternative 3 on land ownership would be high in magnitude and regional in extent, as the proposed land exchange involves multiple parcels at several geographic locations. The action would be permanent in duration; Alternative 3 would result in changed land use and land management conditions for all exchanged parcels. It would facilitate construction of a single lane road within the Izembek National Wildlife Refuge, including the Izembek Wilderness, consolidate all lands on Sitkinak Island under state ownership, place large areas of King Cove Corporation and state lands into federal ownership, and relinquish King Cove Corporation selections within the Izembek Wilderness that would otherwise become privately owned. King Cove Corporation would select an alternate land selection within the Alaska Peninsula National Wildlife Refuge.

The direct and indirect impacts of this alternative on land use and management for the Izembek National Wildlife Refuge would be high in magnitude because the construction of a road through the Izembek National Wildlife Refuge would introduce a transportation use with a different character amidst surrounding lands managed for wilderness and resource protection purposes. The impact to management from the addition of 41,887 acres from the State to the Alaska Peninsula National Wildlife Refuge would consolidate management in the North Creek and Pavlov units. For the State, the management requirements for the road corridor would represent a major change, while the additional of acreage on Sitkinak Island would consolidate management. For the King Cove Corporation, the exchange on management would remove the Kinzarof Lagoon and Mortensens Lagoon parcels from corporate management, and create a new management responsibility for a for the new selection site west of the corporation’s land holding at Old Man’s Lagoon, on the west side of Cold Bay.

Figure 4.3-5 Alternative 3: Proposed New Road (Central Route)



The transfer of submerged lands and water of Kinzarof Lagoon (including eelgrass habitat and intertidal shorelines) to the Izembek State Game Refuge would result in management under the provisions of the *Izembek State Game Refuge Plan*. While the designation of additional lands and waters as part of the Izembek State Game Refuge would afford additional protections beyond those of general state lands, they are subject to less protection than the lands within National Wildlife Refuges. In general, a Special Area Permit would be needed for an activity that may damage refuge resources, disturb wildlife or disrupt existing public uses. In contrast, most uses on a National Wildlife Refuge require both a Compatibility Determination, and an Section 810 evaluation in addition to a special use permit, where needed. A special use permit for the Izembek National Wildlife Refuge also requires compliance with NEPA which could include the preparation of an environmental assessment or environmental impact statement. In addition, the State Game Refuge is currently open to new locatable mineral entry, mineral prospecting and mineral leasing, although the Izembek Game Refuge Plan recommends that the Alaska Department of Fish and Game in cooperation with the Alaska Department of Natural Resources close the State Game Refuge to new locatable mineral entry, mineral prospecting, and mineral leasing. National Wildlife Refuges are closed to new mineral entry by law. (For the full discussion of impacts to wetlands under Alternative 3, see Section 4.4.2.2.)

Taking changes in land ownership and land management together, the magnitude of impact would be major for the Service, with a minor impact on ownership but a major impact on management. For the State, the impacts would be moderate, including minor impacts on land ownership, but a major change in management responsibilities for the new road corridor. For the King Cove Corporation, the impact would be high in magnitude, due to a larger change in ownership, and a minor change in management. Impacts would be of permanent duration since the change in ownership and management would be permanent. The impacts would have a regional extent since the land exchange would involve changes in ownership and management on large areas of land in multiple locations. The impacts would occur in a unique context since the road would be constructed within the protected Izembek Wilderness and the exchange parcels would create a new wilderness area. The summary impact of Alternative 3 on land use and management would be considered major.

See Sections 4.4.3.6 and 4.4.3.10 for impact summaries of Alternative 3 related to Public Use and Wilderness.

Mitigation Measures

No mitigation measures are proposed for Alternative 3, other than the terms of the land exchange outlined in the Act. Although the road design would include physical barriers and management controls to reduce unauthorized use, these are not assumed to be 100 percent effective. In addition, commercial traffic use of the road would be restricted.

Additional law enforcement may be required to patrol and respond to accidents on the 12 miles of access road (under construction) to the Northeast Terminal, and the 18.5 miles of new road through the southern alignment. While no new personnel are anticipated to be hired to provide law enforcement, additional demands on these resources are anticipated.

Cumulative Effects

Cumulative effects for Alternative 3 would be nearly identical to Alternative 2, differing only in the location and amount of federal acreage exchanged for the road corridor. Relevant past actions would include the entitlement and selection of King Cove Corporation land under ANCSA, and the enactment of ANILCA that redesignated the Izembek National Wildlife Refuge, and designated the Izembek Wilderness. No other present or reasonably foreseeable future land exchanges or other activities would result in more extensive changes to ownership patterns or altered land management practices.

Past actions that affect land management include all-terrain vehicle use because the road to the Northeast Terminal reaches near the boundary of the Izembek National Wildlife Refuge. Based on history of previous all-terrain vehicle use in the area, it may be assumed that new all-terrain vehicle routes would originate from that point. Eventually, an all-terrain vehicle route could reach the State Parcel from this location. Unauthorized all-terrain vehicle access to the refuge would continue to be a management challenge and could potentially increase under Alternative 3.

While no new personnel are anticipated to be hired to monitor impacts or provide law enforcement, additional demands on these resources are anticipated. Given the nature and implications of the ownership change, the incremental contribution and total cumulative effects of Alternative 3 related to land management are considered major (indeterminate). Due to potential increases in unauthorized all-terrain vehicle use, Alternative 3 could also have a major adverse contribution to cumulative effects on land management.

Effects to Refuge Purposes

The changes in public use caused by Alternative 3 would be very similar to those of Alternative 2. As a result, the two alternatives would create very similar changes in management. Both alternatives would also have similar impact on the ability of the Service to achieve refuge purposes as mandated by ANILCA already described in Section 4.3.3.1.

Conclusion

Alternative 3 would have a high magnitude impact on land ownership in the area surrounding Cold Bay, with a reduction in land ownership by the King Cove Corporation, and the State of Alaska, and net increases in land ownership by the Izembek National Wildlife Refuge and the Alaska Peninsula National Wildlife Refuge. On Sitkinak Island, the land exchange would consolidate state ownership of the island and would have only low intensity effect on that area. Alternative 3 would result in high intensity impacts on land management, particularly for the Izembek National Wildlife Refuge, which would manage lands adjacent to a road corridor, and the State of Alaska, which would own and manage the road corridor itself. These effects would be regional in nature, permanent in duration, and would affect resources that are unique in context, in that designated wilderness lands would be affected, including the road corridor parcel which fills a unique role in the integrity of the wilderness. The contribution to cumulative effects on land use and management would be major, although mitigated to some degree via restrictions on commercial use of the road corridors and barriers to off-road travel. The overall impact of Alternative 3 related to land use and management is considered major (indeterminate). The summary impact of Alternative 3 on land ownership and land management is a case in which the assessment as beneficial or adverse depends not on a single analytic factor. For the purpose of the EIS, this impact is rated indeterminate and the evaluation of beneficial or adverse will be determined by the decision-maker. For conditions under Section 6406 of the Act which would void the land exchange and return ownership to its status prior to the exchange, see Section 1.2.

Alternative 3 would diminish the ability of the Service to meet the first, second, and fourth of the refuge purposes identified in Public Land Order 2216 and ANILCA. These purposes are:

(i) To conserve fish and wildlife populations and habitats in their natural diversity...;

(ii) to fulfill the international treaty obligations of the U.S. with respect to fish and wildlife and their habitats;

(iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the Refuge.

Alternative 3 would also diminish the ability of the Service to meet the second and third of the refuge purposes identified in the Wilderness Act:

(vi) to protect and preserve the wilderness character of areas within the National Wilderness Preservation System; and

(vii) to administer [the areas] for the use and enjoyment of the American people in a way that will leave them unimpaired for futures use and enjoyment as wilderness.

4.4.3.2 Socioeconomics

Direct Effects and Indirect Effects from the Land Exchange and Construction

The land exchange would be very similar to that described for Alternative 2, although the location and size of the parcel of lands exchanged by the Service would differ. The land exchange is not anticipated to have direct or indirect employment effects. Land is owned by the State of Alaska, King Cove Corporation, and the Service. State and federal staffing and on-site management by the corporation would remain at a low level.

Road construction costs for Alternative 3 are similar to Alternative 2, with only the length of the road varying. The central road alignment construction would be 20 miles of single lane gravel road with an estimated capital cost of $23.7 million (see Chapter 2). Approximately 9 miles of the 20-mile route would traverse existing roads and trails that would require reconstruction or rehabilitation; those costs are included in the capital cost.

Summary

Alternative 3 would generate direct and indirect effects to socioeconomic indicators very similar to those described under Alternative 2. The process of constructing the road would generate short-term employment opportunities in the region, but is not expected to have a permanent impact on population. Because the cost of constructing the road is assumed to be funded by federal agencies, construction is not expected to affect the Aleutians East Borough from a fiscal perspective. During construction, travel between the City of King Cove and the Cold Bay Airport would be by air taxi services as under the baseline conditions.

Direct Effects and Indirect Effects from Operation and Maintenance

This section discusses the long-term impacts resulting from operations and maintenance of Alternative 3 from several perspectives: a) employment and economic activity, b) population and demographics, and c) fiscal impacts to local governments. Analysis and impacts for Alternative 3 are very similar to Alternative 2; differences are noted in this section.

<u>Passenger Trips and Travel Costs</u>

From an economic perspective, Alternative 3 is very similar to Alternative 2. Assumptions in generating trips and costs are the same, except that Alternative 3 is longer by about 2 miles. The additional length adds approximately $2/trip to ground travel costs for most of the user groups because the amortized vehicle cost is assumed equal to $1.00/mile. The trip counts for each group are unchanged between the alternatives. For completeness, the same assessment of economic activity as provided for Alternative 2 is discussed here; the only difference is the cost estimates are slightly higher.

Table 4.4-6 summarizes the estimated baseline trips and travel cost by mode and group under Alternative 3. The additional induced trips (new trips generated because of lower cost or other economic variables) and travel costs are not included in this table, but are summarized in Table 4.4-7 below. In the years 2013 – 2015, passengers would only use the air taxi service because no other option would be available for regular travel.

Travel on the road via the central route would begin in 2016, and is assumed that 75 percent of baseline trips would use the road while 25 percent continue to use the air taxi service. It is also assumed that 100 percent of the 2,000 processing workers, plus 50 other fishery related trips use the road, because of relatively inexpensive, publicly-available taxi or shuttle options that would likely commence in response to demand. Another 350 remaining fishery related trips would be assumed to continue to use the air taxi because of the shorter travel times. Resident and non-fishing related trips using the road average 2,572 trips between 2016 and 2020, which is approximately 68 percent of the baseline trips made by this group. As with Alternative 2, the induced trips are all assumed to be resident and non-fishing related.

Table 4.4-6 Estimated Baseline Trips and Travel Cost by Travel Mode and Group under Alternative 3, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Trips and Travel Cost for Passengers Using the Central Road									
Resident and Non-Fishing Road Passengers	-	-	-	2,551	2,561	2,572	2,582	2,592	2,625
Fishery Related Road Passengers	-	-	-	2,050	2,050	2,050	2,050	2,050	2,050
Total Estimated Road Passengers	-	-	-	4,601	4,611	4,622	4,632	4,642	4,675
Total Cost of Road Trips ($ 2010)	-	-	-	149,261	149,727	150,239	150,705	151,171	152,709
Additional Cost of Ground Vehicle Travel ($ 2010)	-	-	-	-	-	-	-	-	-
Estimated Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	3,701	3,710	3,720	1,183	1,187	1,190	1,194	1,197	1,209
Fishery Related Air Trips	2,400	2,400	2,400	350	350	350	350	350	350
Total Estimated Air Trips	6,101	6,110	6,120	1,533	1,537	1,540	1,544	1,547	1,559
Total Cost of Air Trips ($ 2010)	597,935	598,807	599,737	150,243	150,646	150,931	151,298	151,650	152,777
Additional Cost of Ground Vehicle Travel ($ 2010)[1]	47,310	47,372	47,438	12,861	12,890	12,910	12,936	12,961	13,042
Estimated Trips and Travel Cost for Passengers Using the Both Modes									
Total Trips All Modes	**6,101**	**6,110**	**6,120**	**6,134**	**6,148**	**6,162**	**6,176**	**6,189**	**6,234**
Total Cost of Trips for All Modes ($ 2010)	**645,245**	**646,179**	**647,176**	**312,365**	**313,262**	**314,081**	**314,939**	**315,782**	**318,528**

Note: Trips induced by construction are excluded. Trips for air travel decline after road construction is complete in 2016. Compiled from ground and air passengers and costs presented in Tables 4.2-4 through 4.2-7. Passenger trips apportioned according to capacity and cost of ground vehicles used by fishery or non-fishery related passengers.

[1] Cost for ground travel to and from airport terminal from the City of King Cove.

Source: NEI 2012

Table 4.4-7 Induced and Total Trips and Travel Cost under Alternative 3, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Induced Trips and Travel Cost for Passengers Using the Central Road									
Induced Trips by Resident and Non-Fishing Road Passengers	-	-	-	460	461	462	463	464	468
Cost per Trip ($ 2010)	-	-	-	46.60	46.60	46.60	46.60	46.60	46.60
Travel Costs of Induced Trips ($ 2010)	-	-	-	21,439	21,488	21,537	21,585	21,632	21,788

Note: Numbers are rounded. Passenger trips apportioned according to capacity and cost of ground vehicles used by non-fishery related passengers
Source: NEI 2012

Table 4.4-8 shows the estimated costs for fish processing worker travel, assuming they would all travel by 20-person passenger van. Costs would increase slightly relative to Alternative 2 because of the increased distance of the road.

Table 4.4-8 Processing Crew Transportation in Alternative 3 - 2016

Travel and Cost Under Alternative 3	
Estimated one-way processing crew trips per year	2,000
Average one-way passenger cost ($ 2010)	13.68
Total cost of transporting crews by bus ($ 2010)	27,360

Note: Numbers are rounded.
Source: NEI 2012

For the most, part seafood processing managers and technicians will choose to use air taxi services because of it speed and convenience. Therefore, it is assumed that only 25 trips per year from this group will use the road. As shown in Table 4.2-6, the cost of a taxi or shuttle between the communities of King Cove and Cold Bay is calculated to be about $72.96 per trip under Alternative 3.

An estimated 200 fishing crew and observer trips per year would be taken, with about 25 road trips and 175 air trips between the City of King Cove and Cold Bay Airport under Alternative 3. A large portion of the fishing crew and observer trips are estimated for air taxi services due to the speed and convenience. When they travel by road, fishing crew and observers are assumed to use shuttles between the two communities at a cost of $48.00 per person.

Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 3 are shown for 2016 in Table 4.4-9. Under Alternative 3, trips via the road for the group are assumed to be split between shuttles and private vehicles with 2 passengers ($46.60 per passenger).

Table 4.4-9 Resident and Other Non-Fishery Transportation in Alternative 3 - 2016

	Travel and Cost Under Alternative 3		
	Road	Air	Both Modes
Estimated one-way resident & non-fishery trips per year	1,001	2,733	3,734
Average one-way cost on primary mode ($ 2010)	76.00	98.00	--
Total cost on primary travel mode ($ 2010)	76,076	267,843	343,919
Additional cost of ground vehicle travel ($ 2010)	27,327	19,132	46,459
Total cost of travel on all modes ($ 2010)	**103,403**	**286,975**	**390,378**
Total cost per passenger ($ 2010)	**103.30**	**105.00**	**--**

Note: Numbers are rounded. Passenger trips apportioned according to capacity and cost of ground vehicles used by non-fishery passengers.
Source: NEI 2012

Employment Effects

Overall, Alternative 3 would directly affect employment by creating 6 to 12 new full-time or part-time jobs in the transportation sector. While the effect would be permanent, the jobs would only account for about 5 percent of the total resident wage and salary jobs in the local area of the cities of King Cove and Cold Bay. For additional analysis, refer to Alternative 2.

Population and Demographics Effects

No effects on population would be expected if the new positions were filled by permanent residents. If the positions were filled by nonresidents, the alternative could lead to an increase in population of up to 35 persons, assuming the average household size of 2.8 persons in the City of King Cove. This would represent less than a 5 percent change in the total population of both communities and therefore, the alternative would have a negligible impact on population.

Fiscal Impacts to Local Governments

It is assumed that the Aleutians East Borough would not be responsible for the cost of maintaining the road; therefore, no fiscal effects to local governments would be expected.

Summary

Once the road is operational in 2016, the majority of passengers would likely shift from air services to ground transportation between the communities of King Cove and Cold Bay. Each trip by ground would cost a little less than half the cost of air transportation, which would result in cost savings on an annual basis. A low level but permanent net increase in employment in transportation services is expected. It is likely job increases associated with ground transportation services and road maintenance would likely outweigh any job reductions associated with air transportation. The new jobs are generally expected to be filled by local residents and no effect would be expected in population or demographics. Assuming the Aleutians East Borough would not be responsible for maintenance of the new portions of the road, there would be no fiscal impact of the alternative on local governments.

Mitigation Measures

No socioeconomic mitigation measures would be required under this alternative.

Cumulative Effects

Socioeconomic conditions in the project area, including effects from past actions, are described in Chapter 3 (Section 3.3.2). The reasonably foreseeable implementation of North Pacific Fishery Management Council regulations would likely increase by 10 the number of observers in the Gulf of Alaska groundfish and halibut fisheries coming through the City of King Cove. Each observer would stay in group quarters at Peter Pan for an average of 2 months during the course of the year. In arriving and leaving, these observers would generate 20 additional person trips per year by any mode of transit. This increase in traffic, combined with the traffic generated by the alternative, would have a negligible (beneficial) contribution to cumulative effects on socioeconomic indicators.

Conclusion

Socioeconomic conditions in the project area, including effects from past actions, are described in Chapter 3 (Section 3.3.6.1). Alternative 3 would reduce consumer transportation costs. There would be few effects to any other socioeconomic indicators. Effects to employment, population, and demographics would be permanent, estimated to last for the life of the project. These effects would be of low intensity, with less than 5 percent change in social indicators (such as housing and employment) and only affect the local area with an estimated increase of 7 to 12 new jobs. Consumer transportation costs would be reduced by about half between the communities of King Cove and Cold Bay after the Alternative 3 road became operational in 2016. No fiscal effects to local governments would be anticipated under this alternative. The overall effects to socioeconomic indicators would be minor (beneficial).

4.4.3.3 Transportation

Direct Effects and Indirect Effects from Construction

Under Alternative 3, a 20-mile, single lane road would be constructed from the terminus of the permitted road in the Northeast Terminal (under construction) area westward to the boundary of state lands near the community of Cold Bay.

About 1.6 miles of the route would follow existing roads, 9 miles of the new road would be constructed over existing roads and trails, and the remainder (11 miles) would require a new road footprint. Two temporary barge site landings would be likely required to transport materials, equipment, and supplies into the project area from outside the region. Construction activities would include mobilization, clearing and grubbing, excavation and fill, placement of culverts, and waste disposal using heavy equipment.

Construction of the road could begin in 2014, and take place over approximately two 200-day construction seasons. The estimated $23.7 million project would directly employ approximately 30 construction workers, including those locally hired. Indirect employment would likely temporarily increase slightly, as suppliers build capacity to transport workers, equipment, and materials, as discussed in Section 4.3.3.2, Socioeconomics. This activity would slightly increase road and air traffic in the communities, to and from the barge landing sites, and to and from the airport over the construction period. The road system is limited, and some instances of temporary congestion could occur. Table 4.4-10 reflects an increase in air traffic during projected construction years 2014 and 2015.

During construction, there would be increased potential for access to the Izembek National Wildlife Refuge and other areas by all-terrain vehicles, though this could be mitigated, as discussed below.

Summary

As described in Chapter 3, surface traffic levels in the communities of Cold Bay and King Cove are relatively low, and the existing road system is limited. During the construction period, additional demand would be generated for surface and air transportation. The additional demand on the transportation systems would be observable, but would not alter the overall function of the systems; traffic congestion or disruption would occur occasionally. The direct and indirect impacts of construction on the transportation system are considered medium in magnitude.

Construction impacts would be of temporary duration because construction would occur seasonally and end after an estimated 2 years. The impacts would have a regional extent because it would affect transportation facilities in the communities of Cold Bay and King Cove, as workers and materials are transported to the area, using existing transportation facilities. Geographic effects are not anticipated to extend beyond the region. The impacts would occur in a unique context, since this would be constructed in an area with no existing roads, surrounded by Izembek National Wildlife Refuge and Izembek Wilderness. The isthmus portion of Izembek National Wildlife Refuge fulfills a unique ecosystem role in the area. The summary impact for construction in Alternative 3 on transportation is considered to be moderate.

Direct Effects and Indirect Effects from Operation and Maintenance

The road described in Alternative 3 would be a single lane road with spaced turnout areas, connecting the City of King Cove road system with the existing City of Cold Bay road system near Blinn Lake. The road is expected to be available for year round vehicular traffic access beginning in 2016. Some road closures are expected due to inclement weather. The speed limit would be 20 mph. As shown in Table 4.2–9, the estimated travel time for Alternative 3 is 136 minutes from the City of King Cove to the Cold Bay Airport. Estimated annual operation and maintenance costs would be $710,000. The lifecycle cost of the road is estimated at about $37 million. The useful life of the road, if maintenance continues, could be indefinite, as would be any environmental consequences associated with its presence.

Consumer considerations and cost estimates are shown in Section 4.3.3.2. The travel time of trips is an important parameter for consideration; travel time would affect the time that an emergency response would require. It also may influence trip displacements among transportation modes and could be weighed by residents as importantly as cost. Under Alternative 3 over 2 hours would be required to travel between King Cove and the Cold Bay Airport, more time than a hovercraft, aircraft, or ferry for (Table 4.2–9). This alternative would be at low cost (about $51 per traveler), reliable (98 percent), and nearly always available for City of King Cove residents and visitors to get to the Cold Bay Airport for travel outside of the local area.

Table 4.4-10 reflects a 10 percent increase in general demand, because it is anticipated that taxis, shuttles and private vehicles would increase in the project area, as people take maximum advantage of the lower cost access to the Cold Bay Airport and back. It is unlikely that all air traffic would cease, as the connection time with flights in Cold Bay is also a controlling factor. By 2020, road passengers in Alternative 3 are estimated at 5,095 annually and air taxi passengers at 1,547.

Table 4.4-10 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 3

	2013	2014	2015	2016	2017	2018	2019	2020	2025	
Alternative 3 Central Road Route		**Construction**		**Service**						
Air Taxi Passengers	6,101	6,610	6,620	1,533	1,537	1,540	1,544	1,547	1,559	
Road Travelers		0	0	0	5,061	5,072	5,084	5,095	5,106	5,143

Alternative 3 assumes air taxi passengers increase with construction activity. Alternative 2 assumes 75 percent displacement of passengers (including 100 percent of seafood workers) from air taxi to road, plus induced demand associated with construction, and 10 percent added passenger trips representing new demand for travel between the cities of Cold Bay and King Cove. Induced trips due to construction are extra trips generated due to the additional activity and travel demand created in the area during the construction period.

It is likely that vehicle storage and services would be necessary at the Cold Bay Airport, possibly on a fee basis, which could create revenue for a provider near the airport and offset maintenance costs.

Summary

Alternative 3 operations and maintenance would result in distinctive changes in transportation options, providing a mostly reliable, nearly always available, and lower cost mode of transportation between the communities of King Cove and Cold Bay. The impacts would be regional, in that the alternative provides a new, year round transportation link between the communities of King Cove and Cold Bay. Annual maintenance costs are estimated at $710,000. The 35-year life cycle cost is estimated to be $37 million.

Mitigation Measures

Same as described in Alternative 2.

Cumulative Effects

Same as described in Alternative 2. The contribution of Alternative 3 to cumulative effects on transportation is considered major (beneficial).

Conclusion

Construction of a road linking the communities would add a new mode of transportation that would be mostly available year round. The proposed road would create a more affordable, available, and reliable transportation for the region. The effects of operation of a new mode of transportation are considered high in intensity due to these distinctive changes in the transportation options and costs. The duration of effect is considered permanent because it is estimated that the road would continue to be operated in perpetuity. The extent of the changes is at a regional level, affecting two communities. The context of effects is unique, providing beneficial effects to minority or low income communities. The effects to transportation are considered major (beneficial).

4.4.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

The primary indicators for public health and safety directly impacted by construction in Alternative 3 are related to incidences of illnesses, injuries, and fatalities for workers in the EIS project area and the capability of local clinics to treat injured workers.

The direct and indirect impacts to public health and safety from the construction phase of Alternative 3 are not distinguishable from those in Alternative 2 (see Section 4.3.3.4).

Summary

Construction of the road in Alternative 3 could directly affect public health and safety of road workers and other persons in the EIS project area. Alternative 3 has the potential to impact a small number of people (road and health care workers) in communities throughout the project area, including the City of King Cove which meets the definition of a minority community and a medically underserved area.

Adverse direct effects of the construction phase of Alternative 3 on public health and safety would be low in intensity, potentially affecting a small number of road and health care workers. Effects would be temporary in duration, lasting only the duration of the construction period. Effects would be regional in geographic extent (extending throughout the EIS project area), and unique in context, affecting a minority community and medically underserved area. The direct and indirect effects of the construction phase of Alternative 3 on public health and safety would be considered negligible (adverse).

Direct Effects and Indirect Effects from Operation and Maintenance

The operation and maintenance phase for this alternative involves the use and maintenance of 20 miles of single lane gravel road. The primary indicators for public health and safety directly impacted by operation and maintenance in Alternative 3 are related to (1) safe, available, reliable, and affordable transportation to facilities with medical care not available to the King Cove community, including for emergency medical evacuations and (2) incidences of injuries and fatalities during maintenance and use of the road.

The impacts to public health and safety from the operation and maintenance phase of Alternative 3 are nearly identical to Alternative 2 (see Section 4.3.3.4). The following text discusses aspects of Alternative 3 that are slightly different than Alternative 2. These differences are primarily related the small differences in the length of the 2 roads: Alternative 3 involves constructing a 20-mile long road, whereas the road for Alternative 2 would be 18.5 miles long. The trip to the Cold Bay Airport would involve an approximate 45.2 mile drive from the City of King Cove which would take approximately 136 minutes (assuming a driving speed of 20 mph) (Table 4.2-8). This is 6 minutes longer than the time estimated for transportation via the road in Alternative 2. In 2010, there were 64 medical evacuations from the King Cove Clinic to the Cold Bay Airport (EAT 2010). If the driving distance from the King Cove Clinic to the Cold Bay Airport via the central road alignment is assumed to be 45.2 miles (90.4 miles round trip), then 64 medical evacuations per year would require 5,786 miles of driving per year. This is slightly more than the 5,530 miles of driving per year estimated for Alternative 2. At the yearly rate estimated for Alternative 3, medical evacuations would need to be conducted for approximately 8,642 years to drive 50 million miles (the distance of driving on rural roads in Alaska associated with a single fatality in 2009, see Section 4.3.3.4 for additional information on fatalities).

There are plans to also use the road for non-commercial purposes (other than medical evacuations). The potential direct impacts of these other uses of the road on public health and safety (i.e., primarily related to injuries and fatalities from driving) will depend on how often the road is used, whether people drive on the road at a safe speed, whether the road will be patrolled, and how much road maintenance is required. A small percentage of drivers exceeding the safe operating speed is common for most roads. The incidence of motor vehicle accidents will likely increase if people use the road to travel between the City of King Cove and the City of Cold Bay, instead of traveling by sea or air. If a maximum annual average of 35 vehicles traveled on the road each day (as estimated in the 2003 EIS) for a round trip distance of 90.4 miles, that number of vehicles and distance would correspond to about 3,164 miles driven per day and over 1.1 million miles driven per year. The daily estimate for Alternative 3 is slightly more than the 3,024 miles per day estimate for Alternative 2.

Residents of the City of King Cove have stated that improved access to the Cold Bay Airport would enhance their quality of life by providing reliable access to needed medical services. Road access would provide peace of mind, particularly during extended periods of inclement weather that prevent marine and air travel to Cold Bay Airport. The residents believe that a road would give them a sense of control and independence, because they could transport injured friends or relatives by motor vehicle if other forms of transportation were not available.

Summary

Alternative 3 would meet the overall project purpose of a long-term, available, safe and reliable, year round transportation link between the cities of King Cove and Cold Bay. The operation and maintenance phase of Alternative 3 could beneficially directly impact public health and safety for persons who need specialized or emergency medical care not available in King Cove. Increased travel by road between the communities of Cold Bay and King Cove could increase the incidence of motor vehicle accidents. This in turn could directly impact local medical care facilities and law enforcement agencies. There is no federal, state, nor local law enforcement in the City of Cold Bay. The only law enforcement in the area is provided by the City of King Cove. While no new personnel are anticipated to be hired to monitor impacts or provide law enforcement, additional demands on these resources are anticipated.

Operation and maintenance of the proposed road in Alternative 3 could directly affect public health and the safety in the EIS project area by providing a mostly reliable, year around alternative to access the Cold Bay Airport.

Direct effects of the operations and maintenance phase of Alternative 3 on public health and safety would be medium in intensity, with observable changes in access to medical care not available in the City of King Cove and a potential increase in motor vehicle accidents during the operation phase. Effects are considered permanent in duration, with the operation of the road anticipated in perpetuity. The geographic extent of effects would be regional (affecting two or more communities), and unique in context (affecting a minority community and medically underserved area). The direct and indirect effects of the operation and maintenance phase of Alternative 3 on public health and safety would be considered major (beneficial).

Mitigation Measures

The mitigation measures for Alternative 3 are the same as for Alternative 2 (see Section 4.3.3.4).

Cumulative Effects

The cumulative effects for Alternative 3 are not distinguishable from Alternative 2 (see Section 4.3.3.4).

Conclusion

Alternative 3 would result in direct and indirect effects on public health and safety during the construction phase of the project. Standard practices related to worker health and safety could help mitigate the public safety impacts to road workers.

The operation and maintenance phase of Alternative 3 would benefit the King Cove community by maintaining a mostly safe and reliable transportation route to advanced medical services

Adverse impacts to public safety associated with Alternative 3 include a potential increase in motor vehicle accidents in the project area. Specific practices in road construction, maintenance, and use would help mitigate motor vehicle accidents. Regular patrolling of the road alignment would also help mitigate motor vehicle accidents due to specific driver behaviors, such as drunk driving or speeding.

Effects of Alternative 3 on public health and safety would be medium in intensity, with observable changes in access to medical care not available in the City of King Cove and a potential increase in motor vehicle accidents during the operation phase. Effects are considered permanent in duration, with the operation of the road anticipated in perpetuity. The geographic extent of effects would be regional (affecting two or more communities), and unique in context (affecting a minority community and medically underserved area). The overall effects of the operation and maintenance phase of Alternative 3 on public health and safety would be considered major (beneficial).

4.4.3.5 Environmental Justice

Direct Effects and Indirect Effects from Construction

Direct and indirect effects to human health from Alternative 3 would be similar to those described for Alternative 2 because the new road construction is only 1.5 miles longer. Construction associated with Alternative 3 would have a negligible adverse impact on human health due to the potential for some illness, injury, or fatality of road workers.

Direct and indirect effects to subsistence from Alternative 3 would also be similar to those described for Alternative 2. Construction could have a minor impact on subsistence resources and activities within the road corridor due to the presence of heavy equipment and construction noise.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance effects associated with Alternative 3, would be similar to those associated with Alternative 2 because estimated travel time to the Cold Bay Airport only differs by 6 minutes. Alternative 3 would have direct and indirect effects on human health by increasing the reliability and consistency of transit to Cold Bay Airport, with access to advanced medical facilities. Operation and maintenance would improve subsistence access.

Mitigation Measures

Mitigation measures to reduce motorized vehicle accidents and minimize subsistence access impacts would be the same as those described for Alternative 2.

Cumulative Effects

The beneficial effect on human health of Alternative 3 would be major, the same as Alternative 2. As under Alternative 2, Alternative 3 would create the addition of 12 miles of the King Cove Access Road access and potentially 20 miles of new road that would offer a road network with a mostly reliable, year round, alternative access to Cold Bay and medical facilities. Together these projects would have a positive effect on public health.

Past, ongoing, and reasonably foreseeable future actions are estimated to have a minor impact on subsistence resources and use patterns. Alternative 3 could result in a minor (indeterminate) contribution to cumulative effects on subsistence by displacing subsistence resources, improving access to subsistence resources, and increasing competition for subsistence resources.

Conclusion

Alternative 3 would provide a reliable and consistent mode of transport to medical services and would improve subsistence access for the minority and low-income communities of King Cove and Cold Bay. Alternative 3 would have no disproportionate adverse impact to minority or low-income communities.

4.4.3.6 Public Use

Direct Effects and Indirect Effects from the Land Exchange

The impacts to public use from the land exchange nearly identical to those under Alternative 2 (see Section 4.3.3.6). The following text discusses aspects of Alternative 3 that are slightly different than for Alternative 2; the lengths of the 2 roads and the size of the parcel conveyed to the State of Alaska differ. The central road alignment would transfer 227 acres of the refuge (152 of which is designated wilderness), currently managed for non-motorized recreational and commercial general public use, into a transportation corridor owned by the State of Alaska. The central road alignment may draw more wildlife and bird watching or waterfowl hunting and subsistence hunting from the road because of its proximity to Izembek Lagoon (see Section 4.4.2.4).

The transfer of all lands is assumed to be a permanent action, with the road operated in perpetuity. (The Act contains reversion clauses for the land transfer if a road is not constructed within specified time limits.) Impacts are considered extended in context for public use, as implementation of Alternative 3 would affect populations beyond the region or EIS project area. Refuge visitors include residents of the local communities, other Alaska residents, and refuge visitors from throughout the nation and world. The affected resource is considered important in context for public use, as the affected resource is managed as a national wildlife refuge, and the isthmus area fills a rare ecosystem role in the area. The direct and indirect effects on public use from the land exchange would be major (indeterminate).

Direct Effects and Indirect Effects from Construction

The direct and indirect impacts to public use from the construction phase of Alternative 3 would not be distinguishable from those anticipated under Alternative 2 (see Section 4.3.3.6).

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect impacts to public use from operation and maintenance under Alternative 3 would not be distinguishable from those anticipated under Alternative 2 (see Section 4.3.3.6).

Mitigation Measures

Mitigation measures would be the same as those proposed for Alternative 2 (Section 4.3.3.6).

Cumulative Effects

Past, present and future impacts to public use are the same as those described in Section 4.3.3.6. The Alternative 3 contribution to cumulative effects would be the same as described for Alternative 2, major (indeterminate).

Conclusion

Effects of Alternative 3 would be very similar to those of Alternative 2 regarding public use. The only differences would be that the land corridor within the central road alignment is closer to Izembek Lagoon and may lead to more public access and use in the vicinity of Izembek Lagoon than under Alternative 2. Alternative 3 would have the same effects to public use as Alternative 2, major (indeterminate); refer to section 4.3.3.6 for a detailed description of the effects anticipated under Alternative 2. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.4.3.7 Subsistence

Direct Effects and Indirect Effects from the Land Exchange and Construction

Alternative 3, the central road alignment, was designed to avoid or minimize impacts to wetlands and high value habitat for breeding, nesting, and migrating waterbirds, and to reduce disturbance or impacts to species and habitat in both Izembek and Kinzarof lagoons, while also considering land mammal (caribou, bear, furbearers) movement and habitat values of the isthmus. This alignment seeks to minimize impacts to wetlands and lake-dependent resources, by avoiding or minimizing stream crossings. As a result, direct effects to these subsistence resources would be lessened and the effects from construction activities to subsistence would be similar to Alternative 2 (Section 4.3.3.7). The scale of the proposed road is such that a small workforce, assumed to include local hires as much as possible, would not be expected to bring a new permanent workforce to the region. The proposed road construction would not be expected to increase competition for subsistence resources. The intensity of the impact would be low (perceptible), temporary in duration (lasting only the length of the construction periods), local (discrete portions of the project area) to regional in extent (throughout the project area), and affect resources that are common to important in context. The resources that are important in context include the migratory waterfowl and wetlands/habitat values of Izembek and Kinzarof lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar convention in 1986.

Also under Alternative 3, the execution of the land exchange would result in changes in ownership and management, and these changes in land status also affect the associated subsistence management regimes. For details on each parcel see the discussion under Alternative 2 (Section 4.3.3.7), recognizing that Alternative 3 would result in 227 acres removed from federal management for the central alignment. In all, the land exchange would result in a net addition of 52,356 acres to federal management by the Izembek and Alaska Peninsula National Wildlife Refuges, and this new acreage would be subject to the federal subsistence management program. However, as discussed in relation to Alternative 2, the majority of these acres (the State of Alaska parcel of 44,491 acres) fall outside of the subsistence use areas of the 5 communities. Given current subsistence use patterns, remoteness of the parcels, and distances from urban centers, the parcels entering federal ownership and federal subsistence management are likely to see negligible changes in subsistence use patterns as a result of the land exchange. Fall waterfowl harvests in the Cold Bay vicinity could be a partial exception, in that the waterfowl resource is an important draw for non-local hunters. Under a different federal regime based on the *Migratory Bird Treaty Act*, local rural residents have longer seasons, and the land exchange would likely cause minor, if any, effects on harvest patterns.

Summary

The construction phase of Alternative 3 would have low intensity impacts, with durations ranging from temporary for construction to permanent for the changes in land status. The geographic extent of impacts would range from local for construction of the road to regional for the land status changes and affecting resources that are common to important in context. The resources that are important in context include the habitat values of the Izembek and Kinzarof lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar convention in 1986. The impact of construction activities to subsistence would be considered minor.

Direct Effects and Indirect Effects from Operation and Maintenance

The effects from operation and maintenance activities to subsistence would be similar to Alternative 2 (Section 4.3.3.7).

Summary

Direct and indirect effects from the operations and maintenance phase of Alternative 3 would be similar to Alternative 2. Effects could include minor displacement of subsistence resources, increased access to the area around Izembek and Kinzarof lagoons, and a negligible increase in competition for resources in that area. Impacts would be of low intensity, long-term in duration, local to regional in extent, and affect resources that are common to important in context. The resources that are important in context include the habitat values of the Izembek and Kinzarof lagoons that led to the establishment of the Izembek National Wildlife Refuge and the designation as a Wetland of International Importance under the Ramsar convention in 1986. The impact of operation and maintenance activities to subsistence would be considered minor.

Mitigation Measures

Mitigation measures would be the same as those proposed for Alternative 2 (Section 4.3.3.7).

Cumulative Effects

Past and ongoing actions related to subsistence are described in Chapter 3 (Section 3.3.7). The only reasonably foreseeable future actions that would affect subsistence in the project area are likely additional closures of refuge lands to subsistence use of all-terrain vehicles. Closures, if any, would be implemented following the process outlined in ANILCA with additional analysis and opportunities for public hearings and comments. Even with potential closures to all-terrain vehicle access, implementation of Alternative 3 would result in minor effects on subsistence resources, access to subsistence resources, or competition for subsistence resources. Subsistence activities are unlikely to increase above present levels. This alternative is expected to make a minor contribution to cumulative effects on subsistence resources or harvest patterns.

Conclusion

Implementation of Alternative 3 would have minor (indeterminate) direct and indirect effects on subsistence; and minor (indeterminate) contribution to cumulative effects on subsistence. Effects include displacement of subsistence resources in the vicinity of the road corridor, increased access to the areas around Kinzarof and Izembek lagoons, increased competition for resources in the Kinzarof and Izembek lagoon area, and an increase in lands available under federal subsistence provisions. It is likely that the adverse effects would be balanced by increased access to subsistence resources. Only minor overall effects on subsistence resources, uses, and access are anticipated.

4.4.3.8 Cultural Resources

Criteria and procedures for evaluation of adverse effects to cultural resources are defined in federal regulations in 36 CFR 800.5, and 36 CFR 60.4. For cultural resources determined eligible for the National Register of Historic Places (defined as "historic properties" [36 CFR 800.15(l)]), adverse effects are defined as any action which directly or indirectly alters the characteristics that qualify the property for inclusion in the National Register in a manner that would diminish the property's integrity. As discussed in Section 3.3.8, cultural resources, many eligible for the National Register, have been identified in the vicinity of the land exchange areas that may be subject to ground-disturbing activities (Kinzarof Lagoon parcel). Additionally, based on the density of archaeological sites in the area, it can be anticipated that ground disturbing activities may encounter previously unknown archaeological sites within the areas of road construction.

Direct Effects and Indirect Effects from Construction

Under Alternative 3, a road corridor connecting the communities of King Cove and Cold Bay would be created through an associated land exchange involving federal, state, and King Cove Corporation lands. Potential direct physical impacts to known and unknown cultural resources could occur during the construction of the central road alignment. Direct effects to cultural resources include those activities that physically impact the condition or integrity of the resource. Specifically, ground disturbing activities associated with the construction of the road, staging areas, and material sites could result in direct effects to surface or subsurface prehistoric or historic archaeological sites. Depending on the precise alignment of the road both World War II sites identified in 2012 could be damaged during road construction. Direct effects to the World War II landscape of the Kinzarof parcel will also accrue from alterations to the single lane, light duty, road built in World War II. However, compliance with *Alaska Historic Preservation Act* requires the state to assess adverse effects and develop applicable mitigation measures before any potentially destructive activities could begin, as noted in regard to Alternative 2 (Section 4.4.3.8). Potential indirect effects to cultural resources could also occur during the construction of the central road alignment. Indirect effects to cultural resources include the uncontrolled excavation or looting of archaeological sites caused by the introduction of increased access and local activity and visual impacts to historic or traditional cultural properties. Improved access to remote areas could increase the likelihood of uncontrolled excavation and looting or other damage to archaeological properties during the construction phase of the project.

The area of potential indirect effects (i.e. the proposed corridor and adjacent area) has been subjected to pedestrian survey of surface features. Additional indirect effects could occur at a distance from the proposed corridor, in areas that people would reach due to the increased access. An unknown potential remains for disturbance to surface and subsurface cultural resources. Depending on the characteristics of cultural resources impacted by disturbance and unauthorized excavation in the area of indirect effects, the indirect impacts of construction on cultural resources could vary from low to high intensity (or magnitude) (i.e., perceptible to major alteration in the resource). Effects could range from temporary (only a single season) to permanent in duration (beyond the life of the project), and from local (discrete portions of the project area) to regional (throughout the project area) in geographic extent. Since the scientific importance of undiscovered cultural resources cannot be estimated, the indirect impacts could affect resources ranging from important (rare) to unique (protected by legislation or unique in function) in context. The resources that are unique or important in context include World War II remains, and ephemeral archaeological and historic resources located within or adjacent to the proposed road. Indirect effects at the level of high intensity, permanent duration, regional extent, and unique context would, nonetheless be a very low probability, high consequence event.

Summary

Similar to Alternative 2, potential direct effects during construction would be negligible due to effective cultural resource protection measures in State of Alaska management of construction activities. However, potential indirect effects of construction on cultural resources are considered moderate to major as they range from low to high in intensity, permanent in duration, local to regional in extent, and important to unique in context.

Direct Effects and Indirect Effects from Operation and Maintenance

Under Alternative 3, potential direct and indirect effects to cultural resources could also occur during the operation and maintenance of the central road alignment, including inadvertent damage. Improved access to remote areas could increase the likelihood of uncontrolled excavation or looting or other damage to archaeological, historic, and cultural properties. Unanticipated discoveries of cultural resources within the road corridor during the operations phase would be subject to cultural resource protection measures, and direct impacts are unlikely. However, as with the construction phase, indirect impacts to undiscovered cultural resources outside the road corridor would vary widely. The potential indirect impact to cultural resources could be of low to high intensity, long-term in duration, local to regional in extent, and affect resources that are common to important in context. The resources that are important in context include archaeological, historic, and cultural resources that may be in the vicinity the proposed road.

Summary

Direct effects during operations would be negligible due to effective cultural resource protection measures. However, potential indirect effects of operations and maintenance on cultural resources would be considered moderate to major as they range from low to high in intensity, permanent in duration, local to regional in extent, and important to unique in context.

Mitigation Measures

Direct impacts during construction and operations phases are unlikely due to Cultural Resources (MM-P) protection mitigation measures that include inventory and evaluation prior to construction, and a protocol for protection of resources inadvertently discovered during project activities. Indirect effects to cultural resources outside of the exchange parcels remain a possibility; however, such effects can be mitigated by regular monitoring and interpretation where appropriate. Therefore, with these mitigation measures, no impacts or only minor impacts to archaeological resources are anticipated.

Cumulative Effects

Cumulative effects would arise from activities not associated with the project. No specific reasonably foreseeable future activities have been identified as likely to contribute to unauthorized excavation or looting. At least 1 site discovered in 2012 may be suitable for interpretation. If the site is developed with interpretive signage, then this would increase visitation and foot traffic at this site which would ultimately alter its character. Monitoring of an interpreted site would be effective mitigation for any adverse impacts. As a result of the analysis of likely direct and indirect effects, the project components of this alternative are expected to make a minor contribution to cumulative effects on cultural resources.

Conclusion

Due to prior field studies to identify and avoid cultural resources and cultural resources protection measures for both federal and State of Alaska land managers, implementation of Alternative 3 would have no direct effects on cultural resources. Indirect effects on cultural resources from improved access and unauthorized disturbance or excavation of undocumented cultural resources are not fully predictable, but would likely be minor (low to high intensity, long-term in duration, local to regional in extent, and affecting resources that are common to important in context. This alternative is expected to make a minor contribution to cumulative effects on cultural resources.

4.4.3.9 Visual Resources

This section discusses potential impacts to visual resources that may result from implementing Alternative 3. The proposed central road alignment would be designed to follow existing contours of the landscape, and have a design speed of 20 mph. Road grades would be limited to 12 percent, with grades over 9 percent limited to approximately 0.6 miles of the total 20 miles of road construction.

Direct Effects and Indirect Effects from Construction

Minor direct impacts to visual resources are expected to result from construction of Alternative 3, similar to those described for Alternative 2 (Section 4.3.3.9). Although implementation of Alternative 3 would result in 1.5 fewer new roadway miles due to use of existing roads and trails, this reduction is not considered sufficient to change expected construction-related impacts to visual resources. No change in overall visual quality is expected to result from implementation of Alternative 3. Expected contrast of the alignment and associated features is expected to be weak to moderate. Vividness is expected to be maintained and only minor impacts to intactness and unity would result; consequently, scenic quality of the analysis area would remain very high.

Summary

Direct effects and indirect effects of construction on visual resources are considered minor as they would be medium in intensity (observable changes in visual character of the area), temporary in duration (lasting for the duration of construction; the permanent nature of the road is described under operation and maintenance), local in extent (affecting discrete portions of the project area), and unique in context (affecting visual resources of the isthmus of Izembek Wilderness, a rare visual setting within the locality).

Direct Effects and Indirect Effects from Operation and Maintenance

Moderate direct effects to visual resources are expected to result from implementation of Alternative 3, similar to those described in Alternative 2 (Section 4.3.3.9). Although Alternative 3 would result in 1.5 more miles of roadway (total), this amount is not considered sufficient to change the expected level of impact to visual resources. Beneficial indirect effects would differ in that visual access to the Izembek Lagoon would be improved; however similar benefits would likely not be realized for the Kinzarof Lagoon, as described in Alternative 2 (Section 4.3.3.9). Overall visual access to refuge lands would be very similar across both alternatives.

Summary

Direct effects and indirect effects of operation and maintenance on visual resources would be considered moderate (indeterminate), as they would be medium in intensity (observable changes in visual character of the area), permanent in duration (the roadway is anticipated to be operated in perpetuity), regional in extent (affecting visual resources associated with two communities and spanning the isthmus area), and unique in context(visual resources of the isthmus of Izembek Wilderness, a rare visual setting within the locality).

Mitigation Measures

Mitigation measures are identical to those described in (Section 4.3.3.9).

Cumulative Effects

Cumulative effects of the combined actions are expected to be moderate (indeterminate), as described under Alternative 2 (Section 4.3.3.9). Visual resources in the isthmus area of Izembek Wilderness would be noticeably affected. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

Conclusion

Direct impacts to visual resources due to the implementation of Alternative 3 would be medium intensity (observable changes in visual character of the area), permanent in duration (the roadway is anticipated to be operated in perpetuity), and regional extent (affecting visual resources associated with two communities and spanning the isthmus area). Unique resources of the Izembek Wilderness would be affected, including the isthmus area, a rare visual setting within the locality. The summary impact level for visual resources is expected to be moderate (indeterminate); visual resources in the isthmus area of Izembek Wilderness would be noticeably affected. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.4.3.10 Wilderness

Direct Effects and Indirect Effects

Alternative 3 would implement a land exchange between the federal government, the State of Alaska, and King Cove Corporation for the purpose of constructing a road between the cities of King Cove and Cold Bay. Under this alternative, a new single lane gravel road would be constructed, and would be owned and maintained by the State of Alaska. A total of approximately 152 acres would be removed from Izembek Wilderness for the road corridor that would follow a central alignment through the isthmus between Kinzarof Lagoon and Izembek Lagoon (Figure 2-3).

As part of the proposed land exchange in Alternative 3, an estimated 44,491 acres would be added to wilderness (see Section 2.4.2 for a complete description of components of the proposed land exchange). The state would convey 2 townships of land adjacent to the North Creek Unit of the Alaska Peninsula National Wildlife Refuge to the Service (41,887 acres) to be managed as part of a new wilderness in the Alaska Peninsula National Wildlife Refuge. The Kinzarof Lagoon parcel (2,604 acres), owned by the King Cove Corporation, would be transferred to the Service and managed as part of Izembek Wilderness.

The parcel of land (5,430 acres) currently selected by King Cove Corporation, and located at the edge of Izembek Wilderness, would be relinquished by the corporation and would continue to be managed as part of Izembek Wilderness by the Service (Figure 1-1). An alternate selection (5,430 acres) would be conveyed from non-wilderness lands in the Alaska Peninsula National Wildlife Refuge (Figure 3.3-1).

The effects to wilderness under Alternative 3 include both removing land from wilderness to construct the proposed road and adding large tracts of land to wilderness. Alternative 3 would result in an overall gain of 44,360 acres. All of the lands to be added to designated wilderness meet the basic criteria for wilderness. The direct loss or gain of acreage is important. However, the impacts of a road corridor are much more substantial than the change in acreage alone. This is a complex trade-off; acres added or removed from wilderness are not the single factor that characterizes the action as either beneficial or adverse.

Direct and indirect effects on the character of Izembek Wilderness resulting from Alternative 3 would be similar to analysis presented under Alternative 2 (Section 4.3.3.10). However, the location of the Alternative 3 road corridor through the center of the isthmus, as opposed to the more southern alignment of Alternative 2, would create a larger section of fragmented wilderness lands on the south side of the corridor. The central road alignment would fragment approximately 11,759 acres of wilderness south of the road corridor (excluding Kinzarof Lagoon parcel), interrupting the ecological integrity of the area.

The effects of the addition of the Kinzarof Lagoon parcel to the Izembek Wilderness, relinquishment of the selected parcel, and addition of the state lands as a new designated wilderness in the Alaska Peninsula National Wildlife Refuge would be similar to those discussed in Alternative 2.

Summary

Under Alternative 3, approximately 152 acres would be removed from Izembek Wilderness for the road corridor. Alternative 3 would add 44,491 acres to wilderness through the conveyance of the Kinzarof Lagoon parcel and the State of Alaska parcels to the Service. Approximately 5,430 acres selected by King Cove Corporation would be relinquished and would continue to be managed as part of Izembek Wilderness. Impacts to wilderness character would be similar as those discussed under Alternative 2 (Section 4.3.3.10). The land exchange would have few direct effects on the wilderness character of the exchanged lands and the exchange itself would maintain ecological connectivity with Izembek Wilderness. Indirectly, changes in land ownership could lead to developments and activities that would adversely affect wilderness character.

Mitigation Measures

Mitigation measures that could help reduce adverse impacts to wilderness character resulting from the proposed road corridor under Alternative 3 are discussed under Alternative 2 (Section 4.3.3.10).

Cumulative Effects

Past, present, and reasonably foreseeable future actions that could contribute to cumulative effects to wilderness character within Izembek Wilderness are discussed under Alternative 1 (Section 4.2.3.10). The road corridor proposed under Alternative 3 would ultimately connect with the new King Cove Access Road for travel between the cities of King Cove and Cold Bay, and opportunities for unauthorized motorized use in Izembek Wilderness would increase beyond current levels. Past authorized and unauthorized motorized use in the area has already impacted wilderness resources. Alternative 3 would have a major (indeterminate) contribution to cumulative effects on wilderness character within Izembek Wilderness.

Conclusion

The direct and indirect impacts to wilderness character resulting from Alternative 3 would be very similar to those described under Alternative 2. Impacts would include removal of lands from Izembek Wilderness, addition of lands to Izembek Wilderness, and designation of a new wilderness. The intensity of impacts would be high due to the highly noticeable influence on wilderness characteristics, as described under Alternative 2 (Section 4.3.3.10). The geographic extent of impacts would be extended, through the Izembek Wilderness and beyond the region; wilderness issues are generally important to Alaskans and other Americans. Effects would be permanent in duration; impacts to wilderness characteristics due to the road and impacts due to the designation of new wilderness would be expected to continue in perpetuity. Wilderness resources affected are considered unique in context, as the resources potentially affected in Izembek Wilderness fill unique roles within the locality and the region. The implementation of mitigation measures discussed above could somewhat reduce adverse impacts to the natural quality, the undeveloped quality, and the solitude or primitive and unconfined recreation quality of Izembek Wilderness character. However, implementation of mitigation measures would not eliminate adverse impacts.

Considering the combination of the impact criteria, high intensity, permanent duration, regional to extended geographic extent, and unique context of effects, the impacts to wilderness character resulting from Alternative 3 would be major (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.5 Alternative 4 – Hovercraft Operations from the Northeast Terminal to Cross Wind Cove (Six days per Week)

4.5.1 Physical Environment

4.5.1.1 Air Quality

Direct Effects and Indirect Effects from Construction

No construction activities involving combustion equipment or other air pollution generating activities would occur under Alternative 4. No new emissions of air pollutants would be generated.

Summary

No new construction is associated with Alternative 4; no direct or indirect effects on air quality from construction would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

Emissions during hovercraft operations and maintenance are due to fuel combustion from the vessel engines for normal operations. Estimates of combustion emissions are based on emission factors for similar-sized engines using standard EPA factors, along with the expected operation of 6 round trips per week throughout the year. Table 4.5-1 shows the direct emission estimates for the hovercraft operations. Estimated emission rates for operation and maintenance activities under Alternative 4 would be: 39.7 tons of nitrogen oxide per year; 10.5 tons of carbon monoxide per year; 0.05 tons of sulfur dioxide per year; 0.73 tons per year of particulate matter less than 10 micrometers in diameter; 0.73 tons per year of particulate matter less than 2.5 micrometers in diameter; 1.04 tons per year of volatile organic compounds; and 2045 tons per year of carbon dioxide equivalents. Emissions would occur at the docking sites and along preferred routes. In relation to Alternative 1, the air emissions under Alternative 4 would be a new incremental effect.

Indirect effects to air quality from this alternative would include vehicle and equipment travel to and from hovercraft landing areas and increased development on either end of the hovercraft route. Due to the relatively low use and generally low population of the area, indirect effects on air quality are expected to be negligible.

Summary

The source of emissions from Alternative 4 would affect a relatively large area (approximately 9 miles over water), and would be short events occurring intermittently over the long-term. Direct and indirect effects to air quality from increased emissions are expected to be negligible.

Mitigation Measures

Due to the predicted negligible effects on air quality, no mitigation measures would be required for Alternative 4.

Cumulative Effects

Activities that have the potential to emit air pollution in the area around the hovercraft operations (boat traffic, aircraft passes, and vehicles, for example) are already included in the background, or ambient air, which is expected to meet air quality standards (see Section 3.1.1). Other past, present, and reasonably foreseeable future actions affecting air quality in or adjacent to the EIS project are few; they are described under Alternative 1 in Section 4.2.1.1. The contribution of Alternative 4 to cumulative effects would be negligible.

Conclusion

Alternative 4 would have negligible direct effects on air quality in the immediate vicinity of the hovercraft. In relation to Alternative 1, the air emissions under Alternative 4 would be a new incremental effect. The total estimated annual emissions would consist of small emission sources, operating intermittently, and spread out over a relatively large area. Indirect and cumulative effects would be negligible.

Table 4.5-1 Estimated Air Pollutant Emission Rates for Alternative 4 Operations and Maintenance Activities

Source/Activity	Usage	Emission Rates (tons per year)						
		NOx	CO	SO2	PM10	PM2.5	VOC	CO_2e
HOVERCRAFT								
Main Propulsion Engines (2 x 1205 horsepower)	14,036 MMBtu/yr	22.5	5.97	0.01	0.40	0.40	0.58	1159
Cushion Lift Engines (2 x 905 horsepower)	10,541 MMBtu/yr	16.9	4.48	0.008	0.30	0.30	0.43	871
Service Power Engines (3 x 8kW)	187 MMBtu/yr	0.41	0.09	0.03	0.03	0.03	0.03	15.4
TOTAL (tons per year)		**39.7**	**10.5**	**0.05**	**0.73**	**0.73**	**1.04**	**2045**

NOTES:

Pollutants: NOx - nitrogen oxides; CO – carbon monoxide; SO2 – sulfur dioxide; PM10 – particulate matter less than 10 micrometers in diameter; PM2.5 - particulate matter less than 2.5 micrometers in diameter; VOC – volatile organic compounds; CO_2e – carbon dioxide equivalents.

Hovercraft engine sizes from (Buls 2006).

Usage value for combustion emissions for hovercraft operations (Alternative 4) based on project description: Estimated annual travel is 6 times per week year round (52 weeks), or 312 round trips, with a one-way trip time of 80 minutes. Assume brake-specific fuel consumption rate of 7,000 British Thermal Units per horsepower-hour (Btu/hp-hr) for diesel fuel. 1 kilowatt (kW) = 1.341 horsepower (hp).

Fuel combustion emission factors for engines greater than 600 horsepower (hovercraft engines; non-service power) in lb/MMBtu are from EPA 1996b, Tables 3.4-1 and 3.4-2. Assume use of ultra low sulfur diesel with sulfur content of 0.0015 percent, by weight. Assume PM2.5=PM10.

Fuel combustion emission factors for engines less than 600 horsepower (smaller hovercraft service power engines) in lb/MMBtu are from EPA 1996a. Assume PM2.5=PM10.

CO_2e is assumed to be composed of the following GHG components: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emission factors are equal to the sum of each of these components times their individual Global Warming Potential (GWP) factors. The GWP for these are: CO_2 = 1; CH_4 = 21; and N_2O = 310 (EPA 2009b). Emissions of N_2O are assumed negligible for diesel engines.

Due to rounding, the total tpy may differ slightly from the sum of the individual tpy emission rates.

4.5.1.2 Climate

Direct Effects and Indirect Effects from Construction

No construction activity is associated with Alternative 4; therefore, no construction-related direct or indirect impacts to climate change would result from Alternative 4.

Summary

No construction-related direct or indirect impacts to climate change would result from Alternative 4.

Direct Effects and Indirect Effects from Operation and Maintenance

Sources of direct greenhouse gas emissions under Alternative 4 would include all of the transportation modes used in Alternative 1. In addition, there would be a hovercraft that would make 6 round trips per week, year round.

Effects of global climate change could, over time, affect the transportation operations included in Alternative 4. Changes to storm intensity and frequency could have the largest effect on transportation. If storms increase in frequency and intensity, it could threaten the safety of airplane, boat, and hovercraft transportation.

Alternative 4 would contribute approximately 2,045 tons per year of carbon dioxide equivalent, which is approximately 1,198 tons per year more than Alternative 2 (Table 4.5-2). When compared at the state level, Alternative 4 would contribute approximately 0.08 percent of the State of Alaska's estimated emissions from marine vessels and 0.01 percent of the total transportation emissions in 2010 (CCS 2007). This amount is not expected to be perceptible, and the magnitude of direct effects to climate from Alternative 4 is considered low.

Table 4.5-2 Summary of Greenhouse Gas Emissions for Alternative 4

Activity	Frequency	Estimated Annual Emissions of Carbon Dioxide Equivalent (tons/year)
Hovercraft	6 round trips/week, year round	2,045
Total		**2,045**

Note: Refer to Section 4.5.1.1 for complete details and assumptions regarding emissions calculations.

Summary

Although climate change effects are considered to be long-term, and cover a broad geographic extent, the overall direct and indirect effects of Alternative 4 would be negligible because the amount of emissions is so low compared to total transportation emissions across the state of Alaska.

Mitigation Measures

The impacts to climate from Alternative 4 are expected to be negligible, so no mitigation measures are proposed.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting climate change are the same as Alternative 1, described in Section 4.2.1.2. Due to the extended amount of time that greenhouse gases remain in the atmosphere, any amount of greenhouse gas emissions can be reasonably expected to contribute to future climate change impacts. Alternative 4 would directly emit approximately 2,045 tons of carbon dioxide per year, which is 1,198 tons per year more than Alternative 2, approximately 1,163 tons per year more than Alternative 3, and 1,137 tons per year more than Alternative 5. This roughly equals the average annual carbon dioxide emissions from approximately 407 U.S. passenger cars (EPA 2007). Although the amount of carbon dioxide is measurable, on a global scale, annual emissions from 407 U.S. passenger cars is a negligible amount to global cumulative effects to climate change.

Conclusion

Alternative 4 would contribute approximately 2,045 tons per year of carbon dioxide equivalent, which is approximately 1,198 tons per year more than Alternative 2 (Table 4.5-2). However, when compared at the state level, Alternative 4 would contribute to approximately 0.08 percent of the State of Alaska's estimated emissions from marine vessels and 0.01 percent of the total transportation emissions in 2010 (CCS 2007). This amount is not expected to be perceptible.

Alternative 4 would contribute more than double the amount of greenhouse gas emissions than any other alternative. In relation to Alternative 1, the greenhouse gas emissions under Alternative 4 would be a new incremental effect. Global climate change effects currently have a high enough intensity that perceptible changes around the globe have occurred as described in Section 4.2.1.2. However, when compared to other global actions, Alternative 4 is expected to have a negligible contribution to cumulative effects and to climate change overall.

4.5.1.3 Geology and Soils

Direct Effects and Indirect Effects from Construction

No land exchange or additional ground disturbance would occur within the project area as a result of Alternative 4. Geologic processes and soils would not be altered, and there would be no excavations in marine waters (USACE 2003).

Summary

Alternative 4 would result in no direct or indirect effects to geology and soils from construction.

Direct Effects and Indirect Effects from Operation and Maintenance

Under Alternative 4, a hovercraft would operate 6 days per week, year round, between the new Northeast Terminal and the existing hovercraft terminal at Cross Wind Cove. The indirect effects on soils from hovercraft operations may include localized shoreline erosion from wave action generated by the hovercraft during departures and arrivals. The hovercraft would be refueled on land, and there is the potential for a fuel spill to contaminant soils at the site of the spill. No maintenance dredging is planned for this alternative. Development and implementation of an erosion and sediment control plan and storm water pollution plan would address the needed erosion control measures.

Summary

Soils and geologic resources would incur only indirect effects under this alternative; the effects from operation and maintenance of the hovercraft would be negligible. A fuel spill is a low probability event, but it could affect soils. Mitigation measures aimed at fuel containment, proper handling, and clean-up response would mitigate effects.

Mitigation Measures

Erosion of soil disturbed during construction of the Northeast Terminal would be controlled by mitigation measures described in an Erosion and Sediment Control Plan (MM-A) and Storm Water Pollution Prevention Plan (MM-B). Mitigation measures for potential fuel spills occurring during operation and maintenance of the hovercraft would be described in a Hazardous Material and Petroleum Product Control Plan (MM-C) and a Fuel Handling and Spill Response Plan (MM-D).

Cumulative Effects

Cumulative effects would be similar as those described under Alternative 1. However the addition of hovercraft operations under this alternative would result in an incremental negligible addition to cumulative effects.

Conclusion

Effects to geologic resources and soils related to the implementation of Alternative 4 would be negligible to minor. Erosion of soils would be the largest impact to geologic resources related to the implementation of Alternative 4. At both the Northeast Terminal site and the Lenard Harbor material site, disturbance of soils would be attributed to excavation to support operation and maintenance activities related to the project.

4.5.1.4 Hydrology/Hydrologic Processes

Direct Effects and Indirect Effects from Construction

As there would be no new construction from implementation of Alternative 4, no direct and indirect effects to water resources, water quality, or hydrologic processes would occur from construction under Alternative 4. During construction of the road from Lenard Harbor, as described in the 2003 EIS, fuel would be transported from the City of Cold Bay to the Northeast Terminal facility, and this could result in the remote possibility of a fuel spill that could affect water resources. Construction of stream crossings for the permitted road would have similar impacts as those described for stream crossings associated with Alternatives 2 and 3.

Summary

Alternative 4 would result in no new effects from construction, beyond what was considered in the 2003 EIS.

Direct Effects and Indirect Effects from Operation and Maintenance

Under Alternative 4 and starting in 2013, a hovercraft would operate 6 days per week, year round, between the new Northeast Terminal and the existing hovercraft terminal at Cross Wind Cove. During operation, fuel for the hovercraft would be trucked from the City of King Cove to the Northeast Terminal site via road. No fuel would be stored at the Cross Wind Cove terminal and no refueling would be conducted at Cross Wind Cove. The hovercraft would be refueled on land at the northeast terminal facility. Any fuel spill during transport or refueling of the hovercraft has the potential to affect water quality.

The hovercraft itself could have an uncontrolled release of fuel, effluent, or other materials directly into the water of Cold Bay at docking locations or along preferred routes. Such occurrences would be expected to be rare and could be mitigated by plans for hazardous material handling and clean-up, employee training, regular equipment and hovercraft inspection, and best management practices. Similarly, vehicles and equipment at the Northeast and Cross Wind Cove terminals could potentially release fuel, battery acid, or other substances with the potential to negatively affect water quality.

Summary

Operation and maintenance effects to water resources or water quality may occur under Alternative 4 during use of the hovercraft, but would be negligible under routine operations and with recommended mitigation measures. Fuel spills and the unplanned release of hazardous materials and waste are low probability events, but could affect water quality.

Mitigation Measures

Mitigation measures for potential fuel spills occurring during operation and maintenance of the hovercraft would be described in a Hazardous Material and Petroleum Product Control Plan (MM-C) and a Fuel Handling and Spill Response Plan (MM-D). Examples of mitigation measures to address fuel spills include the requirement for spill response supplies, adequate in type and quantity for the equipment being used, to be onsite and readily accessible at all times. The hovercraft would be refueled on land (USACE 2003).

Cumulative Effects

Negligible direct and indirect effects to water resources and water quality could occur within Cold Bay as a result of implementing Alternative 4. These incremental effects from hovercraft vessels would be in addition to the effects from other past, present, and reasonably foreseeable future activities presented under Alternative 1. Potential fuel and sewage releases at the docking locations and along the preferred routes would provide negligible incremental additions to the cumulative effects on hydrologic processes and water quality.

Conclusion

Direct and indirect impacts to water resources and water quality related to the implementation of Alternative 4 would be negligible. These effects may include fuel and sewage releases at the docking locations and along the preferred routes. There would be a negligible contribution to cumulative effects on hydrology and hydrologic processes.

4.5.1.5 Hazardous Materials

Direct Effects and Indirect Effects from Construction

Under Alternative 4, the land exchange would not be implemented; thus no direct or indirect impacts regarding the transfer of responsibility of contaminated sites documented within lands proposed for exchange would result. As no additional ground disturbance within the project area would result from Alternative 4, hazardous materials would not be altered.

Summary

Under Alternative 4, there would be no construction and therefore there would be no direct or indirect effects from hazardous materials.

Direct Effects and Indirect Effects from Operation and Maintenance

With Alternative 4, hovercraft operations would occur from the Northeast Terminal to Cross Wind Cove after completion of the King Cove Access Road. Hovercraft operation would be 6 days per week, year round. During operation, fuel for the hovercraft would be trucked from the City of King Cove to the Northeast Terminal via road. No fuel would be stored at the Cross Wind Cove hovercraft terminal and no refueling would be conducted there. The hovercraft would be refueled on land at the Northeast Terminal Facility, which would present a risk of a fuel spill. As part of the hovercraft operations, a hazardous material and petroleum product control plan would be developed and implemented to address handling, storage, and disposal of hazardous materials or petroleum products used or generated.

Operations and maintenance of the hovercraft under Alternative 4 could also result in the uncontrolled release of hazardous materials such as fuel, battery acid, or hydraulic fluid, from vehicles and equipment at the Northeast or Cross Wind Cove terminals. Such occurrences could be mitigated by plans for hazardous material handling and clean-up, employee training, and best management practices. Uncontrolled releases could also occur as a result of an accident, such as a grounding or collision, which would have the potential to be more catastrophic and extend beyond “preferred routes” or the docking areas. However, the likelihood of such an event is low, comparable to the probability for spills from fishing vessels and the Alaska Marine Ferry that travels these waters.

Summary

Operation and maintenance effects from hazardous materials may occur under Alternative 4 during use of the hovercraft, but would be negligible under routine operations. Fuel spills are a low probability event that could affect soils or water quality. Mitigation measures should reduce effects in the event of a fuel spill occur.

Mitigation Measures

Mitigation measures to control the release of hazardous materials or petroleum products are addressed in a Hazardous Material and Petroleum Product Control Plan (MM-C) and a Fuel Handling and Spill Response Plan (MM-D). The hazardous material and petroleum product control plan addresses the prevention, containment, cleanup, and disposal of hazardous waste material including petroleum products generated during construction, operation, and maintenance activities. Fuel handling procedures are described in a fuel handling and spill response plan for hovercraft operations. Examples of mitigation measures to address fuel spills include spill response supplies adequate in type and quantity for the equipment being used shall be onsite, and readily accessible at all times.

Cumulative Effects

Reasonably foreseeable future actions in the immediate vicinity of the hovercraft operations include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air or hovercraft, but should not affect the management of hazardous materials. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway which should also not have an effect on hazardous materials. No other reasonably foreseeable future actions are in the immediate vicinity that would affect the management of hazardous materials. The hovercraft operations would have a negligible contribution to cumulative effects. Fuel spills are a low probability event, but if they were to occur, they could cumulatively affect soil and/or water quality.

Conclusion

Implementing Alternative 4 would have no impacts on hazardous materials and waste management other than those addressed and analyzed in the 2003 EIS. Alternative 4 would have negligible direct and indirect effects from hazardous materials and waste management handling. Fuel spills are a low probability event, but could affect soil and water quality. This alternative would have an overall negligible effect on hazardous materials.

4.5.1.6 Noise

Direct Effects and Indirect Effects from Construction

No construction activities involving combustion equipment or other noise generating activities from construction are associated with Alternative 4; hence, no effects on the existing noise environment would result.

Summary

Alternative 4 would have no new construction and therefore no noise effects.

Direct Effects and Indirect Effects from Operation and Maintenance

With Alternative 4, hovercraft operations would occur from the Northeast Terminal, 6 days per week, year round. The 2003 EIS provided expected noise levels, including contours, from a newer generation hovercraft; the actual hovercraft was unknown at the time of the 2003 EIS preparation. The estimated noise level at 1,000 feet was 68 A-weighted decibels (dBA) and 82 dBA at 200 feet. This value is slightly higher than the Suna X hovercraft used between 2007 and 2010, which has a manufacturer rating of 79 dBA at 200 feet or 65 dBA at 1,000 feet (Buls 2006). This analysis includes estimates at both 1,000 feet and 200 feet for comparative purposes to other marine noise analyses and the road alternatives in this EIS. The noise contours shown in the 2003 EIS range from 75 dBA at approximately 250 feet from the hovercraft out to 50 dBA at approximately 2.2 miles away. The noise levels do not account for effects from topography, including waves, or any effects from wind or other attenuation. Therefore, based on the literature for the Suna X hovercraft, along with the natural environment, these values are expected to be conservative.

Indirect effects of this alternative may include increased use of other resources, such as additional travel to and from hovercraft landing areas and increased development on either end of the hovercraft route. Due to the relatively low use and generally low population of the area, indirect effects on the noise environment are expected to be negligible.

Underwater noise was discussed in the 2003 EIS, with the finding that the impact of the underwater noise produced by the hovercraft would be negligible. Ambient underwater noise levels in a relatively quiet low wave energy environment typically range from 106 dB to 115 dB. Underwater noise levels from common conventional vessels range 116 dB to 146 dB at a distance of 50 feet (Hunt 2007) and decrease to 106 dB to 136 dB at a distance of 500 feet. The underwater noise generated by hovercraft is typically lower than those of conventional marine vessels of similar size (Blackwell and Greene 2005). Therefore, underwater noise from the hovercraft would be anticipated to be within the range of ambient underwater noise levels at distances of at least 500 feet. Underwater noise effects would be highly localized and the impacts would be negligible.

Summary

The hovercraft, being mobile, would be a source of noise across a relatively large area (approximately 9 miles over water). Noise would be emitted whenever the hovercraft operates; the hovercraft would become operational only after completion of the King Cove Access Road. The noise level from the hovercraft would consist of intermittent episodes of noise, occurring over the life of the project, spread out over a relatively large area. Underwater noise from the hovercraft would be within the range of ambient underwater noise levels at distances of 500 feet, and noise from indirect activities, such as vehicles traveling to and from the hovercraft terminals, would occur intermittently over the long-term. Overall, noise levels associated with Alternative 4 would have a negligible effect on the noise environment.

Mitigation Measures

Measures to mitigate the effects of noise on biological resources are presented under the various resource discussions in this chapter. Due to the predicted minor effects on the noise environment, no additional mitigation measures are expected for Alternative 4.

Cumulative Effects

Noise-generating activities in the area near the hovercraft operations (boat traffic, aircraft passes, and vehicles, for example) are already included in the background, or ambient, noise levels identified in Section 3.1.6. A current project that would have the potential to affect noise in the area is the completion of the King Cove Access Road Project. The construction of this action would be completed prior to the start of hovercraft operations. Reasonably foreseeable future actions in the immediate vicinity of the hovercraft operations include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air or hovercraft. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway. This action could cause a temporary increase in noise from construction. No other reasonably foreseeable future actions in the immediate vicinity would affect noise. Operation of the hovercraft from the Northeast Terminal would result in a negligible contribution to cumulative effects on noise.

Conclusion

Alternative 4 would result in negligible direct and indirect effects on noise in the project area. Noise would consist of intermittent episodes, occurring over the life of the project, spread out over a relatively large area. In relation to Alternative 1, the noise from Alternative 4 would be a new incremental effect. Alternative 4 would have a negligible contribution to cumulative effects on noise. The overall effect of Alternative 4 on noise would be negligible.

4.5.2 Biological Environment

4.5.2.1 Terrestrial and Aquatic Plant Communities

Direct Effects and Indirect Effects from Construction

Alternative 4 would not require construction activities beyond what has been authorized by the 2003 EIS Record of Decision and subsequent permits. Therefore, no direct or indirect effects on vegetation, including rare plants, would result from construction under Alternative 4.

As in Alternative 1, approximately 5,430 acres of King Cove Corporation selected lands could be withdrawn from the Izembek National Wildlife Refuge and conveyed to the King Cove Corporation, subject to the provisions of ANCSA Section 22(g). The indirect effect of potential development on the selected lands would likely be low in intensity (no such development projects are reasonably foreseeable), the extent would be local because it would be confined to the King Cove Corporation parcel, the duration is unknown but likely permanent, and the affecting resources are also unknown but can be assumed to be common in context (resources not rare in the locality and is not protected by legislation). Therefore the indirect effect on terrestrial and aquatic plant communities from the land exchange would be minor.

Summary

Alternative 4 would have no direct effects from construction and minor indirect effects on vegetation beyond those authorized by the 2003 EIS Record of Decision. Minor indirect effects to terrestrial and aquatic plant communities would result from the conveyance of King Cove Corporation selected lands.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation of the hovercraft may have indirect effects on vegetation. Invasive species are located in the community of Cold Bay and are also likely present in the community of King Cove. These species may be transported to new locations by operation of the hovercraft. The extent of this impact is likely less than in the road alternatives.

Summary

The operation of the hovercraft may aid in the spread of invasive species in the Izembek National Wildlife Refuge vicinity. Therefore, the intensity of this effect would be medium because the presence of invasive species would be observable, the duration would be permanent because these invasive species would remain even if hovercraft operations were to be discontinued, and the extent local (near the Northeast Terminal and along the road to King Cove) for this common (not rare in the locality and is not protected by legislation) resource. Therefore, the direct and indirect effect to terrestrial and aquatic plant communities from implementation of Alternative 4 would be minor.

Mitigation Measures

An Invasive Species Management Plan (MM-K) is recommended to limit the spread of non-native plant species.

Cumulative Effects

Past actions include impacts to vegetation through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. The completion of the King Cove Access Project (USACE 2003) also contributes to effects on vegetation. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect vegetation.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the degradation of terrestrial habitats.

The result of implementing Alternative 4 would result in no additional loss of vegetation communities. However, approximately 5,430 acres of King Cove Corporation selected parcel could be conveyed from Izembek Wilderness, resulting in a minor contribution to cumulative effects to vegetation. However, no additional direct effects on vegetation would result from Alternative 4 because no vegetation-disturbing activity would be implemented under this alternative. Indirect effects could include the transportation of invasive species to new locations by operation of the hovercraft. Therefore, there would be a negligible contribution to cumulative effects to vegetation due to implementation of Alternative 4.

Conclusion

Implementation of Alternative 4 would have no direct effects to vegetation. However, indirect effects could include the conveyance of King Cove Corporation selected lands and the spread of invasive species from increased human and vehicle transportation due to increased hovercraft service. Indirect effects to vegetation would be medium in intensity because the change resource condition would be observable (presence of invasive species), permanent in duration because these species would continue to exist in the area even if the hovercraft operations were discontinued, local in extent (within the vicinity of the Northeast Terminal and along the road to King Cove, and common in context (not rare in the locality and is not protected by legislation). The summary impact of Alternative 4 on vegetation would be considered minor. Implementing an invasive species management plan will assist to manage impacts to terrestrial and aquatic plant communities.

4.5.2.2 Wetlands

Wetlands are critical components of the landscape within the project area. Refer to Table 3.2-7 and Section 4.2.2.2 for an overview of wetland functions.

No impacts to wetlands would be associated with implementation of Alternative 4. Wetlands previously located at the Northeast Terminal were filled, as authorized by the 2003 EIS Record of Decision and subsequent permits.

Direct Effects and Indirect Effects from Construction

Alternative 4 would not require construction activities beyond what has been authorized by the 2003 EIS Record of Decision and subsequent permits. Therefore, no direct effects on wetlands from construction would result.

As in Alternative 1, approximately 5,430 acres of King Cove Corporation selected lands (containing approximately 1,917 acres of wetlands) could be withdrawn from the Izembek Wilderness and conveyed to the King Cove Corporation. Although these lands are subject to the provisions of ANCSA 22(g), which limits development impacts on the adjacent Izembek National Wildlife Refuge lands, the King Cove Corporation would have the right to develop its lands, which could some impact to wetlands. No such development plans are reasonably foreseeable. Any indirect effect to wetlands from potential development on the selected lands would likely be low in intensity (no such development projects are reasonably foreseeable), the extent would be local because it would be confined to the King Cove Corporation parcel, the duration is unknown but likely permanent, and the affecting resources are also unknown but can be assumed to be common in context (resources not rare in the locality and is not protected by legislation). Therefore the indirect effect on wetlands from the land exchange would be minor.

Summary

Alternative 4 would have no direct effects on wetlands from construction beyond those authorized by the 2003 EIS Record of Decision. Minor indirect effects to wetlands could result from the conveyance of King Cove Corporation selected lands.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance of the hovercraft from the Northeast Terminal to Cross Wind Cove would have no direct or indirect effects on wetlands.

Summary

Alternative 4 would have no direct or indirect effects on wetlands from operation and maintenance.

Mitigation Measures

No mitigation measures relative to wetlands are identified for this alternative.

Cumulative Effects

Past actions include impacts to wetlands through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. The completion of the King Cove Access

Project (USACE 2003) also contributes to effects to wetlands. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect wetlands.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the degradation of terrestrial habitats.

Alternative 4 would result in no additional direct effects on wetlands because no wetland disturbing activity would be implemented. Indirectly, an unspecified area of wetlands could be affected from the conveyance of the King Cove Corporation selected lands, should these lands be developed and that development includes wetland areas. Therefore, the alternative could make a minor contribution to cumulative effects to wetlands.

Conclusion

Implementation of Alternative 4 would have no direct and possible minor indirect and cumulative impacts to wetlands.

4.5.2.3 Fish and Essential Fish Habitat

Alternative 4 is the Proposed Action from the 2003 EIS. It incorporates regular hovercraft service, and omits the necessity for additional marine emergency evacuation transport by ferry or fishing vessel. Hovercraft operation would occur 6 days a week, year round. This alternative would use existing or already permitted roads, and therefore would not result in any direct or indirect effects on freshwater or anadromous fish or their Essential Fish Habitat. The analysis below focuses on marine resources.

Direct Effects and Indirect Effects from the Land Exchange

There would be no land exchange for the purpose of constructing and operating a road between the communities of King Cove and Cold Bay. However, the King Cove Corporation selected lands would be conveyed from the Service to the King Cove Corporation. This action would not affect fish and Essential Fish Habitat and is not discussed further.

Direct Effects and Indirect Effects from Construction

No new construction would occur under Alternative 4, beyond what was authorized in the 2003 EIS and subsequent permits. Therefore, no direct or indirect effects from construction would occur to marine fish and Essential Fish Habitat.

Summary

No direct or indirect effects from construction would result from the implementation of Alternative 4.

Direct Effects and Indirect Effects from Operation and Maintenance

Hovercraft operation would have direct effects on marine fish through disturbance from noise and from the physical presence of the hovercraft along the travel route. Since the hovercraft does not contact the water surface, no impacts would result from physical contact with fish or fish habitat, although the presence of the vessel could result in a startle response from nearby fish. Impacts would be concentrated at the water surface along the travel path and landing pads, with minimal disturbance extending into the water column. It is not anticipated that Essential Fish Habitat for marine species would be adversely impacted.

Noise disturbance would be minimal, particularly when compared to other traditional marine vessels, as no propulsion mechanisms extend into the water. Blackwell and Greene (2005) conducted a study on underwater and in-air sounds of a hovercraft operating in the Alaskan Beaufort Sea to assess potential impacts on marine mammals. Although the Griffon 2000TD hovercraft used in the study is about half the size and horse power of the Suna X hovercraft that was used in Cold Bay, the findings may be applicable. Because the sound source is in air, sounds do not propagate well horizontally underwater. Underwater sounds levels returned to background level at approximately 0.6 miles ahead of and behind the hovercraft traveling at full speed and airborne sounds dropped to levels below background noise in less than 1.2 miles. Blackwell and Greene (2005) concluded that a hovercraft is considerably quieter underwater than a comparably sized conventional vessel. A U.S. Postal Service study performed in Alaska in 2000 examined the effects of hovercraft transport on fish and waterfowl (Roof and Fleming

2001). The study concluded that the noise generated from hovercraft operation had no substantial impact on fish or subsistence activities.

Schooling pelagic fish, such as herring and Atka mackerel, are expected to scatter temporarily within the vicinity of the hovercraft path, but have been shown to quickly reschool following a disturbance (USPS 2000). Herring would be susceptible to higher stress from school disruption during pre-spawning aggregations in the spring. Juvenile and larval pelagic fish would also be impacted, as they would have more difficulty escaping the disturbance source. Demersal fish in the shallow waters near the terminals are expected to experience greater levels of disturbance, due to their limited ability to avoid the disturbance, relative to pelagic fish, and the concentrated area of disturbance; the shallow water column provides less area for retreat. Benthic invertebrates such as crab would likely avoid the hovercraft ramps due to the lack of cover and food. However, these effects would be on such a small scale that the impact would be negligible.

Pressure waves generated upon departures and arrivals are another direct effect. They would temporarily disturb the shallow water habitats at the hovercraft landing areas, and have the potential to impact demersal fish, such as flatfish species, and their Essential Fish Habitat. Sculpin eggs, larvae, and adults may all inhabit the shallow cobble habitats near the hovercraft ramp in the Northeast Terminal. Juvenile and larval pelagic groundfish could also be impacted. The limited duration and magnitude of the disturbance, combined with the infrequent number of hovercraft trips would result in long-term (intermittent but persistent for the life of the project) effects for all fish resources impacted. Indirect effects resulting from hovercraft operation are not anticipated. No marine pollution is expected to result from hovercraft operation, as engine exhaust is released into the air. Negligible effects to Essential Fish Habitat are expected under Alternative 4.

Oil, sewage, or other contaminant leaks from hovercraft operations are possible and could affect small numbers of fish depending on the location and magnitude of the spill, and the prevailing winds. Under normal operations including proper safety procedures, the risk of a spill is small. Because the hovercraft is fueled over land rather than water, the chance that a fuel spill could reach marine waters is also small. The chance of catastrophic spills, such as caused by a vessel collision, grounding, or sinking, is low because hovercraft “fly” over the surface of the water thereby avoiding rocks and reefs, which are the main cause of catastrophic fuel spills in conventional vessels. Personal and medical evacuation transport on other marine vessels, such as private fishing vessels, would occur even less frequently under Alternative 4 than they currently do, as the hovercraft would become a more regular mode of transportation. No effects to fish resources are expected to result from air travel.

Summary

Effects from the operation and maintenance of hovercraft options outlined in Alternative 4 would be of low intensity (the activity would not noticeably alter the fish or essential fish habitat), long-term in duration (intermittent but persistent for the life of the project), local in extent (affecting an area less than 1.2 miles on either side of the hovercraft route), but would impact important resources (Essential Fish Habitat). Therefore, the direct and indirect effects from operation and maintenance under Alternative 4 would be negligible.

Mitigation Measures

The following mitigation measures, with potential for reducing adverse impacts resulting from vessel traffic on fish, include:

- The creation and implementation of a Fuel Handling and Spill Response Plan (MM-D) to reduce the risk of fuel spills, and enable faster and more efficient response should a spill occur. Spill response supplies adequate in type and quantity for the equipment being used shall be onsite and readily accessible at all times.
- A Hydro-Acoustic Assessment (MM-I) will be performed to validate the determination that underwater noise from hovercraft operation would not likely adversely affect marine mammals. While not specifically tailored to fish, any additional information collected on the effects of hovercraft operation in marine environments would contribute to the understanding of effects. [See Marine Mammals (Section 4.5.2.6) for a discussion of the hydro-acoustic assessment.]

Cumulative Effects

The completion of the King Cove Access Project (USACE 2003) would also contribute to effects on essential fish habitat. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect fish habitat.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. These routes may cause erosion to existing streams and this in turn could cause the degradation of fish habitat.

Past, present, and reasonably foreseeable future actions affecting fish or Essential Fish Habitat in or adjacent to the EIS project area are few and are described under Alternative 1 in Section 4.2.2.3. The additional direct and indirect effects from the implementation of Alternative 4 would be negligible, and have only negligible contributions to cumulative effects on fish and Essential Fish Habitat.

Conclusion

The combined effects on fish and fish habitat under Alternative 4 would primarily result from hovercraft noise. They would be of low intensity (the activity would not noticeably alter the fish or essential fish habitat), long-term duration (intermittent but persistent for the life of the project), local in extent (affecting an area less than 1.2 miles on either side of the hovercraft route), and would only impact important resources (Essential Fish Habitat). Alternative 4 would have a negligible contribution to cumulative effects to fish and Essential Fish Habitat. The combined effects on fish and Essential Fish Habitat under Alternative 4 would be negligible.

4.5.2.4 Birds

Direct Effects and Indirect Effects from Construction

No new construction would be associated with this alternative, beyond what was authorized in the 2003 EIS and subsequent permits; therefore, no new direct or indirect effects to seabirds and waterfowl. As in Alternative 1, no land exchange would occur; the parcel selected by King Cove Corporation could continue through the conveyance process. Effects to birds from the conveyance are described in Alternative 1; the change in ownership of these lands would remove the wilderness designation and potentially make the lands available for development, subject to the provisions of ANCSA Section 22(g), which could adversely affect birds.

Summary

Alternative 4 would have no direct effects on birds from construction. The indirect effect of conveyance of the King Cove Corporation selected lands could result in activities that disturb birds, but this would be a minor indirect effect.

Direct Effects and Indirect Effects from Operation and Maintenance

Birds other than seabirds and waterfowl are not expected to occur in the vicinity of the hovercraft except at the terminals. Any birds present at these locations when the vessel begins operation may be startled by the noise or presence of human activity. The expected response would be the birds would leave the area. Thus, the chance of direct or indirect effects to birds other than seabirds and waterfowl from the operation and maintenance of Alternative 4 is very small.

The direct and indirect effects of the operation and maintenance of Alternative 4 on seabirds and waterfowl could include short-term behavior disturbance. The noise and sight of the hovercraft as it crosses the open waters of Cold Bay may startle flocks of seabirds and waterfowl, causing them to alter their behavior. Birds may respond to the hovercraft by flushing and either landing nearby or leaving the area. Because just a single round-trip per day would be scheduled, the frequency of these encounters would be low, but they would persist for the life of the project. However, other watercraft currently operates in Cold Bay and birds may have become habituated to them.

Oil or other contaminant leaks from hovercraft operations are possible and could affect small numbers of seabirds and waterfowl depending on the location and magnitude of the spill, and the prevailing winds. Under normal operations including proper safety procedures, the risk of a spill is small. Because the hovercraft is fueled over land rather than water, the chance that a fuel spill could reach marine waters is also small. The chance of catastrophic spills, such as caused by a vessel collision, grounding, or sinking, is low because hovercraft “fly” over the surface of the water thereby avoiding rocks and reefs, which are the main cause of catastrophic fuel spills in conventional vessels.

Summary

Direct and indirect impacts to seabirds and waterfowl from the operation and maintenance of Alternative 4 would be low intensity because the birds would likely become habituated to the disturbances; long-term duration (intermittent but persistent for the life of the project), local in extent (limited to the hovercraft route); and common in context because seabirds and waterfowl (except for Steller's Eider, which are addressed in the Threatened and Endangered Species section) are not rare in the locality and not protected by special legislation. The summary impact level of Alternative 4 on seabirds and waterfowl would be considered minor.

Mitigation Measures

All the mitigation measures listed under Common Mitigation Measures (Section 4.3.2.4), and the prohibition of travel north of a straight line between the Northeast Terminal and Cross Wind Cove, except in the case of a life threatening emergency, should be effective in reducing potential adverse effects to seabirds and waterfowl.

Cumulative Effects

Past and present actions that have and may continue to affect seabirds and waterfowl in the project area are described in Section 3.2.3 Birds. The completion of the King Cove Access Road is expected to result in more waterfowl hunting at Kinzarof Lagoon and the northeast side of Cold Bay, which could disturb other birds as well. Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through the community of King Cove, and upgrades to the Cold Bay Airport. These future actions would add a small amount of habitat loss and would increase human activity in the project area, including more traffic on the road to the hovercraft terminal. The increase in the number of fisheries observers in King Cove could add more travelers. Alternative 4 would contribute to the additive effect of disturbance from human activities to seabirds and waterfowl. However, the frequency of the disturbance would be low, and limited to a small area. Therefore, the overall effect of Alternative 4 when added to the effects of past, present, and future actions would be minor.

Conclusion

Direct and indirect impacts to seabirds and waterfowl from Alternative 4 would be low intensity because the birds would likely become habituated to the disturbances; long-term duration (intermittent but persistent for the life of the project), local in extent (limited to the hovercraft route); and common in context because seabirds and waterfowl (except for Steller's Eider, which are addressed in the Threatened and Endangered Species section) are not rare in the locality and not protected by special legislation, resulting in a minor impact. Birds using the King Cove Corporation selected lands could be adversely affected by development after the lands are conveyed, if development occurred. Alternative 4 would contribute to cumulative effects on seabirds and waterfowl, resulting in a minor impact. The summary impact of Alternative 4 on seabirds and waterfowl is considered minor.

4.5.2.5 Land Mammals

Alternative 4 would include hovercraft operations at a frequency of 6 days per week from the Northeast Terminal. The impacts caused by the use of the hovercraft at a frequency of 6 days per week on land mammals are described in the 2003 EIS (USACE 2003) as negligible.

Under Alternative 4, the land exchange would not occur and the King Cove Corporation selected lands on the northeast side of Cold Bay would be conveyed from the Izembek National Wildlife Refuge to the corporation. The effect of this change in land ownership on land mammals is described under Alternative 1 in Section 4.2.2.5.

Direct Effects and Indirect Effects from Construction

There would be no construction associated with this alternative; therefore, no construction effects would occur. As in Alternative 1, the indirect effect of conveyance of the King Cove Corporation selected lands could result in activities that disturb land mammals, but this would be a minor indirect effect.

Direct Effects and Indirect Effects from Operation and Maintenance

The noise and sight of the hovercraft as it begins operations at the Northeast Terminal and lands at Cross Wind Cove may startle land mammals, causing them to alter their behavior briefly. Noise from the hovercraft should not be audible to mammals within or at the entrance of Kinzarof Lagoon; however, the noise footprint could overlap a portion of the northeastern coast of Cold Bay inside the no transit zone (USACE 2003). Responses of small terrestrial mammals to hovercraft noise are unknown, but the noise would be expected to minimally elicit an alert response from bears or caribou using tundra habitats within 1 to 2 miles of the terminal site similar to the response elicited by small aircraft; animals closer than 1 mile may respond by moving away from the noise source (USACE 2003).

The direct and indirect effects of the operation and maintenance of Alternative 4 on land mammals could include behavior disturbance at the on-shore facilities and increased risk of injury or mortality on the road from the community of King Cove to the Northeast Terminal. The area adjacent to the Northeast Terminal is designated as “medium density – spring, summer, and fall” habitat for brown bear (Service 1998). This site is also designated as “high density – winter range/migration corridor” habitat for caribou (Service 1998). Wolves may occasionally travel through, and river otters and red fox are common in the area, as are many of the small mammals known to occur throughout the project area. The area adjacent to the Cross Wind Cove terminal lies within area designated as important spring habitat for brown bear (ADF&G 2010i), high density winter range/migration habitat for caribou, and likely contains the same furbearers and small mammals found at the Northeast Terminal.

Human activities at the Northeast Terminal and Cross Wind Cove would likely have negligible effects on terrestrial mammals because they would be intermittent, predictable, and limited to the immediate sites. An indirect effect of the operation of Alternative 4 could be an increase in traffic on the road from the community of King Cove to the Northeast Terminal. This would increase the risk of injury or mortality of land mammals either on or crossing the road. The number of land mammals potentially affected by collisions is expected to be small.

Direct and indirect effects caused by the operation of the hovercraft between the Northeast Terminal and Cross Wind Cove would be negligible, as determined in the 2003 EIS.

Summary

Direct and indirect impacts to land mammals from the operation and maintenance of Alternative 4 would be low intensity (reactions by land mammal by disturbance from hovercraft operations may be noticeable but there would be no noticeable change in habitat use), long-term (intermittent but persistent behavioral disturbance for the life of the project) duration, local extent (limited to the area immediately adjacent to the Northeast Terminal), and would affect both common and important resources (caribou are considered important because their population has been below management objectives, which has limited subsistence harvest opportunities in the EIS project area, and brown bear are considered important because of the State's designated Controlled Use Area for brown bear. All other land mammals are considered common because they are not rare in the locality and are not protected by special legislation). The summary impact of Alternative 4 on land mammals would be negligible.

Mitigation Measures

The following elements of a Fish and Wildlife Protection Plan (MM-M) would be used to reduce adverse effects to land mammals.

- No hovercraft, ferry, or helicopter will travel north of a straight line between northeast terminal on Cold Bay and Cross Wind Cove except in the case of a life-threatening emergency.
- All solid or putrescible waste generated during the project activity shall be removed or otherwise disposed of by a method approved by the Alaska Department of Environmental Conservation. All efforts will be made to prevent bears and other wildlife from being attracted to or having access to food or garbage during construction and operation of any transportation link.

Cumulative Effects

Past and present actions that have and may continue to affect land mammals in the project area include sport and subsistence hunting, wildlife viewing and management. Because the project area is in a national wildlife refuge, past and present actions that would affect wildlife have been purposefully limited. Very few land-disturbing activities have taken place in the refuge. The completion of the King Cove Access Road is expected to result in greater hunter access to large mammals in the project area, and more disturbance in previously undisturbed areas.

Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human disturbance to land mammals. While Alternative 4 could disturb individual land mammals, it is not expected to have population-level effects on any land mammal species, even when combined with the cumulative effects from past, present, or reasonably foreseeable future actions. Although human activities would cause increased disturbance to land mammals, the activity would be limited to the hovercraft terminal areas, leaving the majority of land mammal habitats undisturbed. Alternative 4 would result in a minor contribution to cumulative effects on land mammals.

Conclusion

Direct and indirect impacts to land mammals from Alternative 4 would be low intensity (may not be measurable), long-term duration (intermittent and for very short periods but persistent for the life of the project), would occur locally (limited to the area immediately adjacent to the Northeast Terminal), and would generally affect both common and important resources. Caribou are considered important because their population has been below management objectives, which has limited subsistence harvest opportunities in the EIS project area and brown bear are considered important because of the State's designated Controlled Use Area for brown bear. All other land mammals are considered common because they are not rare in the locality and are not protected by special legislation). The conveyance of the King Cove Corporation selected lands could affect important resources (caribou and brown bear). The contribution of Alternative 4 to cumulative effects on land mammals would be minor. The summary impact of Alternative 4 on land mammals is considered minor.

4.5.2.6 Marine Mammals

Alternative 4 would implement the remaining elements of the proposed action for the 2003 EIS. Under this alternative, the hovercraft would operate 6 days per week, year round, between the Northeast Terminal and Cross Wind Cove. The primary difference lies in the road, building, and other infrastructure elements constructed or permitted. Evaluations included build upon the earlier determinations for Alternative 1 in the 2003 EIS and any new relevant information.

Under Alternative 4, the King Cove Corporation selected lands would be conveyed from the Service to the corporation. This action would not affect marine mammals and is not discussed further.

Fourteen species of marine mammals inhabit the North Pacific Ocean adjacent to Cold Bay and the Bering Sea adjacent to Izembek Lagoon (see Section 3.2.6). Of these, harbor seals, killer whales, harbor porpoise, and gray whales occur with some regularity in the EIS project area, so will be evaluated as to potential effects from the proposed alternatives. Northern sea otters and Steller sea lions are discussed in Section 4.5.2.7, Threatened and Endangered Species. Pinnipeds (harbor seals) and cetaceans (killer whales, harbor porpoise, and gray whales) are analyzed together. Although harbor seals use both terrestrial and marine habitats and the cetaceans are restricted to marine habitats and are less commonly sighted in the project area, many of the impact conclusions are the same. Where differences occur, they are noted.

Direct Effects and Indirect Effects from Construction

No construction would be associated with this alternative, beyond what is currently authorized in the 2003 EIS and subsequent permits, for completion of the road to the Northeast Terminal and construction of the hovercraft terminal facility.

Summary

No new construction would be associated with this alternative, so there would be no effects from construction on harbor seals, killer whales, harbor porpoise, and gray whales.

Direct Effects and Indirect Effects from Operation and Maintenance

The primary types of potential direct and indirect effects on harbor seals, killer whales, harbor porpoise, and gray whales from operation and maintenance of the hovercraft are disturbance, primarily from noise, hovercraft strikes, and habitat degradation. The analysis of effects and conclusions take into consideration mitigation measures.

Harbor seals occur in Cold Bay throughout the year in various marine, estuarine, and freshwater stream habitats, and coastal areas for resting, traveling and feeding. Noise from the hovercraft could disrupt these behaviors. Operation of the hovercraft across the proposed open water route could displace harbor seals that move to avoid the vessel. Harbor seals with pups are not reported to frequent the area of the hovercraft route, but if present, may move to inshore areas of Cold Bay farther from the hovercraft noise (USACE 2003). Seasonal foraging by harbor seals may occasionally be disrupted through disturbance of schooling salmon in the Cross Wind Cove area (see Section 4.2.2.3, Fish). Seals have been observed feeding on several species of salmon that are migrating to spawning areas in Stapp or Russell Creek; schools might temporarily scatter during hovercraft landing and takeoff (USACE 2003).

Killer whales, harbor porpoise, and gray whales are relatively uncommon in Cold Bay (Sections 3.2.6.2, 3.2.6.3, and 3.2.6.4), but are occasionally sighted in the upper part of the bay and near the Cold Bay dock. The proposed hovercraft route between the Northeast Terminal and Cross Wind Cove traverses possible feeding and transit areas for these species. With the infrequency of occurrence of these species, the possibility for interactions would be limited. Although killer whales and harbor porpoise have been sighted in Cold Bay during winter, the recorded observations of gray whales were during the summer months only. However, if the hovercraft were to approach whales and porpoises, disturbance reactions, such as avoidance and interrupted communication, could result (Richardson et al. 1995).

Little information exists regarding noise produced by hovercrafts or the effects of hovercraft noise on marine mammals. Dickins (2003) conducted a review of existing information in conjunction with the 2003 EIS (Appendix E2 in USACE 2003). This study noted that at a frequency range of approximately 500 Hz to 8 kHz, harbor seals would detect the hovercraft at about 50 feet, but the maximum underwater detection distance was difficult to predict.

They did not make similar calculations for whales. The estimated auditory bandwidth for pinnipeds in water is 75 Hz to 75 kHz and is 75 Hz to 30 kHz in air (Southall et al. 2007). Killer whales have an estimated auditory bandwidth of 150 Hz to 160 kHz (best hearing is from approximately 10-120 kHz), harbor porpoise have an estimated auditory bandwidth of 200 Hz to 180 kHz, and gray whales have an estimated auditory bandwidth of 7 Hz to 22 kHz (Southall et al. 2007). All would, therefore, be capable of detecting the hovercraft sound underwater. Harbor porpoise tend to change direction and move away from closely approaching boats (Richardson et al. 1995). Migrating gray whales reacted to a large military hovercraft at an average distance of 700 feet, but generally resumed normal behavior within 7 minutes (Richardson et al. 1995).

The likelihood and duration of disturbance depends largely on length of exposure to the noise. The high speed (30-35 knots) at which the hovercraft travels means that it should pass by stationary marine mammals in 10 seconds or less, making it more of a transient pulse than a continuous sound that is characteristic of slower displacement hull vessels (Dickins 2003).

Blackwell and Greene (2005) conducted a study on underwater and in-air sounds of a hovercraft operating in the Beaufort Sea to assess potential impacts on marine mammals. Although the Griffon 2000TD hovercraft used in the study is about half the size and horsepower of the Suna X hovercraft used in Cold Bay, the findings may be applicable. Because the sound source is in air, sounds do not propagate well horizontally underwater. Underwater sounds levels returned to background level at approximately 0.6 miles ahead of and behind the hovercraft traveling at full speed and airborne sounds dropped to levels below background noise in less than 1.2 miles. Blackwell and Greene (2005) concluded that a hovercraft is considerably quieter underwater than a comparably sized conventional vessel.

Mitigation Measure 12 of the 2003 EIS called for implementation of a hydro-acoustic assessment of the hovercraft "to validate the determination that underwater noise would 'not likely adversely affect' marine mammals." The assessment would evaluate and measure underwater noise characteristics of the hovercraft at varying distances and at varying speeds (USACE 2003b). Such analyses are currently lacking, yet are integral to adequately assessing effects of hovercraft operations on marine mammals in Cold Bay.

At the high speed the hovercraft would travel across Cold Bay, it would be possible for a seal, whale, or porpoise to surface directly in front of the hovercraft and be unable to move out of the way. Part of the hovercraft could travel over the animal before it could dive. Vessel speed is a key factor in determining the frequency and severity of ship strikes, with the potential for collision increasing at ship speeds of 15 knots and greater (Laist et al. 2001; Vanderlaan and Taggart 2007). Since the hovercraft rides on a cushion of air, it would travel over a seal, whale, or porpoise at the sea surface with little chance of physical injury (USACE 2003). A potential exception would be the hovercraft could hit a male killer whale dorsal fin, which can extend 6 feet above sea surface (Dickins 2003). Stipulations included within the marine mammal protection plan dictate operating distances around marine mammals could minimize the potential for collision, if time and distance allow.

Hovercraft wake heights at cruising speed are almost nonexistent and would have no effect on resting harbor seals hauled out on rocks, ledges, and nearshore areas.

A mitigation measure includes a year round exclusion zone that prohibits hovercraft travel north of the direct line route between the Northeast Terminal and Cross Wind Cove. The closest point where the hovercraft would pass Kinzarof Lagoon, an area frequented by harbor seals, would be 3.2 miles. This exclusion zone would minimize acoustic disturbances to seals and cetaceans in northern Cold Bay and the entrance to Kinzarof Lagoon. It could also provide a refuge for foraging, resting, and pupping harbor seals. The no travel zone in the head of Cold Bay would mitigate noise disturbance impacts on harbor seals.

Indirect effects of the hovercraft operation include habitat alterations caused by fuel leaks or spills into the nearshore marine environment. Mitigation measures were developed to protect drainages and the marine environment from sediment, hazardous substances, and fuels. Assuming these measures are retained and implemented, effects on harbor seals and their habitat are not expected.

Regular, year round operation of the hovercraft could result in increased incidence of disturbance to harbor seals, killer whales, and harbor porpoise. It could, however, also lead to habituation of harbor seals to the hovercraft's presence and noise. The frequency of occurrence of killer whales and harbor porpoise in Cold Bay may be sufficiently low and irregular to minimize chances of interactions and disturbance despite the frequent crossings of Cold Bay.

Summary

Behavioral effects on harbor seals, killer whales, harbor porpoise, and gray whales from the hovercraft operations would be of low to medium intensity. Detectable reactions to vessel noise may occur, but seals, whales and porpoise are unlikely to leave the area as a result. The no travel zone in the north end of Cold Bay would minimize disturbance effects. Disturbance that may occur would be long-term duration (intermittent but persistent for the life of the project), and localized. All 4 species are federally protected under the *Marine Mammal Protection Act* and are, therefore, considered important in context. Potential injury and habitat alteration effects would be of low intensity, temporary, and local in extent. Imposing mitigation measures should minimize adverse effects. The impact of Alternative 4 on harbor seals, killer whales, harbor porpoise, and gray whales would therefore be considered negligible to minor.

Mitigation Measures

The following mitigation measures described in Appendix F would reduce adverse effects to marine mammals and marine mammal habitat.

Marine Mammal Protection Plan (MM-N), Erosion and Sediment Control Plan (MM-A), Storm Water Pollution Prevention Plan (MM-B), Hazardous Material and Petroleum Product Control Plan (MM-C), Fuel Handling and Spill Response Plan (MM-D), Fish and Wildlife Protection Plan (MM-M), and Hydro-Acoustic Assessment (MM-I).

Cumulative Effects

Past, present and reasonably foreseeable future actions and their respective effects on harbor seals, killer whales, harbor porpoise, and gray whales are the same as described under Alternative 1 (Section 4.2.2.6). Implementing Alternative 4 would make a negligible contribution to the cumulative effects on harbor seals, killer whales, harbor porpoise, and gray whales.

Conclusion

The direct and indirect effects of Alternative 4 on harbor seals, killer whales, harbor porpoise, and gray whales would be of low to medium intensity, as behavioral disturbance is possible, long-term duration (intermittent but persistent for the life of the project), and localized. All 4 species are federally protected under the *Marine Mammal Protection Act* and are, therefore, considered important in context. The contribution to cumulative effects would be negligible. The overall impact considered negligible to minor.

4.5.2.7 Threatened and Endangered Species

Alternative 4 would implement remaining elements of the proposed action for the 2003 EIS. Under Alternative 4, the hovercraft would operate 6 days per week, year round, between the Northeast Terminal and Cross Wind Cove. The primary difference lies in the road, building and other infrastructure elements constructed or permitted. Evaluations included build upon the earlier determinations for Alternative 1 in the 2003 EIS and any new relevant information.

The 3 threatened and endangered species included in this EIS—Steller's Eiders, northern sea otters, and Steller sea lions—are addressed separately below. Because the effects on 2 candidate species, Yellow-billed Loon, and Kittlitz's Murrelet are similar to those expected to occur to Steller's Eiders, the analysis of effects for these species have been combined. Although Yellow-billed Loon, and Kittlitz's Murrelet have no legal protection under the *Endangered Species Act* at this time, they could become listed before the project is completed.

Under Alternative 4, the land exchange would not occur and the King Cove Corporation selected lands on the northeast side of Cold Bay could be conveyed from the Izembek National Wildlife Refuge to the King Cove Corporation. The change in ownership of these lands would remove the wilderness designation and potentially make the lands available for development, subject to the provisions of ANCSA Section 22(g), but these lands likely do not contain habitat for the species considered here are not discussed further.

Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet

Direct Effects and Indirect Effects from Construction

No additional construction would be associated with this alternative beyond what is currently scheduled for completion of the road from King Cove to the Northeast Terminal and construction of the hovercraft storage facility.

Summary

No new construction would be associated with this alternative; therefore, no effects from construction on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

Potential direct and indirect effects on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets caused by operation and maintenance of the hovercraft from the Northeast Terminal to Cross Wind Cove are disturbance, primarily from noise, collision, and habitat degradation. The analysis of effects and conclusions takes into consideration mitigation measures.

Steller's Eiders occur in the EIS project area during the nonbreeding season from the molt in the fall to pre-migration staging in the spring. They are largely absent from the area from mid-May to mid-July. Eiders generally begin arriving in Izembek Lagoon in August with numbers increasing in September. Observations of eiders in Kinzarof Lagoon increase in October (Laubhan and Metzner 1999). Under Alternative 4, eider presence would overlap with the operation of the hovercraft from late summer, through winter, to mid-May; they could be susceptible to disturbance from the hovercraft operating during the winter months in Cold Bay. Wintering eiders in the EIS project area spend much of the time foraging to meet energetic demands (Laubhan and Metzner 1999) and may experience periodic disruptions to foraging when the hovercraft passes by.

Kittlitz's Murrelets have been seen in Cold Bay and are known to breed in the Izembek National Wildlife Refuge near Frosty Peak. Murrelets nesting in other parts of the Izembek National Wildlife Refuge could be present in the EIS project area during the spring, summer, and fall. Yellow-billed Loons are rarely seen in the Izembek National Wildlife Refuge (Taylor and Sowl 2008), but could occur in the EIS project area during spring or fall migration, or during the winter.

The primary source of disturbance would be noise from the hovercraft, with possible displacement of eiders, loons, or murrelets in response to the noise. However, little information exists regarding noise produced by hovercrafts or on hovercraft noise effects on wildlife. Blackwell and Greene (2005) conducted a study on underwater and in-air sounds of a hovercraft operating in the Beaufort Sea to assess potential impacts on marine mammals. Although the Griffon 2000TD hovercraft used in the study is about half the size and horsepower of the Suna X hovercraft used in Cold Bay, the findings may be applicable. Because the sound source is in air, sounds do not propagate well horizontally underwater. Underwater sounds levels returned to background level at approximately 0.6 miles ahead of and behind the hovercraft traveling at full speed, and airborne sounds dropped to levels below background noise in less than 1.2 miles. Blackwell and Greene (2005) concluded that a hovercraft is considerably quieter underwater than a comparably sized conventional vessel. The likelihood and duration of disturbance depends largely on length of exposure to the noise. Dickins (2003) conducted a review of existing information in conjunction with the 2003 EIS (Appendix E2 in USACE 2003). This study concluded that the high speed (30-35 knots) at which the hovercraft travels means that it should pass by stationary animals in 10 seconds or less, making it more of a transient pulse than a continuous sound that is characteristic of slower displacement hull vessels (Dickins 2003).

The proposed hovercraft route from the Northeast Terminal to Cross Wind Cove avoids the nearshore waters near the entrance to Kinzarof Lagoon and eastward along the coast for 3.4 miles, which is where Steller's Eiders would be concentrated. The year round no transit zone prohibits hovercraft travel north of the direct route between the Northeast Terminal and Cross Wind Cove, except in emergency situations. The proposed hovercraft route would, therefore, avoid high density wintering habitat in upper Cold Bay and Kinzarof Lagoons. The hovercraft would traverse low density wintering habitat where fewer eiders may be encountered. The expected noise generated by the hovercraft (51 dB at 2.2 miles) is not likely to reach Kinzarof Lagoon under most wind conditions (USACE 2003). Avoidance of the exclusion area should mitigate most noise disturbance impacts to wintering Steller's Eiders and Yellow-billed Loons in the important wintering habitat of Kinzarof Lagoon and during sensitive periods such as the wing molt in the fall and pre-migration staging in the spring.

The sound of an approaching hovercraft should alert any eiders, loons, or murrelets in its path. Flocks of eiders would likely disperse during passage of the hovercraft but would likely reassemble nearby or return after the hovercraft has passed (USACE 2003). The passage of the hovercraft would be of short duration, generally in low-use areas, but an avoidance response in eiders, loons, or murrelets could occur.

Mitigation measures were derived from an *Endangered Species Act* Section 7 consultation with the Service recommending a study to assess the response of Steller's Eiders to the hovercraft operation during the first 2 winter seasons of service. The Service was to monitor the reaction of Steller's Eiders within the no transit zone as the hovercraft follows its proposed route. The ability to adequately assess effects of hovercraft operations on Steller's Eiders in Cold Bay would be greatly enhanced with these data. If the results of the monitoring assessment indicated there was take of Steller's Eiders, including greater levels of disturbance and stress than originally expected, Section 7 consultation under the *Endangered Species Act* would be reinitiated (USACE 2003).

A pilot study to monitor hovercraft effects on Steller's Eiders and sea otters was completed only through the data collection phase from August 2008 to April 2009 (Fairchild 2009). Observations were made from a shore-based location while the hovercraft operated between Lenard Harbor and Cross Wind Cove, a different route than that proposed under this alternative. Insufficient data were collected to directly address whether the hovercraft operations disturbed Steller's Eiders. Data have not yet been statistically analyzed (Fairchild 2009).

Indirect effects of the hovercraft operation include habitat alterations caused by fuel leaks or spills into the nearshore marine environment. Mitigation measures were developed to protect drainages and the marine environment from sediment, hazardous substances, and fuels. Assuming these measures are retained and implemented, effects on Steller's Eiders, Yellow-billed loons, and Kittlitz's Murrelets and their habitats are not expected.

Summary

Steller's Eiders and Yellow-billed Loons wintering in Cold Bay could experience disturbance effects of hovercraft operations as proposed under Alternative 4. Incorporating and adhering to the exclusion zone in northern Cold Bay would mitigate most disturbance effects to birds using the high density wintering areas of northern Cold Bay and Kinzarof Lagoon. Effects would be of low to medium intensity, depending on whether disturbance occurs, long-term duration (intermittent but persistent for the life of the project), and localized. Steller's Eiders are listed as threatened and protected under the *Endangered Species Act*, so are considered important in context. Yellow-billed Loons and Kittlitz's Murrelets are considered important in context due to their candidate status and have exhibited declining populations. The summary impact of Alternative 4 on these 3 species is considered minor.

Mitigation Measures

Disturbance to Steller's Eiders will be monitored for the first two winter seasons of hovercraft operations as described in a Fish and Wildlife Protection Plan (MM-M). See Appendix F Mitigation Measure M (C)(iii) for a description of monitoring plan elements. In addition a Marine Mammals Protection Plan (MM-N) would be required.

Cumulative Effects

Past, present, and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Disturbance effects associated with implementation of Alternative 4 would result in an additional negligible to minor contribution to cumulative effects on Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet.

Conclusion

Effects of hovercraft operations as proposed under Alternative 4 would be of low to medium intensity, depending on whether disturbance occurs, long-term duration (intermittent but persistent for the life of the project), and localized. The contribution to cumulative effects would be negligible to minor. Steller's Eiders are listed as threatened under the *Endangered Species Act,* so are considered important in context Yellow-billed Loons and Kittlitz's Murrelets are considered important in context and have exhibited declining populations. The overall impact of Alternative 4 on Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet is considered negligible to minor.

<u>Northern Sea Otter: Southwest Alaska Distinct Population Segment</u>

Direct Effects and Indirect Effects from Construction

No additional construction would be associated with this alternative beyond what is currently scheduled for completion of the road from King Cove to the Northeast Terminal and construction of the hovercraft storage facility.

Summary

No new construction would be associated with this alternative, so northern sea otters would not be affected by construction.

Direct Effects and Indirect Effects from Operation and Maintenance

Potential direct and indirect effects on northern sea otters from operation and maintenance of the hovercraft between the Northeast Terminal and Cross Wind Cove are disturbance, primarily from noise, boat strikes, and habitat degradation. The analysis of effects and conclusions takes into consideration mitigation measures.

Sea otters, including young pups, travel, rest and feed year round throughout Cold Bay. They concentrate in high densities in upper Cold Bay and Kinzarof Lagoon, particularly near the entrance to the lagoon. The proposed hovercraft route avoids the nearshore waters at the entrance to Kinzarof Lagoon since the area north of the direct line route between the Northeast Terminal and Cross Wind Cove is closed to hovercraft operation except during life threatening emergencies.

This exclusion zone would minimize acoustic disturbances to sea otters in northern Cold Bay and Kinzarof Lagoon. It could also provide a refuge for foraging, resting, and pupping.

The primary source of disturbance would be noise from the hovercraft. Little information exists regarding noise produced by hovercrafts or on hovercraft noise effects on wildlife. As described above for Steller's Eiders, general findings on underwater noise from hovercraft indicate that they are much quieter than similarly sized conventional vessels and produce more of a transient pulse than continuous sound due to their high rate of passage through an area. Because of their high speed of travel, encounters at close range would be brief.

Noise and the visual presence of hovercraft on the route across Cold Bay would likely disturb sea otters near the Northeast Terminal, causing them to dive or move away from the hovercraft. Sea otters encountering the passing hovercraft may endure some stress and exert energy escaping the disturbance. Traveling at 30-35 knots, passage of the hovercraft would be of short duration and mostly in lower use areas of Cold Bay.

Mitigation Measure 12 of the 2003 EIS called for implementation of a hydro-acoustic assessment of the hovercraft "to validate the determination that underwater noise would 'not likely adversely affect' marine mammals." The assessment would evaluate and measure underwater noise characteristics of the hovercraft at varying distances and at varying speeds (USACE 2003). Such analyses are currently lacking, although they are integral to adequately assessing effects of hovercraft operations on marine mammals in Cold Bay.

A pilot study to monitor hovercraft effects on Steller's Eiders and sea otters was conducted from August 2008 to April 2009 in partial compliance with Mitigation Measure 11 from the 2003 EIS (see Steller's Eiders above). The study was only completed through the data collection phase; data have not yet been analyzed (Fairchild 2009). Observations were made from a shore-based location while the hovercraft operated between Lenard Harbor and Cross Wind Cove, a different route than that proposed under Alternatives 1 and 4 of this EIS. The sample size was too small to make determinations regarding disturbance effects of the hovercraft on sea otters. Otters were, however, observed to change behavior and swim away from the approaching hovercraft, suggesting at least temporary displacement (Fairchild 2009).

The high speed at which the hovercraft travels means that a sea otter could surface directly in front of the hovercraft and not be able to move out of the way quickly enough to avoid collision. Part of the hovercraft could travel over the sea otter before it could dive. Since the hovercraft rides on a cushion of air, it could travel over a sea otter at the sea surface with little chance of physical injury (USACE 2003).

In general, most otters would be alerted to the approach of the hovercraft by noise and get out of the way before being struck.

Indirect effects of the hovercraft operation include habitat alterations caused by fuel leaks or spills into the nearshore marine environment. Mitigation measures were developed to protect drainages and the marine environment from sediment, hazardous substances, and fuels. Assuming these measures are retained and implemented, effects on sea otters and their habitat are not expected.

Summary

Given the proposed route and mitigation measures, long-term displacement of sea otters from any habitats is unlikely. The year round no travel zone in northern Cold Bay and Kinzarof Lagoon would reduce the frequency and duration of direct and indirect impacts of this alternative. Some disturbance and displacement is possible and likely to be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect an important resource. The direct and indirect impact is considered negligible to minor. The southwest Alaska distinct population segment of the northern sea otter is federally protected under the *Endangered Species Act* and the *Marine Mammal Protection Act*, so is considered an important resource.

Mitigation Measures

No additional mitigation measures are identified.

Cumulative Effects

Past, present, and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Implementation of Alternative 4 would result in an additional negligible contribution to cumulative effects on northern sea otters.

Conclusion

Some disturbance and displacement may occur during hovercraft operations under Alternative 4. Effects are likely to be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), and localized. The contribution to cumulative effects would be negligible. The summary impact of Alternative 4 on northern sea otters would be considered negligible to minor.

Steller Sea Lion: Western Distinct Population Segment

Direct Effects and Indirect Effects from Construction

No additional construction would be associated with this alternative beyond what is currently scheduled for completion of the road from King Cove to the Northeast Terminal and construction of the hovercraft storage facility.

Summary

With no new construction associated with this alternative, no effects from construction on Steller sea lions would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

Potential direct and indirect effects on Steller sea lions from operation and maintenance of the hovercraft between the Northeast Terminal and Cross Wind Cove are disturbance, primarily from noise, boat strikes, and habitat degradation. The analysis of effects and conclusions takes into consideration mitigation measures.

Steller sea lions occur in Cold Bay throughout the year, although most observations are during the summer when sea lions feed near salmon spawning streams or on fish scraps near the Cold Bay dock. They occasionally occur in upper Cold Bay near Kinzarof Lagoon. Hovercraft arrivals and departures at Cross Wind Cove could disperse schooling salmon and temporarily disrupt sea lions that may be foraging there during the summer salmon spawning season (USACE 2003).

The hovercraft route between the Northeast Terminal and Cross Wind Cove crosses areas where Steller sea lions travel and feed and could, potentially, be disturbed. Steller sea lion reactions to hovercraft noise may include avoidance of the hovercraft by diving or swimming away. Steller sea lions are widely distributed across Cold Bay, so the potential for disturbance and displacement is low.

Little information exists regarding hovercraft noise effects on marine mammals. Dickins (2003) conducted a review of existing information in conjunction with the 2003 EIS (Appendix E2 in USACE 2003). The study noted that harbor seals would detect the hovercraft underwater at about 50 feet, but that the maximum distance at which it would be detected underwater was difficult to predict. Steller sea lions have the same estimated auditory bandwidth as harbor seals

(75 Hz to 75 kHz in water and 75 Hz to 30 kHz in air [Southall et al. 2007]), so may detect the hovercraft at similar distances. The likelihood and duration of disturbance depends largely on length of exposure to the noise. The high speed (30-35 knots) at which the hovercraft travels means that it should pass by stationary marine mammals in 10 seconds or less, making it more of a transient pulse than a continuous sound that is characteristic of slower displacement hull vessels (Dickins 2003). Studies on hovercraft noise in the Beaufort Sea concluded that hovercraft vessels are much quieter underwater than similarly sized conventional vessels.

As noted, hydro-acoustic assessments of the hovercraft appear to be lacking, yet are integral to adequately assessing effects of hovercraft operations on marine mammals in Cold Bay, including Steller sea lions.

The high speed at which the hovercraft travels across areas used by Steller sea lions means that it would be possible for a sea lion to surface directly in front of the hovercraft and not be able to move out of the way quickly enough to avoid collision. Part of the hovercraft could travel over a sea lion before it could dive. Since the hovercraft rides on a cushion of air, it could travel over a sea lion at the sea surface with little chance of physical injury (USACE 2003).

A year round exclusion zone prohibits hovercraft travel north of the direct line route between the Northeast Terminal and Cross Wind Cove. This exclusion zone could minimize disturbances to any Steller sea lions that occasionally use that area.

Indirect effects of the hovercraft operation include habitat alterations caused by fuel leaks or spills into the nearshore marine environment. Mitigation measures were developed to protect drainages and the marine environment from sediment, hazardous substances, and fuels. Assuming these measures are retained and implemented, effects on Steller sea lions and their habitat are not expected.

Summary

Behavioral effects on Steller sea lions from the hovercraft operating between the Northeast Terminal and Cross Wind Cove 6 days per week year round would be of low to medium intensity because a change in their activities may be observable, long-term duration (intermittent but persistent for the life of the project), and localized to an area near the hovercraft route. Steller sea lions are federally protected under the *Marine Mammal Protection Act* and the *Endangered Species Act*, so are considered important in context. The direct and indirect impact is considered minor.

Although unlikely to occur, potential injury and habitat alteration effects would be of medium intensity, temporary duration, and local in extent, resulting in a minor impact. Imposing mitigation measures should minimize adverse effects.

Mitigation Measures

No additional mitigation measures are identified.

Cumulative Effects

Past, present, and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Implementation of Alternative 4 would result in an additional negligible contribution to cumulative effects on Steller sea lions.

Conclusion

Direct and indirect effects of hovercraft service under Alternative 4 on Steller sea lions would be of low to medium intensity because a change in their activities may be observable, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect an important resource (protected under the *Marine Mammal Protection Act* and the *Endangered Species Act)*, resulting in a minor impact. The contribution to cumulative effects would be negligible. The summary impact of Alternative 4 on Steller sea lions is considered negligible to minor.

4.5.3 Social Environment

4.5.3.1 Land Ownership and Management

Alternative 4 would retain the same land ownership pattern as Alternative 1, the No Action Alternative and, therefore, would have similar effects on land use, management and impact on the Service's ability to meet the purposes of the refuges as described in Section 4.2.3.1. Similarly, the resource values of the parcels are the same as found in Alternative 1. Slight differences in the two alternatives are described in the narrative below.

Direct Effects and Indirect Effects

Effects on Land Ownership

Under Alternative 4, no lands would be exchanged, no road would be constructed, and existing land ownership would remain the same for the foreseeable future, except that the King Cove Corporation land selection within the Izembek Wilderness may proceed to conveyance. The King Cove Corporation selection is part of the existing conditions. This selection would proceed to patent, affecting approximately 5,430 acres within the Izembek Wilderness on the east side of Kinzarof Lagoon. The conveyance of the selected parcel would be an indirect effect of Alternative 4. The selected lands, when patented, would be subject to the provisions of ANCSA Section 22(g), as described in Section 3.3.1.1. Federal lands within Izembek National Wildlife Refuge and Izembek Wilderness and in Alaska Maritime National Wildlife Refuge on Sitkinak Island would remain in federal ownership. Title to State of Alaska land would be unchanged.

Effects on Land Use and Management

Since Alternative 4 would not involve an exchange of land between the parties, the effect of this alternative on land use and management would remain the same as the current situation described in Section 4.2.3.1. Except for the indirect effect of the potential for conveyance of selected lands to the King Cove Corporation, there would be no change in management of the parcels as shown in Table 4.2-1. If the King Cove Corporation selected lands within the Izembek Wilderness are conveyed, their existing rights to manage these lands as private land owners would continue, subject to the requirements Section 22(g) of ANCSA and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes.

Summary

As with Alternative 1 (Section 4.2.3.1), Alternative 4 would introduce no new direct effects, and minor indirect effects to land ownership, land use, and land management within the project area, The summary impact of Alternative 4 on land use and management would be considered minor. See Sections 4.5.3.6 and 4.5.3.10 for impact summaries of Alternative 4 related to Public Use and Wilderness.

Mitigation Measures

Since Alternative 4 would result in no direct impacts and minor indirect impacts to ownership, and land use and management, no mitigation measures are recommended.

Cumulative Effects

The direct and indirect impacts of Alternative 4 are identical to Alternative 1 and are considered minor. Past, present, and reasonably foreseeable future actions are the same as for Alternative 1. The contribution of Alternative 4 to cumulative effects on land ownership, use, and management is considered minor (indeterminate).

Effects to Refuge Purposes

Since Alternative 4 would not involve an exchange of land between the parties, the effect of this alternative on the Service's ability to meet refuge purposes would remain the same as the current situation described in Section 4.2.3.1.

Conclusion

Alternative 4 would have identical impacts to Alternative 1, with respect to land ownership, management, and use. This includes no new direct effects and minor indirect effects. Although past actions that affect land management include all-terrain vehicle use in the vicinity of the Northeast Terminal, the contribution of Alternative 4 to cumulative effects would be minor and would not require mitigation.

Alternative 4 would not noticeably diminish the Service's ability to achieve the refuges' purposes identified in Public Land Order 2216, ANILCA, and the Wilderness Act.

The overall impact of Alternative 4 on land ownership, use, and management would be minor (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.5.3.2 Socioeconomics

Direct Effects and Indirect Effects from Construction

Alternative 4 would require an operator to expend $10.9 million in a capital purchase of a hovercraft. Very little, if any, of these expenditures would occur within the project area, so community economic benefits are negligible. It is assumed federal grants would pay for the hovercraft and related facilities.

Direct Effects and Indirect Effects from Operation and Maintenance

This section discusses the long-term impacts resulting from operations and maintenance of Alternative 4 from several perspectives: 1) employment; economic activity; 2) population and demographics; and 3) fiscal impacts to local governments.

<u>Passenger Trips and Travel Costs</u>

Under Alternative 4, the hovercraft would operate 6 days per week from the Northeast Terminal. Table 4.5-3 summarizes the estimated baseline trips and travel costs by mode and group under Alternative 4.

Table 4.5-3 Estimated Baseline Trips and Travel Cost by Travel Mode and Group under Alternative 4, 2013 – 2020 and 2025

Overall Trips and Travel Costs	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Trips and Travel Cost for Passengers Using the Hovercraft with Six Times per Week Service									
Resident and Non-Fishing Hovercraft Passengers	993	995	997	1,001	1,005	1,008	1,012	1,015	1,026
Fishery Related Hovercraft Passengers	558	558	558	558	558	558	558	558	558
Total Estimated Hovercraft Passengers	1,551	1,553	1,555	1,559	1,563	1,566	1,570	1,573	1,584
Total Cost of Hovercraft Trips ($ 2010)	117,876	118,028	118,180	118,484	118,788	119,016	119,320	119,548	120,384
Additional Cost of Ground Vehicle Travel[1] ($ 2010)	37,730	37,785	37,839	37,949	38,058	38,140	38,249	38,331	38,631
Estimated Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	2,708	2,715	2,723	2,733	2,743	2,754	2,764	2,774	2,808
Fishery Related Air Trips	1,842	1,842	1,842	1,842	1,842	1,842	1,842	1,842	1,842
Total Estimated Air Trips	4,550	4,557	4,565	4,575	4,585	4,596	4,606	4,616	4,650
Total Cost of Air Trips ($ 2010)	445,937	446,613	447,347	448,359	449,350	450,419	451,374	452,412	455,695
Additional Cost of Ground Vehicle Travel ($ 2010)[1]	35,598	35,646	35,699	35,771	35,842	35,918	35,987	36,061	36,295
Estimated Trips and Travel Cost for Passengers Using the Both Modes									
Total Trips Both Modes	**6,101**	**6,110**	**6,120**	**6,134**	**6,148**	**6,162**	**6,176**	**6,189**	**6,234**
Total Cost of Trips for Both Modes ($ 2010)	**637,142**	**638,073**	**639,066**	**640,563**	**642,038**	**643,494**	**644,930**	**646,351**	**651,005**

Note: Compiled from ground and air passengers and costs presented in Tables 4.2-4 through 4.2-7. Numbers are rounded. Passenger trips apportioned according to capacity and cost of ground vehicles used by fishery or non-fishery related passengers

[1] Cost for ground travel from the City of King Cove to terminals and airports.

Source: NEI 2012

Table 4.5-4 shows the estimated costs for fish processing worker travel. The number of seafood processor related trips in and out of the City of King Cove is not expected to increase under any of the alternatives, nor is the number of trips expected to increase over time. Processing crew members are assumed to be transported to and from the Northeast Terminal via a commercial van for hire, carrying 8 passengers on average at a cost per passenger of $15.28 (Table 4.2-6).

Table 4.5-4 Processing Crew Transportation in Alternative 4

	Travel and Cost Under Alternative 4		
	Hovercraft	Air	All Modes
Estimated one-way processing crew trips per year	508	1,492	2,000
Cost on primary mode ($ 2010)	76.00	98.00	--
Total cost on primary travel mode ($ 2010)	38,608	146,216	184,824
Additional cost of ground vehicle travel[1] ($ 2010)	7,760	12,060	19,820
Total cost of travel on all modes ($ 2010)	**46,368**	**158,276**	**204,644**
Total cost per passenger ($ 2010)	**91.28**	**106.08**	**--**

Note: Compiled from ground, hovercraft, and air passengers and costs presented in Tables 4.2-4 through 4.2-7
[1]Travel to and from the City King Cove to hovercraft terminal or airport
Source: NEI 2012

Seafood company managers and technicians, as well as fishing crews and fishery observers, would likely continue to travel by air between the communities of King Cove and Cold Bay on days when air service is available because of the speed and convenience of air travel.

Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 4 are shown for 2016 in Table 4.5-5. In 2016, resident and other non-fishery related trips are projected to increase to 1,001.

Table 4.5-5 Resident and Other Non-Fishery Transportation in Alternative 4

	Travel and Cost Under Alternative 4		
	Hovercraft	Air	Both Modes
Estimated one-way resident & non-fishery trips per year	1,001	2,733	3,734
Average one-way cost on primary mode ($ 2010)	76.00	98.00	--
Total cost on primary travel mode ($ 2010)	76,076	267,843	343,919
Additional cost of ground vehicle travel [1] ($ 2010)	27,327	19,132	46,459
Total cost of travel on all modes ($ 2010)	**103,403**	**286,975**	**390,378**
Total cost per passenger ($ 2010)	**103.30**	**105.00**	**--**

Note: Compiled from ground, hovercraft, and air passengers and costs presented in Tables 4.2-4 through 4.2-7
[1]Travel to and from the City of King Cove to hovercraft terminals or airport.
Source: NEI 2012

Employment Effects

Two crews of 3 persons each would be required for operating the hovercraft, which would be based at the Northeast Terminal under Alternative 4. In addition, 2 other full time jobs may be needed. One job would be a manager to handle the accounting and promotion of hovercraft services; the other job would support hovercraft operations (engineering, etc.). It would be likely that non-residents would move to the community to fill these positions if local residents do not have the necessary skills, licenses, and certifications. In the long-term, it is anticipated the jobs would be filled by local residents of the 2 communities.

As indicated in the estimation of travel costs, the location of the hovercraft terminal (12.5 miles beyond Lenard Harbor) would likely create a demand for taxi drivers and shuttle drivers. An estimated 9 to 17 total direct jobs would be created in the transportation sector including the jobs operating the hovercraft.

The IMPLAN software package was used to estimate the indirect and induced jobs created as the direct spending flows through the economy. IMPLAN estimates that for every $1 million spent in water transportation services, an additional 1.25 indirect and induced jobs are created in the local area (the communities of King Cove and Cold Bay). Given the estimated $2.4 million in annual operating expenses for Alternative 4 (see Chapter 2), approximately 2 to 3 indirect and induced jobs would result from the alternative. IMPLAN data also indicate 0.78 indirect and induced jobs per $1 million dollars spent for air taxi services and 1.11 indirect and induced jobs per $1 million dollars spent in vehicle based transportation.

The sum of the direct jobs with the indirect and induced jobs yields the estimated total employment impact in the range of 12 to 20 jobs under this alternative. This is less than 10 percent of the total number of jobs in the cities of King Cove and Cold Bay.

Population and Demographics Effects

No effects on population would be expected if the new positions created under Alternative 4 would be filled by permanent residents. If the total additional jobs were filled by nonresidents, then the alternative could lead to an increase in population of 34 to 56 people, assuming the average household size of 2.8 persons in the City of King Cove. The hovercraft pilot jobs are skilled positions that require certification and licensing. These positions would be filled initially by non-residents, but residents could eventually obtain the necessary training and certification to fill the position. The other jobs could be filled by residents. Therefore, the population impact would likely be at the lower end of the range described above and would represent less than 5 percent of the current population in the City of King Cove.

Fiscal Impacts to Local Governments

It is assumed that capital costs of the hovercraft and related equipment and facilities ($10.9 million) would be paid by federal grants. Based on prior hovercraft operations described in Chapter 3, this alternative may result in about $2.2 million of annual losses to any potential operator. It is assumed that neither the Aleutians East Borough nor any other local government will be the hovercraft operator. Therefore, there would be no fiscal impact of Alternative 4 on local governments.

Summary

Alternative 4 would have negligible socioeconomic effects to the cities of King Cove and Cold Bay based on estimated changes to employment, economic activity in transportation, and population. Transportation costs between the cities would continue in excess of $100 per passenger trip, including ground travel costs. An operator would need to subsidize the hovercraft at roughly $2.2 million annually; the subsidy rate would move slightly lower over time as travel by hovercraft increases with population (and assuming costs and ticket prices remain constant in real terms). Alternative 4 would result in few to no fiscal effects to local governments.

Mitigation Measures

The acquisition of additional outside funding could mitigate shortfalls in operating revenue [Fares, Subsidies, and Additional Revenue (MM-S)]. Efforts could also be made to increase cargo revenue and recover medical charter costs.

Cumulative Effects

Socioeconomic conditions in the project area, including effects from past actions, are described in Chapter 3 and in the assumptions for analysis (Section 4.1.4). The reasonably foreseeable implementation of North Pacific Fishery Management Council regulations would likely increase by 10 the number of observers in the Gulf of Alaska groundfish and halibut fisheries coming through the City of King Cove. Each observer would stay in group quarters at Peter Pan for an average of 2 months during the course of the year. In arriving and leaving, these observers would generate 20 additional person trips per year in any travel mode. These additional trips would have a negligible contribution to cumulative effects on socioeconomic indicators.

Conclusion

Under Alternative 4, consumer transportation costs would be essentially the same as current costs; each trip between King Cove and Cold Bay would be reduced by less than $2.00 per trip. Effects to employment, population, and demographics would be permanent with an estimated increase of 13 to 21 new jobs. There would be few effects to any other socioeconomic indicators. No fiscal effects to local governments would be anticipated under this alternative; however, the hovercraft operator would need to subsidize a loss of about $2.2 million annually.

The direct and indirect effects to transportation costs (to the user), employment, and population and demographics would be negligible, as would effects to fiscal resources for local government. Effects to these indicators would be of low intensity (affecting less than a 5 percent change in social indicators) in the communities of King Cove and Cold Bay (regional extent, affecting two or more communities). The context for the socioeconomic environment is considered unique, as the communities are classified as minority and low income communities. The duration of effects would be considered permanent, lasting for the life of the project. The contribution to cumulative effects on socioeconomic indicators would be negligible for all factors. The overall effect on socioeconomic indicators would be negligible (beneficial) due to the low intensity of estimated impacts.

4.5.3.3 Transportation

Direct Effects and Indirect Effects from Construction

No new construction would be associated with this alternative other than what has already been authorized by the 2003 EIS Record of Decision and subsequent permits. Though construction of the hovercraft hangar at the Northeast Terminal has been suspended (Lundell and Croghan 2012), it is assumed for this alternative that facilities would be in place at the time of implementation, as authorized in the 2003 EIS. Alternative 4 would involve hovercraft operations between the Northeast Terminal and Cross Wind Cove year round, 6 days a week. Wave and wind conditions at the Northeast Terminal site could improve hovercraft operability over that experienced in Lenard Harbor. Service would be implemented in 2013.

Summary

No new construction would be associated with this alternative other than what has already been authorized or permitted. Therefore, Alternative 4 would have no direct or indirect effects from construction.

Direct Effects and Indirect Effects from Operation and Maintenance

Hovercraft operations in Alternative 4 would involve year round service, 6 days a week. Hovercraft and air taxi operating costs, ridership, and fares would remain at $76 (2009/2010 levels). Restrictions for surface transportation through the Izembek National Wildlife Refuge and Izembek Wilderness would remain as present, as outlined in Chapter 3. The capacity for emergency responses would increase with a 6-day-a week annual schedule, as discussed in Section 4.5.3.4, Public Health and Safety. Operating conditions may improve at this location, although by how much is unknown.

The lifecycle cost over 35 years is estimated at $52.8 million, with passenger revenues recovering about 7 percent of the cost. This represents a major budget shortfall for the operator of the hovercraft service. In the shorter term, without considering replacement of the hovercraft after its useful life, an operator would face a projected shortfall of about $2.2 million dollars a year. For the purposes of this analysis, operating costs include maintenance of the access road from King Cove Airport. Though the road maintenance cost (about $316,800 annually) is included in total operating costs, it would not necessarily be assigned to or funded by the hovercraft operator.

Adding in the cost of ground transportation to the new hovercraft terminal, the cost to the consumer would be about $104, similar to that of air travel (Table 4.2-9). The travel time is an important parameter for comparison of alternatives, because it affects the time that an emergency response could be conducted. It also may influence trip displacements among transportation modes and could be weighed by residents as importantly as cost. Assuming average operable weather, the hovercraft trip is approximately 83 minutes from the City of King Cove to the Cold Bay Airport, including road travel (Table 4.2-8).

Previous estimates on hovercraft operating revenues assumed that potential cargo and mail contracts would contribute to revenue. However, from 2007 to 2010, efforts to attract additional hovercraft revenue via cargo and mail contracts were not realized.

Under this alternative, it is assumed that air taxi passengers to and from the Cold Bay Airport would decline by displacement of passengers to the hovercraft, as shown in Table 4.5-6. However, some passengers would still use air taxis and air freight would still be transported between King Cove and Cold Bay. While demand for air travel would decline during this time, overall travel demand would increase slightly with the projected increase in the population of the City of King Cove. By 2020, hovercraft passengers in the Alternative 4 scenario are estimated at 1,573 annually and air taxi passengers at 4,616. It is assumed that trips to the Cold Bay Airport using the hovercraft would double to that of 2007 to 2010 levels, despite similar challenges of weather-related cancellations.

Table 4.5-6 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 4

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Alternative 4 Hovercraft 6 x a week 2013									
Air Taxi Passengers	4,550	4,557	4,565	4,575	4,585	4,596	4,606	4,616	4,650
Hovercraft	1,551	1,553	1,555	1,559	1,563	1,566	1,570	1,573	1,584

Source: NEI 2012.

Trips to the King Cove Airport or to the Northeast Terminal would not be anticipated to change traffic levels on City of King Cove roads.

Emergency medical charters using the hovercraft have historically taken place, as described in Section 4.5.3.4, Public Health and Safety. Since Alternative 4 includes a full time hovercraft weekly crew and staff, this level of service could provide for on-call, year round emergency transportation. Some startup time would likely be involved in preparing the hovercraft for an unscheduled emergency evacuation.

Summary

Based on the historical statistics associated with hovercraft operations, Alternative 4 would incur annual operating cost shortfalls of roughly $2.2 million for the hovercraft operator. The 35-year life cycle cost is estimated at about $52.8 million. While operations would be increased to year round, weather conditions and operability limitations of hovercraft would still constrain service and the ability to provide timely emergency evacuation services. Alternative 4 would provide another form of transportation, besides air, to and from the Cold Bay Airport, operating 6 days per week. It also provides for 4 full time, year round jobs. The direct and indirect impacts of this alternative would be medium magnitude; an additional mode of transportation would be provided from the City of King Cove to access the Cold Bay Airport. Service would be available on a scheduled basis only, subject to operating limitations. Impacts would be of long-term duration by the addition of another mode of year round transportation for the life of the project. Impacts would have a regional extent within the Cold Bay region, providing service between the communities of King Cove and Cold Bay.

Mitigation Measures

Mitigation measures for Alternative 4 (hovercraft) would continue as previously permitted. No additional mitigation measures are identified.

Cumulative Effects

Additional fishery observers operating out of King Cove would slightly increase demand for travel between the King Cove and Cold Bay communities. Scheduled operation of the hovercraft 6 days per week would provide a full time transportation link for the region, which would benefit about 1,600 passengers per year. The contribution to cumulative effects would include an annual $2.2 million subsidy for an operator. Alternative 4 would have a moderate (indeterminate) cumulative effect to transportation due to fiscal impacts and the addition of a regional transportation link.

Conclusion

Operation of the hovercraft on a 6-times-per-week schedule would add a year round transportation choice for transit to the Cold Bay Airport, and provide a year round opportunity for emergency trips. However, the annual shortfall between revenue and operating cost is roughly a $2.2 million fiscal burden for an operator. Reliability may be improved over the Lenard Harbor location, but it could still be problematic given other operation limitations of the hovercraft.

The impacts of this alternative would be medium magnitude; an additional mode of transportation would be provided from the City of King Cove to access the Cold Bay Airport. Service would be available on a scheduled basis only, subject to operating limitations. Impacts would be of long-term duration by the addition of another mode of year round transportation for the life of the project. Impacts would have a regional extent within the Cold Bay region, providing service between the communities of King Cove and Cold Bay. The overall impact of Alternative 4 on transportation is considered moderate (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.5.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

Alternative 4 would have no new construction beyond what was authorized in the 2003 EIS and subsequent permits, so no direct or indirect effects on public health and safety would occur.

Summary

No direct or indirect impacts to public health and safety from construction because would occur as no construction is necessary in this alternative.

Direct Effects and Indirect Effects from Operation and Maintenance

The Aleutians East Borough suspended service of the Suna X hovercraft in 2010. After modifications to the hovercraft were completed, it was redeployed in Akutan in 2012. The operation and maintenance phase for this alternative involves a hovercraft, operating from the Northeast Terminal. The primary indicators for public health and safety directly impacted by Alternative 4 are related to safe, available, reliable, and affordable transportation to facilities with medical care not available to the King Cove community, including for emergency medical evacuations.

Under Alternative 4, a new hovercraft would have regular scheduled trips for 6 days a week year round and would be available for emergency medical evacuations 24 hours a day, 7 days a week year round. Operation and maintenance of Alternative 4 would have a direct effect on public health and safety of persons throughout the project area who may need medical care not available in the City of King Cove (including emergency medical evacuations from the King Cove Health Clinic) and for persons who might assist in the medical evacuation transportation. Because the hovercraft would have regular scheduled trips for 6 days a week and would operate year round, persons in the City of King Cove who have specialized medical needs would have more opportunities to travel to the Cold Bay Airport. The trip to the Cold Bay Airport would take approximately 83 minutes and would include a 21.6 mile drive from the King Cove Clinic to the hovercraft terminal and a 1.1 mile drive from the Cross Wind Cove hovercraft terminal to Cold Bay Airport, as shown in Table 4.2-5.

Alternative 4 would directly benefit public health (e.g., for non-emergency and emergency patients needing to travel to the Cold Bay Airport) and public safety (e.g., for those who transport patients during medical evacuations). Alternative 4 would increase the availability of transportation to needed medical services as compared to current (baseline) conditions. The beneficial impacts would last as long as the hovercraft was in operation and would have the potential to impact persons throughout the EIS project area. If Alternative 4 was implemented, other current types of medical evacuation transportation would still be available on a limited basis. Persons in the King Cove community would benefit from the availability of the hovercraft for transportation year round, but would not be precluded from using the other forms of medical evacuation transport. Depending on the weather, and the availability of the various modes of transportation, the best mode of transportation (hovercraft, other type of boat, plane, and helicopter) could be selected for each specific medical evacuation incident. Alternative 4 would primarily affect the City of King Cove, which meets the definition of a minority community and medically underserved area.

Conditions where it is not possible to complete medical evacuations via a hovercraft would still occur. Operational reliability of the hovercraft is affected by the availability of trained crew to operate the vessel and by periodic maintenance delays. Some weather conditions are too adverse to travel by hovercraft. For example, as the Suna X operated previously, there were 56 “not in service days” for the hovercraft during the period of July 1, 2008, through June 30, 2009, due to adverse weather (42 days), scheduled maintenance (3 days), unscheduled maintenance (1 day), facilities repairs (4 days), holidays (3 days), and minimum crew not available (3 days) (AEB 2010b). Under Alternative 4, access to advanced medical services could still be unavailable during extended periods of inclement weather that prevent marine and air travel.

Alternative 4 requires maintenance of the 21.6 mile access road from the King Cove Clinic to the hovercraft terminal. Maintenance would include signage, regular grading, and snow removal, and these actions could directly impact public safety if workers are injured. Further, emergency and non-emergency medical evacuation trips to and from the King Cove Clinic and the Northeast Terminal could increase the number of motor vehicle accidents in the King Cove community beyond current levels.

As discussed in Chapter 3, residents of the City of King Cove have indicated that the current lack of safe and reliable transportation to needed medical services affects their quality of life by affecting their peace of mind, particularly during extended periods of inclement weather that prevent marine and air travel. They have stated that they experience a lack of control and independence in their lives because current transport to needed medical services depends on numerous factors that are beyond their control. Alternative 4 would alleviate some, but not all, of these concerns by offering a year round option for medical evacuation (hovercraft), but one that is still subject to weather operability, crew availability, and routine maintenance.

Summary

The direct effects of the operation and maintenance phase of Alternative 4 on public health and safety would be based on operational reliability of the hovercraft, which is affected by the availability of trained crew, periodic maintenance delays and weather conditions. The availability of a year-round additional transportation option for medical care would alleviate some of the concerns expressed by residents.

Beneficial direct effects of Alternative 4 on public health and safety would be medium in intensity, with a measurable increase in scheduled service to access the Cold Bay Airport with connections to advanced medical facilities. Effects would be long-term in duration, with service lasting for the life of the project. The effects would be regional in geographic extent, with service affecting the communities of King Cove and Cold Bay, which are unique in context (minority or low income communities and a medically underserved area). The direct effects of the operation and maintenance phase of Alternative 4 on public health and safety would be considered major (beneficial).

Mitigation Measures

Alternative 4 would not require mitigation measures for public health and safety, other than continuation of established practices. The primary mitigation measures for Alternative 4 are safety restrictions on normal operation of the hovercraft to seas that are below 6 feet and winds that are below 30 knots per hour. Regular maintenance and increased availability of a trained crew to operate the vessel could help reduce the number of days per year that the hovercraft is unavailable [Hovercraft Operations and Maintenance (MM-Y)].

Cumulative Effects

Past and present actions affecting public health and safety are described in Chapter 3 (Section 3.3.4). No reasonably foreseeable future actions would affect public health and safety. Alternative 4 would have a moderate (beneficial) contribution to cumulative effects on public health and safety. This alternative would supplement existing air transport, maximizing opportunity for emergency travel.

Conclusion

No direct or indirect impacts to public health and safety from construction would occur because no construction is necessary in this alternative. Alternative 4 would provide an increased availability of transportation to needed medical services for the King Cove community as compared to current (baseline, No Action) conditions. Regular maintenance and increased availability of a trained crew to operate the vessel could help reduce the number of days per year that the hovercraft is unavailable. Adhering to safety restrictions on hovercraft travel could help mitigate the potential for accidents.

Effects of Alternative 4 on public health and safety would be medium in intensity, with a measurable increase in scheduled service to access the Cold Bay Airport with connections to advanced medical facilities. Effects would be long-term in duration, with service lasting for the life of the project. The effects would be regional in geographic extent, with service affecting the communities of King Cove and Cold Bay, which are unique in context (minority or low income communities and a medically underserved area). The effects of implementation of Alternative 4 on public health and safety would be considered major (beneficial).

4.5.3.5 Environmental Justice

Direct Effects and Indirect Effects from Construction

Alternative 4 has no associated construction, beyond what was authorized in the 2003 EIS and subsequent permits.

Summary

No construction will occur under Alternative 4.

Direct Effects and Indirect Effects from Operation and Maintenance

The hovercraft would operate 6 days a week, year round, from the Northeast Terminal. The direct effects of the operation and maintenance phase of Alternative 4 on public health and safety would be based on operational reliability of the hovercraft, which is affected by the availability of trained crew, periodic maintenance delays, and weather conditions.

Alternative 4 would not provide new access to subsistence resources, distribution of, or competition for subsistence resources.

Summary

Operation and maintenance associated with Alternative 4 would have direct and indirect effects on human health by an increase in reliability. Operation and maintenance of Alternative 4 would not affect subsistence access.

Mitigation Measures

Mitigation measures associated with Alternative 4 include safety restrictions on normal operation of the hovercraft, regular maintenance, and increased availability of a trained crew to operate the vessel to reduce the number of days per year that the hovercraft is unavailable [Hovercraft Operations and Maintenance (MM-Y)]. No new mitigation measures are recommended for this alternative.

Cumulative Effects

Alternative 4 would increase the availability of transportation to medical services as compared to current (baseline) conditions. The contribution of Alternative 4 to cumulative effects on public health would be moderate. Implementation of Alternative 4 would make a minor contribution to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources.

Conclusion

Alternative 4 would provide an increased availability of transportation to needed medical services for the King Cove community as compared to current conditions and would have a minor impact on subsistence resources or activities. Alternative 4 would have no disproportionate adverse impact to minority or low-income communities.

4.5.3.6 Public Use

Direct Effects and Indirect Effects from Construction

Under Alternative 4, there would be no construction and therefore no impacts to public use would result from construction activities.

Summary

Under Alternative 4, there would be no construction and therefore no impacts to public use would result from construction activities.

Direct Effects and Indirect Effects from Operation and Maintenance

A land exchange would not take place and public use of existing parcels would remain the same. The conveyance of King Cove Corporation's ANSCA selection of 5,430 acres on the east side of Kinzarof Lagoon would likely occur, making these acres no longer available for public use without permission from King Cove Corporation.

Summary

The only effect of Alternative 4 on public use would be conveyance of 5,430 acres to King Cove Corporation of selected lands in Izembek Wilderness that could displace the low level of public use in the area. Impact duration would be permanent.

The direct and indirect impacts of this alternative could be low in magnitude because the conveyance of selected lands in Izembek Wilderness would displace the low level of public use in the area. Impact duration would be permanent with the change in land ownership, and would have a local extent, affecting a discrete portion of the project area. The impacts would affect land resources and associated public uses that are common in context since the right to select this parcel pre-dates the establishment of Izembek Wilderness. Thus, the impact of Alternative 4 on public use would be considered minor.

Mitigation Measures

Although this alternative could result in a minor change in public use (associated with the conveyance of selected lands to King Cove Corporation), no mitigation measures are recommended. Future uses of the land would be subject to Section 22(g) of ANCSA.

Cumulative Effects

The direct and indirect impacts of Alternative 4 are considered minor, due to the low levels of use on the selected parcel. Relevant past actions include the enactment of ANILCA that designated wilderness areas throughout the state, including the Izembek Wilderness. No present or reasonably foreseeable future actions would induce additional changes to public use in the vicinity. Consequently, the contribution of Alternative 4 to cumulative effects on public use is considered negligible.

Conclusion

Alternative 4 could have minor impacts to public use, due to the conveyance of the selected parcel to King Cove Corporation. Future use of the parcel would be subject to the requirements of Section 22(g) of ANCSA. Future public uses of the parcels would be subject to authorization by the private land owner.

4.5.3.7 Subsistence

Direct Effects and Indirect Effects from Construction

Alternative 4 would provide hovercraft service. It would not require additional facilities or ground disturbing activities beyond what was authorized in the 2003 EIS and subsequent permits. As with Alternative 1, conveyance of the King Cove Corporation selected lands would result in minor indirect effects (see Section 4.2.3.7).

Direct Effects and Indirect Effects from Operation and Maintenance

Effects on Subsistence Resources

The hovercraft terminals would be operated in subsistence use areas for waterfowl, salmon, and other marine fish, as shown in Figure 3.3-23 for the community of King Cove, Figure 3.3-24 for the community of Cold Bay, and Figure 3.3-25 for the Community of False Pass (as recorded in the 1980s). The hovercraft would transit between the Northeast Terminal and Cross Wind Cove on the west side of Cold Bay. Neither terminal is located in a concentrated waterfowl subsistence use area. Operation of the hovercraft could displace subsistence resources in a limited area, thus affecting resource availability to subsistence harvesters in the immediate area of the terminal. Bird, marine, and terrestrial subsistence resources could be displaced temporarily in the vicinity of the operating hovercraft. Increases in transportation activities along the access road to the Northeast Terminal are considered part of the existing conditions, as noted in the analysis of Alternative 1. Under Alternative 4, the hovercraft would operate 6 days per week throughout the year and so some increase in traffic to the Northeast Terminal would occur. This could result in minor new effects on resource availability (resource displacement or contamination concerns). Road maintenance activities would be limited to snow removal and grading and are unlikely to displace subsistence resources longer than the duration of the specific maintenance activity. Impacts to the availability of subsistence resources in the terminal areas and along the access road would be low in intensity (perceptible), temporary (intermittent disturbance during hovercraft operation periods), local (discrete portions of the study area) to regional (throughout the study area) in extent, and common to important in context. The resources that are important in context include migratory waterfowl.

Effects on Access to Subsistence Resources

Under Alternative 4, access to subsistence resources would not be restricted and could be beneficially affected by operation and maintenance of road access to the Northeast Terminal year round. Alternative 4 would provide opportunities for continued subsistence uses by local residents of the King Cove, Cold Bay, False Pass and Sand Point communities. Road access to the Northeast Terminal was described as an existing condition under Alternative 1, so no change in road access results from Alternative 4.

Increased Competition for Subsistence Resources

For the purposes of this analysis, it is assumed that operation of the hovercraft and maintenance of the associated roads to the terminals would be performed by residents of the Aleutians East Borough and nearby communities. Hovercraft operations under Alternative 4 are not expected to result in an increase in commercial and sport harvest to such an extent that subsistence uses by community residents of King Cove, Cold Bay, False Pass, and Sand Point would be restricted.

Alternative 4 could increase the presence of subsistence users near the Northeast Terminal. As with Alternative 1, subsistence hunters from the community of King Cove would have road access through the Delta Creek Valley and along eastern Cold Bay to harvest subsistence resources, and conveyance of the 5,430 acre selected parcel to King Cove Corporation would enable the corporation to restrict access on the land to non-shareholders and reduce competition for subsistence resources on the parcel.

It is expected that other traditional boat transportation from King Cove to concentrated subsistence use areas in western and northern Cold Bay would be unaffected. The impacts of increased competition for subsistence resources, including migratory waterfowl, would be low in intensity (perceptible), long-term (extending up to the life of the project), local (discrete portions of the study area) to regional (throughout the study area) in extent, and affecting resources that are common to important in context**.** The resources that are important in context include the migratory waterfowl.

Summary

Impacts to subsistence from operation of the hovercraft and year round road access to the Northeast Terminal would include displacement of subsistence resources, and increased subsistence uses in that area. These impacts would be of low intensity, long-term duration, local to regional in extent and affect resources that are common in context. The impact of operation and maintenance activities to subsistence under Alternative 4 would be considered minor.

Mitigation Measures

No mitigation measures are proposed for subsistence.

Cumulative Effects

Past and ongoing actions related to subsistence are described in Chapter 3 (Section 3.3.7). No reasonably foreseeable future actions would affect subsistence use and resources in the project area, except for the possible displacement of non-subsistence users that currently use the parcel to be conveyed to King Cove Corporation. Alternative 4 would make a minor contribution to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources.

Conclusion

Implementation of Alternative 4 would have minor direct and indirect effects on subsistence; this alternative would make a minor contribution to cumulative effects on subsistence.

4.5.3.8 Cultural Resources

Direct Effects and Indirect Effects from Construction

Under Alternative 4, no construction would occur. Therefore, no direct or indirect effects on cultural resources from construction activities would occur.

Summary

Alternative 4 would have no effects on cultural resources, since no construction would occur.

Direct Effects and Indirect Effects from Operation and Maintenance

No direct or indirect effects on cultural resources from operation and maintenance would occur under Alternative 4.

Summary

No operation or maintenance-related impacts to cultural resources would be expected under Alternative 4.

Mitigation Measures

No mitigation measures for cultural resources would be required under Alternative 4.

Cumulative Effects

Alternative 4 would have no contribution to cumulative impacts on cultural resources.

Conclusion

Alternative 4 would have no direct, indirect, or cumulative effect on cultural resources in the project area.

4.5.3.9 Visual Resources

Direct Effects and Indirect Effects from Construction

Implementation of Alternative 4 would not require construction beyond what has already been authorized by the 2003 EIS Record of Decision and subsequent permits. Consequently, no impacts to visual resources are expected to result from construction-related activities.

Summary

Visual resources would not be impacted by implementation of Alternative 4.

Direct Effects and Indirect Effects from Operation and Maintenance

No direct effects to visual resources are expected as a result of implementation of Alternative 4. Conveyance of the 5,430 acre selected parcel could lead to development activities, subject to the provisions of ANCSA Section 22(g); however, no development plans have been identified. Operation of the hovercraft would introduce weak visual contrast to the surrounding landscape. Movement of the hovercraft across Cold Bay would be noticeable; however, periods where the vessel was in view would be episodic and transient. The 6 days a week schedule is expected to be consistent with the landscape character of the communities of King Cove and Cold Bay, and the current use of Cold Bay. No reduction in scenic quality for any administrative area is expected as a result of implementation of Alternative 4.

Beneficial indirect effects to visual resources may be realized as a result of increased visual access to views of Cold Bay. It is expected that consistent use of the hovercraft, combined with the associated roadway and hovercraft terminal would change the landscape character of the surrounding communities of Cold Bay and King Cove and would afford additional views of Cold Bay and the surrounding landscape. Indirect impacts to visual resources would be low intensity (perceptible changes in visual condition) and long-term in duration (lasting the life of the project), but in a local area (limited to geographically discrete portions of the project area) and affecting resources that are common in context (visual resources that are not protected by legislation and are not rare in the locality).

Summary

No direct effects to visual resources would be expected in Alternative 4. Indirect effects to visual resources would be minor (indeterminate), which would include additional views of Cold Bay and the surrounding landscape from the hovercraft, and changes in visual resources associated with the conveyance of selected lands to King Cove Corporation.

Mitigation Measures

No mitigation measures for visual resources are proposed under Alternative 4.

Cumulative Effects

Cumulative effects would be similar to those described in Alternative 1 (Section 4.2.3.9); however, Alternative 4 is also expected to result in indirect impacts to visual resources, as it is expected that consistent use of the hovercraft, combined with the associated roadway and hovercraft terminal, would change the landscape character of the surrounding communities of

Cold Bay and King Cove and would afford additional views of Cold Bay and the surrounding landscape. Alternative 4 would have a minor (indeterminate) contribution to cumulative effects on visual resources.

Conclusion

Direct and indirect impacts to visual resources due to the implementation of Alternative 4 would be low intensity (perceptible changes in visual condition) and long-term in duration (lasting the life of the project), but in a local area (limited to geographically discrete portions of the project area)and affecting resources that are common in context (visual resources that are not protected by legislation and are not rare in the locality). Alternative 4 would have a minor (indeterminate) contribution to cumulative effects on visual resources. The impact of Alternative 4 on visual resources is considered minor (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.5.3.10 Wilderness

Direct Effects and Indirect Effects

Under Alternative 4, no land exchange would take place among the Service, the State of Alaska, and King Cove Corporation. Approximately 5,430 acres of King Cove Corporation selected lands could be withdrawn from the Izembek National Wildlife Refuge and conveyed to the King Cove Corporation, subject to the provisions of ANCSA Section 22(g). The selected parcel would continue to be designated as wilderness by the Service until conveyance. Upon conveyance, the parcel would be subject to potential development under the terms of ANCSA 22(g); however, there are no future plans identified for development. This parcel is located on the east side of Cold Bay, at the edge of the Izembek Wilderness. The right to select this parcel pre-dates the establishment of Izembek Wilderness.

The hovercraft service would operate 6 days per week, 1 round trip per day, year round. Alternative 4 would affect the solitude or primitive and unconfined recreation quality of wilderness character. Visitors within the Izembek Wilderness would experience an increase in intermittent noise or visual disturbances in localized areas, through the sights and sounds of vehicles traveling to the Northeast Terminal from the City of King Cove. These long-term visual and noise disturbances would persist through the life of the project. There would be impacts to wilderness character through the alteration of views and soundscapes. However, when selected lands are transferred to the King Cove Corporation, noise and visual disturbance from the vicinity of the Northeast Terminal could be reduced in Izembek Wilderness, as the wilderness boundary would become more distant from that location.

Summary

Under Alternative 4, the parcel selected by King Cove Corporation within Izembek Wilderness would continue to be designated as wilderness by the Service until conveyance. The parcel would be subject to potential development, under the terms of ANCSA Section 22(g), but there are no known plans for development at this time.

The implementation of Alternative 4 would have no direct and indirect impacts to the untrammeled quality and natural quality of wilderness character, minor direct and indirect impacts to the undeveloped quality resulting from increased access opportunities to the wilderness, and some impacts to the solitude or primitive and unconfined recreation quality, primarily due to the long-term alteration of the views and soundscapes at localized areas within Izembek Wilderness. The context of the Izembek Wilderness is considered unique. The direct and indirect impacts to wilderness character resulting from Alternative 4 would be minor to moderate.

Mitigation Measures

Mitigation measures for Alternative 4 (hovercraft) would continue as previously permitted.

Cumulative Effects

Past, present, and reasonably foreseeable future actions that could contribute to cumulative effects to wilderness character within Izembek Wilderness are discussed under Alternative 1 (Section 4.2.3.10). The construction of the road to the Northeast Terminal could increase unauthorized use of motor vehicles within Izembek Wilderness, potentially creating low intensity, long-term, localized impacts to a unique resource.

The hovercraft operations proposed under Alternative 4 would intensify localized noise disturbance to visitors within Izembek Wilderness. Alternative 4 would have a moderate contribution to cumulative effects on wilderness character within Izembek Wilderness.

Conclusion

Due to the unique context of the Izembek Wilderness (land are protected by legislation and managed for wilderness characteristics; the isthmus area fills a unique ecosystem role in the locality), the direct and indirect impacts to wilderness character resulting from Alternative 4 would be considered minor to moderate. The duration of impacts to the soundscape resulting from hovercraft or vehicle operations to users within Izembek Wilderness would be long-term, due to the intermittent episodes (hovercraft operation periods) occurring over the life of the project. The intensity would be medium, with changes to wilderness character detectable to wilderness visitors, particularly in the vicinity of the Northeast Terminal. The extent of impacts would be local, affecting site-specific locations within the wilderness, particularly in the vicinity of the Northeast Terminal. The impact of Alternative 4 on wilderness character within Izembek Wilderness is considered minor to moderate.

4.6 Alternative 5 – Lenard Harbor Ferry with Cold Bay Dock Improvement

4.6.1 Physical Environment

4.6.1.1 Air Quality

Direct Effects and Indirect Effects from Construction

The construction associated with Alternative 5 includes construction of the Lenard Harbor ferry terminal, which is estimated to have an approximate 2-acre footprint. As with Alternatives 2 and 3, this type of construction would create both combustion emissions from equipment and fugitive dust emissions for ground-disturbing activities. Modifications to the existing Cold Bay dock would also create combustion emissions from equipment; however, most of this work would occur near or over water, and would not be a source of fugitive dust.

The construction at the terminal and dock is expected to be completed in 1 to 2 years. To maximize annual emissions estimates, the 1-year construction period is conservatively used in this analysis (all emissions occur in 12 months). Estimates of emissions are based on general equipment specifications and use assumptions for the construction needs of this alternative. The equipment and operation is based on the full 12 months of construction, 22 days per month, and 8 hours per day. To be conservative, it is assumed that the equipment considered will be used for the entirety of the construction period. As with the construction emission estimates for Alternatives 2 and 3, equipment specifications and emission rates are based on data from the California Air Resources Board (California Air Resources Board 2011a,b), with the assumption that emission factors for equipment and vehicles in Alaska will not have as stringent emission requirements (limits) as those in California. Further, and to be more conservative, emission factors for the equipment and vehicles used for the construction of Alternative 5 are also assumed to be double those used by the California Air Resources Board.

Table 4.6-1 shows the emission estimates for the individual combustion equipment, the fugitive dust emissions described above, and the total predicted annual emissions associated with the construction of this alternative. These are considered to be directly related to project construction and have the potential to effect air quality in the vicinity of the specific construction activity. Indirect project activities, such as rock crushing operations or the use of roadways to transport construction materials and equipment, could also affect air quality. Such activities would be temporary and are expected to have minimal emissions not likely to exceed direct construction emissions.

Summary

The direct and indirect emissions of air pollutants during construction are expected to have short-term (24-hour or less) and localized effects on air quality. Over the period of construction emissions of air pollutants are expected to be less than the estimated annual emissions that would result from operation and maintenance of the ferry (see Section 4.3.1.2 for more details). These emissions would be spread out over the route from the Lenard Harbor Ferry terminal to the Cold Bay Dock. Therefore, the construction would have only a minor effect on air quality.

Table 4.6-1 Estimated Emission Rates for Alternative 5 Construction Activities

Construction Equipment	Hours/ Day	Number of Units	Estimated Pollutant Emission Rates													
			NOx		CO		SO2		PM10		PM2.5		VOC		CO_2e	
			Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy	Unit lb/hr	Total tpy
Diesel Construction Equipment																
Crane (120 horsepower)	4	2	1.31	1.38	0.74	0.79	0.001	0.001	0.12	0.13	0.11	0.12	0.22	0.24	101	106
Forklift (175 horsepower)	2	1	0.72	0.19	0.45	0.12	0.001	0.0002	0.07	0.02	0.07	0.02	0.13	0.03	62.6	16.5
Compactor (120 horsepower)	1	1	1.48	0.16	0.83	0.09	0.001	0.0001	0.13	0.01	0.12	0.01	0.24	0.03	118	12.4
Backhoe/ Loader (120 horsepower)	1	1	1.13	0.12	0.72	0.08	0.001	0.0001	0.10	0.01	0.09	0.01	0.18	0.02	104	10.9
Vehicles with On Road Engines																
Pickup Truck	2	1	0.002	0.0004	0.02	0.01	0.00004	0.00001	0.0003	0.0001	0.0002	0.0001	0.001	0.0004	4.10	1.06
Delivery Trucks	2	2	0.12	0.06	0.06	0.03	0.0001	0.00007	0.008	0.004	0.007	0.004	0.03	0.02	14.0	7.36
Worker Vehicles	1	10	0.02	0.002	0.03	0.02	0.0001	0.00004	0.001	0.0003	0.0004	0.0003	0.002	0.001	6.65	4.26
Dump/Concrete Truck	2	1	0.12	0.03	0.06	0.02	0.0001	0.00003	0.008	0.002	0.007	0.002	0.03	0.009	14.0	3.68
Fugitive Dust																
Heavy Construction				--		--		--		2.88		0.29		--		--
TOTAL (tons per year)				**1.94**		**1.14**		**0.002**		**3.06**		**0.45**		**0.34**		**162**

NOTES:

Pollutants: NOx - nitrogen oxides; CO – carbon monoxide; SO2 – sulfur dioxide; PM10 – particulate matter less than 10 micrometers in diameter; PM2.5 - particulate matter less than 2.5 micrometers in diameter; VOC – volatile organic compounds; CO_2e – carbon dioxide equivalents.

Construction equipment assumed for typical construction activity.

Unit Hours per Day estimated based on typical load factors for construction equipment and vehicle use over an 8 hour day.

Number of Units based on best estimate for construction project of this size over 12 month time frame.

Unit pound per hour (lb/hr) emission rates conservatively assumed to be double (2x) California Air Resources Board OFFROAD Mobile Source Emission Factors for diesel equipment (2010 data) and EMFAC2007 model for on road vehicles (with assumed mileage based on road construction project). (California Air Resources Board 2011a,b)

Total Tons per Year (tpy) emission rates based on Unit lb/hr rate times operating hours. Construction expected to occur for 8 hours per day, 22 days per month, and 12 months per year.

CO_2e is assumed to be composed of the following GHG components: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emission factors are equal to the sum of each of these components times their individual Global Warming Potential (GWP) factors. The GWP for these are: CO_2 = 1; CH_4 = 21; and N_2O = 310 (EPA 2009b).

Fugitive Dust emissions based on the emission factor of 1.2 tons/acre/month for total suspended particulate (EPA 1995), with a factor of 0.1 applied to account for ratio of PM10 to total suspended particulate, construction activities occurring for 22 days per month (as opposed to 30), and the local climate conditions (relatively wet as compared to the semi-arid conditions that the emission factor is based on). The annual rate is determined from the total project area of 2 acres under construction for the entire 12 month period.

Emissions of PM2.5 estimated to be 10 percent of PM10 emissions based on gravel road emission ratio estimates (EPA 2006b, Table 13.2.2-2).

Due to rounding, the total tpy may differ slightly from the sum of the individual tpy emission rates.

Direct Effects and Indirect Effects from Operation and Maintenance

Emissions during ferry operations and maintenance would be from fuel combustion in the ferry vessel's engines during normal operations. Estimates of combustion emissions are based on emission factors for similar-sized engines using standard EPA factors, along with the expected operation of 6 round trips per week throughout the year. Table 4.6-2 shows the direct emission estimates for the ferry operations. Indirectly, activities such as passenger and employee travel to and from the ferry terminals, could affect air quality, as could increased development on either end of the ferry route. Due to the relatively low use and generally low population of the area, indirect effects on air quality are expected to be negligible.

Summary

The source of emissions from the operation and maintenance of the ferry would be mobile and would occur across a relatively large area (approximately 14 miles over water). The direct effects on air quality from the operation and maintenance of the ferry are expected to be minor, although they would be reoccurring over the long-term. Indirect effects on air quality are expected to be negligible and reoccurring over the long-term. They would stem from vehicles and development at the terminal and dock and along the access roads.

Mitigation Measures

Due to the predicted minor effects on air quality, no mitigation measures would be required for Alternative 5.

Cumulative Effects

Activities that have the potential to emit air pollution in the area around the ferry operations (boat traffic, aircraft passes, and vehicles, for example) are already included in the background, or ambient air, which is expected to meet air quality standards (see Section 3.1.1). Past, present, and reasonably foreseeable future actions affecting air quality in or adjacent to the EIS project are few; they are described under Alternative 1 in Section 4.2.1.1. The increased demand for transit to the City of King Cove because of the expansion of the North Pacific Groundfish Observer Program would likely be served by air or ferry. The contribution of this alternative to cumulative effects is considered to be negligible.

Conclusion

Alternative 5 would have minor direct effects on air quality in the immediate vicinity of the ferry. In relation to Alternative 1, the air emissions under Alternative 5 would be a new incremental effect. The total estimated annual emissions would consist of small emission sources, operating intermittently, and spread out over a relatively large area. Indirect and cumulative effects would be negligible.

Table 4.6-2 Estimated Air Pollutant Emission Rates for Alternative 5 Operations and Maintenance Activities

Source/Activity	Usage	Emission Rates (tons per year)						
		NOx	CO	SO2	PM10	PM2.5	VOC	CO_2e
FERRY								
Main Propulsion Engine (1200 horsepower)	9,435 MMBtu/yr	15.1	4.01	0.007	0.27	0.27	0.39	779
Service Power Engine (200 horsepower)	1,572 MMBtu/yr	3.47	0.75	0.23	0.24	0.24	0.28	129
TOTAL (tons per year)		**18.6**	**4.76**	**0.24**	**0.51**	**0.51**	**0.67**	**908**

NOTES:

Pollutants: NOx - nitrogen oxides; CO – carbon monoxide; SO2 – sulfur dioxide; PM10 – particulate matter less than 10 micrometers in diameter; PM2.5 - particulate matter less than 2.5 micrometers in diameter; VOC – volatile organic compounds; CO_2e – carbon dioxide equivalents.

Ferry engine sizes estimated from vessels of similar sizing; assume Caterpillar Model 3508B (1200 brake horsepower) or similar (Caterpillar 2011).

Usage value for combustion emissions for ferry operations (Alternative 5) based on project description: Estimated annual travel is 6 times per week year round (52 weeks), or 312 round trips, with a one-way trip time of 108 minutes. Assume brake-specific fuel consumption rate of 7,000 British Thermal Units per horsepower-hour (Btu/hp-hr) for diesel fuel.

Fuel combustion emission factors for engines greater than 600 horsepower (ferry engine; non-service power) in lb/MMBtu are from EPA 1996b, Tables 3.4-1 and 3.4-2. Assume use of ultra low sulfur diesel with sulfur content of 0.0015 percent, by weight. Assume PM2.5=PM10.

Fuel combustion emission factors for engines less than 600 horsepower (smaller service power engines) in lb/MMBtu are from EPA 1996a, Table 3.3-1. Assume PM2.5=PM10.

CO_2e is assumed to be composed of the following GHG components: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emission factors are equal to the sum of each of these components times their individual Global Warming Potential (GWP) factors. The GWP for these are: CO_2 = 1; CH_4 = 21; and N_2O = 310 (EPA 2009b). Emissions of N_2O are assumed negligible for diesel engines.

Due to rounding, the total tpy may differ slightly from the sum of the individual tpy emission rates.

4.6.1.2 Climate

Direct Effects and Indirect Effects from Construction

Construction activity associated with Alternative 5 would include construction of the ferry terminal, modifications to the Cold Bay dock, and purchase/fabrication of the vessel, which would involve heavy machinery. The amount of greenhouse gases emitted during construction of Alternative 5 is estimated to be 162 tons for a period of 1 year (See Section 4.6.1.1 for more detail on the calculations), which is less than 0.01 percent of the State of Alaska's estimated total greenhouse gas emissions from the industrial sector during 2010 (CCS 2007). The magnitude of impacts from construction would be low because the construction phase would only involve short-term emissions and the size of the construction project is relatively small. However, once greenhouse gases are emitted they combine with other gases in the atmosphere and they persist for a long time.

Summary

Overall construction-related effects to climate change associated with Alternative 5 are considered negligible because the emission amounts are low compared to overall industrial emissions in Alaska.

Direct Effects and Indirect Effects from Operation and Maintenance

Effects to climate change as a result of Alternative 5 would stem from greenhouse gas emissions from trips between the communities of Cold Bay and King Cove. Sources of direct greenhouse gas emissions under Alternative 5 would include all of the transportation modes used in Alternative 1 plus a ferry that would make 6 round trips per week, year round. Sources of indirect greenhouse gas emissions would be the use of vehicles traveling to and from the ferry terminals.

Effects of global climate change could, over time, affect the transportation operations included in Alternative 5. Changes to storm intensity and frequency would have the largest effect on transportation. If storms increase in frequency and intensity, the safety of airplane, boat, and ferry transportation could be threatened.

Alternative 5 would contribute approximately 908 tons per year of carbon dioxide equivalent, which is more than Alternatives 2 and 3, but 1,137 tons per year less than Alternative 4 (Table 4.6-3). When compared at the state level, it would contribute to approximately 0.04 percent of the State of Alaska's estimated emissions from marine vessels and 0.01 percent of the total transportation emissions in 2010 (CCS 2007). This amount is not expected to be perceptible.

Table 4.6-3 Summary of Greenhouse Gas Emissions for Alternative 5

Activity	Frequency	Estimated Annual Emissions of Carbon Dioxide Equivalent (tons/year)
Ferry for Alternative 5	6 round trips/week, year round	908
Total		**908**

Note: Refer to Section 4.6.1.1 for complete details and assumptions regarding emissions calculations.

Summary

Although climate change effects are considered to be long-term, and cover a broad geographic extent, the overall direct and indirect effects of Alternative 5 would be negligible because the amount of emissions is so low compared to total transportation emissions across the state of Alaska.

Mitigation Measures

The impacts to climate from Alternative 5 are expected to be negligible, so no mitigation measures are proposed.

Cumulative Effects

Past, present, and reasonably foreseeable future actions affecting climate change are the same as Alternative 1 (see Section 4.2.1.2). Due to the extended amount of time that greenhouse gases remain in the atmosphere, any amount of greenhouse gas emissions can be reasonably expected to contribute to future climate change impacts. Alternative 5 would directly emit approximately 908 tons of carbon dioxide per year, which is 1,137 tons per year less than Alternative 4 but more than the road alternatives. This roughly equals the average annual carbon dioxide emissions from approximately 188 U.S. passenger cars (EPA 2007). Although the amount of carbon dioxide is measurable, on a global scale, annual emissions from 188 U.S. passenger cars is a negligible amount to global cumulative effects to climate change.

Conclusion

Alternative 5 is expected to have negligible direct effects due to the level of emissions (908 tons), although the emissions would be present long-term and over a broad geographic extent. In relation to Alternative 1, the greenhouse gas emissions under Alternative 5 would be a new incremental effect. Global climate change effects currently have a high enough intensity that perceptible changes around the globe have occurred (see Section 4.2.1.2). However, when compared to other global actions, Alternative 5 is expected to have a negligible contribution to cumulative effects. The overall contribution of Alternative 5 to climate change would be negligible.

4.6.1.3 Geology and Soils

Direct Effects and Indirect Effects from Construction

Alternative 5 would include the use of a ferry to travel 14 miles between a terminal at Lenard Harbor and a substantially modified Cold Bay dock. This alternative would include construction activities at the Lenard Harbor terminal and improvements to the existing Cold Bay dock that would disturb approximately 0.4 acre of wetland soils and an estimated 0.2 acre of state owned submerged soils (tidelands). Dredging and pile driving would occur at the Lenard Harbor ferry terminal and at the Cold Bay dock. This activity would disturb submerged sediments by displacement in the immediate location of the pile and by disruption of the sediment profile nearby. In addition, construction of a temporary barge landing and staging area at the Lenard Harbor site would include the placement of fill material over less than 0.1 acre of wetland soils and 0.1 acre of state owned tidelands adjacent to the construction area footprint. Direct impact from construction activities and disturbance of vegetation at these sites would expose new soil and rock, causing some soil erosion from channelization of runoff.

Potential direct and indirect effects to soil could also arise from an uncontained release of fuel or other hazardous materials. Pollution from oil and other hazardous substances are regulated by the Alaska Department of Environmental Conservation in accordance with Alaska Administrative Code, Title 18, Chapter 75, Oil and Other Hazardous Substances Pollution Control (18 AAC 75) (ADEC 2008). The risk and impact of an uncontained release is reviewed in Section 4.6.1.5 as are the measures to reduce this risk.

Similar to construction activities under Alternatives 2 and 3, indirect effects to other resources would result from using rock with a high concentration of sulfide minerals to fill wetlands as would placing the rock at the water surface. This action could propagate the generation of acid rock drainage which in turn would impact the quality of the water bodies in which the rock would be placed. Since the actual type of rock planned for use during construction is not known, precautionary measures should be conducted to determine the usability of the geologic resource.

Summary

Direct effects of construction would include the disturbance of less than 1 acre of soils. Effects to soils from construction would be permanent and highly localized. Indirectly, project activities would have the potential to release fuel or other hazardous materials into soils and substrates during the construction process. With implementation of mitigation measures, effects from construction would be minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance of the ferry between Lenard Harbor and Cold Bay dock would have no direct or indirect effects on geology and soil resources. During operations, no suspension of sediments in marine waters would be expected, including at the terminal and dock.

Summary

Operation and maintenance of Alternative 5 would have no direct or indirect effects on geology or soil resources.

Mitigation Measures

Erosion of soil disturbed during construction of the ferry terminal facility would be controlled by mitigation measures described in an Erosion and Sediment Control Plan (MM-A) and Storm Water Pollution Prevention Plan (MM-B). Follow-up Geotechnical Studies (MM-F) should be conducted to evaluate the intensity and extent of potential ground failure from an earthquake at the Lenard Harbor ferry terminal site and identify necessary engineering controls to abate the potential for catastrophic ground failure.

Cumulative Effects

Cumulative effects would include past, present, and reasonably foreseeable future actions discussed under Alternative 1. Construction activities would result in negligible incremental additions to cumulative effects on less than 1 acre at the Lenard Harbor site beyond those addressed and analyzed in the 2003 EIS.

Conclusion

Soils would be permanently disturbed at highly localized sites at the Lenard Harbor terminal and Cold Bay dock, and construction would have no effect on geologic resources. The overall effect would be minor. Operation and maintenance of the ferry would have no effects on geologic resources and soils.

4.6.1.4 Hydrology/Hydrologic Processes

Direct Effects and Indirect Effects from Construction

There would be no land exchange as part of this alternative. Construction would be limited to less than 1 acre: replacing the Lenard Harbor terminal structure, upgrading the parking area and security fencing, and making major modifications to the Cold Bay dock. Construction activities within Alternative 5 would have negligible effects on hydrologic processes within the project area.

The construction staging areas at Lenard Harbor and near the Cold Bay dock would involve barge landings at established sites. Pile driving would occur at the Cold Bay dock. This activity would disturb and displace submerged sediments thereby increasing the turbidity concentration near those areas during construction. Barges would be stationed at the staging areas, but only temporarily and with no substantial change to water quality or water resources. Increases in turbidity near shore would increase during mobilization of the barge in shallow areas, but would likely be of very short duration. Supplies would be offloaded from barges using methods to prevent fuel spills. These impacts were considered and analyzed in the 2003 EIS.

Direct impacts on water resources and water quality as a result of Alternative 5 construction activities would be highly localized and would include the off-loading of equipment and supplies from barges at the staging areas. These impacts were considered and analyzed in the 2003 EIS.

Summary

Direct and indirect effects on hydrologic process resulting from construction would be negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect impacts to water resources or water quality due to potential fuel and sewage releases may occur under Alternative 5 during ferry operations. The extent of the effects would be limited to those portions of Cold Bay at the docking locations and along the preferred routes of travel used by the ferry vessel. These impacts were considered and analyzed in the 2003 EIS. Direct and indirect effects from operation and maintenance of the ferry could also include effects from hazardous materials that could occur from the uncontrolled release of fuel, battery acid, or hydraulic fluid, from vehicles at the Lenard Harbor ferry terminal, similar to the effects from uncontrolled releases discussed under Alternative 2. The ferry would be refueled over water at the Cold Bay dock which presents the greater risk of a fuel spill into marine waters. No fuel would be stored at Lenard Harbor.

Summary

Direct and indirect effects on hydrologic processes from operation and maintenance of the ferry would be negligible with implementation of the mitigation measures identified.

Mitigation Measures

Mitigation measures for the construction of Alternative 5 would be the same as described for Alternative 2. Mitigation measures for operation and maintenance would be the same as described for Alternative 4.

Cumulative Effects

Alternative 5 would result in negligible incremental additions to cumulative effects on water resources, water quality, and hydrologic processes within Cold Bay. Reasonably foreseeable future actions in the immediate vicinity include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air or marine vessels. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway which would have a direct effect on hydrology in that local area. No other reasonably foreseeable future actions are in the immediate vicinity that would affect hydrology or hydrologic processes.

Conclusion

Effects to water resources and water quality related to the implementation of Alternative 5 would be negligible. The greatest threats to water quality include an increase in turbidity due to dredging and pile driving activities at the Lenard Harbor ferry terminal, modifications at the Cold Bay dock, and refueling the ferry in open water at the Cold Bay dock. No fuel would be stored at the Lenard Harbor terminal.

4.6.1.5 Hazardous Materials

Direct Effects and Indirect Effects from Construction

Under Alternative 5, the land exchange would not be implemented; thus no direct or indirect impacts regarding the transfer of responsibility of contaminated sites documented within lands proposed for exchange would result. Direct and indirect effects to hazardous materials and waste management handling associated with activities of Alternative 5 were considered and analyzed in the 2003 EIS. Fuel storage would involve 500-gallon to 2,000-gallon aboveground tanks at the ferry terminal and dock and a truck would be used for fuel deliveries (USACE 2003). Documented contamination of bottom sediments near the Cold Bay dock would require further evaluation of the nature and extent of the contamination prior to implementation of construction activities. These sediments could be dispersed during construction activities if precautions are not put in place in advance of construction activities. No contamination was reported at the Lenard Harbor ferry terminal site (USACE 2003).

Summary

Construction activities associated with Alternative 5 would have negligible direct and indirect effects from hazardous materials. The localized dispersal of contaminated sediments could occur during construction activities at the Cold Bay dock, but would be mitigated through advanced assessment, construction planning, and best management practices.

Direct Effects and Indirect Effects from Operation and Maintenance

Alternative 5 would include the use of a ferry to travel 14 miles between a terminal at Lenard Harbor and a substantially modified Cold Bay dock. No contamination was found in sediments from the Lenard Harbor ferry terminal. Bottom sediments at the Cold Bay dock were found to contain concentrations of lead and polynuclear aromatic hydrocarbon compounds (USACE 2003). During operations, no re-suspension of the contaminated sediments in marine waters would be expected. However, further evaluation of the nature and extent of contamination should be conducted prior to construction and operation activities. Results from the evaluation may suggest remedial actions to remove the contaminated materials from the area near the Cold Bay dock.

The ferry would be refueled over water at the Cold Bay dock, which would present a risk of a fuel spill; no fuel would be stored at Lenard Harbor. Operations and maintenance of the ferry under Alternative 5 could also result in the uncontrolled release of hazardous materials such as fuel, battery acid, or hydraulic fluid, from vehicles at the Lenard Harbor ferry terminal or equipment at the Cold Bay dock. Such occurrences could be mitigated by plans for hazardous material handling and clean-up, employee training, and best management practices. Uncontrolled releases could also occur as a result of an accident, such as a grounding or collision, which would have the potential to be more catastrophic and extend beyond “preferred routes” or the docking areas. However, the likelihood of such an event is low, comparable to the probability for spills from fishing vessels and the Alaska Marine Ferry that travels these waters, and such occurrences could also be mitigated by plans for hazardous material handling and clean-up, employee training, and best management practices.

Summary

Alternative 5 would have negligible direct and indirect effects on hazardous materials. Mitigation measures should reduce effects in the event of a fuel spill occur,

Mitigation Measures

Mitigation measures for the construction of Alternative 5 would be the same as described for Alternative 2. Mitigation measures for operation and maintenance would be the same as described for Alternative 4.

Cumulative Effects

Cumulative effects would include past, present, and reasonably foreseeable future actions discussed under Alternative 1. Reasonably foreseeable future actions include the new North Pacific Fishery Management Council regulations for increased observers in the Gulf of Alaska, which could cause a negligible increase in demand for travel to the City of King Cove, via air or existing marine vessels, but should not affect the management of hazardous materials. The Cold Bay Airport Runway Safety Area project includes an upgrade to the existing runway, which should also not have an effect on hazardous materials. No other reasonably foreseeable future actions are in the immediate vicinity that would affect the management of hazardous materials. The effects of operating and maintain a ferry between Lenard Harbor and the Cold Bay dock would be addressed in a hazardous materials and petroleum product control plan, and would produce negligible contributions to cumulative effects, should such service be initiated. Negligible incremental additions to cumulative effects would be a result of construction activities on less than 1 acre at the Lenard Harbor site beyond those addressed and analyzed in the 2003 EIS.

Conclusion

Implementing Alternative 5 would have negligible direct and indirect effects to hazardous materials and waste management handling. Potential effects under routine operations would be temporary and localized. Fuel spills would be a low probability event.

4.6.1.6 Noise

Direct Effects and Indirect Effects from Construction

The construction associated with Alternative 5 includes modifications to the Lenard Harbor ferry terminal. As with Alternatives 2 and 3, this type of construction would create elevated noise levels due to equipment. Modifications to the existing Cold Bay dock would also create increased noise levels from equipment. The determination of construction noise levels is based on the same methodology that was used for Alternatives 2 and 3 construction activities. Although this includes the use of FHWA's model for road construction, the model includes similar equipment to that expected for the terminal and dock construction activities (mainly an outdoor structure using large construction equipment).

The construction at the terminal and dock is expected to be completed in 1 to 2 years. A conservative assumption for construction operations and equipment was made for the air quality analysis (see Section 4.6.1.1). For the noise analysis, the sound levels emitted from equipment in an immediate area would be applicable for assessing the highest expected noise levels. For this, it is assumed that the following equipment would be operating simultaneously for the construction at either the new terminal or the existing Cold Bay dock: 1 crane, 1 compactor, 1 backhoe/loader, 1 pick-up truck, 1 delivery truck (assume flatbed), 2 worker vehicles, and 1 dump/concrete truck. Actual equipment usage at any specific time would likely be less than this. Due to the high impact noise value of an impact pile driver, this equipment was also added in for the noise analysis. Construction is only expected to occur during daylight hours. Although other equipment may be used during construction, they are not included in this analysis.

The assumed minimum construction zone is 200 feet from the construction activity; this would be the distance to any potential nearby (public) receptor. At this distance, the noise level from the modeled equipment would have the equivalent sound level (L_{eq}) of 82.5 dBA, primarily due to the impact pile driver. Without the pile driver, the noise level would drop to an equivalent sound level (L_{eq}) of 69.7 dBA. Compared to existing noise levels of approximately 50 dBA (see Section 3.1.6), the construction activities for Alternative 5 would have a moderate, temporary effect on noise (with or without pile driving) and would occur in the immediate vicinity of construction activities.

Indirect effects of construction would be increases in noise by the use of other resources such as transport construction equipment on existing roadways. These activities, and their associated noise, would also be temporary. Increased use of existing roads would likely produce negligible increases to existing noise levels, and the noise would occur at different locations than the actual construction activities.

Summary

The direct and indirect effects on noise from the construction of Alternative 5 are expected to be moderate. Effects would be at a high intensity, due to potential noise generating equipment and operations. These effects would occur only during the actual construction (temporary duration), and in the immediate vicinity of the construction activity. Some additional noise would be generated from the transport of equipment to and from the construction site, and these effects would be negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

The 2003 EIS provided information on ferry noise indicating that noise levels from ferry operations would be lower than those for a hovercraft. There is no specific noise data available for the types of ferry which may be operating at the sites associated with this project. The exterior noise level limit imposed by the State of Alaska for their Fast Vehicle Ferry is 60 dBA at 1,000 feet with engines developing their maximum fast ferry power rating (The Glosten Associates 2002), or 74 dBA at 200 feet. For comparison, the predicted noise level for the BHT-150 hovercraft is 68 dBA at 1,000 feet. This analysis includes estimates at both 1,000 feet and 200 feet for comparative purposes to other marine noise analyses and the road alternatives in this EIS

Noise levels from ferry operations are assumed to be the same as for the hovercraft operations outlined in Alternative 4. Noise generated by the ferry's operation would be localized and long-term. As with the increase in hovercraft operations in Alternative 4, the ferry operations in this alternative are not new to the Cold Bay dock area, but rather an increase in service. Therefore, the noise levels for the Cold Bay dock area would be no greater than those already existing, as the noise levels do not accumulate over days. The noise levels for the Lenard Harbor Ferry Terminal area would be an additional noise effect.

Indirect effects of this alternative may include increased use of other resources, such as additional travel (including to and from the ferry terminals) and other activities which may have an effect on noise, such as increased development on either end of the ferry route. Due to the relatively low use and generally low population of the area, indirect effects on the noise environment are expected to be negligible.

Underwater noise was discussed in the 2003 EIS. Ambient underwater noise levels in a relatively quiet low wave energy environment typically range from 106 dB to 115 dB. Underwater noise levels from common conventional vessels range 116 dB to 146 dB at a distance of 50 feet (Hunt 2007) and decrease to 106 dB to 136 dB at a distance of 500 feet. Thus, at a distance of 500 feet, underwater noise from the ferry is anticipated to be within the range of ambient underwater noise levels at the lower operational noise levels and could potentially exceed ambient conditions at higher operational noise levels. Underwater noise effects are highly localized and the impacts would be negligible.

Summary

Alternative 5 would consist of intermittent episodes of noise, occurring over the life of the project, spread out over a relatively large area. As a result, Alternative 5 would have a negligible direct effect on the noise environment.

Mitigation Measures

Due to the predicted minor effects on the noise environment, no mitigation measures are expected for Alternative 5.

Cumulative Effects

Noise-generating activities in the area around the ferry operations (boat traffic, aircraft passes, and vehicles, for example) are already included in the background, or ambient, noise levels identified in Section 3.1.6. Past, present, and reasonably foreseeable future actions that could affect the noise environment are described in Alternative 1. Alternative 5 would have a negligible contribution to cumulative effects on noise.

Conclusion

Alternative 5 would result in negligible direct and indirect effects on noise in the project area. Noise would consist of intermittent episodes, occurring over the life of the project, spread out over a relatively large area. In relation to Alternative 1, the noise from Alternative 5 would be a new incremental effect. There would a negligible contribution to cumulative effects on noise. The overall effect of Alternative 5 on noise would be negligible.

4.6.2 Biological Environment

4.6.2.1 Terrestrial and Aquatic Plant Communities

Direct Effects and Indirect Effects from Construction

Construction activities associated with Alternative 5 would include disturbing less than 1 acre of native shoreline plant communities, including a gravelly vegetated bench at Lenard Harbor. Seagrass patches occur in the head of the harbor, but none were observed at the terminal site, and therefore no impact to seagrass from this alternative is expected. No impact to rare plant species is anticipated as none are known to occur in the Alternative 5 construction sites. No impacts are expected due to improvements at Cold Bay dock.

As in Alternative 1, approximately 5,430 acres of King Cove Corporation selected lands could be withdrawn from the Izembek National Wildlife Refuge and conveyed to the King Cove Corporation, subject to the provisions of ANCSA Section 22(g). Any indirect effect of potential development on the selected lands would likely be low in intensity (no such development projects are reasonably foreseeable), the extent would be local because it would be confined to the King Cove Corporation parcel, the duration is unknown but likely permanent, and the affecting resources are also unknown but can be assumed to be common in context (resources not rare in the locality and is not protected by legislation). Therefore the indirect effect on terrestrial and aquatic plant communities from the land exchange would be minor.

Summary

The direct and indirect effects from construction would be the loss of less than 1 acre of native shoreline plant communities. Alternative 5 would contribute minor indirect effects to terrestrial and aquatic plant communities from the conveyance of the King Cove Corporation selected lands. Any indirect effect of potential development on the selected lands would likely be low in intensity (no such development projects are reasonably foreseeable), the extent would be local because it would be confined to the King Cove Corporation parcel, the duration is unknown but possibly permanent, and the affecting resources are also unknown but can be assumed to be common in context (resources not rare in the locality and is not protected by legislation). Therefore the indirect effect on terrestrial and aquatic plant communities from the land exchange would be minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance of the ferry terminal at Lenard Harbor and the Cold Bay dock may have indirect effects on vegetation. Invasive species are located in the community of Cold Bay and are also likely present in the community of King Cove. These species may be transported to new locations by operation of the ferry. The extent of this impact is likely less than in the road alternatives.

Summary

The operation of the Lenard Harbor Ferry may aid in the spread of invasive species in the Izembek National Wildlife Refuge vicinity. Therefore, the intensity of this effect would be medium because the presence of invasive species would be observable, the duration would be permanent because these invasive species would remain even if the ferry operations were to be discontinued, and the extent local (near the ferry terminal and along the road to King Cove) for this common resource. Therefore, the direct and indirect effect to vegetation from implementation of Alternative 5 would be minor.

Mitigation Measures

An Invasive Species Management Plan (MM-K) is recommended to limit the spread of non-native plant species, and pre-construction Rare Plant Surveys (MM-J) should be conducted to determine if any rare plant species occur within the construction footprint.

Cumulative Effects

Past actions include impacts to vegetation through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. The completion of the King Cove Access Project (USACE 2003) also contributes to effects to vegetation. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect vegetation.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. Shrub vegetation, coupled with a harsh climate and slow rates of recovery for soils and vegetation, predispose the area to erosion, and this in turn could cause the degradation of terrestrial habitats.

New direct effects resulting from Alternative 5 is the loss of less than 1 acre of native shoreline plant communities. Indirect effects could include the transportation of invasive species to new locations by operation of the ferry. Approximately 5,430 acres of lands on the King Cove Corporation selected parcel could be conveyed from the Izembek National Wildlife Refuge. Therefore, implementation of Alternative 5 would have a minor contribution to cumulative effects to vegetation.

Conclusion

Implementation of Alternative 5 would have no direct effects to terrestrial and aquatic plant communities. However, indirect effects could include the conveyance of King Cove Corporation selected lands and the spread of invasive species from increased human and vehicle transportation due to ferry service. Indirect effects to vegetation would be medium in intensity because the change resource condition would be observable (presence of invasive species), permanent in duration because these species would continue to exist in the area even if ferry operations were discontinued, local in extent (within the vicinity of the ferry terminal and along the road to King Cove, and common in context (resources not rare in the locality and not protected by legislation). The summary impact of Alternative 5 on terrestrial and aquatic plant communities would be considered minor. Implementing an invasive species management plan would assist to manage impacts to terrestrial and aquatic plant communities.

4.6.2.2 Wetlands

Wetlands are critical components of the landscape within the project area. Refer to Table 3.2-7 and Section 3.2.2.4 for an overview of wetland functions.

Under Alternative 5, a ferry would travel 14 miles between a terminal at Lenard Harbor and a substantially modified Cold Bay dock.

Direct Effects and Indirect Effects from the Land Exchange

Under Alternative 5, no land exchange would be conducted. However, approximately 5,430 acres of King Cove Corporation selected lands (containing approximately 1,917 acres of wetlands) could be withdrawn from the Izembek Wilderness and conveyed to the King Cove Corporation. Although these lands are subject to the provisions of ANCSA 22(g), which limits development impacts on the adjacent Izembek National Wildlife Refuge lands, the King Cove Corporation would have the right to develop its lands, including wetlands. While there is potential for development of the King Cove Corporation selected lands, subject to provisions of ANCSA Section 22(g), no such development plans are reasonably foreseeable.

Direct Effects and Indirect Effects from Construction

Construction activities associated with Alternative 5 would include the placement of 1,250 cubic yards of fill material in 0.4 acre of beach system wetland at the Lenard Harbor Ferry Terminal site, and 1,250 cubic yards of fill in 0.2 acre of state owned tidelands. The temporary barge landing and staging area at the Lenard Harbor site would include the placement of 560 cubic yards of temporary fill material in less than 0.1 acre of beach system wetland and 1,000 cubic feet of fill in approximately 0.1 acre of state owned tideland that was not within the footprint of the previously permitted area. Further, this alternative would require the potential excavation of 80 cubic yards of materials from approximately 0.1 acre of lowland wet low sedge/scrub wetland at the Lenard Harbor material site.

As described in Chapter 3, coastal sedge marsh wetlands function in sediment stabilization along shorelines because dense sedge roots and leaves serve to bind and shelter the sediments against the erosive forces of wind-generated waves. These sites provide high primary productivity because of their dense sedge vegetation. Rates of decomposition and associated nutrient cycling may be somewhat slow in these wetlands as shown by the accumulation of organic matter beneath new sedge growth. However, the coastal sedge marshes likely export substantial amounts of organic carbon directly into nearby water bodies.

By providing a diverse environment of wetland, open water, and upland areas within close proximity to each other, coastal sedge marshes have substantial wildlife use. The variety of habitat types allows wildlife to exist without having to expend extra energy traveling long distances to feed or rest. Passerines and waterfowl may use the diverse habitat for resting and cover, nesting, and feeding. It is likely that these wetlands provide mammal habitat for feeding and cover as well as travel corridors. Coastal sedge marshes may support a great diversity and abundance of wildlife, since it is an element of a diverse shoreline complex.

Summary

The direct effects from construction would be the loss of hydrologic, biogeochemical, and habitat wetland functions on less than 1 acre of beach system wetlands. This would be a high intensity (change would be noticeable), permanent (fill would persist beyond the life of the project), and local (less than 1 acre) effect to a common resource (resources not rare in the locality and is not protected by legislation). This wetland is not within the Ramsar designated area. The effects to wetlands from construction of Alternative 5 would therefore be minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance of the ferry terminal at Lenard Harbor and the Cold Bay dock would have no direct or indirect effects on wetlands.

Summary

Operation and maintenance of Alternative 5 would have no direct or indirect effects on wetlands.

Mitigation Measures

The mitigation measure Mitigation of Wetland Loss (MM-L) will identify best management practices to be described on Corps and Alaska Department of Fish and Game permits to allow for depositing fill into wetlands for project construction.

Cumulative Effects

Past actions include impacts to wetlands through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. The completion of the King Cove Access Project (USACE 2003) also contributes to effects to wetlands. Approximately 6 acres of low sedge and herbaceous meadow wetland have been filled along the segment from King Cove Airport to Lenard Harbor, and 3 acres of depression wetlands were filled at the Northeast Terminal site. The remainder of the project, which consists of a 12-mile long, 14-foot wide access road from the Lenard Harbor site to the Northeast Terminal site (currently under construction), will fill an additional 11 acres of primarily lowland wet sedge meadow wetland. However, as a mitigation measure for wetlands altered by the King Cove Access Project, King Cove Corporation donated 11.9 acres of high value wetlands at the entrance of Kinzarof Lagoon to the United States, which were designated as Special Aquatic Sites under 40 CFR 230.40-A, and are now part of the Izembek Wilderness.

The result of implementing Alternative 5 would include the additional loss of wetlands or wetland functions on less than 1 acre of beach system wetlands. Also, approximately 1,917 acres of wetlands on the King Cove Corporation selected parcel would be conveyed from the Izembek Wilderness. Alternative 5 would have a minor contribution to cumulative effects on wetlands.

Conclusion

Direct effects to wetlands due to implementation of Alternative 5 would be high in intensity (change would be noticeable), permanent (fill would persist beyond the life of the project), and local (less than 1 acre) effect to a common resource (resources not rare in the locality and is not protected by legislation). This beach system wetland (less than 1 acre affected) is not within the

Ramsar designated area. The effects to wetlands from construction of Alternative 5 would therefore be minor.

Conveyance of the King Cove Corporation selected lands could have a minor indirect effect on wetlands. The duration of the impacts would be permanent, the extent would be local, and the context would be common. There would be a minor contribution to cumulative effects on wetlands. The summary impact of Alternative 5 on wetland resources would be considered minor.

4.6.2.3 Fish and Essential Fish Habitat

Alternative 5 would operate regular ferry service from Lenard Harbor to the City of Cold Bay. The ferry would make a single round-trip 6 days a week, year round, and would be available for emergency evacuations. This alternative would use existing or permitted roads and therefore would not result in new effects on freshwater or anadromous fish or Essential Fish Habitat. The analysis below focuses on marine resources.

Direct Effects and Indirect Effects from the Land Exchange

There would be no land exchange for the purpose of constructing and operating a road between the communities of King Cove and Cold Bay. However, the King Cove Corporation selected lands would be conveyed from the Service to the King Cove Corporation. This action would not affect fish and Essential Fish Habitat and is not discussed further.

Direct Effects and Indirect Effects from Construction

The implementation of Alternative 5 would require the construction of a ferry terminal at Lenard Harbor and the modification of the existing Cold Bay dock. The Lenard Harbor ferry terminal construction would require less than 0.1 acres of disturbed land below mean low low water and 600 cubic yards of fill. The Cold Bay dock modifications would not result in new construction below the water line (other than piles). Therefore, effects on Essential Fish Habitat would be negligible. Construction would initially result in a loss of habitat from piles driven into the seafloor. Incidental mortality of some slow moving invertebrates, such as sea urchins, sea stars, bivalves and crab, could occur during pile driving, but would be limited in scope. Noise generated by pile driving could also temporarily displace marine resources. Once construction was completed, it is anticipated the area would be quickly recolonized by nearby sea life, resulting in no net loss of habitat.

It is unlikely that Essential Fish Habitat would be affected in the vicinity of the Lenard Harbor terminal. The location of the Lenard Harbor ferry terminal is not ideal habitat for flatfish, sculpins, or Atka mackerel. Juvenile walleye pollock and Pacific cod may be found in the area, but would only be temporarily displaced during construction. Once complete, the dock may provide additional habitat for adult pollock and cod.

Summary

Effects from the construction activities described in Alternative 5 would be of low intensity (would not noticeably alter the resource) and would be temporary for the Cold Bay Dock site and permanent for the less than 0.1 acre at the Lenard Harbor ferry terminal. Effects would be, localized at each site and although the resource is unique because of its Essential Fish Habitat status, the recolonization by nearby sea life would result in no net loss of habitat. The direct and indirect effects on fish resources from construction under Alternative 5 would therefore be negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

The operation of a ferry would add regular vessel traffic to the marine environment of Cold Bay. The ferry would operate for 6 round trips a week between Lenard Harbor and Cold Bay, and would be available for emergency medical evacuations 24 hours per day, 7 days per week.

Anticipated direct effects resulting from Alternative 5 would be disturbance from noise and pollution from vessel traffic. A ferry could interact with juvenile or larval fish through direct contact. Larval and juvenile groundfish feeding in very shallow surface waters, such as pollock, cod, and mackerel, would also be susceptible to intermittent noise disturbance from the passing ferry. The slow speed of the vessel and the regular use of this area by other vessels would suggest that these effects would be negligible, as area fish resources are already accustomed to such disturbances. The infrequent number of scheduled ferry trips, combined with the small number of unique emergency trips, would add an insignificant amount of impact in an area already accustomed to regular vessel traffic. Ferry operations in Lenard Harbor could displace sculpins temporarily during docking and departure. Although these activities would occur intermittently, sculpins could be prevented from nesting in the immediate dock area. Effects would be negligible.

Personal and medical evacuation transport on other marine vessels, such as private fishing vessels, would occur less frequently under Alternative 5 than they currently do, as the ferry would be a more regular mode of transportation.

Oil, sewage, or other contaminant leaks from ferry operations are possible and could affect small numbers of fish depending on the location and magnitude of the spill, and the prevailing winds. Under normal operations including proper safety procedures, the risk of a spill is small.

Summary

Effects from the operation and maintenance of a ferry from Cold Bay to Lenard Harbor outlined in Alternative 5 would be low intensity (no noticeable change in fish resources), long-term duration (intermittent but persistent throughout the life of the project) local in extent for a unique resource (Essential Fish Habitat). The slow speed of the vessel and the regular use of this area by other vessels would suggest that these effects would be negligible, as area fish resources are already accustomed to such disturbances. Therefore, the direct and indirect effects from operation and maintenance under Alternative 5 would be negligible.

Mitigation Measures

The following mitigation measures having potential for reducing adverse impacts resulting from vessel traffic on fish include:

- The creation and implementation of a Fuel Handling and Spill Response Plan (MM-D) to reduce the risk of fuel spills, and enable faster and more efficient response should a spill occur. Spill response supplies adequate in type and quantity for the equipment being used shall be onsite and readily accessible at all times.

Cumulative Effects

The completion of the King Cove Access Project (USACE 2003) would also contribute to effects on essential fish habitat. New routes made by all-terrain vehicles into the Izembek Wilderness from the newly constructed Northeast Terminal site have recently been documented (Sowl 2011f). It is likely, based on documented use trends, that all-terrain vehicle use could increase in this area (illegal and legal) thus having the potential to affect fish habitat.

Aerial photography of current use shows scarring of the landscape by all-terrain vehicle trails, and as use progresses, these trails have widened, developed rutting, mud holes, parallel tracks, and detour routes to avoid areas that have become too wet from prior vehicle disturbance. These routes may cause erosion to existing streams and this in turn could cause the degradation of fish habitat.

Past, present, and reasonably foreseeable future actions affecting fish or Essential Fish Habitat in or adjacent to the EIS project area are few are described under Alternative 1 in Section 4.2.2.3. The direct and indirect effects from the implementation of Alternative 5 would be negligible with only negligible contributions to cumulative effects on fish and Essential Fish Habitat.

Conclusion

The combined effects on fish and fish habitat under Alternative 5 would result from the construction of a ferry terminal and the operation of a ferry across Cold Bay. The effects would be low intensity (no noticeable change in fish resources), long-term duration (intermittent but persistent throughout the life of the project) local in extent for a unique resource (Essential Fish Habitat). The impact level on fish and Essential Fish Habitat would be negligible.

4.6.2.4 Birds

The analysis of the effects of Alternative 5 on birds has been separated into 2 groups, seabirds and waterfowl, and other birds. The birds are grouped based on the use of the area and the expected type of potential effects.

Seabirds and Waterfowl

Direct Effects and Indirect Effects from Construction

The direct and indirect effects of the construction of Alternative 5 on seabirds, including gulls and terns, and waterfowl include short-term behavior disturbance. The disturbance would be limited to the immediate areas of construction (Lenard Harbor Ferry Terminal and the Cold Bay Dock). A group of pigeon guillemots that are known to nest on the Cold Bay Dock (USACE 2003) may be forced to relocate their nests to another area during construction.

As in Alternative 1, no land exchange would be associated with the alternative; the parcel selected by King Cove Corporation could continue through the conveyance process. Effects to birds from the conveyance are described in Alternative 1; the change in ownership of these lands would remove the wilderness designation and potentially make the lands available for development, subject to the provisions of ANCSA Section 22(g), which could adversely affect birds.

Summary

Direct and indirect impacts to seabirds and waterfowl from the construction of Alternative 5 and conveyance of the selected parcel would be low (flushing) to high (nest disturbance) intensity, temporary in duration (only lasting the extent of the construction season) and local extent (only in the immediate vicinity of the construction site). Resources are considered common in context because seabirds and waterfowl are not rare in the locality and not protected by special legislation. The impact level of Alternative 5 on seabirds and waterfowl would be considered minor.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects of the operation and maintenance of Alternative 5 on seabirds and waterfowl could include short-term behavior disturbance. The noise and sight of the ferry as it crosses the open waters of Cold Bay may startle flocks of seabirds and waterfowl, causing them to alter their behavior. Birds may respond to the ferry by flushing and either landing nearby or leaving the area. With a 1 trip per day, six days per week schedule, the frequency of these encounters would be low, and because other watercraft currently operates in Cold Bay, birds may have become habituated to the noise and sight. In addition, the ferry's route would not take it close to Kinzarof Lagoon or the nearshore waters where waterfowl may be present.

Oil or other contaminant leaks from ferry operations are possible and could affect small numbers of seabirds and waterfowl depending on the location and magnitude of the spill, and the prevailing winds. Under normal operations including proper safety procedures, the risk of a spill is small. Because the ferry would be fueled over water at the Cold Bay dock ferry docking facility rather than over land, the risk of a spill entering marine waters is higher than for a hovercraft. However, the fueling is done using fuel containment booms around the vessel, reducing the likelihood of a spill large enough to affect seabirds and waterfowl.

Summary

Direct and indirect impacts to seabirds and waterfowl from the operation and maintenance of Alternative 5 would be low (flushing) to high (nest disturbance) intensity, long-term duration (intermittent but persistent for the life of the project), and local extent (only in the immediate vicinity of the ferry route). Resources are considered common in context because seabirds and waterfowl (except for Steller's Eider, which are addressed in the Threatened and Endangered Species section) are not rare in the locality and not protected by special legislation. The summary impact level of Alternative 5 on seabirds and waterfowl from operation and maintenance would be minor.

Mitigation Measures

All the mitigation measures listed under Common Mitigation Measures (Section 4.3.2.4), and the prohibition of travel north of a straight line between the Northeast Terminal and Cross Wind Cove, except in the case of a life threatening emergency (Section 4.2.2.7), should be effective in reducing potential adverse effects to seabirds and waterfowl. To prevent disturbance to the pigeon guillemots on the Cold Bay Dock, measures should be taken to prevent them from nesting there prior to the start of construction.

Cumulative Effects

Past and present actions that have and may continue to affect seabirds and waterfowl in the project area are described in Section 3.2.3 Birds. The completion of the King Cove Access Road is expected to result in more waterfowl hunting at Kinzarof Lagoon and the northeast side of Cold Bay.

The reasonably foreseeable future actions would add a small amount of habitat loss and would increase human activity in the project area, including more traffic on the road to the ferry terminal. The increase in the number of fisheries observers in King Cove could also add more travelers. Alternative 5 would contribute to the additive effect of disturbance from human activities to seabirds and waterfowl. However, the frequency of the disturbance would be low, and limited to a small area. Therefore the overall effect of Alternative 5 when added to the effects of past, present, and future actions would be minor.

Conclusion

Direct and indirect impacts to seabirds and waterfowl from Alternative 5 would be low (flushing) to high (nest disturbance) intensity, temporary in duration for construction but long-term intermittent for operation of the ferry and local extent (only in the immediate vicinity of the ferry terminals and route), and common in context because seabirds and waterfowl are not rare in the locality and not protected by special legislation. The contribution to cumulative effects would be minor and the summary impact level would be minor.

Other Birds

Direct Effects and Indirect Effects from Construction

The direct and indirect effects of the construction of Alternative 5 on other birds could include short-term behavior disturbance. The disturbance would be limited to the immediate areas of construction (Lenard Harbor Ferry Terminal and the Cold Bay Dock). The number of other birds in either of these areas is expected to be small.

Summary

Direct and indirect impacts of the construction of Alternative 5 on other birds would be low (flushing) to high (nest disturbance) intensity, temporary duration, local extent, and common context because none are rare in the locality and they are not protected by special legislation. The summary impact level of Alternative 5 on other birds would be considered minor.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects of the operation and maintenance of Alternative 5 on other birds could include short-term behavior disturbance, mostly near the onshore facilities. Increased human activity at these locations could cause other birds to avoid the areas. Because of an abundance of more suitable habitat in the surrounding area, the effect would be negligible.

Summary

Direct and indirect impacts of the operation and maintenance of Alternative 5 on other birds would be low intensity, long-term duration (intermittent but persistent for the life of the project), local extent (limited to the ferry route), and common context because none are rare in the locality and they are not protected by special legislation. The summary impact level of Alternative 5 on other birds would be considered minor.

Mitigation Measures

The mitigation measures currently in place to reduce impacts to birds from the operation of the hovercraft should be effective in reducing potential adverse effects to seabirds and waterfowl.

Cumulative Effects

Past and present actions that have and may continue to affect other birds in the project area are described in Section 3.2.3 Birds. The completion of the King Cove Access Road is expected to result in more human activity at Kinzarof Lagoon and the northeast side of Cold Bay.

The reasonably foreseeable future actions would add a small amount of habitat loss and would increase human activity in the project area, including more traffic on the road to the ferry terminal. The increase in the number of fisheries observers in King Cove could also add more travelers. Alternative 5 is not expected to contribute more than a minor amount to the additive effect of disturbance from human activities to other birds. Therefore the cumulative effect of Alternative 5 when added to the effects of past, present, and future actions would be minor.

Conclusion

Direct and indirect impacts of the operation and maintenance of Alternative 5 on other birds would be low (flushing) to high (nest disturbance) intensity, temporary in duration for construction but long-term intermittent for operation of the ferry and local extent (only in the immediate vicinity of the ferry terminals and route), and common in context because they are not rare in the locality and not protected by special legislation. The contribution to cumulative effects would be minor and the summary impact level for other birds would be minor.

Overall Conclusion

The overall impact level of Alternative 5 on all birds would be minor.

4.6.2.5 Land Mammals

Alternative 5 includes using a ferry to travel 14 miles between a terminal in Lenard Harbor and a substantially modified Cold Bay dock. Construction would occur at both the ferry terminal and the Cold Bay dock. Under Alternative 5, the land exchange would not occur and the King Cove Corporation selected lands would be conveyed from the Izembek National Wildlife Refuge to the King Cove Corporation. The effect of this change in land ownership on land mammals is described under Alternative 1 in Section 4.2.2.5.

Direct Effects and Indirect Effects from Construction

Construction under Alternative 5 is limited to 2 previously disturbed sites. The Lenard Harbor site is presently occupied by the former hovercraft terminal, and the work at the Cold Bay Dock is limited to the existing facilities. Land mammals occurring at either of these sites are likely limited to a few small mammals such as mice or voles. These animals would be displaced during construction by the noise and human activity. Larger mammals in the surrounding area, including caribou, may be startled by the construction noise and would move away from the area. As in Alternative 1, the indirect effect of conveyance of the King Cove Corporation selected lands could result in activities that disturb land mammals, but this would be a minor indirect effect.

Summary

Direct and indirect impacts to land mammals from the construction of Alternative 5 would be low intensity (change in land mammal behavior would not be noticeably altered), temporary duration (during the 2 year construction period) local extent (limited geographically to the Cold Bay Dock and Lenard Harbor terminal sites), and would affect both common and important resources, resulting in a minor impact. Caribou are considered important because their population has been below management objectives, which has limited subsistence harvest opportunities in the EIS project area, and brown bear are considered important because of the State's designated Controlled Use Area for brown bear. All other land mammals are considered common because they are not rare in the locality and are not protected by special legislation.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects to land mammals from the operation and maintenance of Alternative 5 include behavior disturbance at the on-shore facilities and increased risk of injury or mortality on the road from the community of King Cove to the Lenard Harbor Ferry Terminal. The beach at the Lenard Harbor site is located within an area designated "medium density – spring, summer and fall" for brown bear (Service 1998); however, because human activity exists at this site, brown bear may occur there less frequently. The higher elevation landscape adjacent to the Lenard Harbor site is recognized as high density brown bear denning habitat (ADF&G 2010i). The Cold Bay Dock site is adjacent to low density winter range/migration for the caribou; however, the Alaska Department of Fish and Game identifies the site as outside the known winter use area. Both sites may be occasionally visited by wolves and the following other land mammals; river otters, red fox, shrews, northern red-backed voles, meadow jumping mice, both brown and collared lemmings, and Arctic ground squirrels.

Although the noise and sight of the ferry may temporarily startle land mammals, it would be a predictable disturbance occurring in a limited area. It is expected that land mammals near the operations would become habituated to the disturbance or would relocate to adjacent habitat. Human activities at the Lenard Harbor Ferry Terminal and Cold Bay Dock would likely have negligible effects on land mammals because they are temporary, predictable, and limited to the immediate sites.

An indirect effect of the operation of Alternative 5 would be an increase in traffic on the road from the City of King Cove to the ferry terminal. This would increase the risk of injury or mortality of land mammals either on or crossing the road. The number of land mammals potentially affected by collisions is expected to be small.

Summary

Direct and indirect impacts to land mammals from the operation and maintenance of Alternative 5 would be low intensity because a change in land mammal behavior would not be noticeably altered, long-term (intermittent but persistent for the life of the project), local extent (limited geographically to the Cold Bay Dock and Lenard Harbor terminal sites), and would affect both common and important resources, resulting in a negligible impact. Caribou are considered important because their population has been below management objectives, which has limited subsistence harvest opportunities in the EIS project area, and brown bear are considered important because of the State's designated Controlled Use Area for brown bear. All other land mammals are considered common because they are not rare in the locality and are not protected by special legislation.

Mitigation Measures

The following elements of a Fish and Wildlife Protection Plan (MM-M) would be used to reduce adverse effects to land mammals..

- No vessel will travel north of a straight line between Northeast Terminal and Cross Wind Cove except in the case of a life-threatening emergency.
- All solid or putrescible waste generated during the project activity shall be removed or otherwise disposed of by a method approved by the Alaska Department of Environmental Conservation. All efforts will be made to prevent bears and other wildlife from being attracted to or having access to food or garbage during construction and operation of any transportation link.
- Project personnel, their contractors, and others will not use construction project access to hunting and trapping areas that are not available to the general public to support harvest opportunities.

Cumulative Effects

Past and present actions that have and may continue to affect land mammals in the project area include sport and subsistence hunting, wildlife viewing and management. The completion of the King Cove Access Road is expected to result in greater hunter access to large mammals in the project area, and more disturbance in previously undisturbed areas.

Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through the community of King Cove and upgrades to the Cold Bay Airport. These actions may cause an increase in human disturbance to land mammals. While Alternative 5 could disturb individual land mammals, it is not expected to have population-level effects on any land mammal species, even when combined with the cumulative effects from past, present, or reasonably foreseeable future actions. Although human activities would cause increased disturbance to land mammals, the activity would be limited to the ferry terminal areas, leaving the majority of land mammal habitats undisturbed. Alternative 5 would result in a negligible contribution to cumulative effects on land mammals.

Conclusion

Direct and indirect impacts to land mammals from Alternative 5 would be low intensity (may not be measurable), long-term duration (intermittent and for very short periods but persistent for the life of the project), would occur in limited areas, and would affect generally affect common and important resources. The conveyance of the King Cove Corporation selected lands could affect important resources (caribou and brown bear). Caribou are considered important because their current population was recently below management objectives, which has limited subsistence harvest opportunities in the EIS project area and brown bear are considered important because of the State's designated Controlled Use Area for brown bear. The contribution of Alternative 5 to cumulative effects on land mammals would be negligible. The summary impact of Alternative 5 on land mammals is considered negligible to minor.

4.6.2.6 Marine Mammals

Alternative 5 is similar to the 2003 EIS Alternative 4. The primary difference lies in the road to Lenard Harbor and other infrastructure elements constructed or permitted. Under this alternative, the ferry would operate 6 days per week, year round, between Lenard Harbor and the Cold Bay dock. Evaluations included here build upon the earlier determinations for Alternative 4 in the 2003 EIS and any new relevant information.

Under this alternative, the King Cove Corporation selected lands would be conveyed from the Service to the corporation. This action would not affect marine mammals and is not discussed further.

Fourteen species of marine mammals inhabit the North Pacific Ocean adjacent to Cold Bay and the Bering Sea adjacent to Izembek Lagoon (see Section 3.2.6). Of these, harbor seals, killer whales, harbor porpoise, and gray whales occur with some regularity in the EIS project area, so will be evaluated as to potential effects from the proposed alternatives. Northern sea otters and Steller sea lions are discussed in Section 4.6.2.7, Threatened and Endangered Species. Pinnipeds (harbor seals) and cetaceans (killer whales, harbor porpoise, and gray whales) are analyzed together. Although harbor seals use both terrestrial and marine habitats and the cetaceans are restricted to marine habitats and are less commonly sighted in the project area, many of the impact conclusions are the same. Where differences occur they are noted.

Direct Effects and Indirect Effects from Construction

Noise generated from construction activities at the Cold Bay dock could elicit behavioral responses from harbor seals, killer whales, harbor porpoise, or gray whales near the dock. Construction would require driving 180 spin-fin piles into the seafloor alongside the existing dock. Noise from pile driving activities may mask marine mammal vocalizations or cause deflection or avoidance of an area (David 2006; Tougaard et al. 2009; Würsig et al. 2000). The 2003 EIS acknowledged the potential for noise disturbance and assumed that pile driving would be suspended overnight to avoid unnecessary disturbance to nearby residences in the City of Cold Bay. Noise would likely result in some level of temporary displacement or avoidance of the area by harbor seals, killer whales, harbor porpoise, and gray whales during pile driving activities. Primary haul-out, pupping, and resting areas for harbor seals are in and around Kinzarof Lagoon and Izembek Lagoon, and not in the immediate vicinity of the Cold Bay dock and construction area. Although pile driving sounds may be audible, the distance of sensitive haul-outs from the sound source should alleviate potential disturbance of or displacement from important pupping locations. The frequency of occurrence of killer whales, harbor porpoise, and gray whales near the dock is relatively low, limiting the chances they would be disrupted by construction noise.

Fuel leaks or other hazardous material spills into marine waters during construction could affect nearshore marine habitats. Mitigation measures (refer to Section 4.2.2.6) provide plans to control fuels and hazardous waste onsite during construction.

Summary

Noise impacts of construction associated with Alternative 5 could cause behavioral disturbances of low to medium intensity because behavioral responses may be observable during construction, but would be temporary in duration and localized in extent. Potential habitat impacts should be alleviated through application of mitigation measures. The summary impact level of the construction of Alternative 5 is considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

The primary types of potential direct and indirect effects on harbor seals, killer whales, harbor porpoise, and gray whales from operation and maintenance of the ferry from Lenard Harbor to Cold Bay dock are disturbance, primarily from noise, boat strikes or habitat degradation. Noise levels emitted by the ferry are expected to be similar to underwater noise levels created by fishing boats in the area, and considerably louder than the hovercraft discussed in Alternative 4 (USACE 2003). If the daily trip of the ferry approaches harbor seals, it may cause temporary avoidance or escape reactions. Most harbor seal encounters would likely occur in the nearshore areas closer to Lenard Harbor or Cold Bay dock. Harbor seals feeding at Delta Creek (during the summer salmon season), or in other areas along the ferry route may be displaced or temporarily disturbed while feeding. Killer whales, harbor porpoise, or gray whales feeding or traveling along the ferry route could be temporarily disturbed or displaced as the ferry passes by. The frequency with which these encounters might occur would be low, given the irregular occurrence and distribution of these species in Cold Bay. Gray whales appear to be present only in the summer, so would not encounter the ferry during other times of the year.

Due to the slow speed of the ferry (10 knots), direct strikes are unlikely. Vessel speed is a key factor in determining the frequency and severity of ship strikes, with the potential for collision increasing at ship speeds of 15 knots and greater (Laist et al. 2001; Vanderlaan and Taggart 2007). If a ship strike did occur, injury or death could result. Harbor seals, killer whales, harbor porpoise, and gray whales would most likely hear the ferry in sufficient time to move out of the way. In addition, implementing mitigation measures included in the marine mammal protection plan would further protect marine mammals by minimizing disturbance effects.

Impacts to nearshore marine habitat near the ferry terminals could result from fuel leaks or spills during refueling operations. Potential impacts during refueling could be mitigated by deploying a boom around the ferry during refueling and through other spill response and prevention measures included in the mitigation measures.

Summary

Direct and indirect effects on harbor seals, killer whales, harbor porpoise, and gray whales from operation and maintenance of the Lenard Harbor ferry would consist primarily of localized disturbance effects along the ferry route. Animals feeding or traveling along the ferry route could be temporarily disturbed or displaced as the ferry passes. The frequency of encounters would likely be highest for harbor seals and very low for the other species. These behavioral effects on marine mammals would be intermittent and restricted to vicinity of the ferry's route, but would affect species that receive federal protection under the *Marine Mammal Protection Act*. Direct ship strikes are possible, but unlikely, given the ferry's slow speed and noise (considerably more than the hovercraft). The overall impact of the operation and maintenance of Alternative 5 is considered negligible to minor.

Mitigation Measures

The following mitigation measures described in Appendix F would reduce adverse effects to marine mammals and marine mammal habitat.

Marine Mammal Protection Plan (MM-N), Erosion and Sediment Control Plan (MM-A), Storm Water Pollution Prevention Plan (MM-B), Hazardous Material and Petroleum Product Control Plan (MM-C), Fuel Handling and Spill Response Plan (MM-D), and Fish and Wildlife Protection Plan (MM-M).

Cumulative Effects

Past, present and reasonably foreseeable future actions and their respective effects on harbor seals, killer whales, harbor porpoise, and gray whales are the same as described in Section 4.2.2.6. Implementation of Alternative 5 would result in a negligible cumulative increase in disturbance to harbor seals, killer whales, harbor porpoise, and gray whales.

Conclusion

Noise induced behavioral disturbance of harbor seals, killer whales, harbor porpoise, and gray whales near Cold Bay dock is possible during the construction and operation phases of Alternative 5. Effects, if they occur, would include temporary disruption or displacement of animals feeding or traveling near the construction site or along the ferry's route. Disturbance would likely be highest for harbor seals because of their relative abundance in the area and very low for the other species. Direct vessel strikes would be unlikely due to the ferry's slow speed and noise levels. Behavioral effects would be intermittent and restricted to the vicinity of the ferry's operation and construction, but would affect species that receive federal protection under the *Marine Mammal Protection Act.* Alternative 5 would have a negligible cumulative increase in disturbance to marine mammals and negligible to minor overall effect on harbor seals, killer whales, harbor porpoise and gray whales.

4.6.2.7 Threatened and Endangered Species

Alternative 5 is similar to the 2003 EIS Alternative 4. The primary difference lies in the road and other infrastructure elements constructed or permitted. Under this alternative, the ferry would operate 6 days per week, year round, between Lenard Harbor and the Cold Bay dock. Evaluations included here build upon the earlier determinations for Alternative 4 in the 2003 EIS and any new relevant information.

The 3 threatened and endangered species included in this EIS—Steller's Eider, northern sea otters, and Steller sea lions—are addressed separately below. Because the effects on 2 candidate species, Yellow-billed Loon, and Kittlitz's Murrelet are similar to those expected to occur to Steller's Eider, the analysis of effects for these species have been combined.

<u>Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet</u>

Direct Effects and Indirect Effects from Construction

Noise generated from construction activities associated with modifications to the existing Cold Bay dock could elicit behavioral responses from Steller's Eider, Yellow-billed Loon, or Kittlitz's Murrelet near the dock. Construction would require driving 180 spin-fin piles into the seafloor alongside the existing dock. The 2003 EIS acknowledged the potential for noise disturbance and assumed that pile driving would be suspended overnight to avoid unnecessary disturbance to nearby residences in the City of Cold Bay. Pile driving would also be suspended when Steller's Eiders are within ¼ mile of the work site (USACE 2003). In addition, Steller's Eiders and Yellow-billed Loons would be absent from the area during much of the summer construction period. Measures included in the fish and wildlife protection plan to reduce impacts of construction activities would further mitigate potential disturbance effects.

Fuel leaks or other hazardous material spills into marine waters during construction could affect nearshore marine habitats. Mitigation measures provide plans to control fuels and hazardous waste onsite during construction.

Under Alternative 5, the land exchange would not occur and the King Cove Corporation selected lands on the northeast side of Cold Bay would be conveyed from the Izembek National Wildlife Refuge to the King Cove Corporation. The change in ownership of these lands would remove the wilderness designation and potentially make the lands available for development, subject to the provisions of ANCSA Section 22(g), but these lands likely do not contain habitat for any of species considered here.

Summary

Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet may experience some disturbance effects during the construction associated with Alternative 5. However, Steller's Eider and Yellow-billed Loon are absent from the area during most of the summer construction period and mitigation measures regarding pile driving would minimize impacts. The construction period is projected to continue into November. Fall construction could, therefore, coincide with the late-summer/fall return of Steller's Eiders and the molt period in September and October. Kittlitz's Murrelets are not likely to occur near the Cold Bay dock. Effects would be of low to medium intensity because changes in behavior may be observable, temporary (during the construction period), and localized. The context is important for all 3 species because of their threatened and endangered species status or their candidate species status. The direct and indirect impact is considered negligible to minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Possible direct and indirect effects on Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet from operation and maintenance of the ferry from Lenard Harbor to Cold Bay dock are disturbance, primarily from noise, boat strikes, or habitat degradation. Noise levels emitted by the ferry are expected to be similar to underwater noise levels created by fishing boats in the area (USACE 2003). The ferry route traverses a low-use eider area in Cold Bay (Figure 3.2-25) and the Cold Bay dock that extends 1,200 feet from shore, lies outside the nearshore habitats most commonly used by eiders. The ferry route would not cross high density wintering habitat. Because Yellow-billed Loon are rare in the project area and Kittlitz's Murrelets are only seen occasionally, the likelihood of either of them encountering ferry traffic is low.

The ferry would move relatively slowly (approximately 10 knots). Direct strikes are unlikely since Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet would be able to detect the vessel and have ample time to move away as it approaches.

Impacts to nearshore marine habitat near the ferry terminals could result from fuel leaks or spills during refueling operations. Potential impacts during refueling could be mitigated by deploying a boom around the ferry during refueling and through other spill response and prevention measures.

Summary

Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet could experience short term disturbance along the proposed ferry route, but effects would be low to medium intensity because changes in behavior may be observable, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect important resources (threatened and endangered species status or candidate species status). The direct and indirect impact is considered negligible to minor.

Mitigation Measures

The following mitigation measures described in Appendix F would reduce adverse effects to Steller's Eiders, Yellow-billed Loon, Kittlitz's Murrelets, and their habitat: Marine Mammal Protection Plan (MM-N) and a Fish and Wildlife Protection Plan (MM-M).

Cumulative Effects

Past, present, and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Disturbance effects associated with implementation of Alternative 5 would result in a negligible contribution to cumulative effects on Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet.

Conclusion

Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets may experience some disturbance effects during construction and operation phases of Alternative 5. Seasonality of occurrence of Steller's Eiders and Yellow-billed Loons in Cold Bay and mitigation measures would limit impacts. Effects would be of low to medium intensity because changes in behavior may be observable, long-term duration (intermittent but persistent for the life of the project), local extent¸ and would affect important resources (threatened and endangered species status or candidate species status). Alternative 5 would have a negligible contribution to cumulative effects on these 3 species. The overall impact of Alternative 5 on Steller’s Eider, Yellow-billed Loon, and Kittlitz’s Murrelet is considered negligible to minor.

Northern Sea Otter: Southwest Alaska Distinct Population Segment

Direct Effects and Indirect Effects from Construction

Noise generated from construction activities associated with modifications to the existing Cold Bay dock could elicit behavioral responses from sea otters near the dock. Construction would require driving 180 spin-fin piles into the seafloor alongside the existing dock. Noise from pile driving activities may mask marine mammal vocalizations or cause deflection or avoidance of an area (David 2006; Tougaard et al. 2009; Würsig et al. 2000). The 2003 EIS acknowledged the potential for noise disturbance and assumed that pile driving would be suspended overnight to avoid unnecessary disturbance to nearby residences in the City of Cold Bay. Pile driving would also be suspended when sea otters are within ¼ mile of the work site (USACE 2003). Noise would likely result in some level of temporary displacement or avoidance of the area by sea otters during pile driving activities. Measures included in the fish and wildlife protection plan and the marine mammal protection plan would mitigate disturbance effects of construction activities.

Fuel leaks or other hazardous material spills into marine waters during construction could affect nearshore marine habitats. Mitigation measures provide plans to control fuels and hazardous waste onsite during construction.

Summary

Noise impacts of construction associated with Alternative 5 could cause behavioral disturbances of low to medium intensity, but would be temporary in duration and localized in extent. Potential habitat impacts should be alleviated through application of mitigation measures. The direct and indirect impact is considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Possible direct and indirect effects on sea otters from operation and maintenance of the ferry from Lenard Harbor to Cold Bay dock are disturbance, primarily from noise, boat strikes, or habitat degradation. Noise levels emitted by the ferry are expected to be similar to underwater noise levels created by fishing boats in the area, and considerably louder than a hovercraft (USACE 2003). If the ferry encounters sea otters, it may cause temporary avoidance or escape reactions. Most sea otter encounters would likely occur in the nearshore areas closer to Lenard Harbor or Cold Bay dock. The route of the ferry avoids the sea otter concentration areas in northern Cold Bay and Kinzarof Lagoon.

Due to the slow speed of the ferry (10 knots), collisions with sea otters are unlikely. Vessel speed is a key factor in determining the frequency and severity of ship strikes, with the potential for collision increasing at ship speeds of 15 knots and greater (Laist et al. 2001; Vanderlaan and Taggart 2007). If a ship strike did occur, injury or death could result. Sea otters would most likely hear the ferry in sufficient time to move out of the way. In addition, implementing mitigation measures included in the marine mammal protection plan would further minimize disturbance effects.

Impacts to nearshore marine habitat near the ferry terminals could result from fuel leaks or spills during refueling operations. Potential impacts during refueling could be mitigated by deploying a boom around the ferry during refueling and through other spill response and prevention measures.

Summary

Northern sea otters would primarily experience disturbance effects during operation and maintenance of the ferry. Mitigation measures would be taken to avoid or substantially minimize any potential direct or indirect effects. Effects would be of low to medium intensity, depending on frequency of disturbance, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect an important resource (threatened and endangered species). The impact level is considered negligible.

Mitigation Measures

The following mitigation measures described in Appendix F would reduce adverse effects to northern sea otter and otter habitat: Marine Mammal Protection Plan (MM-N) and a Fish and Wildlife Protection Plan (MM-M).

Cumulative Effects

Past, present, and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Implementation of Alternative 5 would result in a negligible contribution to cumulative effects on northern sea otters.

Conclusion

Mitigation measures would be taken to avoid or substantially reduce potential direct or indirect effects to sea otters during the construction and operation phases of this alternative. Noise induced behavioral disturbance near the Cold Bay dock is possible during the construction activities. Some disturbance and displacement are also possible during operation of the ferry. Effects would likely be of low to medium intensity because response reactions may be observable, long-term in duration (intermittent but persistent for the life of the project), local extent, and would affect an important resource. Northern sea otter are federally protected under the *Endangered Species Act* and the *Marine Mammal Protection Act*, so is considered an important resource. The contribution to cumulative effects would be negligible. The overall impact of Alternative 5 on sea otters is considered negligible.

Steller Sea Lion: Western Distinct Population Segment

Direct Effects and Indirect Effects from Construction

Noise generated from construction activities associated with modifications to the existing Cold Bay dock could elicit behavioral responses from Steller sea lions near the dock. Construction would require driving 180 spin-fin piles into the seafloor alongside the existing dock. Noise from pile driving activities may mask marine mammal vocalizations or cause deflection or avoidance of an area (David 2006; Tougaard et al. 2009; Würsig et al. 2000). The 2003 EIS acknowledged the potential for noise disturbance and assumed that pile driving would be suspended overnight to avoid unnecessary disturbance to nearby residences in the City of Cold Bay. Pile driving would also be suspended when sea lions are within ¼ mile of the work site (USACE 2003). Noise would likely result in some level of temporary displacement or avoidance of the area by Steller sea lions during pile driving activities.

Fuel leaks or other hazardous material spills into marine waters during construction could affect nearshore marine habitats. Mitigation measures provide plans to control fuels and hazardous waste onsite during construction.

Summary

Noise impacts of construction associated with Alternative 5 could cause behavioral disturbances of low to medium intensity (observable), but would be temporary in duration and localized in extent for an important species protected under the *Endangered Species Act* and the *Marine Mammal Protection Act*. Potential habitat impacts should be alleviated through application of mitigation measures. The direct and indirect impact is considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Possible direct and indirect effects on Steller sea lions from operation and maintenance of the ferry from Lenard Harbor to the Cold Bay dock are disturbance, primarily from noise, boat strikes or habitat degradation. Noise levels emitted by the ferry are expected to be similar to underwater noise levels created by fishing boats in the area, and considerably louder than the hovercraft (USACE 2003). Steller sea lions feeding or traveling along the ferry route could be temporarily disturbed or displaced as the ferry passes by. With only 1 round trip scheduled per day and limited occurrence of Steller sea lions in Cold Bay, the frequency with which these encounters might occur would be low. Most sea lions are found in the bay during summer months feeding near salmon spawning streams.

Due to the slow speed of the ferry (10 knots), collisions with Steller sea lions are unlikely. Vessel speed is a key factor in determining the frequency and severity of ship strikes, with the potential for collision increasing at ship speeds of 15 knots and greater (Laist et al. 2001; Vanderlaan and Taggart 2007). If a ship strike did occur, injury or death could result. Sea lions would most likely hear the ferry in sufficient time to move out of the way. In addition, implementing mitigation measures included in the marine mammal protection plan would further minimize disturbance effects.

Impacts to nearshore marine habitat near the ferry terminals could result from fuel leaks or spills during refueling operations. Potential impacts during refueling could be mitigated by deploying a boom around the ferry during refueling and through other spill response and prevention measures.

Summary

Direct and indirect effects on Steller sea lions from operation and maintenance of the Lenard Harbor ferry would consist primarily of disturbance effects that are of low to medium intensity (observable), long-term duration (intermittent but persistent for the life of the project), local extent, and would affect an important resource protected under the *Endangered Species Act* and the *Marine Mammal Protection Act*. The direct and indirect impacts are considered negligible.

Mitigation Measures

The mitigation measures described above for northern sea otters apply to Steller sea lions.

Cumulative Effects

Past, present, and reasonably foreseeable future actions are the same as described in Section 4.2.2.7. Implementation of Alternative 5 would result in a negligible contribution to cumulative effects on Steller sea lions.

Conclusion

Mitigation measures would be taken to avoid or substantially reduce potential direct or indirect effects to Steller sea lions during the construction and operation phases of this alternative. Noise induced behavioral disturbance near the Cold Bay dock is possible during the construction activities. Some disturbance and displacement are also possible during operation of the ferry. Effects would likely be of low to medium intensity (observable), long-term in duration (intermittent but persistent for the life of the project), and localized, for important species protected under the *Endangered Species Act* and the *Marine Mammals Protection Act*., resulting in a negligible impact. The contribution to cumulative effects would be negligible. The overall impact of Alternative 5 on Steller sea lions would be negligible.

4.6.3 Social Environment

4.6.3.1 Land Ownership and Management

Alternative 5 would retain the same land ownership pattern as Alternative 1, the No Action Alternative and, therefore, would have similar effects on land use, management and impact on the Service's ability to meet the purposes of the refuges as described in Section 4.2.3.1. Similarly, the resource values of the parcels are the same as found in Alternative 1. Slight differences in the two alternatives are described in the narrative below.

Direct Effects and Indirect Effects

Effects on Land Ownership

Under Alternative 5, no lands would be exchanged, no road would be constructed, and existing land ownership would remain the same for the foreseeable future, except that the King Cove Corporation land selection within the Izembek Wilderness may proceed to conveyance. The King Cove Corporation selection is part of the existing conditions. This selection would proceed to patent, affecting approximately 5,430 acres within the Izembek Wilderness on the east side of Kinzarof Lagoon. The conveyance of the selected parcel would be an indirect effect of Alternative 4. The selected lands, when patented, would be subject to the provisions of ANCSA Section 22(g), as described in Section 3.3.1.1. Federal lands within Izembek National Wildlife Refuge and Izembek Wilderness and in Alaska Maritime National Wildlife Refuge on Sitkinak Island would remain in federal ownership. Title to State of Alaska land would be unchanged.

Effects on Land Use and Management

Since Alternative 5 would not involve an exchange of land between the parties, the effect of this alternative on land use and management would remain the same as the current situation described in Section 4.2.3.1. Except for the indirect effect of the potential for conveyance of selected lands to the King Cove Corporation, there would be no change in management of the parcels as shown in Table 4.2-1. If the King Cove Corporation selected lands within the Izembek Wilderness are conveyed, their existing rights to manage these lands as private land owners would continue, subject to the requirements Section 22(g) of ANCSA and to the compatibility requirements of 50 CFR Parts 25 and 26 which require that the refuge manager evaluate the effects of a proposed use on adjacent refuge lands and the ability of the refuge to achieve its purposes.

Summary

As with Alternative 1 (Section 4.2.3.1), Alternative 5 would introduce no new direct, and minor indirect effects to land ownership, land use, and land management within the project area. The summary impact of Alternative 5 would be considered minor. See Sections 4.6.3.6 and 4.6.3.10 for impact summaries of Alternative 5 related to Public Use and Wilderness.

Mitigation Measures

Since Alternative 5 would result in no direct impacts and minor indirect impacts in ownership, and potential land use and management, no mitigation measures are recommended.

Cumulative Effects

The direct and indirect impacts of Alternative 5 are identical to Alternative 1 and are considered minor. Past, present, and reasonably foreseeable future actions are the same as for Alternative 1. The contribution of Alternative 5 to cumulative effects on land ownership, use, and management is considered minor (indeterminate).

Effects to Refuge Purposes

Since Alternative 5 would not involve an exchange of land between the parties, the effect of this alternative on the Service's ability to meet refuge purposes would remain the same as the current situation described in Section 4.2.3.1.

Conclusion

Alternative 5 would have identical impacts to Alternative 1 and Alternative 4, with respect to land ownership, management, and use. That is, there would be no new direct impacts, and minor indirect impacts, since there would be no land exchange. Although past actions that affect land management include all-terrain vehicle use in the vicinity of the Northeast Terminal, the contribution of Alternative 5 to cumulative effects would be minor and would not require mitigation.

Alternative 5 would not noticeably diminish the Service's ability to achieve the refuges' purposes identified in Public Land Order 2216, ANILCA, and the Wilderness Act.

The overall impact of Alternative 5 on land ownership, use, and management would be minor (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.6.3.2 Socioeconomics

Direct Effects and Indirect Effects from Construction

Implementing Alternative 5 would result in a ferry traveling 14 miles between a terminal at Lenard Harbor and a modified Cold Bay dock. Construction of the terminal and dock is expected to be completed in 1 to 2 years. An estimated total of 16 seasonal workers would be hired for construction activities related to the dock improvements. The direct employment effect from construction activities would be less than 7 percent of the total resident wage and salary jobs in the communities of King Cove and Cold Bay.

Alternative 5 capital costs are estimated at $27.1 million, including the construction of ferry terminals at Lenard Harbor ($5.6 million) and at the existing Cold Bay dock ($12.5 million), and the acquisition costs of a new ferry with ice breaking features ($9.0 million). These costs would likely be funded by federal grants, and therefore, there would be no fiscal effect to local governments from construction activities under Alternative 5.

Summary

Ferry dock construction would result in a total of 16 jobs over a 1 to 2 year construction period. Capital costs for construction and the purchase of a new ferry would be $27.1 million. These costs would be funded by federal grants and would not affect the fiscal status of local governments.

Direct Effects and Indirect Effects from Operation and Maintenance

This section discusses the long-term impacts resulting from operations and maintenance of Alternative 5 from several perspectives: 1) employment and economic activity; 2) population and demographics; and 3) fiscal impacts to local governments.

<u>Passenger Trips and Travel Costs</u>

Under this alternative, a ferry with 6 days per week service would operate from Lenard Harbor to the Cold Bay dock. The number of trips by mode in this alternative is assumed to be identical to the number of trips under Alternative 4. The ticket price on the ferry is assumed to equal the ticket price on the hovercraft ($76), as is discussed in Alternative 4. The major difference between the 2 alternatives is the travel time on the ferry (1 hour 14 minutes) compared to travel time on the hovercraft (15 minutes); the differences in ground travel time and costs; and allowing time for dock construction by 2016. As shown in Table 4.2-9, one-way ground travel time from the City of King Cove to Lenard Harbor is estimated at 29 minutes, while one-way ground travel time to the Northeast Terminal is estimated at 65 minutes. As with the other alternatives, assumptions about vehicle capacities have been made regarding ground travel costs for fish processing crews; managers and technicians; fish harvesters and observers; and residents and non-fishery related passengers. Table 4.6-4 summarizes the estimated baseline trips and travel cost by mode and group under Alternative 5.

Table 4.6-4 Estimated Baseline Trips and Travel Cost by Travel Mode and Group under Alternative 5, 2013 – 2020 and 2025

Overall Trips and Travel Costs	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Trips and Travel Cost for Passengers Using the Lenard Harbor Ferry with Six Times per Week Service									
Resident and Non-Fishing Ferry Passengers	0	0	0	1,001	1,005	1,008	1,012	1,015	1,026
Fishery Related Ferry Passengers	0	0	0	558	558	558	558	558	558
Total Estimated Ferry Passengers	0	0	0	1,559	1,563	1,566	1,570	1,573	1,584
Total Cost of Ferry Trips ($ 2010)	0	0	0	118,484	118,788	119,016	119,320	119,548	120,384
Additional Cost of Ground Vehicle Travel ($ 2010)[1]	0	0	0	19,255	19,312	19,355	19,412	19,455	19,612
Estimated Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	4,259	4,268	4,278	2,733	2,743	2,754	2,764	2,774	2,808
Fishery Related Air Trips	1,842	1,842	1,842	1,842	1,842	1,842	1,842	1,842	1,842
Total Estimated Air Trips	6,101	6,110	6,120	4,575	4,585	4,596	4,606	4,616	4,650
Total Cost of Air Trips ($ 2010)	597,935	598,807	599,737	448,359	449,350	450,419	451,374	452,412	455,695
Additional Cost of Ground Vehicle Travel ($ 2010)[1]	46,455	46,517	46,517	35,771	35,842	35,918	35,987	36,061	36,295
Estimated Trips and Travel Cost for Passengers Using the Both Modes									
Total Trips Both Modes	**6,101**	**6,110**	**6,120**	**6,134**	**6,148**	**6,162**	**6,176**	**6,189**	**6,234**
Total Cost of Trips for Both Modes ($ 2010)	**644,391**	**645,325**	**646,321**	**621,869**	**623,292**	**624,708**	**626,092**	**627,475**	**631,986**

Note: Compiled from ground and air passengers and costs presented in Tables 4.2-4 through 4.2-7. Numbers are rounded. Passenger trips apportioned according to capacity and cost of ground vehicles used by fishery or non-fishery related passengers
[1] Cost for ground travel from the City of King Cove to terminals and airports.

Source: Northern Economics, Inc.

The number of processor related trips in and out of the City of King Cove is not expected to increase under any of the alternatives, nor would the number of trips increase over time. Seafood processing crew costs are shown in Table 4.6-5.

Table 4.6-5 Processing Crew Transportation in Alternative 5 - 2016

	Travel and Cost Under Alternative 5		
	Ferry	**Air**	**Both Modes**
Estimated one-way processing crew trips per year	508	1,492	2,000
Average one-way cost on primary mode ($ 2010)	76.00	98.00	--
Total cost on primary travel mode ($ 2010)	38,608	146,216	184,824
Additional cost of ground vehicle travel [1]($ 2010)	3,537	12,060	15,597
Total cost of travel on all modes ($ 2010)	**42,145**	**158,276**	**200,421**
Total cost per passenger ($ 2010)	**82.96**	**106.08**	**--**

Note: Compiled from ground, ferry, and air passengers and costs presented in Tables 4.2-4 through 4.2-7
[1]Travel to and from King Cove to ferry terminal or airport.
Source: NEI 2012

Seafood company managers and technicians, as well as fishing crews and fishery observers, would likely continue to travel by air between the communities of King Cove and Cold Bay on days when air service is available because of the speed and convenience of air travel. Air service would not be available (because of weather or mechanical delays) about 12.5 percent of all trips.

Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 5 are shown for 2016 in Table 4.6-6.

Table 4.6-6 Resident and Other Non-Fishery Transportation in Alternative 5 - 2016

	Travel and Cost Under Alternative 5		
	Ferry	**Air**	**All Modes**
Estimated one-way resident & non-fishery trips per year	1,001	2,733	3,734
Average one-way cost on primary mode ($ 2010)	76.00	98.00	--
Total cost on primary travel mode ($ 2010)	76,076	267,843	343,919
Additional cost of ground vehicle travel[1] ($ 2010)	14,314	19,132	33,446
Total cost of travel on all modes ($ 2010)	**90,390**	**286,975**	**377,365**
Total cost per passenger ($ 2010)	**90.30**	**105.00**	**--**

Note: Compiled from ground, hovercraft, and air passengers and costs presented in Tables 4.2-4 through 4.2-7
[1] Travel to and from the City of King Cove to ferry terminals or airport.
Source: NEI 2012

Direct and Indirect Employment Impacts

Two complete crews would be needed to operate the ferry. Each crew would consist of 3 persons, and therefore 6 full time crew positions would be expected to be created. In addition, 2 onshore support jobs would be anticipated. It is likely that non-residents would move to the community to fill these positions if local residents do not have the necessary skills, licenses, and certifications. In the long-term, it is anticipated that the jobs could be filled by local residents of the communities.

The 8 direct jobs for operating or managing the ferry would likely generate a small number of additional full or part-time jobs, especially in the transportation sector. With ferry service 6 days per week, Alternative 5 could create an opportunity to develop a small number of jobs (1 to 6) in transportation service with taxis or shuttles transporting passengers to and from the ferry terminal. Overall, the ferry plus the ground transportation direct jobs would create an estimated 9 to 14 direct jobs in the transportation sector.

The IMPLAN software package was used to estimate the indirect and induced jobs created as the direct spending flows through the economy. IMPLAN estimates that for every $1 million spent in water transportation services, an additional 1.25 indirect and induced jobs are created in the local area (communities of King Cove and Cold Bay). Given the estimated $2.3 million in annual operating expenses for Alternative 5, approximately 1 to 2 indirect and induced jobs would result from the Alternative. IMPLAN data also indicate 0.78 indirect and induced jobs per $1 million dollars spent for air taxi services, and 1.11 indirect and induced jobs per $1 million dollars spent in ground transportation.

The sum of the direct jobs with the indirect and induced jobs yields the estimated total employment impact in the range of 11-16 jobs under this alternative. This is less than 5 percent of the total number of jobs in the cities of King Cove and Cold Bay.

Population and Demographics

No effects on population would be expected if the new positions are filled by permanent residents. If the additional 11-16 jobs were filled by residents, then the alternative could lead to an increase in population of about 31 to 45 persons, assuming the average household size of 2.8 persons in the City of King Cove. The ferry captain jobs are skilled positions that require certification and licensing. These positions would likely be filled initially by non-residents, but residents could eventually obtain the necessary training and certification to fill the positions. The other jobs could most likely be filled by residents. Therefore, the population impact would be at the lower end of the range described above and would represent only about 5 percent of the current population in the City of King Cove.

Fiscal Impacts to Local Governments

Alternative 5 assumes that federal grants would cover the capital costs of the ferry. It is also assumed that the neither the Aleutians East Borough nor any other local government will operate the ferry. Ferry operations are anticipated to result in about $2.6 million of annual losses, and these losses will need to be subsidized by some unspecified non-local entity.

Summary

Alternative 5 would have negligible socioeconomic effects to the cities of King Cove and Cold Bay and to the Aleutians East Borough based on estimated changes to employment, economic activity in transportation, and population. Transportation costs between the cities, including ground transportation costs between the City of King Cove and the terminal at Lenard Harbor would be somewhat less expensive than air travel. An operator would need to be willing to subsidize the ferry at roughly $2.6 million annually; the subsidy rate would move slightly lower over time as travel by ferry increases with population (and assuming costs and ticket prices remain constant in real terms). Alternative 5 would result in few to no fiscal effects to local governments.

Effects to socioeconomic resources would be of low intensity, with less than a 5 percent change in social indicators (such as employment and housing). Effects would have a regional extent, affecting the communities of King Cove and Cold Bay. The duration would be long-term to permanent, persisting for the life of the project. The context of effects is considered unique, affecting minority and low income communities.

Mitigation Measures

The acquisition of additional outside funding could mitigate shortfalls in operating revenue [Fares, Subsidies, and Additional Revenue (MM-S)]. Efforts could also be made to increase cargo revenue and recover medical charter costs.

Cumulative Effects

Socioeconomic conditions in the project area, including effects from past actions, are described in Chapter 3 and in the assumptions for analysis (Section 4.1.4). The reasonably foreseeable implementation of North Pacific Fishery Management Council regulations would likely increase by 10 the number of observers in the Gulf of Alaska groundfish and halibut fisheries coming through the City of King Cove. Each observer would stay in group quarters at Peter Pan for an average of 2 months during the course of the year. In arriving and leaving, these observers would generate 20 additional person trips per year by any travel mode. These additional trips would have a negligible contribution to cumulative effects on socioeconomic indicators.

Conclusion

Under Alternative 5, consumer transportation costs would be slightly less than current costs; each trip between King Cove and Cold Bay would be reduced by $14.70 per trip. Effects to employment, population, and demographics would be permanent with an estimated increase of 10 to 17 new jobs. There would be few effects to any other socioeconomic indicators. No fiscal effects to local governments would be anticipated under this alternative; however, the ferry operator would need to subsidize a loss of about $2.6 million annually.

The direct and indirect effects to transportation costs (to the user), employment, and population and demographics would be negligible, and there would be no effects to fiscal resources for local government. Effects to these indicators would be of low intensity, with less than a 5 percent change in social indicators (such as employment and housing). Effects are considered to have a permanent duration, persisting for the life of the project, with a regional extent, affecting the communities of King Cove and Cold Bay. The context of effects is considered unique, affecting minority and low income communities. The contribution to cumulative effects on socioeconomic indicators would be negligible for all factors. The effects would be negligible for population and demographics, transportation costs and employment, and no effects to local government fiscal resources. The overall effects to socioeconomic indicators would be negligible (beneficial); however the ferry operator would have to subsidize a loss of about $2.6 million annually.

4.6.3.3 Transportation

Direct Effects and Indirect Effects from Construction

Alternative 5 would incorporate a new ferry service from Lenard Harbor to the Cold Bay Dock. The project would acquire a $9 million, 150-passenger, 19-vehicle, 100 to 150-foot open-deck ferry. The dock on the Cold Bay Airport side would be modified to accommodate the ferry, and a new ferry terminal would be built at Lenard Harbor, on the King Cove side of the bay. The construction elements of this alternative are described in detail in Chapter 2, and incorporate estimates presented in the 2003 EIS.

The Lenard Harbor Ferry Terminal would be accessed by the existing road and incorporate existing features of the former hovercraft terminal located there. New facilities at the site would consist of a 34- by 40-foot skid-mounted building (for an office and public waiting room), potable water and septic system, and a ramp between the shore and the ferry dock. The new dock would be supported by a float contained within guide piles. A construction barge site would probably be necessary to transport materials to the site. Modifications to the Cold Bay city dock would include wave protection, a floating ramp, and a passenger walkway. No fill or dredging would be required, as a pile driver would be employed.

Summary

The transport of construction workers and the shipment of equipment and supplies would increase commercial barge and air transport service activity temporarily. The direct and indirect impacts of this alternative on transportation would be medium in intensity, since it would add surface and air traffic during the construction phase and disrupt Cold Bay dock activities. Minor traffic congestion or disruption on roads and marine activities is anticipated as heavy equipment is maneuvered into place. Impacts would be of temporary duration because construction would occur over 1 to 2 years. The impacts would have a regional extent because it would affect transportation facilities in the cities of Cold Bay and King Cove, as workers and materials are transported to the area, using existing transportation facilities. The impacts would occur in a common context, since this would be constructed in an area where marine transportation facilities already exist. The impact of Alternative 5 construction on transportation is considered to be moderate.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation costs would be similar to that estimated for Alternative 4, which assumes operations 6 days a week, year round, and $76 fares. Estimated life cycle costs would be higher than the other alternatives, at about $71.7 million, because of the dock modifications.

Passengers are estimated at the same levels as that of the hovercraft in Alternative 4, as shown in Table 4.6-7. By 2020, ferry passengers for the 6 days a week schedule are estimated to be 1,573 and 4,616 for air.

Table 4.6-7 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 5

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Alternative 5 Ferry 6x a week 2013									
Air Taxi Passengers	6,101	6,110	6,120	4,575	4,585	4,596	4,606	4,616	4,650
Ferry Passengers	0	0	0	1,559	1,563	1,566	1,570	1,573	1,584

Source: NEI 2012

Operating costs include about $108,800 annually for maintenance of the road connecting King Cove Airport to Lenard Harbor, though that cost would not necessarily be borne by a ferry operator. This alternative has similar annual shortfalls between estimated annual revenue and costs, to that of hovercraft operations in Alternative 4, at about $2.5 million.

Consumer costs would be similar to that of the hovercraft and air alternatives, at about $101, as shown in Table 4.2-9. As shown in Table 4.2-9, the ferry trip length, assuming average operable weather, would be approximately 106 minutes from the City of King Cove to the Cold Bay dock.

Annual availability and reliability is higher than that of the hovercraft alternative, and similar to that of the road alternatives. Travel time between the cities of Cold Bay and King Cove is less than that of the roads, but additional mobilization time would likely be added for an unscheduled trip.

Summary

Alternative 5 would provide another form of transportation besides air to and from Cold Bay Airport. Based on reports from other ferry operations, the service is anticipated to be quite reliable. Annual availability is somewhat more limited than that of the road alternatives, because of the mobilization required for unscheduled trips. Travel times between the cities are about ½ hour less than the road alternatives, however. The direct and indirect impacts of this alternative would be medium in intensity since a ferry would provide an additional mode of transportation from the City of King Cove to access the Cold Bay Airport. Service would be available on a scheduled basis only, subject to operating limitations. Impacts would be of long-term duration by the addition of another mode of year round transportation for the life of the project. The impacts would have a regional extent, not reaching beyond the Cold Bay region. The impacts would occur in a common context, since this alternative would be constructed in an area where marine transportation facilities already exist.

Mitigation Measures

Construction practices would be stipulated and enforced to mitigate the effects of construction consequences to the environment. All construction activities would be conducted within a clearly demarcated site, and designated staging areas. A construction manager would be on site at all times to ensure implementation and compliance with all environmental mitigation requirements identified within other resource discussion. No additional mitigation measures are identified.

Cumulative Effects

Additional fishery observers operating out of King Cove would slightly increase demand for travel between the King Cove and Cold Bay communities. Operation of the ferry on a 6 days a week schedule would provide a full time transportation link for the region, which would benefit about 1,600 passengers per year. However, the alternative would likely initiate major revenue losses for an operator, an estimated $2.5 million annually. Alternative 5 would have a moderate (indeterminate) cumulative effect to transportation due to fiscal impacts and the addition of a regional transportation link.

Conclusion

Operation of the ferry 6 days per week would add a reliable transportation choice for transit to the Cold Bay Airport. However, the shortfalls in revenues to cover operating costs and high lifecycle costs present an economic burden for a ferry operator. The cost to the operator would be the greatest for any alternative. The direct and indirect effects of Alternative 5 on transportation would be moderate, with a moderate contribution to cumulative effects. The overall impact of Alternative 5 on transportation is considered moderate (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.6.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

This alternative involves constructing a Lenard Harbor ferry terminal and making modifications to the Cold Bay dock. The primary indicators for public health and safety directly impacted by construction in Alternative 5 are related to incidences of potential injuries for workers in the project area and the capability of local clinics to treat injured workers.

Direct impacts to public health and safety during construction could include illnesses, injuries, and fatalities to workers and increased need for treatment at local clinics. However, the construction projects would likely not impact overall public health and safety in the project area.

Adverse indirect effects on public health could include an increased use of limited local medical facilities by out-of-town workers mobilized to construct the Lenard Harbor ferry terminal and make modifications to the Cold Bay dock. These effects could affect communities throughout the project area, including the City of King Cove, which meets the definition of a minority community and a medically underserved area.

Summary

Construction of a Lenard Harbor ferry terminal and modifying the Cold Bay dock in Alternative 5 could directly affect public health and safety of workers. Adverse direct effects of the construction phase of Alternative 5 on public health and safety would be low in intensity, potentially affecting a small number of people at levels above typical background conditions, but within normal limits of health care needs of the area. Effects would be temporary in duration, lasting only for the period of project construction. Effects would be regional in geographic extent, potentially affecting the communities of King Cove and Cold Bay, which are unique in context as a minority community and medically underserved area. The direct effects of the construction phase of Alternative 5 on public health and safety would be considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

The operation and maintenance phase for this alternative involves the use of the ferry for transportation and maintenance of the access road. The primary indicators for public health and safety directly impacted by operation and maintenance for Alternative 5 are safe, available, reliable, and affordable transportation to facilities with medical care not available to the King Cove community, including medical care requiring emergency medical evacuations.

Under Alternative 5, the ferry would have regular scheduled trips for 6 days a week year round and would be available for emergency medical evacuations 24 hours a day, 7 days a week year round. Operation and maintenance of Alternative 5 would have a direct effect on public health and safety of persons throughout the project area who may need medical care not available in the City of King Cove (including emergency medical evacuations from the King Cove Health Clinic) and for persons who might assist in the medical evacuation transportation. Because the ferry would have regular scheduled trips for 6 days a week and operate year round, persons in the City of King Cove who have non-emergency medical needs would have more opportunities to travel to the Cold Bay Airport.

Regarding medical evacuation transport, a ferry that is available year round could provide transport to the City of Cold Bay under weather conditions not amenable to travel by helicopter, plane, boat, or other vessel. Unlike transport by air and other types of transport by sea, the ferry is predicted to be able to operate weatherwise most of the time. The trip to the Cold Bay Airport would take approximately 106 minutes and would include a 9.6 mile drive from the City of King Cove to Lenard Harbor and a 1.1 mile drive from the Cold Bay dock to Cold Bay Airport, as shown in Table 4.2-5. This alternative could have a direct beneficial impact on public health (e.g., for non-emergency and emergency patients) and public safety (e.g., for those who transport patients during medical evacuations). The beneficial impacts would last as long as the ferry was in operation and would have the potential to impact persons throughout the EIS project area. Alternative 5 would primarily impact the City of King Cove, which meets the definition of a minority community and medically underserved area.

Conditions where it may not be possible to complete medical evacuations via the ferry would still occur. There could still be unavailability during periods of inclement weather that prevent marine and air travel for advanced medical services, and the ferry would be occasionally removed from service for inspections and maintenance.

Beneficial indirect effects on public health and safety could include members of the King Cove community having increased access to health care. Because the ferry can operate safely under most weather conditions, Alternative 5 would provide safe and reliable transportation during medical evacuations. If Alternative 5 was implemented, the other available types of medical evacuation transportation (helicopter, plane) would still be available on a limited basis. When there are no delays and weather conditions are not adverse, persons in the King Cove community would benefit from the availability of safe and reliable transportation 24 hours a day, 7 days a week throughout the year via the ferry, but would not be precluded from using the other forms of medical evacuation transport. Depending on the weather, and the availability of the various modes of transportation, the best mode of transportation (ferry, other type of boat, helicopter, or plane) could be selected for each specific medical evacuation incident.

Alternative 5 would require maintenance of the 9.6 mile access road from the King Cove Clinic to Lenard Harbor. Maintenance would include signage, regular grading, and snow removal, and these actions could directly impact public safety if workers are injured. Further, emergency and non-emergency medical evacuation trips to and from the King Cove Clinic and Lenard Harbor could increase the number of motor vehicle accidents in the King Cove community beyond current levels.

Residents of the City of King Cove have indicated that the current lack of safe and reliable transportation to needed medical services affects their quality of life by affecting their peace of mind, particularly during extended periods of inclement weather that prevent marine and air travel. Alternative 5 would alleviate some resident concerns by offering a year round option for medical evacuation (ferry service), but one that is still subject to some weather operability, crew availability, and routine maintenance.

Summary

Operation and maintenance under Alternative 5 would directly benefit public health and safety by offering access to advanced medical services via reliable ferry service. Beneficial direct effects of the operation phase of Alternative 5 on public health and safety would be high in intensity, potentially affecting the community of King Cove, providing improved levels of transportation access to the Cold Bay Airport with connections to advanced medical facilities. Effects would be long-term in duration, lasting only for the life of the project. Effects would be regional in geographic extent, but with primary effect to the City of King Cove, which is unique in context as a minority community and medically underserved area. The direct effects of Alternative 5 on public health and safety would be considered major (beneficial).

Mitigation Measures

Standard Health and Safety Practices (MM-T) could help mitigate the potential public safety impacts to workers from construction of the Lenard Harbor ferry terminal and modifications made to the Cold Bay dock.

Cumulative Effects

Past and present actions affecting public health and safety are described in Chapter 3 (Section 3.3.4). No reasonably foreseeable future actions would affect public health and safety. Alternative 5 would have a moderate (beneficial) contribution to cumulative effects on public health and safety. This alternative would supplement existing air transport, maximizing opportunity for emergency travel.

Conclusion

The direct and indirect effects of the construction phase of Alternative 5 on public health and safety would be negligible. Standard practices related to worker health and safety could help mitigate the public safety impacts to construction workers. Alternative 5 would provide a safe and reliable year round option for medical evacuation (ferry) transportation to needed medical services for the King Cove community. The impact of Alternative 5 on public health and safety is considered major (beneficial).

4.6.3.5 Environmental Justice

Direct Effects and Indirect Effects from Construction

Construction of the Lenard Harbor Ferry terminal and modifications to the Cold Bay dock under Alternative 5 should have little impact to public health and safety associated with illness, injury, or fatality of workers or indirect increased use of limited local medical facilities. Adverse direct and indirect effects of Alternative 5 would be low in intensity, temporary in duration, regional in extent, and unique in context.

During construction, subsistence harvest of waterfowl, salmon fishing, and marine invertebrate gathering (crab) could be disturbed as some resources could be displaced by the presence of heavy equipment and construction noises. Displacement of subsistence resources would be temporary and could occur intermittently for the duration of construction activities (1 to 2 years) at both ferry terminals. The intensity of the impact would be low, local to regional in extent and affect resources that are common to important in context.

Summary

The direct and indirect effects of construction of Alternative 4 to human health and subsistence would be considered negligible.

Direct Effects and Indirect Effects from Operation and Maintenance

Under Alternative 5, a ferry would be available year round to provide transport to the Cold Bay Airport. Unlike other forms of transport by air and sea, the ferry is predicted to be able to operate under most weather conditions (Table 4.2-9).

The new ferry would operate within concentrated subsistence use areas for waterfowl, salmon, and crab in Lenard Harbor and a waterfowl concentration area near Delta Point and Nurse Lagoon. The ferry could temporarily disturb or displace individual animals, but would not be expected to permanently affect their location or availability. Similarly, operation and maintenance of the ferry should not affect access to these subsistence resources, nor competition for them.

Summary

Operation and maintenance associated with Alternative 5 would have direct and indirect effects on human health by an increase in reliability. Operation and maintenance of alternative 5 could temporarily displace or disturb certain subsistence resources, but would not have more than a negligible effect.

Beneficial direct effects of Alternative 5 on public health and safety would be high in intensity, potentially affecting the community of King Cove, providing improved levels of transportation access to the Cold Bay Airport with connections to advanced medical facilities. Effects would be long-term in duration, lasting only for the life of the project. The effects would be regional in geographic extent, but with primary effect to the City of King Cove, which is unique in context as a minority community and medically underserved area.

Impacts to the availability of subsistence resources, access to subsistence resources, and increased competition for subsistence resources would be considered of low intensity, with small changes in the resource condition. Effects would be long-term in duration, lasting for the life of the project, with a local to regional in extent, with primary effects to the City of King Cove. Effects would be common to important in context, as subsistence resources and access to subsistence resources are not rare in the locality or the region, but they are important to the local communities.

Mitigation Measures

Standard Health and Safety Practices (MM-T) during ferry and dock construction could help reduce worker injury or fatality.

Cumulative Effects

The ferry can operate under most weather conditions; therefore, it would contribute to safety and reliability in the emergency health care system for City of King Cove residents. Depending on the weather, severity of the injury, and availability of transit modes, the best mode could be selected for each emergency incident.

Implementation of Alternative 5 would make a minor contribution to cumulative effects on subsistence resources, access to subsistence resources, and competition for subsistence resources.

Conclusion

Alternative 5 would provide an increased availability of transportation to needed medical services for the King Cove community as compared to current (baseline, No Action) conditions. Alternative 5 would have a minor impact on subsistence resources or activities. Therefore, Alternative 5 would have no disproportionate adverse impact to minority or low-income communities.

4.6.3.6 Public Use

Direct Effects and Indirect Effects from Construction

Under Alternative 5, construction would occur at Lenard Harbor and the Cold Bay dock. No impacts to public use would result from construction activities.

Summary

Under Alternative 5, no impacts to public use would result from construction activities.

Direct Effects and Indirect Effects from Operation and Maintenance

A land exchange would not take place and public use of existing parcels would remain the same. The conveyance of King Cove Corporation’s ANCSA selection of 5,430 acres on the east side of Kinzarof Lagoon would likely occur, making these acres no longer available for public use without permission from King Cove Corporation.

Summary

The only effect of Alternative 5 on public use would be conveyance of 5,430 acres to King Cove Corporation of selected lands in Izembek Wilderness that could displace the low level of public use in the area. Impact duration could be permanent.

The direct and indirect impacts of this alternative would be low in magnitude because the conveyance of selected lands in Izembek Wilderness could displace the low level of public use in the area. Impact duration could be permanent (King Cove Corporation ownership of the land would last in perpetuity) and would have a local extent, affecting refuge visitors, but primarily residents of the City of King Cove. The impacts would affect land resources and associated public uses that are common in context since the right to select this parcel pre-dates the establishment of Izembek Wilderness. Thus, the summary impact of Alternative 5 on public use would be considered minor.

Mitigation Measures

Although this alternative could result in a minor change in public use (associated with the conveyance of selected lands to King Cove Corporation), no mitigation measures are recommended. Future uses of the land would be subject to Section 22(g) of ANCSA.

Cumulative Effects

Relevant past actions include the enactment of ANILCA that designated wilderness areas throughout the state, including the Izembek Wilderness. No present or reasonably foreseeable future actions would induce additional changes to public use in the vicinity. Consequently, the contribution of Alternative 5 to cumulative effects on public use is considered negligible.

Conclusion

Alternative 5 could have minor impacts to public use, due to the conveyance of the selected parcel to King Cove Corporation. Future use of the parcel would be subject to the requirements of Section 22(g) of ANCSA. Future public uses of the parcels would be subject to authorization by the private land owner.

4.6.3.7 Subsistence

Direct Effects and Indirect Effects from Construction

Under Alternative 5, no land exchange would occur and the alternative would require the construction of a ferry dock and terminal at Lenard Harbor near King Cove. Lenard Harbor is known as an area of concentrated harvest for subsistence marine fishing (crabbing) by residents of the communities of King Cove and False Pass. Lenard Harbor terminal construction and related transportation activity could locally displace subsistence resources occasionally when present during construction. This could in turn affect resource availability to subsistence harvesters in the immediate areas of the Lenard Harbor ferry dock and terminal during construction activities.

Modifications to the existing Cold Bay dock would include adding a wave barrier, vehicle ramp system, and a pedestrian walkway. This area near the Cold Bay dock is used for marine invertebrate gathering and salmon fishing. During construction, subsistence harvest of waterfowl, salmon fishing, and marine invertebrate gathering could be disturbed as some resources (waterfowl) could be displaced by the presence of heavy equipment and construction noises.

Access to subsistence resources for harvest could be limited during construction to protect public safety. However, mitigation measures could allow for specific days to be established when construction activities are limited to allow subsistence harvest, or a safety guard could be used to ensure safe access to resources during construction. Displacement of subsistence resources would be temporary and could occur intermittently for the duration of construction activities (seasonally for 1 to 2 years) at both ferry terminals. The impacts would be temporary in duration, lasting only the length of the construction, local (discrete portions of the project area) to regional (throughout the project area) in extent, and affecting resources that are common to important in context. The resources that are important in context include migratory waterfowl.

Indirect effects under Alternative 5, would be identical to those of Alternative 1 and Alternative 4, and include conveyance of the King Cove Corporation selected lands. These indirect effects are considered minor.

Summary

Direct impacts to subsistence from implementation of Alternative 5 would be low intensity and temporary in duration (lasting only the length of the construction), local to regional in extent, and affecting resources that are common to important in context. The resources that are important in context include migratory waterfowl. The direct and indirect impacts to subsistence due to construction of Alternative 5 are considered minor.

Indirect effects under Alternative 5, would be identical to those of Alternative 1 and Alternative 4, and include conveyance of the King Cove Corporation selected lands. These indirect effects are considered minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Effects on Subsistence Resources

Under Alternative 5, a new ferry would provide year round service between Lenard Harbor and the Cold Bay dock. Ferry service would include 1 round trip per day, 6 days per week. The ferry would be operated within concentrated subsistence use areas for waterfowl, salmon, and crab in Lenard Harbor. During operation, the ferry would transit through a waterfowl concentration area near Delta Point and Nurse Lagoon on the western side of Cold Bay. If icebreaking is required during ferry operation, displacement of subsistence resources (marine mammals) may result if they are present during icebreaking. Icebreaking is likely to be infrequent and the impact of disturbance to subsistence resources would be considered local and temporary, occurring only for the length of icebreaking. Impacts to the availability of subsistence resources in the ferry terminal areas and along the access roads would be considered long-term and of low intensity. The primary subsistence resources affected would be waterfowl and marine mammals, which are important in context.

Effects on Access to Subsistence Resources

Access to subsistence resources under this alternative for residents of the communities of King Cove, Cold Bay, False Pass, and Sand Point would be the same as described for Alternative 1 and Alternative 4. Since road access to Lenard Harbor is part of the existing conditions, Alternative 5 would not establish new access to this location. During operation of the ferry, the placement of crab pots by subsistence users would need to consider the travel routes and terminal facility in Lenard Harbor. A ferry would likely pass over crab pot buoys and leave buoys undisturbed (USACE 2003). Impacts to access subsistence resources in the ferry terminal areas and along the access roads would be low in intensity (perceptible), long-term (lasting the life of the project), local (discrete portions of the project area) to regional (throughout the project area) in extent, and common to important in context. The resources that are important in context include the migratory waterfowl.

Increased Competition for Subsistence Resources

The effect of Alternative 5 on competition for subsistence resources would be similar to those described for Alternative 1 and Alternative 4. The long-term impacts of increased competition for subsistence resources including migratory waterfowl would be of low intensity, local to regional extent, and affecting resources that are common to important in context. The resources that are important in context include the migratory waterfowl.

Summary

Impacts to subsistence from operation of the ferry would include temporary displacement of subsistence resources and increased subsistence uses. These impacts would be long-term and of low intensity, local to regional in extent and affecting resources that are common to important in context. The resources that are important in context include the migratory waterfowl. The impact would be considered minor.

Mitigation Measures

No mitigation measures are proposed for subsistence resources.

Cumulative Effects

Past and ongoing actions related to subsistence are described in Chapter 3 (Section 3.3.7). No reasonably foreseeable future actions would affect subsistence uses and resources in the project area except for the possible displacement of non-subsistence users that currently use the parcel to be conveyed to King Cove Corporation. Alternative 5 would make a minor contribution to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources.

Conclusion

Implementation of Alternative 5 would have minor direct and indirect effects on subsistence; this alternative would have minor cumulative effects on subsistence.

4.6.3.8 Cultural Resources

Direct Effects and Indirect Effects from Construction

Under Alternative 5, the Lenard Harbor ferry dock and Cold Bay dock improvements would be constructed. Potential direct physical impacts to cultural resources could occur during the construction of the ferry dock. Direct effects to cultural resources include those activities that physically impact the condition or integrity of the resource. Specifically, construction of the dock could result in direct effects to underwater prehistoric or historic archaeological sites. However, archeological surveys would be required prior to ground disturbing activities, and this should prevent direct impacts.

Potential indirect effects to cultural resources could also occur during construction of the Cold Bay dock improvements. Indirect effects to cultural resources include inadvertent damage outside of the project area during the construction phase of the project. Indirect impacts may occur, resulting from ground-disturbing activities that encounter cultural materials. Since these activities could affect undocumented cultural resources, they are likely to be localized in extent, but it is not possible to precisely predict the duration or context. Permanent damage to a rare or unique cultural resource would be a low probability, high consequence event.

Summary

Due to cultural resource protection measures, there would be no direct effects within the construction area. Indirect effects of construction on cultural resources are considered minor as they are likely to be low in intensity (perceptible), temporary to permanent in duration, local in extent, and important in context.

Direct Effects and Indirect Effects from Operation and Maintenance

No direct effects on cultural resources from operation and maintenance would occur under Alternative 5. However, indirect effects to cultural resources may include inadvertent damage from operation and maintenance of the docks and the ferry.

Summary

No direct effects on cultural resources are expected; indirect effects of operations and maintenance would be considered minor, as they would likely be low in intensity, temporary to permanent in duration, local in extent, and important in context.

Mitigation Measures

Under Alternative 5, mitigation would be required. An appropriate level of investigation and evaluation would be completed before any potentially destructive activities could begin [see Appendix F, Cultural Resources Mitigation Measure (MM-P)].

Cumulative Effects

The direct and indirect impacts of Alternative 5 are considered minor. The incremental contribution and total cumulative effects of Alternative 5 related to cultural resources are considered to be minor.

Conclusion

Implementation of Alternative 5 would have no direct effects, due to effective cultural resource project measures. Indirect effects of disturbance to cultural resources beyond the project area would likely be minor, based on low intensity (perceptible), temporary to permanent duration, local extent (discrete portions of the project area), and affecting resources that area important (rare) in context. Alternative 5 would make a minor contribution to cumulative effects on cultural resources. The impact level for cultural resources is expected to be minor.

4.6.3.9 Visual Resources

Direct Effects and Indirect Effects from Construction

Alternative 5 would consist of construction of the Lenard Harbor ferry terminal and major modifications to the existing Cold Bay dock. Negligible direct effects are expected to result from construction-related actions associated with Alternative 5. Construction-related impacts are expected to include increased vehicles and personnel, and potentially fugitive dust.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects to visual resources are expected as a result of implementation of Alternative 5. Improvement and use of the Lenard Harbor and Cold Bay docks would change the overall landscape character of the communities of King Cove and Cold Bay. The maritime aesthetic is consistent with current use and landscape character of Cold Bay. Operation of the ferry could introduce moderate visual contrast to the surrounding landscape; however, periods where the vessel was in view would be episodic and transient, and views of the ferry may also result in a direct effect to visual resources. The 6 days a week schedule is expected to be consistent with the landscape character of the communities of King Cove and Cold Bay, and the current use of Cold Bay. No reduction in scenic quality for any administrative area is expected as a result of implementation of Alternative 5.

Indirect effects to visual resources may be realized as a result of increased visual access to surrounding views. The deck of the ferry would promote access to views of Cold Bay and the surrounding landscape.

Under this alternative, approximately 5,430 acres of King Cove Corporation selected lands could be withdrawn from the Izembek Wilderness and conveyed to the King Cove Corporation. It is unclear how visual resources in the area could change based on conveyance of selected lands because there is no identified proposed future use. The parcel is contiguous with other parcels conveyed to King Cove Corporation and future uses would be subject to Section 22(g) of ANCSA.

Summary

Direct effects to visual resources would be minor, which would include additional views of the ferry and ferry terminals from Izembek National Wildlife Refuge Cold Bay and views of the surrounding landscape from the ferry. Indirect effects would include potential changes in visual resources associated with the conveyance of selected lands to King Cove Corporation. Direct and indirect effects of the Alternative 5 are expected to be minor.

Direct impacts are expected to be low intensity; the small changes in the visual resources would be consistent with current use and landscape character of the Cold Bay region. Effects would be long-term to permanent, with changes in the visual character that last for the life of the plan or beyond. Effects would be localized, limited to the vicinity of Cold Bay, a discrete portion of the project area, and would affect a common resource (the visual resources of the marine environment of Cold Bay are typical of the area). The impacts of the potential conveyance of the selected lands would be low in magnitude because the parcel is contiguous with other parcels conveyed to King Cove Corporation and future uses would be subject to Section 22(g) of ANCSA. The impacts would have a local extent since effects would occur in the vicinity of the conveyed parcel. The impact level for visual resources is expected to be minor (indeterminate). As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

Mitigation Measures

No mitigation measures for visual resources are proposed as part of Alternative 5.

Cumulative Effects

Cumulative effects would be similar to those described in Section 4.3.3.9; however, the contribution of Alternative 5 is expected to result in changes to visual resources in the communities of Cold Bay and King Cove. Cumulative effects of the combined actions are expected to be minor (indeterminate).

Conclusion

As described above, direct and indirect impacts to visual resources due to the implementation of Alternative 5 would be of low intensity and long-term to permanent in duration, but localized and affecting resources that are common in context. The impact of Alternative 5 is considered minor (indeterminate) to scenic quality and visual resources. As described in Section 4.1.3, impacts may consist of complex trade-offs, including both beneficial and adverse elements. These are characterized as indeterminate. Where there are notable trade-offs, the effects are disclosed, but the deciding officer will make the evaluation of the character of the impact.

4.6.3.10 Wilderness Character

Direct Effects and Indirect Effects

Under Alternative 5, no land exchange would take place among the Service, the State of Alaska, and King Cove Corporation. The parcel of land currently selected by King Cove Corporation, and located within Izembek Wilderness, could continue to be designated as wilderness by the Service until the parcel was eventually conveyed to the King Cove Corporation. The parcel would be subject to potential development under the terms of ANCSA 22(g) if conveyed to King Cove Corporation; however there are no future plans identified for development. This parcel is located on the east side of Cold Bay, at the edge of the Izembek Wilderness. The right to select this parcel pre-dates the establishment of Izembek Wilderness.

During the construction phase of Alternative 5, the operation of heavy equipment, vehicles, and pile driving equipment would produce noise above ambient levels (50 dBA) that would be audible from within Izembek Wilderness (USACE 2003). These activities would have localized impacts to some visitors to Izembek Wilderness through a diminished opportunity for experiencing natural quiet and opportunities for primitive recreation.

During the operation phase of Alternative 5, ferry service would provide year round service between Lenard Harbor and the Cold Bay dock, conducting 1 round trip per day, 6 days per week. These activities would be audible within Izembek Wilderness; however, noise levels from ferry services would be less than levels generated by hovercraft operations in Alternative 4 (USACE 2003). Visual disturbances caused by ferry service would also be similar to those discussed under Alternative 4. Visitors to the Izembek Wilderness would experience increased intermittent, but persistent, disturbances in localized areas through the sights and sounds of ferry operations, reducing opportunities to experience solitude and primitive recreation within the wilderness. These impacts would be slightly detectable changes in wilderness character through the alteration of views of the ferry within the wilderness. Potential development of lands selected by the King Cove Corporation also has the ability to impact the solitude or primitive and unconfined recreation quality of wilderness character. The parcel is located at the edge of the Izembek Wilderness and is contiguous with other parcels conveyed to King Cove Corporation and any potential development would be subject under the terms of ANCSA Section 22(g).

Summary

Under Alternative 5, approximately 5,430 acres of King Cove Corporation selected lands could be withdrawn from the Izembek Wilderness and conveyed to the King Cove Corporation, subject to the provisions of ANCSA Section 22(g). The selected would continue to be designated as wilderness until conveyance.

The implementation of Alternative 5 would also result in low intensity impacts, with slight changes to wilderness character. Effects would be long-term, persisting for the duration of operations of the ferry. Effects would be localized, primarily in the portions of the wilderness closest to ferry terminals and operations. The impacts are considered to affect an area unique in context in Izembek Wilderness. Alternative 5 would have no direct and indirect impacts to the untrammeled quality, the natural quality, and the undeveloped quality of wilderness character. There would be minor direct and indirect impacts to the solitude or primitive and unconfined recreation quality, primarily due to the long-term alteration of views within Izembek Wilderness.

The overall direct and indirect impacts to wilderness character resulting from Alternative 5 would be minor.

Mitigation Measures

Two mitigation measures have been proposed associated with ferry terminal facilities in Lenard Harbor and the City of Cold Bay to help mitigate impacts to wilderness character (USACE 2003) [Ferry Terminal Facilities Management (MM-Z)]. These include:

- Signage would be posted to inform the public about unauthorized motorized use within Izembek Wilderness. These signs would be posted along existing roads and trails at the Izembek Wilderness boundary, especially on the west side of Cold Bay.
- Shielded lighting could be used at terminal areas during darkness to reduce adverse impacts to solitude or primitive and unconfined recreation.

Cumulative Effects

The construction of the road to the Northeast Terminal could increase unauthorized use of motor vehicles within Izembek wilderness.

The ferry operations proposed under Alternative 5 would create intermittent episodes of disturbance occurring over the life of the project through localized visual disturbance to visitors within Izembek Wilderness. Alternative 5 would have a minor contribution to cumulative effects on wilderness character within Izembek Wilderness.

Conclusion

The direct and indirect impacts to wilderness character resulting from Alternative 5 would be considered minor. The duration of impacts to the views of users within Izembek Wilderness would be long-term and noise impacts would be intermittent episodes of disturbance occurring over the life of the project. The impact of Alternative 5 on wilderness character within Izembek Wilderness is considered minor.

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