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National Wildlife Refuge Land Exchange/Road Corridor

Draft Environmental Impact Statement

Chapter 4 Environmental Consequences

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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 CEQ 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, where 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 discreet 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.

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.

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; <10% of EIS 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.
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 lost 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 the 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.
	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 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.

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 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 at 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 5 to 7 years and would return to pre-activity levels at 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.

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 Criteria for Determining Impact Level 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**: >10% increase or decrease in social indicators (such as employment, population, or tourism levels).	**Medium**: 5% to 10% increase or decrease in social indicators.	**Low**: <5% increase or decrease in social indicators.
	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.	**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.	**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 aspect of wilderness character.	**Low**: Changes to wilderness character would be slightly (if at all) detectable by the visitor, though 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, or extend greater than 1 year.	**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; <10% of EIS project area affected. 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.

4.2 Alternative 1 – No Action – Existing Air and Marine Service

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 generated from potential 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.

As the Draft EIS was approaching completion, the Aleutians East Borough sent the Service a letter stating that they will not resume hovercraft service in the foreseeable future. Due to the timing of the letter, we are unable to restructure the analysis of consequences to reflect this change in the No Action alternative in the Draft EIS. While the Borough does not plan to operate the hovercraft, all other aspects of the No Action alternative remain the same. The Final EIS will reflect this change and other changes that are made in response to public comments.

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

With the No Action alternative, hovercraft operations are expected to resume from the Northeast Hovercraft Terminal in 2013, 3 days per week April through October. 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. Table 4.2.1-1 shows the direct emission estimates for the hovercraft operations 3 days per week, for 7 months.

Alternative 1 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.

Summary

Direct and indirect effects from the operation of the hovercraft would be low intensity, long-term duration, local extent, with a common context, resulting in negligible effects.

Table 4.2.1-1 Estimated Air Pollutant Emission Rates for Alternative 1 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 hp)	4,401 MMBtu/yr	6.48	1.72	0.003	0.12	0.12	0.17	334
Cushion Lift Engines (2 x 905 hp)	3,041 MMBtu/yr	4.87	1.29	0.002	0.09	0.09	0.13	251
Service Power Engines (3 x 8kW)	54 MMBtu/yr	0.12	0.03	0.008	0.008	0.008	0.01	443
TOTAL (tons per year)		**11.5**	**3.04**	**0.01**	**0.21**	**0.21**	**0.30**	**590**

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.

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 Hovercraft 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 would be complete prior to the resumption of the hovercraft operations in late 2012. 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 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 continuing effects from the operation of the hovercraft 3 days per week, April through October, would have a negligible contribution to cumulative effects for air quality in the EIS project area.

Conclusion

Alternative 1 would have a negligible direct effect on air quality in the immediate vicinity of the hovercraft. 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. The overall effect of Alternative 1 on air quality would be negligible.

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, and changes to storm intensity and frequency. 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 implementation of 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 following 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
- Hovercraft service from April through October, 3 times per week after completion of the permitted road scheduled in late 2012

These modes of transportation would still be in use for each action alternative described in the following sections, with the exception of the hovercraft 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 hovercraft transportation.

The King Cove and Cold Bay communities have small populations. Under Alternative 1, vehicular traffic is limited since no roads extend outside of either community. For comparison between alternatives, emissions from flights and personal fishing vessels are not quantified, since these could be the same for all Alternatives (1-5) and are difficult to quantify. State ferry service, which operates 2 trips per month (May – September), would be the same for each alternative and is included in the emissions calculations. Greenhouse gas emissions measured as carbon dioxide equivalent were estimated for ferry and hovercraft service, and are summarized in Table 4.2.1-2 below. The total of 620 tons per year of emissions is equal to approximately 0.02% of the State of Alaska's estimated emissions from on-road vehicles and less than 0.01% 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 1 is considered low.

Table 4.2.1-2 Summary of Annual Greenhouse Gas Emissions for Alternative 1

Activity	Frequency	Estimated Annual Emissions of Carbon Dioxide Equivalent (tons/year)
Hovercraft	3 round trips/week (April to October)	590
State Ferry	2 round trips/month (May to September)	30
TOTAL		**620**

Note: Refer to Section 4.2.1.1 for complete details and assumptions regarding emissions calculations.

Greenhouse gases can remain in the atmosphere from decades up to centuries or longer. Therefore, direct effects would be long-term in duration. Greenhouse gas concentrations contribute to warming the planet and climate change on a global level (IPCC 2007). Therefore, direct effects would be extended. 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. Therefore, the context of direct effects to climate change is considered to be important.

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. The direct and indirect impacts to climate change would be negligible due to the low magnitude, although the duration would be long-term, the extent would be extended, and the context would be important.

Mitigation Measures

The impacts to climate from Alternative 1 are expected to be negligible, 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. Over time, greenhouse gases are removed from the atmosphere due to natural, chemical processes. The removal rate varies between the different gases and can also vary based on conditions such as gas concentration in the atmosphere, changes in vegetation coverage, temperature, or other background chemical conditions (Solomon et al. 2007). 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. The effects are additive because the more greenhouse gases that are emitted, the higher the greenhouse gas atmospheric concentrations, and consequently the higher the ability to warm the planet which leads to other climate change impacts, such as sea level rise, decrease in snow and ice extent, increase in temperature, and increase in storm frequency and intensity. The effects are also synergistic because as the concentration of greenhouse gases in the atmosphere increases, it also affects the ability for these gases to be removed or absorbed by the atmosphere. Therefore, greenhouse gases atmospheric concentrations will continue to increase, and perhaps accelerate, because of the continued increase in emissions and the potential decrease in the removal rate of these gases from the atmosphere (Solomon et al. 2007).

According to the International Panel on Climate Change, carbon dioxide is considered the most important greenhouse gas due to its dominant atmospheric concentration. Burning fossil fuels is the largest contributor to carbon dioxide emissions, accounting for approximately $^{2}/_{3}$ of the total since 1750 (Solomon et al. 2007). Scientists have identified specific climate trends that are attributed to these human-caused greenhouse gases emissions, including increases in air temperature, decrease in snow and ice extent, sea level rise, and decrease in ice thickness. The past greenhouse gas emissions are expected to lead to warming and climate change in the future, even if greenhouse gases emissions were to halt (Solomon et al. 2007).

Reasonably foreseeable future actions that would cumulatively contribute to global climate change impacts include but are not limited to actions that emit greenhouse gases, absorb heat, and remove trees that can remove carbon dioxide from the atmosphere. On a global level, the continued use of fossil fuel combustion vehicles, fossil fuel use for manufacturing and energy production, and the continued exploration and development of fossil fuel reserves are some of the major past, present, and future contributors to cumulative climate change effects. In the EIS

project area, these types of future activities 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, they combine to create a perceptible change to climate. 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 1 would roughly equal the average annual carbon dioxide emissions from 127 U.S. passenger cars (EPA 2007). Although the amount of carbon dioxide is measurable, on a global scale, emissions from 127 U.S. passenger cars is expected to contribute a negligible amount to global cumulative effects to climate change.

Conclusion

Alternative 1 is expected to have negligible direct effects due to the low magnitude, although the duration would be long-term, the extent is extended, and the context is important. Global climate change effects currently have a high enough intensity that perceptible changes around the globe have occurred as described above. However, when compared to other global actions, Alternative 1 is expected to have a negligible contribution to cumulative effects. The overall contribution to climate change would be 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

Construction would have no direct or indirect effects on geology and soils.

Direct Effects and Indirect Effects from Operation and Maintenance

With the No Action alternative, hovercraft operations are expected to resume from the Northeast Hovercraft Terminal after completion of the access road in late 2012, 3 days per week April through October. The indirect effects on soils from hovercraft operations may include shoreline erosion from wave action generated by the hovercraft during departures and arrivals. The hovercraft would be refueled on land.

Summary

Indirect effects to geologic resources would be of medium intensity, long-term in duration, localized in extent, and common in context. Therefore, the effects from operation and maintenance would be negligible to minor.

Mitigation Measures

Applicable mitigation measures identified in the 2003 EIS for hovercraft operations include a Storm Water Pollution Prevention Plan and the use of spill containment structures to minimize fuel releases to soils during refueling of the hovercraft on land. No additional mitigation measures for Alternative 1 have been identified.

Cumulative Effects

Past and present effects on geologic resources include disturbance of soils and beach materials at the new Northeast Hovercraft Terminal, and soils along the road corridor from the City of King Cove to the new facility and at the Lenard Harbor material site. The estimated completion of the permitted road and new hovercraft facility is planned for late 2012. Geologic resources from the Lenard Harbor material site would be used for construction of the road and pad for the new hovercraft 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 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 would have no effect on geologic resources or soils. The Cold Bay Airport Runway Safety Area 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 geology or soil resources. The continuing effects

from the operation of the hovercraft 3 days per week, April through October, would have a negligible contribution to cumulative effects on geology and soils in the EIS project area. With negligible direct or indirect effects to geologic processes and soils expected under Alternative 1, it would have a negligible contribution to cumulative effects on these resources.

Conclusion

Alternative 1 would result in negligible to minor direct and indirect effects on geologic resources and soils in the project area. These effects may include shoreline erosion from wave action generated by the hovercraft during departures and arrivals, which would be a negligible contribution to cumulative effects on geology and soils. Alternative 1 would have a negligible to minor effect to geologic resources and soils.

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 direct or indirect effects would occur on hydrologic processes from construction.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects to water resources or water quality may occur under Alternative 1 during use of marine and hovercraft modes of transportation, but would be negligible under routine operations. 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 ferry and hovercraft vessels. These impacts were considered and analyzed in the 2003 EIS.

Waters of the State of Alaska (surface water and groundwater) are regulated by the ADEC in accordance with Alaska Administrative Code (AAC), 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 marine and hovercraft modes of transportation, but would be negligible under routine operations. Although effects would be long-term in duration, they would be low intensity, local in extent, and common in context. 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 currently being implemented for existing hovercraft operations. Mitigation measures for potential fuel spills occurring during operation and maintenance of the hovercraft are described in a Hazardous Material and Petroleum Product Control Plan which also includes 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. The hovercraft would be refueled on land (USACE 2003).

Cumulative Effects

Direct and indirect impacts to water resources and water quality may occur within Cold Bay. The impacts from ferry and hovercraft vessels may include fuel and sewage releases at the docking locations and along the preferred routes of the marine vessels. These impacts were considered and analyzed in the 2003 EIS. 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 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. The continuing effects from the operation of the hovercraft 3 days per week, April through October, would have a negligible contribution to cumulative effects on hydrology and hydrologic processes in the EIS project area. Therefore, Alternative 1 would have only a negligible contribution to cumulative effects on these resources.

Conclusion

Impacts to water resources and water quality related to Alternative 1 would result in negligible direct and indirect effects. These effects may include fuel and sewage releases at the docking locations and along the preferred routes. There would a negligible contribution to cumulative effects. Alternative 1 would have an overall negligible effect on hydrologic processes and water quality.

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

Operation and maintenance activities would occur with resuming hovercraft operations between the Northeast Hovercraft Terminal and Cross Wind Cove. Effects were considered and analyzed in the 2003 EIS; no evidence of contamination was found at the Northeast Hovercraft Terminal site. During operation, fuel for the hovercraft would be trucked from the City of King Cove to the 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 Hovercraft Terminal facility. 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.

Summary

Operation and maintenance effects from hazardous materials may occur under Alternative 1 during use of the hovercraft, but would be negligible under routine operations because they would be temporary in duration, low in intensity, local in extent, and common in context. Fuel spills are a low probability event, but could affect water quality.

Mitigation Measures

Mitigation measures identified in the 2003 EIS to control the release of hazardous materials or petroleum products are addressed in a Hazardous Material and Petroleum Product Control Plan, which includes a Fuel Handling and Spill Response Plan. 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 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 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 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 negligible direct and indirect impacts regarding hazardous materials, and a negligible contribution to cumulative effects. Fuel spills are a low probability event, but could affect water quality.

Conclusion

Alternative 1 would have no impacts to hazardous materials and waste management other than those addressed and analyzed in the 2003 EIS. Alternative 1 would have negligible direct and indirect effects from hazardous materials and waste management handling because any possible effects under routine operations would be temporary in duration, low intensity, local in extent and common in context. Fuel spills are a low probability event, but could affect water quality. This alternative would have 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

With the No Action alternative, hovercraft operations are expected to resume from the Northeast Hovercraft Terminal in 2013, 3 days per week April through October. The 2003 EIS provided expected noise levels, including contours, from a newer generation hovercraft; the actual hovercraft that is expected to restore service was unknown at the time of the 2003 EIS preparation. The estimated noise level at 1,000 feet was 68 A weighted decibels (dBA). This value is slightly higher than the existing hovercraft, which has a manufacturer rating of 65 dBA at 1,000 feet (Buls 2006). 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 existing hovercraft, along with the natural environment, these values are expected to be conservative.

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. The underwater noise generated by hovercraft is typically lower than those of conventional marine vessels of similar size (Blackwell and Greene 2005).

Summary

The direct and indirect noise effects from the operation of the hovercraft from the Northeast Hovercraft Terminal would be negligible. Effects would be at a medium intensity, long-term duration (intermittent but persistent for the life of the project), and local extent with common context.

Mitigation Measures

The mitigation measures currently in place to reduce impacts for the operation of the hovercraft, described in the 2003 EIS, should be effective in reducing potential adverse effects to noise. No additional mitigation measures would be implemented under Alternative 1 because no new noise generating activities are associated with this alternative.

Cumulative Effects

While no new noise generating activities would occur under Alternative 1, negligible direct and indirect effects to the noise environment from operations of the hovercraft would occur. 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 complete prior to the resumption of the 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 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. The continuing effects from the operation of the hovercraft 3 days per week, April through October, would have a negligible contribution to cumulative effects on noise in the EIS project area. Thus, operation of the hovercraft from the Northeast Hovercraft Terminal would result in a negligible contribution to cumulative effects on noise.

Conclusion

Alternative 1 would result in negligible direct and indirect effects on noise in the project area. Noise would consist of intermittent episodes, intermittently occurring over the life of the project, spread out over a relatively large area. Alternative 1 would have a negligible contribution to cumulative effects on noise and the overall effect on noise would be negligible.

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 land 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 have "values," which are also 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 alternatives described below are therefore recognized in relation to the functions of the affected plant communities and the values of those functions based on location.

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 and indirect effects to vegetation were already addressed in those documents.

Summary

Alternative 1 would result in no direct or indirect effects on vegetation from construction.

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 and hovercraft service from the Northeast Hovercraft Terminal.

Adoption of the No Action alternative would not introduce new impacts to vegetation. However, under this alternative, the King Cove Corporation selected lands would 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 Sec. 22(g). 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).

Summary

No new direct or indirect effects on vegetation would result from operation and maintenance, but the parcel selected by King Cove Corporation would continue through the conveyance process and could potentially be subject to development.

Mitigation Measures

No additional mitigation measures would be required.

Cumulative Effects

Alternative 1 would have no contribution to cumulative effects to vegetation because no vegetation-disturbing activity would be implemented.

Conclusion

Alternative 1 would not result in any new effects on vegetation.

4.2.2.2 Wetlands

Wetlands are important components of the landscape within the project area. 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).

The values of wetlands are considered to have been reduced when their functional capacity is 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 any habitat, biogeochemical, or hydrologic function. Wetlands both 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 Construction

Alternative 1 would have no new construction and so would have no direct or indirect effects on wetlands.

Summary

No direct or indirect effects on wetlands would result from construction.

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 Hovercraft Terminal that is estimated to fill 11 acres of primarily lowland wet sedge meadow wetland. Adoption of the No Action alternative would not introduce new impacts to wetlands.

Adoption of the No Action alternative would not introduce new impacts to wetlands. However, under this alternative, approximately 5,430 acres of King Cove Corporation selected lands (containing approximately 1,917 acres of wetlands) would be withdrawn from the Izembek Wilderness and conveyed to the King Cove Corporation.

Summary

No new direct or indirect effects on wetlands would result from operation and maintenance, but the parcel selected by King Cove Corporation would continue through the conveyance process.

The change in ownership of these lands would remove the wilderness designation and make the lands potentially available for development, subject to the provisions of ANCSA Section 22(g).

Mitigation Measures

No additional mitigation measures would be required.

Cumulative Effects

Alternative 1 would result in no additional direct or indirect effects on wetlands because no wetland disturbing activity would be implemented. Therefore, the alternative would not contribute to cumulative effects to wetlands.

Conclusion

Alternative 1 would not result any new effects on wetlands.

4.2.2.3 Fish and Essential Fish Habitat

Alternative 1 would continue the current transportation methods between King Cove and Cold Bay, including the use of the Aleutian East Borough's hovercraft from the Northeast Hovercraft Terminal 3 days per week, April through October, after the completion of the access road. Existing transportation via commercial air carriers and privately owned marine vessels would also continue. The primary mechanisms for effects on fish are noise and pollution generated from marine vessels and hovercraft operation. 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 Construction

Alternative 1 would have no new construction beyond what was authorized in the 2003 EIS and subsequent permits, so the alternative would have no direct or indirect effects 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

Direct effects from hovercraft operation under Alternative 1 include intermittent disturbance to marine fish 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 essential 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. Indirect effects resulting from hovercraft operation are not anticipated. Noise disturbance would be intermittent and minimal, particularly when compared to traditional marine vessels, as no propulsion mechanisms extend into the water.

Oil 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.

As hovercraft operation would cease in winter, additional marine vessel trips would be more likely to occur during that period. The small number of unique emergency trips, if any, add a negligible amount of impact in an area already accustomed to regular vessel traffic. No impacts to fish resources are expected to result from air travel.

Summary

Alternative 1would 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. Effects from the operation and maintenance of transportation options outlined in Alternative 1 would be of low intensity, long-term in duration (intermittent but persistent for the life of the project), local in extent, and would only impact common resources. Therefore, the direct and indirect effects from operation and maintenance under Alternative 1 would be negligible.

Mitigation Measures

The mitigation measures identified in the 2003 EIS 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 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;
- Prohibiting use of the hovercraft ramps for public boat launch or retrieval. This measure will ensure that the marine resources around the ramps are strictly exposed to the infrequent hovercraft traffic;
- A Hydro-Acoustic Assessment will be performed to validate the determination that underwater noise 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.

Cumulative Effects

Past actions affecting fish or essential fish habitat in or adjacent to the EIS project area are few because this remote location is largely undeveloped and inaccessible. 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 Hovercraft Terminal on Cold Bay and the construction of a new hovercraft landing site and terminal. This action would be complete in the latter part of 2012. 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 that the effects would be negligible. Likewise, appropriate design features were incorporated to ensure that 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.

Effects from the operation and maintenance of transportation options outlined in Alternative 1 would be primarily associated with vessel noise. There would be a negligible contribution to cumulative effects on fish and essential fish habitat under Alternative 1.

Conclusion

Direct and indirect effects to fish and fish essential fish habitat, resulting from vessel noise, would be of low intensity, long-term in duration (intermittent but persistent for the life of the project), local in extent, and would only impact common resources. Alternative 1 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 1 would be negligible.

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.

Summary

Alternative 1 would have no direct or indirect effects from construction on birds.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative includes hovercraft operations 3 days per week between April and October (upon completion of the access road to the Northeast Hovercraft Terminal), continuing regularly scheduled commercial air flights between King Cove and Cold Bay, and twice-monthly (May – September) state ferry service between King Cove and Cold Bay. Hovercraft and ferry use is most likely to affect seabirds and waterfowl since those groups are more likely to occur in Cold Bay. The effects of the hovercraft on birds include flushing when a vessel approaches. The frequency of encounters would be intermittent (3 round trips per week), but would persist for the life of the project at a low intensity. The duration of effects is considered long-term (intermittent but persistent for the life of the project), occurring in a localized geographic area. The ferry would be less likely to disturb waterfowl since it does not pass near Kinzarof Lagoon or nearshore waters. Birds have likely become accustomed to boat traffic in Cold Bay, so disturbance from the ferry would be negligible. The continuation of commercial air flights would affect birds in the vicinities of the Cold Bay and King Cove airports and along the flight paths. It is likely that birds have become habituated to aircraft activities in the area.

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.

Under 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 would 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

The direct and indirect effects from the operation and maintenance of Alternative 1 on birds would be low intensity¸ long-term duration (intermittent but persistent for the life of the project), local in geographic extent, and would generally affect resources that are common. The overall impact of the direct and indirect effects is considered minor.

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 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

Direct and indirect impacts to birds from Alternative 1 would be low intensity, long-term to permanent in duration (intermittent but persistent for the life of the project), local in extent, and would affect both common and unique resources. If the King Cove Corporation selected lands are withdrawn from wilderness status and conveyed, potential land use changes would be 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 effects to birds using these lands, including localized loss of habitat and increased periodic disturbance. The contribution of Alternative 1 to cumulative effects on birds would be minor. The summary impact of Alternative 1 on birds is considered minor.

4.2.2.5 Land Mammals

Direct Effects and Indirect Effects from Construction

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

Summary

Alternative 1 would have no direct or indirect effects from construction.

Direct Effects and Indirect Effects from Operation and Maintenance

The No Action alternative includes resuming hovercraft operations 3 days per week between April and October (estimated April 2013), continuing regularly scheduled commercial air flights between the communities of King Cove and Cold Bay, and twice-monthly (May – September) state ferry service between King Cove and Cold Bay. These activities may briefly disturb land mammals near operations at the Northeast Hovercraft Terminal, Cross Wind Cove, and the King Cove and Cold Bay airports. The duration of land-based operations would be brief and the frequency of disturbances would be limited, 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. This is the same conclusion that was reached in the 2003 EIS (USACE 2003).

Under Alternative 1, 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. 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), which could adversely affect brown bears, caribou, and other land mammals.

Summary

The direct and indirect effects from the operation and maintenance of Alternative 1 on land mammals 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), local in geographic extent, and would generally affect resources that are common. However, caribou are considered important because their current population is below management objectives, which precludes subsistence harvest opportunities in the EIS project area, and brown bear are considered important because of the establishment of the Izembek Controlled Use Area to regulate brown bear harvest. The overall impact of the direct and indirect effects is considered negligible to minor.

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. 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 negligible contribution to cumulative effects on land mammals due to increased human activity in the project area.

Conclusion

Direct and indirect impacts to land mammals from Alternative 1 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 generally affect common 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 is below management objectives, which precludes subsistence harvest opportunities in the EIS project area and brown bear are considered important because of the establishment of the Izembek Controlled Use Area to regulate brown bear harvest. Effects would be at a low intensity, permanent duration, and local extent. The contribution of Alternative 1 to cumulative effects on land mammals would be negligible. The summary impact of Alternative 1 on land mammals is considered negligible to minor.

4.2.2.6 Marine Mammals

Alternative 1, the No Action alternative, would be a continuation of existing transportation options between the communities of King Cove and Cold Bay. The hovercraft service from Lenard Harbor, suspended in November 2010, would resume from the Northeast Hovercraft Terminal upon completion of the hovercraft terminal facility and access road in late 2012. This alternative is therefore similar to Alternative 1 in the 2003 EIS, except for differences in the seasonality and frequency of operation. In the present alternative, service is planned for 3 days per week, April through October, with no service during winter months. Other differences are that the access road, building, and other infrastructure elements have been constructed or permitted (and under construction) since 2003.

Evaluations included here build upon the analysis for Alternative 1 in the 2003 EIS, any new relevant information, and any potential changes in effects associated with the proposed scheduling differences.

Under this alternative, the King Cove Corporation selected lands would be conveyed from the Service to the King Cove 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 4.2.2.7, 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 Hovercraft Terminal and construction of the hovercraft storage facility.

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 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, or habitat degradation. The analysis of effects and conclusions take into consideration mitigation measures proposed in the 2003 EIS that are equally applicable to the present EIS. The specific mitigation measures considered are listed in the Mitigation Measures section below.

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 Hovercraft Terminal and Cross Wind Cove traverses possible feeding and transit areas for these species. With the limited service proposed under Alternative 1 and the infrequency of occurrence of these species, the possibility for interactions would be limited. However, if the hovercraft intersects 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 on hovercraft noise effects on marine mammals. Dickins (2003) conducted a review of existing information in conjunction with the 2003 EIS (Appendix E2, 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 that the maximum distance at which it would be detected underwater 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 travels 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 (2003 EIS Mitigation Measure 6) 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.

Mitigation Measure 5 in the 2003 EIS includes a year round exclusion zone that prohibits hovercraft travel north of the direct line route between the Northeast Hovercraft 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 1 through 4 from the 2003 EIS 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.

Summary

Behavioral effects on harbor seals, killer whales, harbor porpoise, and gray whales from the hovercraft operations would be of low to medium intensity. 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 should minimize disturbance effects. Disturbance that may occur would be long-term (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, therefore, considered important in context.

Potential injury and habitat alteration effects would be of low intensity, temporary in duration, and local in extent. Imposing mitigation measures included in the 2003 EIS should minimize adverse effects.

The impact of Alternative 1 on harbor seals, killer whales, harbor porpoise, and gray whales would be considered negligible to minor.

Mitigation Measures

The following mitigation measures were proposed by the applicant in the 2003 EIS and excerpted for inclusion here. Included are those applicable to marine mammals and marine mammal habitat in the present EIS. The mitigation measure numbers are as found in the 2003 EIS.

- Aleutians East Borough [applicant] will incorporate an erosion and sediment control plan into project plans and specifications. The goal of this plan is to prevent the degradation of freshwater or marine waters from project activities. (Mitigation Measure 1)
- The construction contractor will prepare and implement a plan showing appropriate erosion and siltation controls that will be used and maintained during construction. (Mitigation Measure 2)
- Hazardous material and petroleum products will be handled in accordance with an approved ADEC [Alaska Department of Environmental Conservation] or EPA corrective action plan. (Mitigation Measure 3)
- Spill response supplies adequate in type and quantity for the equipment being used on the project shall be onsite and readily accessible at all times. (Mitigation Measure 4)
- Aleutians East Borough [applicant] will develop a comprehensive plan that will detail specific measures to be implemented to protect important fish and wildlife resources during project construction and operation. Included in this measure is the provision that no hovercraft will travel north of a straight line between the northeast terminal on Cold Bay and Cross Wind Cove terminals, except in the case of a life-threatening emergency. (Mitigation Measure 5)
- Aleutians East Borough [applicant] will develop a comprehensive marine mammal protection plan 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. (Mitigation Measure 6)

  The Marine Mammal Protection Plan was included as Appendix J6 in the 2003 Final EIS. It included the following stipulations:

  1. When any marine mammal is observed from the vessel the captain shall:
     (a) not approach to within 100 yards of the marine mammal;
     (b) change vessel course away from the marine mammal's observed and/or anticipated path of travel; and
     (c) adjust vessel speed as necessary in order to comply with (a) and (b) above.
  2. These provisions would not apply to the extent that a vessel is restricted in its ability to maneuver due to shoreline or navigational hazards, other nearby vessels or unanticipated conditions, which would create a safety hazard to the vessel, its crew and/or passengers.

3. No hovercraft or helicopter will travel north of a straight line between northeast terminal on Cold Bay and Cross Wind Cove terminals, except in the case of a life-threatening emergency.
4. Assume that your action is a disturbance and cautiously move away from the animals if you observe any of the following behaviors.
   - Rapid changes in direction or swimming speed
   - Erratic swimming patterns
   - Escape tactics such as prolonged diving, underwater exhalation, underwater course changes, or rapid swimming at the surface
   - Tail slapping or lateral tail swishing at the surface
   - Female attempting to shield a calf with her body or by her movements

   The hovercraft may approach harbor seal haul out sites in Kinzarof Lagoon in the event of a medical emergency during severe weather. If any of the following harbor seal behaviors are observed, marine vessels should cautiously leave the vicinity in order to minimize the disturbance:

   - Aggressive behavior by many animals towards the disturbance; or movement by many away from the disturbance
   - Herd movement towards the water
   - Hurried entry into the water by many animals
   - Increased interactions with other animals
   - Increased vocalizations
   - Several individuals raising their heads simultaneously
5. All solid or putrescible waste generated during the project activity shall be removed or otherwise disposed of in a method approved by ADEC [Alaska Department of Environmental Conservation].
6. Procedures to protect marine mammals include:
   - Remain at least 100 yards away from any marine mammal that is on land, rock or ice.
   - Offering food, discarding fish, fish waste or any other food item is prohibited.
   - Do not handle pups.
   - Do not pursue marine mammals, as federal law prohibits it.
   - If the animals appear to be bothered by your presence, leave the area immediately.

- Several stipulations are associated with 2003 EIS Mitigation Measure 11; only 2 are listed here.

  A. Uncontrolled Motorized Access: The goal of this action is to prevent uncontrolled vehicle or boat access to the Izembek NWR [National Wildlife Refuge] Wilderness Area or important wildlife concentration areas in upper Cold Bay.
     ii) Aleutians East Borough [applicant] shall prohibit use of the hovercraft ramp for public boat launching or retrieval. Such prohibition shall be coordinated with the State of Alaska pursuant to the tidelands lease.

- A hydro-acoustic assessment of the hovercraft would be implemented in order to validate the determination that underwater noise would "not likely adversely affect" marine mammals. The plan of study should be reviewed, modified if necessary, and approved by NMFS [National Marine Fisheries Service], USFWS [Service], and the Corps at least 45 days prior to the implementation of the study. The approved study plan would be implemented no later than 30 days after commencement of hovercraft operations. AEB shall submit a draft plan of study at least 90 days prior to the commencement of hovercraft operations. The assessment will evaluate and measure the characteristics of underwater noise (wave frequency and intensity) from the hovercraft at varying distances as it is operated at varying speeds (stationary hover, normal operating speed, and maximum operating speed). A report documenting the collected information and findings of the assessment shall be provided the Corps, USFWS [Service], and NMFS [National Marine Fisheries Service] within 90 days after the completed field measurements.

  As an alternative to implementing this hydro-acoustic assessment, if an offsite acoustic assessment is completed by others (e.g., the manufacturer) which thoroughly addresses the underwater acoustic signature relative to the same, or equivalent type of hovercraft, that assessment may be substituted for the onsite assessment upon acceptance of the study by NMFS [National Marine Fisheries Service] and USFWS [Service] in coordination with the Corps. (Mitigation Measure 12)

  Such analyses are currently lacking, yet are integral to adequately assessing effects of hovercraft operations on marine mammals in Cold Bay.

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/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 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 a negligible contribution to cumulative effects on harbor seals, killer whales, harbor porpoise, and gray whales.

Conclusion

The direct and indirect effects of Alternative 1 on harbor seals, killer whales, harbor porpoise, and gray whales would be of low to medium intensity, as behavioral disturbance is possible. Effects would be long-term (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. Alternative 1 would result in a negligible contribution to cumulative effects on harbor seals, killer whales, harbor porpoise, and gray whales. The overall impact would be considered negligible to minor.

4.2.2.7 Threatened and Endangered Species

Alternative 1, the No Action alternative, would be a continuation of existing transportation options between the communities of King Cove and Cold Bay. The hovercraft service from Lenard Harbor that was suspended in November 2010 would resume from the Northeast Hovercraft Terminal upon completion of the hovercraft storage facility and access road in late 2012. This alternative is therefore similar to Alternative 1 in the 2003 EIS except for differences in seasonality and frequency of operation. In the present Alternative 1, service is planned for 3 days per week, April through October, with no service during winter months. Other differences are that the access road, building, and other infrastructure elements have been constructed or permitted (and under construction) since 2003.

Evaluations included here build upon the earlier determinations for Alternative 1 in the 2003 EIS, any new relevant information, and any potential changes in effects associated with the proposed scheduling differences.

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 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, but 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 beyond what is currently scheduled for completion of the road to the Northeast Hovercraft Terminal and construction of the hovercraft terminal facility.

Summary

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

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 Hovercraft 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 proposed in the 2003 EIS that are equally applicable to the present EIS. The specific

mitigation measures that were taken into consideration are listed in the Mitigation Measures section below.

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 1, eider presence would overlap with the operation of the hovercraft 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 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 (USACE 2003, Appendix E2). 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 Hovercraft 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 (see 2003 EIS Mitigation Measure 5 below) prohibits hovercraft travel north of the direct route between the Northeast Hovercraft Terminal and Cross Wind Cove, except in emergency situations. 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). Adherence to the exclusion area should mitigate most noise disturbance impacts, particularly 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 Measure 11 in the 2003 EIS was 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 Alternatives 1 and 4 of this EIS. 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 1 through 4 from the 2003 EIS 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

Given the mitigation measures, particularly the exclusion zone in northern Cold Bay, and limited service, disturbance effects on Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets from the operation and maintenance of the hovercraft as proposed under Alternative 1 would be minor. Effects would be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), and localized. Steller's Eider is listed as threatened under the *Endangered Species Act*, so is considered important in context. Yellow-billed Loon and Kittlitz's Murrelet are candidates for listed status, and their populations are declining so they are also considered important in context. The direct and indirect impact level is considered minor.

Mitigation Measures

The following mitigation measures were proposed by the applicant in the 2003 EIS and excerpted for inclusion here. Included are those applicable to Steller's Eiders, Yellow-billed Loon, Kittlitz's Murrelets, and their habitat in this EIS. The mitigation measure numbers are as found in the 2003 EIS.

- Aleutians East Borough will incorporate an erosion and sediment control plan into project plans and specifications. The goal of this plan is to prevent the degradation of freshwater or marine waters from project activities. (Mitigation Measure 1)

- The construction contractor will prepare and implement a plan showing appropriate erosion and siltation controls that will be used and maintained during construction. (Mitigation Measure 2)
- Hazardous material and petroleum products will be handled in accordance with an approved ADEC or EPA corrective action plan. (Mitigation Measure 3)
- Spill response supplies adequate in type and quantity for the equipment being used on the project shall be onsite and readily accessible at all times. (Mitigation Measure 4)
- Aleutians East Borough will develop a comprehensive plan that will detail specific measures to be implemented to protect important fish and wildlife resources during project construction and operation. (Mitigation Measure 5)

  The Fish and Wildlife Protection Plan was included as Appendix J5 in the 2003 Final EIS. The plan includes the following stipulations relevant to Steller's Eider. These measures would also mitigate impacts to Yellow-billed Loon and Kittlitz's Murrelet.

  1. No hovercraft, ferry, or helicopter will travel north of a straight line between the northeast terminal on Cold Bay and Cross Wind Cove except in the case of a life-threatening emergency.
  2. All solid or putrescible waste generated during the project activity shall be removed or otherwise disposed of in a method approved by ADEC [Alaska Department of Environmental Conservation].
  3. If threatened or endangered species are present during project construction, work shall be stopped and the appropriate resource agency contacted for recommendations prior to proceeding.
  4. 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. All utilities will be buried.
  5. Mitigation measures for protecting threatened and endangered species include:
     - Train project personnel in identification of threatened and endangered species
     - Remain at least 100 yards from a threatened and endangered species on land
     - Offering food, discarding fish, fish waste or any other food item is prohibited
     - Pursuit of threatened and endangered species is prohibited by law
     - If animals appear bothered, leave the area immediately

- Several stipulations are associated with 2003 EIS Mitigation Measure 11. Only a few are shown here.

  B. Uncontrolled Motorized Access: The goal of this action is to prevent uncontrolled vehicle or boat access to the Izembek NWR [National Wildlife Refuge] Wilderness Area or important wildlife concentration areas in upper Cold Bay.
     - ii) Aleutians East Borough shall prohibit use of the hovercraft ramp for public boat launching or retrieval. Such prohibition shall be coordinated with the State of Alaska pursuant to the tidelands lease.
     - iv) The response of Steller's Eiders to the hovercraft operation will be assessed during the first 2 winter seasons. The USFWS [Service] will monitor the reaction of Steller's Eiders within the No Transit Zone (NTZ; MM-5B.i) as

the hovercraft follows its proposed route. Data needs include environmental conditions, reaction and distance of Steller's Eider flocks seen from the hovercraft, and post-passage behaviors, if possible. A summary report will be prepared by USFWS [Service] and distributed to the Corps, AEB [applicant], and other interested parties by June of each year.

Cumulative Effects

Past and present actions that have and may continue to affect Steller's Eiders, Yellow-billed Loons, and Kittlitz's Murrelets in the project area are described in Section 3.2.7.1. 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 a component of Alternative 1 and, for the purposes of analysis, 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 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 a negligible contribution to cumulative effects on Steller's Eider, Yellow-billed Loon and Kittlitz's Murrelet.

Conclusion

The effects of hovercraft operations as proposed under Alternative 1 would be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), and localized. The change in ownership of the King Cove Corporation selected 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 have little value to any of the species considered here. The contribution to cumulative effects on these species is considered negligible. The summary impact of Alternative 1 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

No additional construction would be associated with this alternative beyond what is currently scheduled for completion of the road to the Northeast Hovercraft Terminal and construction of the hovercraft storage facility.

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

Potential direct and indirect effects on northern sea otters from operation and maintenance of the hovercraft between the Northeast Hovercraft 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 proposed in the 2003 EIS that are equally applicable to the present EIS. The specific mitigation measures that were taken under consideration are listed in the Mitigation Measures section below.

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 Hovercraft Terminal and Cross Wind Cove is closed to hovercraft operation except during life threatening emergencies (2003 EIS Mitigation Measures 5 and 6).

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 terminal at the Northeast Hovercraft 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 (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 1 through 4 from the 2003 EIS 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 the abbreviated schedule of operation associated with Alternative 1, long-term displacement of sea otters from any habitats is unlikely. Mitigation measures would reduce the frequency and duration of direct and indirect impacts of this alternative. Some disturbance and displacement is possible, but is likely to be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), 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 on sea otters is considered minor.

Mitigation Measures

The following mitigation measures were proposed by the applicant in the 2003 EIS and excerpted for inclusion here. The mitigation measures described above for Steller's Eiders would also reduce adverse effects on sea otters. The following are measures specific to marine mammal protection. The mitigation measure numbers are as found in the 2003 EIS.

- Aleutians East Borough [applicant] will develop a comprehensive marine mammal protection plan 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. (Mitigation Measure 6)

The Marine Mammal Protection Plan was included as Appendix J6 in the 2003 Final EIS. It included the following stipulations related to the above mitigation measure:

6. When any marine mammal is observed from the vessel the captain shall:
   (a) not approach to within 100 yards of the marine mammal;
   (b) change vessel course away from the marine mammal's observed and/or anticipated path of travel; and
   (c) adjust vessel speed as necessary in order to comply with (a) and (b), above.

   These provisions would not apply to the extent that a vessel is restricted in its ability to maneuver due to shoreline or navigational hazards, other nearby vessels or unanticipated conditions, which would create a safety hazard to the vessel, its crew and/or passengers.

7. No hovercraft or helicopter will travel north of a straight line between northeast terminal on Cold Bay and Cross Wind Cove terminals, except in the case of a life-threatening emergency
8. All solid or putrescible waste generated during the project activity shall be removed or otherwise disposed of in a method approved by ADEC [Alaska Department of Environmental Conservation].

9. Procedures to protect marine mammals include:
    - Remain at least 100 yards away from any marine mammal that is on land, rock or ice.
    - Offering food, discarding fish, fish waste or any other food item is prohibited.
    - Do not handle pups.
    - Do not pursue marine mammals, as federal law prohibits it.
    - If the animals appear to be bothered by your presence, leave the area immediately.

- A hydro-acoustic assessment of the hovercraft would be implemented in order to validate the determination that underwater noise would "not likely adversely affect" marine mammals. The plan of study should be reviewed, modified if necessary, and approved by National Marine Fisheries Service, USFWS [Service], and the Corps at least 45 days prior to the implementation of the study. The approved study plan would be implemented no later than 30 days after commencement of hovercraft operations. AEB [applicant] shall submit a draft plan of study at least 90 days prior to the commencement of hovercraft operations. The assessment will evaluate and measure the characteristics of underwater noise (wave frequency and intensity) from the hovercraft at varying distances as it is operated at varying speeds (stationary hover, normal operating speed, and maximum operating speed). A report documenting the collected information and findings of the assessment shall be provided the Corps, USFWS [Service], and National Marine Fisheries Service within 90 days after the completed field measurements.

  As an alternative to implementing this hydro-acoustic assessment, if an offsite acoustic assessment is completed by others (e.g., the manufacturer) which thoroughly addresses the underwater acoustic signature relative to the same, or equivalent type of hovercraft, that assessment may be substituted for the onsite assessment upon acceptance of the study by National Marine Fisheries Service and USFWS [Service] in coordination with the Corps. (Mitigation Measure 12)

  Such analyses are currently lacking, yet are integral to adequately assessing effects of hovercraft operations on marine mammals in Cold Bay.

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 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 a negligible contribution to cumulative effects on northern sea otters.

Conclusion

Some disturbance and displacement is possible during hovercraft operations under Alternative 1 and likely to be of low to medium intensity, long-term duration (intermittent but persistent for

the life of the project), 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 summary impact of Alternative 1 on sea otters is 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 to the Northeast Hovercraft Terminal and construction of the hovercraft storage facility.

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

Potential direct and indirect effects on Steller sea lions from operation and maintenance of the hovercraft between the Northeast Hovercraft 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 proposed in the 2003 EIS that are equally applicable to the present EIS. The specific mitigation measures that were taken into consideration are listed in the Mitigation Measures section below.

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 landings and takeoffs 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 Hovercraft 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 and the hovercraft would operate only 3 days a week along a specified route, 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, 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 are much quieter underwater than similarly sized conventional vessels.

Mitigation Measure 12 of the 2003 EIS would apply to Steller sea lions. 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.

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 being hit. 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 seal at the sea surface with little chance of physical injury (USACE 2003).

Mitigation Measures 5 and 6 in the 2003 EIS include a year round exclusion zone that prohibits hovercraft travel north of the direct line route between the Northeast Hovercraft 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 1 through 4 from the 2003 EIS 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 operation would be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), and localized. 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 for behavioral effects is considered minor.

Potential injury and habitat alteration effects would be of medium intensity, long-term duration (intermittent but persistent for the life of the project), and local in extent. Imposing mitigation measures included in the 2003 EIS should minimize adverse effects. The direct and indirect impact for injury and habitat alteration is considered negligible.

Mitigation Measures

The mitigation measures described above for northern sea otters apply to Steller sea lions.

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 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 a negligible contribution to cumulative effects on Steller sea lions.

Conclusion

Direct and indirect effects of hovercraft service under Alternative 1 on Steller sea lions would be of low to medium intensity, long-term duration, local extent, and would affect an important resource, resulting in a negligible to minor impact. The alternative would have a negligible contribution to cumulative effects. The overall impact of Alternative 1 on Steller sea lions is considered negligible to minor.

4.2.3 Social Environment

4.2.3.1 Land Ownership and Use

Direct Effects and Indirect Effects of Land Exchange

Land Ownership

Under Alternative 1, no lands would be exchanged and existing land ownership would remain the same for the foreseeable future, with the exception of conveyance of selected land to King Cove Corporation. The Corporation can elect to receive patent to its selected lands on the east side of Kinzarof Lagoon, effectively removing approximately 5,430 acres from the Izembek Wilderness. The selected lands, when patented, would be subject to the provisions of ANCSA Sec. 22(g), as described in Section 3.3.1.1. No road corridor would be established for construction under this alternative. 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 King Cove Corporation land would be unchanged, with the exception above.

Alternative 1 would have an indirect impact on current land ownership, as land status of certain state-owned tide and submerged lands would be affected. House Bill 210, the legislation authorizing the addition of tide and submerged lands of Kinzarof Lagoon to the Izembek State Game Refuge, was conditional upon the execution of the land exchange. According to Sec. 6(1) of the state legislation, if the land exchange authorized by the Act is declared null and void, the state-owned tide and submerged lands would remain in their former status.

Land Use and Management

Under Alternative 1, a road corridor connecting King Cove and Cold Bay would not be built and no land exchange would occur. With the exception of conveying lands selected by the King Cove Corporation, current land use would remain unchanged, and management plans would be remain in effect as shown in Table 4.2.3-1 below. The conveyance of King Cove Corporation selected lands from Izembek Wilderness may result in changes in land use on that parcel, subject to the requirements Section 22(g) of ANCSA.

Summary

Under Alternative 1, direct effects to land ownership, land use, and land management within the project area would result from the conveyance of King Cove Corporation selected lands within Izembek Wilderness. It is unclear how land use might change based on conveyance of selected lands, although future uses would be subject to Section 22(g) of ANCSA. Ownership and management of other parcels would not change. The provisions of House Bill 210 that added the tide and submerged lands of Kinzarof Lagoon to the Izembek State Game Refuge would be voided, per Section 6(1) of the bill.

The direct and indirect impacts of this alternative would be low in magnitude because the conveyance of Corporation-selected lands in Izembek Wilderness would result in some changes in land uses and management, but would be subject to Section 22(g) of ANCSA. Impact duration would be permanent. The impacts would have a local extent since effects would occur in the

vicinity of the conveyed parcel from Izembek Wilderness. The impacts would affect land resources that are common in context since the right to select this parcel pre-dates the establishment of Izembek Wilderness. The summary impact of Alternative 1 on land use and management would be considered minor; due to the localized nature of the impacts and that the lands are contiguous with other parcels conveyed to King Cove Corporation. 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

While the No Action alternative would result in a change in ownership and potential land use and management (associated with the conveyance of selected lands to King Cove Corporation), no mitigation measures are recommended.

Cumulative Effects

The direct and indirect impacts of Alternative 1 are considered moderate, because while no land exchange would occur, conveyance of King Cove Corporation selected lands would be completed, with uncertain implications for land use and management. Relevant past actions would include the entitlement and selection of King Cove Corporation land under ANCSA, and the enactment of ANILCA that designated wilderness areas throughout the state, including 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. Consequently, the incremental contribution of Alternative 1 to cumulative effects on land ownership, use, and management are considered minor.

Conclusion

Alternative 1 would result in the conveyance of King Cove Corporation selected lands, including 5,430 acres of lands currently in Izembek Wilderness. Due to uncertain implications to land use and management, and the requirements of Section 22(g) of ANCSA, the direct and indirect effects to land use and management would be minor. The contribution to cumulative effects would be minor and would not require mitigation. The overall impact of Alternative 1 on land ownership, use, and management would be minor.

Table 4.2.3-1 Land Use and Management Comparison Alternative 1

Exchange Parcel	Existing Condition			Under Alternative 1		
	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	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	Izembek National Wildlife Refuge Comprehensive Conservation Plan	Wilderness	Conveyed to King Cove Corporation	None	Private

4.2.3.2 Socioeconomics

Socioeconomic Assumptions for Analysis

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.

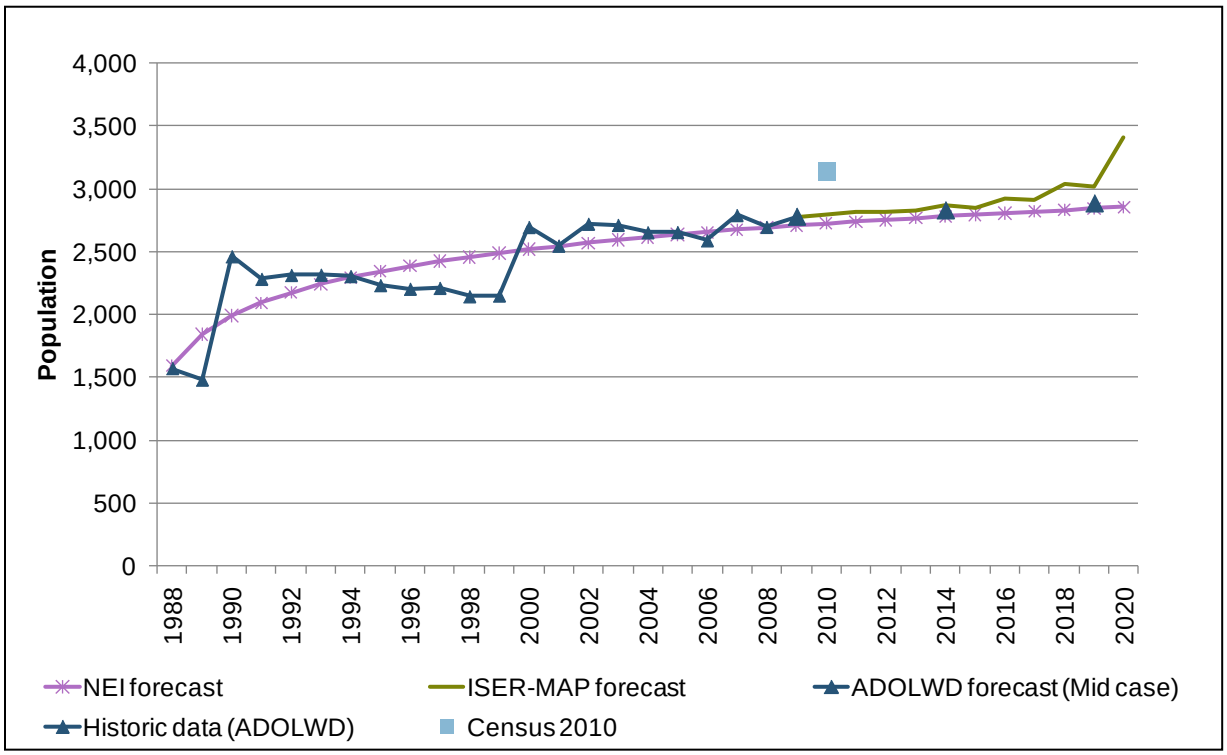
The socioeconomic effects of the various alternatives need to be estimated relative to a baseline. For purposes of this analysis, the baseline is considered to be the projection into the future of the socioeconomic conditions described in the Affected Environment chapter, before the hovercraft resumes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

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 4-1 compares the results, which are explained in further detail below.

Figure 4-1 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)

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 2009 and are shown as a continuous line with triangular markers in Figure 4-1. The historical population line in Figure 4-1 incorporates the 1990 and 2000 Census, but the 2010 Census population is shown separately as a blue square. It is thought that the high value for 2010 does not reflect a real change in the permanent population of the Aleutians East Borough, but rather 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. The Department of Labor projects low, medium, and high growth scenarios; only the medium growth scenario is considered here. Forecasts for the Aleutians East Borough are shown in disconnected blue triangles in Figure 4-1. According to the Department of Labor (medium growth) projections, the population in the Aleutians East Borough is expected to reach 2,887 persons by 2019. The Department of Labor approach consists of projecting forward in time from the 2009 population 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 significant 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 significantly 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, a significant 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 for details). However, the inclusion of the development of the large diameter natural gas pipeline from the North Slope to Calgary, which leads to the significant jump in population between 2019 and 2020 shown in Figure 4-1 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 4.2.3-2 Population Baseline Forecasts, 2009-2020

	Aleutians East Borough	City of King Cove	City of Cold Bay	Akutan	False Pass	Nelson Lagoon	Sand Point
2009	2,778	744	84	846	41	60	1,001
2010	2,724	751	75	822	55	70	950
2011	2,739	756	74	829	55	70	956
2012	2,754	761	73	835	55	69	961
2013	2,768	765	72	840	55	69	967
2014	2,782	770	71	846	54	69	972
2015	2,795	774	69	851	54	69	978
2016	2,808	778	68	856	54	69	983
2017	2,820	782	67	860	54	68	988
2018	2,832	786	66	864	54	68	993
2019	2,843	790	65	869	53	68	998
2020	2,854	794	64	873	53	68	1,002

In summary, the 10-year forecast for the Aleutians East Borough population shows an annual average growth of 0.5 percent, reaching about 2,850 by 2020 (Figure 4-1, and Tables 4.2.3-2 and 4.2.3-3). Tables 4.2.3-2 and 4.2.3-3 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 4.2.3-3. The year-over-year forecast growth rates for the City of King Cove are particularly important because they 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 4.2.3-3 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
2009	-	-	-	-	-	-	-
2010	-1.94%	1.00%	-10.18%	-2.80%	35.29%	16.35%	-5.13%
2011	0.56%	0.64%	-1.71%	0.78%	-0.49%	-0.34%	0.63%
2012	0.54%	0.62%	-1.68%	0.72%	-0.47%	-0.32%	0.61%
2013	0.51%	0.60%	-1.66%	0.68%	-0.46%	-0.31%	0.59%
2014	0.49%	0.58%	-1.64%	0.63%	-0.45%	-0.30%	0.57%
2015	0.47%	0.56%	-1.62%	0.60%	-0.44%	-0.29%	0.55%
2016	0.45%	0.54%	-1.60%	0.56%	-0.43%	-0.28%	0.53%
2017	0.44%	0.52%	-1.59%	0.53%	-0.42%	-0.27%	0.51%
2018	0.42%	0.51%	-1.57%	0.51%	-0.41%	-0.26%	0.50%
2019	0.40%	0.49%	-1.56%	0.48%	-0.40%	-0.25%	0.48%
2020	0.39%	0.48%	-1.54%	0.46%	-0.40%	-0.25%	0.47%

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.

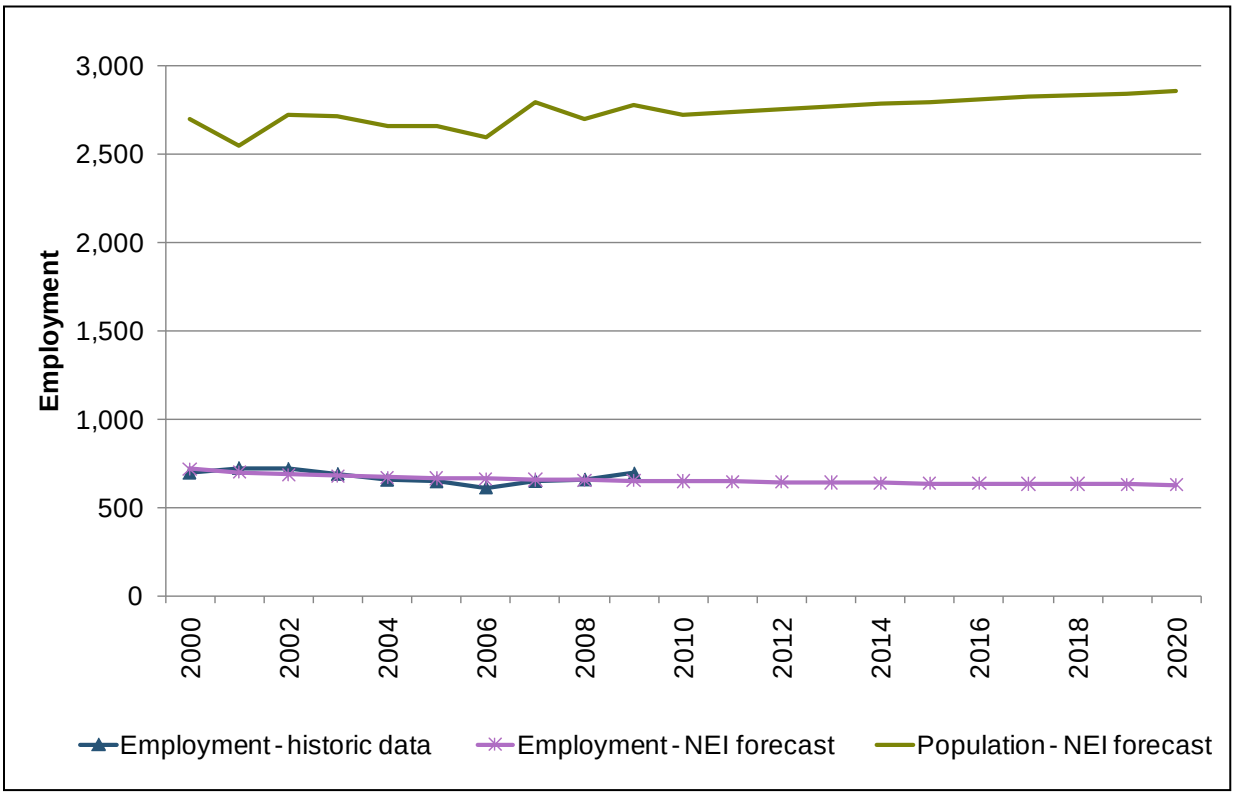
Any population forecast is uncertain and the precision declines as the projection extends further into the future. Projections for small areas also have a higher level of uncertainty. The fact that the approaches provide similar results is reassuring. Nevertheless the results in this section should be 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 -0.3 percent, reaching about 630 working residents by 2020 (Figure 4-2). 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.

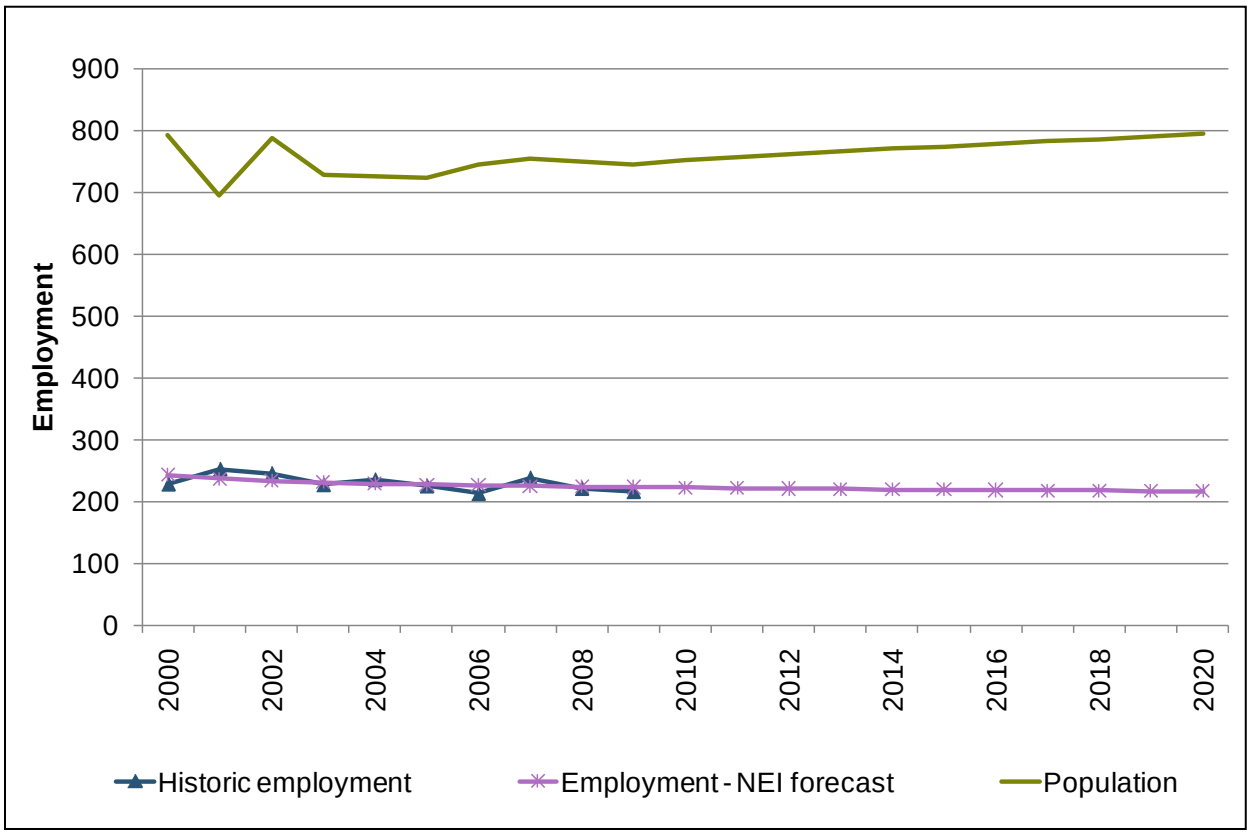
Figure 4-2 Baseline Forecasts of Employment by Place of Residence, Aleutians East Borough, 2000-2020



NEI – Northern Economics, Inc.

The 10-year forecast for employment by place of residence in the City of King Cove shows an annual average decrease of -0.3 percent, reaching about 220 working residents by 2020 (Figure 4-3). In addition to resident workers, it is anticipated that the large seafood processor (Peter Pan Seafoods) will continue to employ up to 500 non-residents during peak seasons.

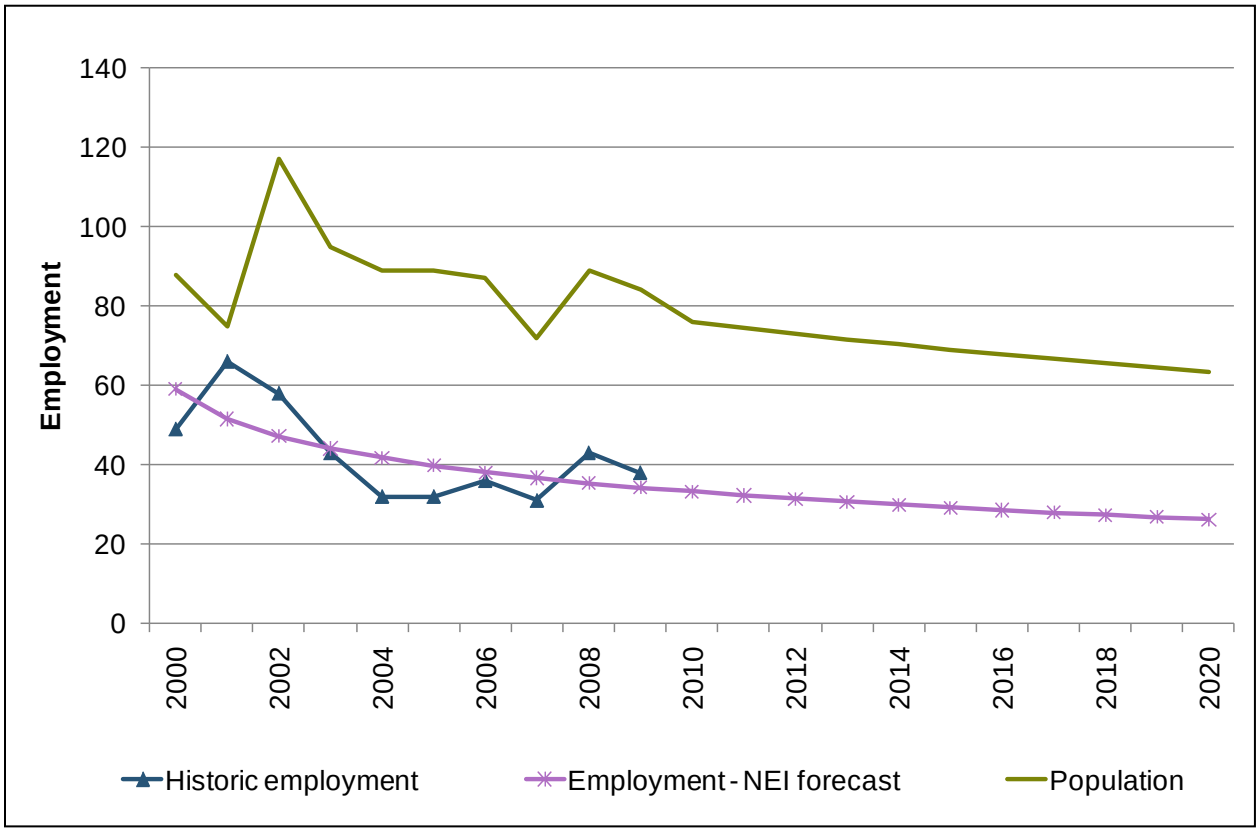
Figure 4-3 Baseline Forecasts of Employment by Place of Residence, City of King Cove, 2000-2020



NEI – Northern Economics, Inc.

The 10-year forecast for employment by place of residence in the City of Cold Bay shows an annual average decrease of -2.3 percent, reaching about 30 working residents by 2020 (Figure 4-4).

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



NEI – Northern Economics, Inc.

Baseline Fiscal Conditions of Local Governments

Under baseline conditions, the Aleutians East Borough has limited discretionary funds available to subsidize the transportation alternatives. Total general fund revenues have averaged about $7 million 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 significant 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.

Baseline Transportation Assumptions

To estimate travel expenses for the alternatives, the number of trips taken must be estimated. Table 4.2.3-4 shows the estimated total number of passenger trips for the years 2013 – 2020 and for 2025. These estimates are taken directly from the Transportation section (Section 4.2.3.3) where detailed assumptions regarding the trip estimates are provided. 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 varies across alternatives. In this section, the distribution of passenger trips by primary travel mode, as determined in Section 4.2.3.3, is used to estimate the total costs of travel, including the cost estimates of ground vehicle travel that will be required under the alternatives using the hovercraft and the ferry.

Table 4.2.3-4 Estimated Baseline Passenger Trips for all Alternatives and Induced Trips under Alternatives 2 and 3, 2013 – 2020 & 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Baseline Passenger Trips under all Alternatives	4,353	4,379	4,403	4,427	4,450	4,473	4,495	4,517	4,617
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	332	335	335	337	338	346
Total Trips under Alternatives 2 and 3	**4,353**	**4,879**	**4,903**	**4,759**	**4,785**	**4,808**	**4,832**	**4,855**	**4,963**

See Transportation, Section 4.2.3.3

In addition to estimates of baseline passenger trips, Table 4.2.3-4 contains estimates of induced trips. One set of trips are induced by the construction of the roads under Alternatives 2 and 3. These trips are not specifically addressed in this section, because they are part of the construction phase of the project and are presumably included in the construction cost estimates.

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 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. This set of induced trips will be discussed in greater detail under the specific alternative in which they occur.

To fully estimate the baseline travel costs, the total amount spent on hovercrafts, ferries, 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 Hovercraft 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 4.2.3-5 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 4.2.3-5 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 @ 20 mph (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 Hovercraft Terminal	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

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 the hovercraft, or for the proposed ferry—both 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 hovercraft 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 ferry and hovercraft 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. 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:

- Peter Pan Seafoods fish processing crews
- Managers and technicians for Peter Pan Seafoods
- Fishing crew members and fishery observers
- Residents and other persons not associated with fisheries

These 4 groups are addressed under each alternative. The groups are analyzed independently because each would have different travel patterns and modes and the impacts of the alternatives on these groups could vary considerably.

Finally, 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 were developed. These are described below.

Peter Pan Crew Bus/Van: This is assumed to be a Peter Pan owned vehicle or vehicles for the exclusive use of Peter Pan employees or contractors. The van is driven by a Peter Pan employee with a fully-loaded wage rate (including benefits) of $25/hour. For alternatives involving the hovercraft or ferry (Alternatives 1, 4, and 5), the vehicle is assumed to be an 11-passenger van, with 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, 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. 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 Peter Pan Crew Bus/Van for each alternative are shown in Table 4.2.3-6.

Peter Pan Sport Utility Vehicle: This is also assumed to be a Peter Pan owned vehicle for the exclusive use of Peter Pan employees or contractors. The sport utility vehicle is used to pick up or drop off a maximum of 3 managers and/or technicians traveling to/from the City of King Cove. The sport utility vehicle is driven by a Peter Pan employee with a fully-loaded wage rate (including benefits) of $25/hour. The sport utility vehicle is assumed to have a fully amortized cost of $1.00/mile. Because of its lower passenger capacity and thus relatively high costs, the sport utility vehicle is not used for transportation of personnel for the road alternatives; managers and technician are assumed to use the shuttle service to travel on the road to and from the Cold Bay Airport. Estimated costs per passenger for the Peter Pan sport utility vehicle for each alternative are shown in Table 4.2.3-6.

Commercial Shuttle Van: This is a commercial vehicle used to transport passengers between the City of King Cove and the marine terminals under Alternatives 1, 4, and 5, and between the City of King Cove and the Cold Bay Airport under Alternatives 2 and 3. The van seats up to 11 people and 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 4.2.3-6.

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 that the vehicle carries passengers in both directions. For trips to the marine terminals, it is assumed that the vehicle carries passengers in only 1 direction. Costs per passenger that accrue to the driver of personal vehicles are shown in Table 4.2.3-6.

Table 4.2.3-6 Estimated Ground Travel Cost per Passenger from the City of King Cove, by Alternative and Vehicle Type

Vehicle Type	Alternative 1: Hovercraft at Northeast Terminal	Alternative 2: Southern Road	Alternative 3: Central Road	Alternative 4: Hovercraft at Northeast Terminal	Alternative 5: Ferry at Lenard Harbor	Air Taxi Service: King Cove Airport
One-Way Cost per Passenger from the City of King Cove (2010)						
Peter Pan Crew Bus/Van	$15.28	$13.13	$13.68	$15.28	$6.96	$8.08
Peter Pan Sport Utility Vehicle	$81.47	n/a	n/a	$81.47	$37.13	$16.17
Shuttle	$33.00	$46.00	$48.00	$33.00	$19.00	$10.00
Free Driver + 2 Passengers (RT)	$21.60	$43.20	$45.20	$21.60	$9.60	$4.00

Alternative 1

Under Alternative 1, current air and marine modes of transportation between the cities of King Cove and Cold Bay would continue to operate. Scheduled hovercraft service would resume in April 2013, after the new terminal at the Northeast Hovercraft Terminal and its access road are completed in 2012. The hovercraft would make 1 round trip per day, with service 3 days per week during the months of April through October and no service during winter months.

Direct Effects and Indirect Effects from Construction for Alternative 1

No new construction would be required for Alternative 1. Facilities required for the hovercraft operations and the associated access roads would already be in place.

Direct Effects and Indirect Effects from Operation and Maintenance for Alternative 1

This section discusses the direct and indirect impacts of the Alternative 1 from 4 perspectives:

- The direct effect of the alternative in terms the number of trips taken, and the travel costs associated with that travel
- The direct and indirect effect on employment—how many and what kinds of jobs will be generated under the alternative
- The indirect and induced effects of the alternative on economic activity— is the alternative likely to generate a substantial change in the pattern of economic activities in the affected communities
- The population effects of the alternative
- The alternative's fiscal effects on local governments

Direct and Indirect Effects of the Alternative on Passenger Trips and Travel Costs

Under Alternative 1, the hovercraft terminal would be relocated from Lenard Harbor to 12.5 miles farther away to the northeast end of the bay. Hovercraft travel times between the Northeast Hovercraft Terminal and the Cross Wind Cove terminal are expected to decrease and the reliability of the service is expected to increase. Ticket prices for the hovercraft are assumed to remain at $76. The alternative would also increase ground travel times and costs between the terminal and the City of King Cove.

In general, the most significant measurable economic impact would be the effect on the cost of travel. If significant cost savings are realized, then the money that is not spent on travel can be used in other ways. If cost increases, then the additional money for travel needs must come from other sources. Other impacts of the alternatives are less easily measured as economic impacts, but are still likely to be important. An example of this latter type of impact would include changes in the time spent travelling. In theory, if less time is spent on travel, then more time can be spent in productive activities, or in leisure activities. Productivity and leisure are classified in a broad sense as economic benefits, but it is very difficult to translate either into terms that are comparable to dollars saved or dollars spent. Therefore, this section will focus on travel expenses of the alternative rather than on non-monetary issues.

Impacts on Key Economic Groups of Alternative 1

This section discusses the impacts of Alternative 1 on 4 key economic groups that travel between the communities of King Cove and Cold Bay using the modes of travel examined in the alternatives. The groups are analyzed independently because the 4 groups will have different travel patterns and modes. Estimates of passenger trips and total passenger travel costs by year are shown in Table 4.2.3-7. The total number of trips in both modes 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 4,353 to 4,517 between 2013 and 2020, and then up to 4,617 in 2025. Total travel costs would increase from $457,297 in 2013 to $474,466 in 2020. Ground vehicle travel accounts for about 10 percent of the total cost of travel by both travel modes, but represents 24 percent of the costs associated with hovercraft, but only 8 percent of cost associated with air travel.

Table 4.2.3-7 Estimated Trips and Travel Cost by Travel Mode and Group under Alternative 1, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Trips and Travel Cost for Passengers Using the Hovercraft with 3 Days per Week Service									
Resident and Non-Fishing Hovercraft Passengers	354	359	363	368	372	376	380	384	402
Fishery Related Hovercraft Passengers	434	434	434	434	434	434	434	434	434
Total Estimated Hovercraft Passengers	788	793	797	802	806	810	814	818	836
Total Cost of Hovercraft Trips ($ 2010)	$59,888	$60,268	$60,572	$60,952	$61,256	$61,560	$61,864	$62,168	$63,536
Additional Cost of Vehicle Travel ($ 2010)	$19,315	$19,451	$19,560	$19,697	$19,806	$19,915	$20,024	$20,134	$20,625
Estimated Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	1,599	1,620	1,640	1,659	1,678	1,697	1,715	1,733	1,815
Fishery Related Air Trips	1,966	1,966	1,966	1,966	1,966	1,966	1,966	1,966	1,966
Total Estimated Air Trips	3,565	3,586	3,606	3,625	3,644	3,663	3,681	3,699	3,781
Total Cost of Air Trips ($ 2010)	$349,370	$351,428	$353,388	$355,250	$357,112	$358,974	$360,738	$362,502	$370,538
Additional Cost of Vehicle Travel ($ 2010)	$28,725	$28,872	$29,012	$29,145	$29,278	$29,411	$29,537	$29,663	$30,237
Estimated Trips and Travel Cost for All Passengers Using the Both Modes									
Total Trips Both Modes	**4,353**	**4,379**	**4,403**	**4,427**	**4,450**	**4,473**	**4,495**	**4,517**	**4,617**
Total Cost of Trips for Both Modes ($ 2010)	**$457,297**	**$460,019**	**$462,532**	**$465,044**	**$467,452**	**$469,860**	**$472,163**	**$474,466**	**$484,936**

Travel Costs Estimates of Processing Crew

As indicated in Section 3.3.2.3, Peter Pan Seafoods is the largest employer in King Cove. Peter Pan experiences 2 employment peaks of about 500 employees. One peak is in the winter from late January through early March, and the other peak is in the summer from June through August. Off peak crews are much smaller with a minimum of 25 workers in December (Schwarzmiller 2010). From this information, it can be assumed that Peter Pan's processing crews make a total of 2,000 one-way trips between the City of King Cove and the Cold Bay Airport per year:

- 500 arrive at the beginning of the year and 500 leave in early spring.
- 500 arrive in June and 500 leave in late fall.

Under Alternative 1, the transportation assumptions estimate that approximately 18.1 percent of the one-way trips use the hovercraft at a one-way fare of $76 and the remaining 81.9 percent use the air service at a one-way fare $98. Specific information is not available about the modes that Peter Pan has used in the past, but it can be assumed that in general they use whatever modes are available on the days their crew members are scheduled to arrive and depart. Assuming that 100 percent of Peter Pan's processing crew use these modes, then we can assume that approximately 362 one-way trips would use the hovercraft and the air service would be used for 1,638 one-way flights.

Estimated total cost for these 2,000 passengers per year is $206,806. Total cost per passenger on the hovercraft including ground transportation would be $91.28 ($76 hovercraft fare plus $15.28

ground travel cost), while total cost per passenger by air would be $106.08 ($98 in air fare plus $8.08 in ground travel costs.) Ground travel costs are shown above in Table 4.2.3-7.

Travel Costs Estimates of Processing Managers and Technicians

In addition to processing crews, managers and technical staff frequently travel to and from the facility in the City of King Cove. While the specific number of trips taken by managers and technicians is not available, 200 one-way trips per year have been assumed. As with the processing crew, increases in this number of trips over time are not expected.

Under Alternative 1, managers and technicians are assumed to use the hovercraft 18.1 percent of the time, based upon the 2009 split between hovercraft (36 trips) and aircraft (164 trips). In general, it is assumed this group is averse to additional travel time relative to travel cost and would choose to fly, whenever flying is an option. When managers travel in vehicles to and from the Northeast Hovercraft Terminal, or to and from the King Cove Airport, an average of 1.5 passengers with a hired driver in the Peter Pan vehicle is assumed. The average calculated cost per passenger to and from the hovercraft terminal is $81.47, and $16.20 to and from the King Cove Airport. Total costs of travel on all modes are estimated at $24,392 or an average of $121.96 per passenger. The estimated total cost for trips using the hovercraft including ground travel cost ($157.47 per passenger) would be higher than the total cost to use the air taxi service ($114.17 per passenger).

Estimates of Fishing Crew and Fishery Observer Travel Costs

As discussed in the Affected Environment section (Section 3.3.2), Peter Pan has indicated that each year they make travel arrangements for approximately 200 trips between the City of King Cove and the Cold Bay Airport for non-resident fishing crews and fishery observers. This number is expected to increase by a small but unknown amount because of pending regulations approved by the North Pacific Fishery Management Council. The implementation of the regulation would increase the number of observers on fishing vessels that are less than 125 feet in length. An increase in deployed observers is expected to be in the range of 5 to 20 per year, but this analysis assumes that this group would continue to make 200 one-way trips per year. It is possible additional harvester trips between the Cold Bay Airport and the City of King Cove occur that are not arranged through Peter Pan, but information is not available to calculate those numbers and no assumptions about such trips are included in this analysis.

Under Alternative 1, fishing crews and observers are assumed to use the 2 available travel modes in proportion to levels assumed in Section 4.2.3.3, that is, 18.1 percent (36 trips) use the hovercraft and the remainder (164 trips) use the air service. Once on land, this group is assumed to use the commercial shuttle service to travel into the City of King Cove. Total costs for this group under Alternative 1 are $21,636, with the average cost per passenger on the hovercraft ($109.00/passenger) exceeding costs for air service ($108.00/passenger) by $1.00 per passenger, after ground transportation costs are included.

Travel Costs of Residents and Other Persons Not Associated with Fisheries

Information is not available that specifically estimates the number of trips taken between the communities of King Cove and Cold Bay by residents or other persons not associated with fish harvesting or processing that travel within the region. The number of trips of residents and other persons not associated with fisheries is assumed to equal the difference in the total number of

trips for the alternative (estimated in Section 4.2.3.3) and the number of trips by persons associated with the fishing and processing industry. These trips are referred to as "resident and non-fishery trips." Because it was assumed the number of trips related to the fishing industry is constant over time and alternative, any change in the number of trips from year to year, or across alternatives will occur in this economic group.

Section 4.2.3.3 estimates that in 2013, a total of 4,353 trips by all groups will use either the hovercraft or air service. As discussed above, fishery related trips sum to 2,400. Therefore in 2013, 1,953 resident and non-fishery related trips will be taken between the communities of King Cove and Cold Bay. Of these, 18.1 percent would travel by hovercraft (354 trips) and the remainder would travel by air (1,599 trips). With an average ground travel cost of $27.30 per passenger, the cost of travel on the hovercraft is estimated at $97.60 per passenger or $36,568 over all trips. Ground travel costs for the group assume that 50 percent of passengers would use the commercial shuttle service ($33.00 per passenger) and that the remainder travel in private vehicles with 2 other passengers at a cost of $21.60 per person.

The cost of air taxi service sums to $105.00/passenger ($98.00 + $7.00) on average for residents and other non-fishery trips. Ground travel is calculated by assuming a 50/50 split between the shuttle ($10.00 per passenger) and private vehicles with 2 other passengers ($4.00 per passenger). The total projected cost of travel by air in 2013 for the resident and non-fishing group, including ground travel, sums to $167,895 (1,599 trips at $105/passenger).

Direct and Indirect Effects on Employment

A crew of 3 persons would be required for operating the hovercraft, which would be based at the Northeast Hovercraft Terminal under Alternative 1. In addition, 2 other full time jobs may be needed. One job would be for a manager to handle the accounting and promotion of the hovercraft services, and the other would be for support of hovercraft operations (engineering, etc.). It is likely that non-residents will 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 would be filled by local residents of the communities.

As indicated in the estimation of travel costs, the relocation of the hovercraft terminal 12.5 miles beyond Lenard Harbor is likely to increase the demand for taxi drivers and shuttle drivers. Seven to 12 direct jobs are estimated to be created in the transportation sector. Data from the Department of Labor (ADOLWD 2011f) suggest that these could be filled by resident workers. In 2010, 32 workers were employed in the trade, transportation, and utilities industries in the City of King Cove, representing 15 percent of all resident non-federal wage and salary workers in the community. On the other hand, the community had 99 workers with experience in the trade (81), transportation and warehousing (16), and utilities (2) sectors during the past 5 years (ADOLWD 2011f). Overall, a total direct effect on employment of 7 to 12 persons in the transportation sector is estimated under Alternative 1.

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 and ground transportation services, 1.25 additional indirect and induced jobs are created in the local area (cities of King Cove and Cold Bay). Given an estimated $1.1 million in annual operating expenses for Alternative 1, 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 impact in the range of 8 to 14 jobs under this alternative. This is about 5 percent of the total number of jobs in the cities of King Cove and Cold Bay. Therefore, Alternative 1 would have a negligible impact on employment.

Population and Demographics

No effects on population would be expected if all the positions are filled by permanent residents. If the total additional 8-14 jobs were filled by nonresidents, then the alternative could lead to an increase in population of about 24-44 persons, assuming the average household size of 2.9 persons in the City of King Cove. The hovercraft pilot jobs are skilled positions that require certification and licensing. We would assume that these positions would be filled initially by non-residents, but residents would eventually obtain the necessary training and certification and would 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

Hovercraft operations are anticipated to result in about $1 million of annual losses to the Aleutians East Borough. This represents almost 15-20 percent of the borough's discretionary expenses in a fiscal year (expenses other than debt service, bonds, and school expense items in the budget). Hovercrafts are high-maintenance vessels and the borough would be responsible for 100 percent of the operation and maintenance costs estimated at about $1 million per year (including the costs of $100,000 per year into a sinking fund for major repair and overhaul during the 35-year life of the hovercraft). The operation and maintenance costs would not be fully covered with the estimated $0.08 million of annual revenues from the hovercraft operations. No acquisition capital costs would be required because the borough owns a hovercraft that is currently idle and available to resume operations. However, the Aleutians East Borough would be responsible for the replacement cost for a new hovercraft in 2035 at a cost estimated to be approximately $12 million.

As indicated in the baseline summary, the Aleutians East Borough has had a history in recent years of budget surpluses that have exceeded the projected net losses of the hovercraft. The borough also has a Permanent Fund and other undesignated capital funds of nearly $24 million. In theory, the budget surpluses and available capital funds could cover (i.e., subsidize) the net operating costs of the hovercraft for an indefinite period. However, subsidizing the hovercraft would limit the growth of the borough's capital funds, remove available discretionary funds for use in other borough communities, and potentially curtail the ability to fund other projects in the future. Alternative 1 would have moderate fiscal effects.

Summary

Alternative 1 would have negligible socioeconomic effects to the cities of King Cove and Cold Bay because the expected changes in employment, economic activity in transportation, and population would all be of low intensity, with a local extent. For analysis purposes, the duration would be long-term to permanent, with a common context. Transportation costs between the

cities would continue in excess of $100 per passenger trip, if ground travel costs are included. The Aleutians East Borough would need to continue to subsidize the hovercraft at roughly the cost of $1 million annually, although at a slightly lower rate over time, as travel is assumed to increase with population, while costs and ticket prices are assumed to remain constant in real terms. The fiscal effects to the Aleutians East Borough would be of medium intensity, permanent duration, regional extent, and common context. The summary fiscal impact is therefore considered moderate.

Mitigation Measures

Measures to mitigate the negative fiscal impacts to the borough could include adjustments in fares, efforts to increase the hovercraft's revenues from mail and freight transportation, and external grant sources to subsidize operations.

Cumulative Effects

Effects to the local government have been influenced by the 2003 EIS and the operations of the 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. The projected increase in transportation needs due to additional fishery observers in the area were described in this section. Alternative 1 would generally perpetuate existing conditions; with no additional contribution to cumulative effects on socioeconomic indicators.

Conclusion

While transportation modes and costs are expected to be held constant, the direct and indirect effects to population and demographics and to employment would be negligible. Effects to these indicators would be of low intensity, over a permanent duration, with a local extent, and a common context. Effects to fiscal resources for the local government would be of a medium intensity due to the projected level of subsidy required for the hovercraft. Effects would be of a permanent duration with a regional extent, affecting availability of fiscal resources to other communities in the borough. The context, as a regional government, is considered common. The contribution to cumulative effects on socioeconomic indicators would be negligible. The overall effects would be negligible to minor for employment, population and demographics and moderate for fiscal resources.

4.2.3.3 Transportation

Transportation Assumptions for Analysis

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 King Cove Airport has limited navigational aids, visual flight rules mean only daylight access, which is reduced in the winter months.

Hovercraft service from Lenard Harbor was initiated in 2007, but was suspended in 2010 in response to substantial operating losses by the operator, the Aleutians East Borough. A plan for the resumption of operations in 2012 is being evaluated by the borough. 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.

Currently no road access exists between the communities of King Cove and Cold Bay. A project is currently permitted for a new hovercraft terminal and access road extending north of the City of King Cove. The project is scheduled for completion in 2012, and is anticipated to reduce hovercraft travel time to Cold Bay Airport to about 8 minutes, and originate in somewhat calmer water and wind conditions, increasing operability.

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 Appendix C, and discussed in Section 4.2.3.4, Public Health and Safety.

Trip Estimates

Table 4.2.3–8 shows trip travel times for all modes (road, marine, and air) for Alternatives 1 - 5.

Table 4.2.3–8 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)	
Hovercraft (Alts. 1 and 4)	4.0	5.6	12.0	n/a	1.1	22.7	68	8.2	15	**83**
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**
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 passenger and trip estimates build upon estimates provided in the 2003 EIS (USACE 2003, p. 146). The starting point was the 2003 EIS estimate of 3,500 King Cove air taxi passengers, which is assumed to encompass the bulk of demand for passengers traveling between the King Cove and Cold Bay airports. Hovercraft passengers are estimated using 2007-2010 data collected by the Aleutians East Borough. Estimates of displacement of air passengers to other modes is broadly assigned according to economic considerations discussed in Section 4.2.3.2, Socioeconomics.

Consideration of the alternatives is unique in that few modern comparables to the introduction of new access modes in remote communities are available. 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 Peter Pan Seafood 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. This is discussed further in Section 4.2.3.2, Socioeconomics.

Table 4.2.3–9 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 detail 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. Without those considerations, 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, though rapid, is quite limited in availability for on-demand trips. The hovercraft, with lower operating tolerances than the aircraft commonly accommodated at the King Cove Airport, and with a more limited operating schedule, is capable of less annual on-demand coverage than aircraft.

Road transportation is almost always available, assuming regular and timely maintenance. The same is true for ferry transportation, which has broad operating tolerances, though they must be grounded periodically for maintenance and inspections. 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 4.2.3–9 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 and 4 - Hovercraft	$100	70%	83
Alternative 2 – Southern Road	$45	98%	130
Alternative 3 - Central Road	$47	98%	136
Alternative 5 - Ferry	$90	99%	106
Air Travel	$98	75%	37

Summarized from Socioeconomics (Section 4.2.3.2) and Transportation.(Section 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.

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 subsidy, 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

Direct Effects and Indirect Effects from Construction

No new construction would be associated with this alternative. Hovercraft transportation facilities would be in place at the time of implementation, as authorized in the 2003 EIS and subsequent permits. Wave and wind conditions at the new site may improve hovercraft operability over that experienced at Lenard Harbor. Service would be implemented in April 2013, after completion of the new hovercraft terminal and access road. Alternative 1, the No Action alternative, considers re-implementing hovercraft service in April of 2013, after the new terminal at the northeast terminal Cold Bay and its access road are completed in 2012.

Direct Effects and Indirect Effects from Operation and Maintenance

Round trip hovercraft service from the Northeast Hovercraft Terminal to Cross Wind Cove would be 3 times a week, April through October. Hovercraft and air taxi operating costs, ridership, and fares would remain at 2009/2010 levels. 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 last operated. 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.

The lifecycle cost over 35 years is estimated at $26.3 million, with passenger revenues recovering about 10 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 $1 million a year, as indicated in Section 4.2.3.2, Socioeconomics. Previous estimates on hovercraft operating revenues assumed that potential cargo and/or mail contracts would contribute to revenue. However, from 2007 to 2010, efforts to attract revenue via cargo and mail contracts were not realized. For the purpose of this analysis, operating costs include maintenance of the access road from King Cove Airport to the Northeast Hovercraft Terminal. Though the road maintenance cost (about $70,000 annually) is included in the operating cost estimate, it would not necessarily be assigned to or funded by the hovercraft operator.

Adding in the cost of ground transportation to the Northeast Hovercraft Terminal, the cost to the consumer would be about $100, similar to that of air travel (Table 4.2.3–9). 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. Assuming average operable weather, the hovercraft operation presents a shorter travel time than road and ferry alternatives (Table 4.2.3–8). The hovercraft operation is about 70 percent reliable, assuming reliability levels experienced operating from the Lenard Harbor terminal, as operations from the new Northeast Hovercraft Terminal have not been tested. The trip is approximately 83 minutes from the City of King Cove to the Cold Bay Airport, including road travel. This compares with about 37 minutes travel time and about 80 percent reliability for comparable

existing road-air transportation via the King Cove Airport. Under this alternative, it is assumed that air taxi trips to the Cold Bay Airport would remain at similar levels to the present, despite similar challenges of weather-related cancellations. This is because the frequency of flights offered is Monday through Saturday, twice a day, year round, as compared to 3 days a week, April through October, for the hovercraft.

By 2020, hovercraft passengers in the Alternative 1 scenario are estimated at 818 annually and air taxi passengers at 3,699, as shown in Table 4.2.3–10. Trips to the King Cove Airport or to the Northeast Hovercraft Terminal are not anticipated to change traffic levels on city roads.

Table 4.2.3-10 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 1

Alternative 1 Hovercraft 3 days a week - 2013	2013	2014	2015	2016	2017	2018	2019	2020	2025
Air Taxi Passengers	3,565	3,586	3,606	3,625	3,644	3,663	3,681	3,699	3,781
Hovercraft Passengers	788	793	797	802	806	810	814	818	836

Emergency medical charters using the hovercraft have historically taken place, as described in 4.2.3.4, Public Health and Safety, at a cost of about $3,000. However, the charter costs were sometimes non-recoverable from sponsoring health organizations, contributing further to budget shortfalls by the Aleutians East Borough as the hovercraft operator. The provision of emergency transportation requires a full on-call crew for 24-hour, year round coverage, which is not provided in Alternative 1. Under this alternative, emergency medical evacuation by hovercraft would only be available during the operating season of April through October.

Primary transportation concerns under this alternative focus on the cost and reliability of existing hovercraft and air modes of transportation.

Summary

Alternative 1 would continue to incur major operating cost shortfalls for the hovercraft operator, currently the Aleutians East Borough. It would provide another form of transportation, besides air, to and from Cold Bay Airport. The hovercraft would operate 3 days a week, would operate at about a 70 percent reliability level, and would only be available for public transportation and emergency evacuations April through October. Air traffic between the airports of King Cove and Cold Bay would remain at approximately current levels, with about 75 percent reliability due to weather and topographic operating constraints (see Section 3.3.3.2 for a description of reliability estimates). Given the reliability of scheduled hovercraft operations on a 3 days per week schedule, seasonally, Alternative 1 provides the least availability of any of the alternatives. The direct and indirect impacts of this alternative would be low magnitude, since hovercraft would operate the same as previously, with improved facilities, and air operations would remain the same. Emergency medical evacuation would remain constrained by operability limitations of hovercraft and air taxi. Some startup time would likely be involved in preparing the hovercraft for an unscheduled emergency evacuation. Impacts would be of long-term duration since no transportation modal changes would occur. The impacts would have a regional extent with no effects reaching beyond the EIS project area. The impacts would occur in a common context,

since transportation operations and facilities would be operated as before. The summary impact for Alternative 1 on existing transportation systems and conditions is considered to be minor.

Mitigation Measures

One mitigation measure would be to acquire additional outside funding to cover the operator's shortfall in operating revenue. Efforts to increase cargo revenue and recover medical charter costs could also be continued. Existing mitigations associated with the Northeast Hovercraft Terminal project include the installation and use of fuel spill retention booms and other response supplies at the terminal, and a requirement for landing only in the designated area.

Cumulative Effects

Reasonably foreseeable future actions include a small increase in fisheries observers going to the City of Cold Bay. Demand for transportation to the Cold Bay Airport would increase slightly in approximation with population growth. Public revenues and expenditures have been previously affected by hovercraft operations. Alternative 1 would continue a moderate (adverse) cumulative effect on local government fiscal considerations. The overall cumulative effect of Alternative 1 on transportation is considered moderate.

Conclusion

Operation of the hovercraft on a 3 days per week, April through October schedule would continue into the future, and continue a seasonal and limited transportation choice for transit to the Cold Bay Airport. Scheduled reliability of hovercraft and air taxis would remain at about 70 to 75 percent, and the hovercraft would continue to operate at a substantial shortfall of $1 million annually. Beyond the necessity of additional subsidy to cover operations costs, the direct, indirect and cumulative effects of Alternative 1 are considered minor.

4.2.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

Under Alternative 1, no new construction beyond what was authorized in the 2003 EIS and subsequent permits would occur, so 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 there would be no construction 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, public health and safety concerns would continue primarily for the King Cove community which needs safe, available, and reliable access to advanced and emergency health care via the Cold Bay Airport. 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 by sea or air only, which can be hazardous or impassable at times. Under the No Action alternative, there would not be long-term, safe, reliable, and affordable year round transportation between the cities of King Cove and Cold Bay. As a result, 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 have to reach Cold Bay by air or boat, as available, until 2013. Alternative 1 presumes that hovercraft operations would resume in 2013. 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.

In Alternative 1, hovercraft service would not be provided during winter months. Patients in the City of King Cove requiring specialized (non-emergency) medical care would have an additional means of transport (other than by plane or fishing vessel) to the Cold Bay Airport for 3 days per week from April to October. For emergency medical evaluations, the hovercraft could be available for 24 hours per day, 7 days per week during the months of April through October. However, it may not always be possible to complete medical evacuations via the hovercraft. Additionally, medical evacuations by hovercraft may be completed under dangerous weather conditions that pose a threat to the safety of those involved. Operational reliability of the hovercraft is affected by the availability of trained crew to operate the vessel and by periodic maintenance delays. Operating procedures prohibit operation of the hovercraft in seas above 6 feet and/or winds above 30 knots per hour (except for emergencies, such as medical evacuations). Although it is allowable to conduct medical evacuations by hovercraft in more extreme conditions, such practices may pose a threat to the safety of those involved. Medical evacuations during the winter months would continue to be by helicopter, plane, or boat only. (For additional information on hovercraft operations, refer to Section 3.3.3.)

The time needed to evacuate patients from the King Cove Clinic to the Cold Bay Airport varies based on the different modes of transportation. Tables 4.2.3-8 and 4.2.3-9 provide information about transport options under baseline (No Action) conditions.

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 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 would not meet the overall project purpose of a long-term, safe and reliable, year round transportation link between the cities of King Cove and Cold Bay. Under Alternative 1, the hovercraft would be available for medical evacuations for 24 hours per day, 7 days per week only during the months of April through October. Positive direct effects of Alternative 1 on public health and safety would be low in intensity, long-term in duration, regional in geographic extent, and unique in context (as a minority community and a medically underserved area). The direct and indirect effects of the operation and maintenance phase of Alternative 1 on public health and safety would be considered minor.

Mitigation Measures

Alternative 1 would not require mitigation measures for public health and safety, other than continuation of established practices.

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. When there are no delays and weather conditions are not adverse, the other current types of medical evacuation transport could be just as safe as but faster than predicted for the hovercraft. During the months of April through October, persons in the King Cove community would benefit from the availability of the hovercraft for transportation, 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, plane, and helicopter) could be selected for each specific medical evacuation incident. Operation and maintenance of Alternative 1 would have minor direct and indirect effects to public health and safety and a minor contribution to cumulative effects on this resource; there would be an additional option for medical evacuation (hovercraft) for part of the year.

Conclusion

Positive direct effects of Alternative 1 on public health and safety would be low in intensity, long-term in duration, regional in geographic extent, and unique in context (as a minority community and a medically underserved area). The alternative would have a minor contribution to cumulative effects on this resource; there would be an additional option for medical evacuation (hovercraft) for part of the year. The effects of the operation and maintenance phase of Alternative 1 on public health and safety would be considered minor.

4.2.3.5 Environmental Justice

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, in the analysis of environmental effects (including public health and safety and subsistence effects), there is the requirement under Executive Order 12898 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 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.

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 hovercraft travel time to the Cold Bay Airport would be shorter than several transportation modes (fishing vessel, road, and ferry), but is limited from April to October and can be unreliable due to weather and other issues. Therefore, the use of hovercraft under Alternative 1 would not meet the project purpose of a long-term, safe and reliable, year round transportation system between the cities of King Cove and Cold Bay. The positive direct effects of the use of hovercraft (Alternative 1) on public health and safety would be low in intensity, long-term in duration, regional in geographic extent, and unique in context (as a minority community and a medically underserved area). The direct and indirect effects of the operation and maintenance phase of Alternative 1 on public health and safety would be considered minor.

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 impacts introduced to subsistence resources, access, or competition under Alternative 1; use of the hovercraft from the Northeast Hovercraft Terminal is considered part of the existing conditions for the purposes of this analysis.

Mitigation Measures

As described in the 2003 EIS, mitigation measures associated with Alternative 1 would 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. No new mitigation measures for subsistence are recommended for this alternative.

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. During the months of April through October, persons in the King Cove community would benefit from the availability of the hovercraft for transportation in addition to other forms of medical evacuation transport. The contribution of

Alternative 1 to cumulative effects on human health would be minor and beneficial. Alternative 1 would have no contribution to cumulative effects on subsistence resources and use patterns.

Conclusion

Alternative 1 would have a minor beneficial impact on human health and no new impacts on subsistence activities. Alternative 1 would not have a disproportionate adverse impact to minority or low income communities.

4.2.3.6 Public Use

Direct Effects and Indirect Effects from Construction

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

Summary

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

Direct Effects and Indirect Effects from Operation and Maintenance

No direct or indirect 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, under this alternative, approximately 5,430 acres of King Cove Corporation selected lands would be withdrawn from the Izembek Wilderness and conveyed to King Cove Corporation. Although public use of this parcel is estimated to be low, upon conveyance the parcel would become private land and not available for general public uses. 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).

Summary

The direct and indirect impacts of this alternative would 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. The impacts would have a local extent since effects would occur in the vicinity of the conveyed parcel from Izembek Wilderness. 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 1 on public use would be considered negligible.

Mitigation Measures

Although the No Action alternative would result in a negligible 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 1 are considered negligible, 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 1 to cumulative effects on public use is considered negligible.

Conclusion

Alternative 1 would have negligible 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.

4.2.3.7 Subsistence

Direct Effects and Indirect Effects from Construction

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

Summary

Under Alternative 1, no construction would occur and therefore no impacts to subsistence would result from construction activities. The transfer of the land currently selected by the King Cove Corporation, and located within the Izembek Wilderness to the west of Cold Bay, would proceed under Alternative 1. This would remove land from federal subsistence regulation, but would be expected to have little impact to subsistence access or resources, particularly because most subsistence users in this area would be shareholders of the King Cove Corporation.

Direct Effects and Indirect Effects from Operation and Maintenance

Effects on Subsistence Resources

The hovercraft terminal would be operated in subsistence use areas for waterfowl, salmon, and other marine fish. Operation of the hovercraft could temporarily displace subsistence resources in a localized area, thus affecting resource availability to subsistence harvesters in the immediate area of the terminal. Increases in transportation activities along the access road to the Northeast Hovercraft Terminal could potentially affect resource availability (resource displacement or contamination concerns). Displacement would be limited to 3 days per week from April through October. These effects are considered part of the existing conditions under the No Action alternative. No new incremental environmental effects would be introduced by Alternative 1.

Effects on Access to Subsistence Resources

Under this alternative during operation and maintenance, King Cove hunters would have road access along the completed road and to the area near the hovercraft terminal. This could result in increased use of this area for subsistence hunting of marine invertebrates, marine and freshwater fish, trapping, vegetation gathering, and caribou hunting (if resumed) by community of King Cove subsistence users. This area is used by subsistence users from the communities of King Cove, False Pass, and Sand Point.

Alternative 1 could result in a potentially beneficial effect on access to subsistence resources for the community of King Cove as it would allow users to reach the areas near the Northeast Hovercraft Terminal by the road. This would result in less expenditure of fuel costs for subsistence practices while harvesting from this area of Cold Bay.

These effects are considered part of the existing conditions under the No Action alternative. No new incremental environmental effects would be introduced by Alternative 1.

Competition for Subsistence Resources

Alternative 1 could increase the presence of subsistence users near the Northeast Hovercraft Terminal. However, this alternative would not be expected to increase competition for

subsistence resources in the project area, since Alternative 1 would not bring new construction crews to the region. This area is already used by subsistence users from King Cove, False Pass, and Sand Point.

Summary

No new impacts from operation and maintenance activities to subsistence would occur under Alternative 1. Existing impacts to subsistence from 3 days per week, seasonal operation of the hovercraft would continue; these effects could include limited displacement of subsistence resources, increased access by road to the area around the Northeast Hovercraft Terminal, and increased subsistence uses in that area. Impacts of hovercraft operations on this schedule would be of low intensity, long-term in duration, local to regional in extent, and affect resources that are common in context. However, Alternative 1 would introduce no new incremental direct or indirect impacts on subsistence.

Mitigation Measures

With no new direct and indirect impacts, no mitigation measures are anticipated for subsistence resources, other than continuation of practices already employed for operation of the hovercraft and access road.

Cumulative Effects

Past and ongoing actions related to subsistence are described in Chapter 3 (Section 3.3.7). Under Alternative 1, the existing conditions would include improved access by road to subsistence resources near the Northeast Hovercraft Terminal. No reasonably foreseeable future actions would affect subsistence in the project area. Alternative 1 would not contribute to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources. As a result, this alternative is not expected to contribute to cumulative effects on subsistence resources or harvest patterns. Alternative 1 would have no cumulative effect on subsistence resources or activity.

Conclusion

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

4.2.3.8 Cultural Resources

Direct Effects and Indirect Effects from Construction

There would be no construction associated with Alternative 1.

Summary

Under Alternative 1, no construction-related 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

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 (road, hovercraft, or ferry). 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) 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 1989):

- *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:

- Individuals engaged in recreation (tourism) or subsistence on the Izembek National Wildlife Refuge and/or 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
- 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 travelway 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)
- 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

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

Air and marine activity would continue at current levels. Such actions are transient, and do not impact vividness, reduce intactness, or reduce unity in existing visual quality. Under this alternative, approximately 5,430 acres of King Cove Corporation selected lands would 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

The direct and indirect impacts of this alternative would be low in magnitude because the selected lands are contiguous with other parcels conveyed to King Cove Corporation and future uses would be subject to Section 22(g) of ANCSA. Impact duration would be permanent. The impacts would have a local extent since effects would occur in the vicinity of the conveyed parcel. The impacts would affect visual resources that are common in context. Thus, 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 and construction of the new hovercraft terminal (including installation of the armor stone protection) 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.

Conclusion

Alternative 1 would have negligible impacts to visual resources, 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.

4.2.3.10 Wilderness

Federal land managers have developed a monitoring framework related to the 4 qualities of wilderness character, with specific indicators of each quality identified (Landres et al. 2008). The Service used this methodology to provide information about the current status of Izembek Wilderness, which was discussed in Section 3.3.10 (Service 2010b).

Direct Effects and Indirect Effects

Under Alternative 1, no land exchange would take place between the Service, King Cove Corporation, and the State of Alaska. The parcel of land currently selected under ANCSA by King Cove Corporation, and located within Izembek Wilderness, would continue to be managed as wilderness by the Service until the parcel is eventually conveyed to the King Cove Corporation. 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 boundary. The right to select this parcel pre-dates the establishment of Izembek Wilderness.

Hovercraft operations would resume 3 days per week, originating from the Northeast Hovercraft Terminal, upon completion of the access road.

Untrammeled Quality

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

Natural Quality

No 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 as identified by the Service (Service 2010b).

Undeveloped Quality

With Alternative 1, the King Cove Access Road to the Northeast Hovercraft Terminal would be operational. The access road corridor would be located outside of Izembek Wilderness, but would bring the use of motorized vehicles in close proximity to the edge of the wilderness boundary. The Northeast Hovercraft Terminal would be located approximately 0.5 miles from the current Izembek Wilderness boundary (USACE 2003), increasing to 2 miles when the adjacent parcel is conveyed to the King Cove Corporation. The presence of the access road could increase opportunities for (prohibited) non-traditional subsistence use of motorized vehicles within Izembek Wilderness, potentially creating low intensity, long-term, localized impacts to a unique resource. Use of motorized vehicles along the edge of Izembek Wilderness would occur intermittently, and due to the permanence of the access road, the effects of this use would persist through the life of the project. Impacts would be localized, as the access road runs just outside the edge of Izembek Wilderness. And as noted above, the parcel selected by King Cove Corporation would be subject to potential development under the terms of ANCSA Section

22 (g). The parcel is located at the edge of the Izembek Wilderness and is contiguous with other parcels conveyed to King Cove Corporation.

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 at their current levels. These actions would create intermittent episodes occurring over the life of the project, low magnitude impacts to the solitude of visitors who may be able to see or hear airplanes, and/or boat traffic from the top of ridges in Izembek Wilderness (USACE 2003).

Visitors to the Izembek Wilderness could experience long-term, localized impacts to solitude or opportunities for primitive and unconfined recreation that would persist through the life of the project resulting from sounds of vehicles traveling to the Northeast Hovercraft Terminal and hovercraft operations 3 days per week. For visitors within the Izembek Wilderness, terrain features surrounding the Northeast Hovercraft Terminal could potentially screen out sound generated by terminal operations. However, when the hovercraft crosses Cold Bay, noise above ambient levels (50 dBA) would be audible within the Izembek Wilderness (USACE 2003). The Northeast Hovercraft Terminal would not be visible from the Izembek Wilderness to the east, or from the northern side of Kinzarof Lagoon due to intervening steep topography (USACE 2003). The magnitude of these impacts as experienced by users of Izembek Wilderness would be low; changes to the soundscape of users from specific locations in the wilderness would be slightly detectable. When selected lands are transferred to the King Cove Corporation, noise and visual disturbance from the vicinity of the Northeast Hovercraft Terminal could be reduced in Izembek Wilderness, as the wilderness boundary would be more distant from that location. The selected lands could also be subject to development, subject to the provisions of ANCSA Section 22 (g), but there are no known plans for development at this time. The change in this wilderness quality indicator would occur on lands that are unique in context. Therefore, the summary impact rating for the solitude or primitive and unconfined recreation quality under Alternative 1 would be minor.

Summary

Under Alternative 1, the parcel selected by King Cove Corporation located within Izembek Wilderness would continue to be managed as wilderness by the Service until the parcel was eventually conveyed to the King Cove Corporation.

Alternative 1 would result in low intensity, long-term, localized effects, to wilderness character (unique context). There would be no direct and indirect impacts to the untrammeled quality and natural quality of wilderness character, and minor 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 at specific locations 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, the direct and indirect impacts to wilderness character resulting from Alternative 1 would be minor.

Mitigation Measures

Mitigation measures for Alternative 1, with operations originating from the Northeast Hovercraft Terminal, would continue as described in the 2003 EIS.

Cumulative Effects

In 1980, the passage of ANILCA designated approximately 95 percent of the Izembek National Wildlife Refuge as Izembek Wilderness. With the passage of ANILCA, Congress did not modify the basic provisions of the *Wilderness Act of 1964*, the definition of wilderness, or the mandate to preserve wilderness character. The rights of rural residents to continue subsistence practices on federal lands were also set into law with ANILCA. Rural residents were allowed to continue to use off-road vehicles for subsistence harvests, and traditional access and subsistence uses of these newly-designated Izembek Wilderness lands were allowed to continue. Other non-subsistence vehicles uses across the refuge were prohibited. Currently, occasional non-traditional subsistence 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). This motorized activity creates noise intrusions within the Izembek Wilderness that are considered localized in extent, low intensity, and temporary in duration. Continuous usage of the same routes by motorized vehicles within Izembek Wilderness could intensify long-term effects through the creation of pioneer trails within the wilderness.

The construction and operation of the King Cove Access Road from Lenard Harbor to the Northeast Hovercraft Terminal would occur from 2011 through late 2012. This permitted road would traverse 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, low intensity, and localized. Portions of the road to the Northeast Hovercraft Terminal 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. Completion of the road, however, is a component of Alternative 1 and, for the purposes of this analysis, is considered part of the existing conditions.

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

Conclusion

Due to the unique context of the Izembek Wilderness, 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. 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, long-term, local impacts to a unique resource. 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 summary 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 Construction

Emissions during roadway construction may be associated with land clearing, drilling and blasting, ground excavation, and cut and fill operations. Dust emissions vary depending on the level of activity, the specific operation, and the meteorological conditions. 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, for a total of 14 months. 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 4.3.1-1 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 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 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

The direct and indirect effects on air quality from the construction of Alternative 2 are expected to be medium in magnitude on a short-term basis (24-hour or less), due to localized emissions of nitrogen oxides, carbon monoxide, sulfur dioxide, and particulate matter. These minor effects 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 are expected to be below 10 tons per year (except for greenhouse gases, shown here as carbon dioxide equivalents; see Section 4.3.1.2 for more details) and would be spread out over the road footprint area (107 acres). Therefore, the construction would have only a minor overall effect on air quality.

Table 4.3.1-1 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 hp)	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 hp)	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 hp)	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 hp)	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 are due to vehicle travel, and include 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 119 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 City of King Cove. 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 4.3.1-2 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 have an effect on air quality. 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.

In addition to the new road segment, this alternative would reduce the hovercraft operations from 3 days per week to zero. Emissions during hovercraft operations and maintenance are due to fuel combustion in the unit for normal operations. Estimates of combustion emissions are based on emission factors for similar-sized engines using standard EPA factors (EPA 1996a,b), along with the expected operation of 3 round trips per week from April to October, or approximately 90 round trips per year. These reduced emissions are also shown in Table 4.3.1-2. The emissions are shown separate from the roadway emissions to demonstrate that the reduction is in a different location. The alternative would still cause an overall net increase in emissions.

Summary

The direct effects on air quality from the operation and maintenance of Alternative 2 are expected to be negligible from emissions because they would be low in magnitude, long-term in duration (reoccurring short-term events), local in extent, and of common context. 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 a moderate effect on air quality, but these reoccurring short-term events would likely remain long-term in duration, local in extent, and common context. Indirect effects on air quality are expected to be minor. This alternative would also create a reduction in emissions along the existing hovercraft route. These effects are also expected to be a minor improvement to the air quality in the immediate vicinity of the hovercraft route.

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, additional 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

Alternative 2 would have negligible to minor direct effects on air quality in the immediate vicinity of the southern road alignment. Indirect and cumulative effects would be minor. This alternative would reduce emissions from hovercraft operations to zero, but would contribute to an overall increase in emissions. 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. Indirect and cumulative effects may be minor. The overall effect of Alternative 2 on air quality would be minor.

Table 4.3.1-2 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**
HOVERCRAFT REMOVAL								
Main Propulsion Engines (2 x 1205 hp)	-4,401 MMBtu/yr	-6.48	-1.72	-0.003	-0.12	-0.12	-0.17	-334
Cushion Lift Engines (2 x 905 hp)	-3,041 MMBtu/yr	-4.87	-1.29	-0.002	-0.09	-0.09	-0.13	-251
Service Power Engines (3 x 8kW)	-54 MMBtu/yr	-0.12	-0.03	-0.008	-0.008	-0.008	-0.01	443
TOTAL (tons per year)		**-11.5**	**-3.04**	**-0.01**	**-0.21**	**-0.21**	**-0.30**	**-590**
NET TOTAL (tons per year)		**11.3**	**1.87**	**1.48**	**26.4**	**3.86**	**1.56**	**257**

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 City of King Cove and Cold Bay Airport of 119 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.

Hovercraft engine sizes from (Buls 2006).

Usage value for combustion emissions for hovercraft operations based on project description: Estimated annual travel is 3 times per week between April and October (30 weeks), or 90 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%, by weight. 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.

4.3.1.2 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% of this state-wide annual total for a period of 2 years. The magnitude of impacts from construction would be low because these emissions would only occur for 2 years and then cease, and because the annual emissions would not be perceptible. Despite the magnitude, once greenhouse gases are emitted they have the same duration, extent, and context which are long-term duration, extended, and important.

Summary

Although climate change effects are considered to be long-term, extended, and affect important resources, the construction-related direct and indirect effects are considered negligible since the magnitude is so low.

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 except for hovercraft service. Additionally it would also include greenhouse gas emissions from vehicles traveling on and maintaining the southern road alignment. Indirect effects could result from more recreationists and wildlife viewers visiting the area due to better access to sites. Due to the remote location, the 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 4.3.1-3). Alternative 2 would contribute 877 tons per year of carbon dioxide equivalent, which is 257 tons more per year than Alternative 1. When compared at the state level, Alternative 2 would contribute approximately 0.02% of the State of Alaska's estimated emissions from on-road vehicles and less than 0.01% 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. Despite the magnitude, once greenhouse gases are emitted, they have the same duration, extent, and context which are long-term duration, extended, and important. See the discussion under Alternative 1 for the assumptions related to intensity, duration, extent and context.

Table 4.3.1-3 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
State Ferry	2 round trips/month (May-September)	30
TOTAL		**877**

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

Summary

Direct and indirect effects to climate change associated with Alternative 2 are considered negligible. Although climate change effects are considered to be long-term, extended, and affect important resources, 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 average annual emissions from 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 more greenhouse gas emissions than Alternative 1. However, Alternative 2 is expected to have negligible direct and indirect effects due to the low magnitude, although the duration would be long-term, the extent is extended and the context is important. 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 2 is expected to have a negligible contribution to cumulative effects. The overall contribution 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 through 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, 7 box stream crossing culverts, and 154 intermittent and small stream pipe 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 2.

This alternative would disturb 107 acres of surface and shallow subsurface soil along the road corridor and 1 acre at the barge landing areas near the Northeast and Cross Wind Cove hovercraft 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. Approximately 182,000 cubic yards of fill would be imported from the material site near the Northeast Hovercraft 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.

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.

An indirect effect to other resources common in context would be using rock unsuitable for construction. Such geologic resources include rocks with a high concentration of sulfide minerals that could result in acid rock drainage if used to fill wetlands or placing that rock at the water surface. 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 the rock would be placed within.

Direct impacts on soils as a result of Alternative 2 would be permanent, of high intensity, covering local extent, for this common geologic resource, and would include excavation, grading and compaction, and direct loss of soil cover by exposure in the area of the new road, and exposure of soils to localized runoff and erosion. The resulting effect would be moderate.

Summary

Direct effects would include the disturbance of about 108 acres, with the potential for accidental release of fuel or other hazardous materials during the construction process. This moderate direct effect would be high intensity, permanent, local and common.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct impacts from Alternative 2 would be reduced during operation and maintenance activities. Of the total 182,000 cubic yards of fill from the material site, 10,000 cubic yards would be processed and stockpiled for future road maintenance.

Moderate indirect effects on soils would occur under this alternative; these effects would be high in intensity, long-term to permanent in duration, with local extent and affecting resources that are common in context. 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. 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

Moderate 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. These effects would be high in intensity, long-term to permanent in duration, with local extent and affecting resources that are common in context.

Mitigation Measures

Mitigation measures to limit soil erosion would include development and implementation of an Erosion and Sediment Control Plan, as described in the 2003 EIS, which defines the state and federal regulatory statutes and describes the construction industry standards for reducing sediment runoff during road construction projects. In addition, a re-vegetation plan would be developed to effectively re-vegetate disturbed stream banks and slopes with native species suited for the specific sites characteristics. Mitigation measures to limit impact to resources common in context would also include development and implementation of a Storm Water Pollution Prevention Plan, as per the 2003 EIS. This plan would identify those common 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 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. This plan would also contain a Spill Prevention, Containment and Countermeasures Plan.

In addition the above mitigation measures identified in the 2003 EIS, rock planned for infill of wetlands should undergo analytical testing 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, the direct and indirect effects resulting from 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 a total of up to 114 acres of regionally common soils when including the disturbance at the material site. The area subject to excavation would total 111,000 cubic yards. These additive incremental effects attributable to implementation of Alternative 2 would be considered moderate because they are high intensity, permanent, local (extent) and common (context).

Conclusion

Soil removal/excavation and road construction would result in direct and indirect impacts to geologic resources and soils that would be high in intensity, permanent in duration, over a local extent and affect resources that are common in context. The effects would be moderate with more than 108 acres of land impacted.

4.3.1.4 Hydrology/Hydrologic Processes

Direct Effects and Indirect Effects from Construction

As a result of Alternative 2, disturbance of hydrologic resources would occur along 18.5 miles of road construction. The road would be constructed using a balanced cut and fill methodology through the proposed corridor. As part of the road construction, 3.8 acres of hydrologic resources in the form of wetlands would be impacted with up to 25,000 cubic yards of fill, 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 0.2 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 2. Quantities of water would be needed for embankment compaction and dust control. The road material should remain moist due to typically wet weather; therefore, water requirements would be relatively low. 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 Hovercraft 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 (150 acres, not connected to anadromous streams) at the western terminus of Alternative 2. Locations and preliminary estimates of 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 as a result of the reestablishment of hydrologic processes within each stream.

Direct effects on hydrologic resources and processes as a result of Alternative 2 would be permanent, of high intensity, covering both local and regional extent, and would include stream crossings and infill of wetlands in the area of the new road, and exposure of water resources to localized, temporary in duration sediment discharges from disturbance during excavation and construction activities. The context of these hydrologic resources is considered unique because of the stream designation 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.

An example of indirect effects to other resources common in context would be a decrease in water quality from 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 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. Indirect effects may occur from the uncontained release of hazardous materials and from stream turbidity generated by streambank construction activities. These effects would be of high intensity, permanent, and local to regional for this unique resource. The direct and indirect effects would be moderate with the applied mitigation measures identified below.

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 the 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 as a result of the reestablishment of hydrologic processes within each stream.

Indirect effects on hydrologic resources would occur as the increase in sediment load from road runoff would impact the quality of 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, and often surpass design standards due to practicability and financial considerations.

Indirect effects on hydrologic resources may also occur as a result of increased sedimentation in streams resulting from soil erosion of trails resulting from all-terrain vehicle use. 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.

The effects could be medium in intensity with applied mitigation measures, episodic but long-term in duration, with local extent, and affecting resources that are unique in context due to the essential fish habitat designation.

Direct and indirect effects at the staging area near the Northeast Hovercraft Terminal would be highest during construction, but would continue at a reduced level during operation and maintenance activities. These may include isolated areas where surface water runoff is concentrated by erosion control methods to discharge in select areas near the staging area.

Summary

Direct and indirect effects would continue during the operation and maintenance stage of the alternative as a result of continued movement of sediment and the associated reestablishment of hydrological processes and from newly introduced sediment from eroding trails caused by all-terrain vehicles that may proceed past the barriers. These effects would be medium intensity, permanent, and local 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, as identified in the 2003 EIS. 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 to limit impact to resources common in context would include development and implementation of a Storm Water Pollution Prevention Plan which would identify those common resources and their known locations and implement control measures to protect those resources. 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. The refuge law enforcement staff shall conduct these monitoring activities, observing streams for indications of unlawful stream crossings. Monitoring by camera or personnel would occur and fines/charges would be assigned to perpetrators. The refuge would enforce use of the barrier to avoid the need for mitigation. If damage to the stream occurs, restoration efforts 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, 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 processes would be additive to other past, present and reasonably foreseeable future activities in Alternative 1 (Section 4.2.1.4). These effects would result from the mobilization of equipment, fuel, and supplies; excavation; potential temporary rerouting of stream courses during installation of drainage structures; and potential natural re-routing/reestablishment of stream courses from existing ones. The implementation of Alternative 2 could directly result in disturbance of hydrologic resources on a total of up to 4 acres of regionally common water resources and tidelands when including the barge landing sites, and 8 stream crossings. The incremental effects attributable to implementation of this alternative would be considered moderate.

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

Conclusion

Construction, operation, and maintenance of Alternative 2 would result in direct and indirect impacts to hydrologic resources and water quality that would be medium to high in intensity, permanent in duration, over a local extent and affect resources that are unique in context. The impact would be moderate, due to implementation of mitigation measures.

4.3.1.5 Hazardous Materials

Direct Effects and Indirect Effects from Construction

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.

Under Alternative 2, mobilization of equipment, supplies and fuel represents activities with potential risks over the course of 2 construction seasons. During operation, hazardous materials onsite include fuel, battery acid, and hydraulic fluid. During construction, 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. With standard spill prevention design and procedures, the risk of an accidental release into the environment 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. The greatest risk of a spill generally occurs during fuel transportation and equipment refueling.

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 is comparatively low, the duration would be temporary, the extent would be local, and the potential for adverse effects would be minor.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct impacts from the Alternative 2 would be highest during road construction, and would be reduced in the period following the project completion, during operation and maintenance activities, as a result of the continued presence of fuel, battery acid, and hydraulic fluid used in maintenance vehicles. With standard spill prevention design and procedures, the risk of an

accidental release into the environment 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 is comparatively low, and the potential for adverse effects would be minor, because the intensity would be low, the duration temporary to long-term, and the extent would be local for common resources.

Mitigation Measures

Application of mitigation measures identified in the 2003 EIS would have temporary fuel storage tanks enclosed within a portable berm and secondary containment device. 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. Secondary containment systems, including double-walled tanks and alarms, promote secure storage. A Spill Prevention, Control, and Countermeasure Plan 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

If a spill were to occur on land, the impact would be high in intensity, short term in duration, local in extent, and affecting a common resource. This potential minor incremental effect would be additive to past, present, and reasonably foreseeable future releases of hazardous materials within the project area. Past actions related to hazardous materials are described in Section 3.1.5. 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, but should not affect the management of hazardous materials. The Cold Bay Airport Runway Safety Area 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 the spill were to occur in wetland or a water body, the moderate effect would likely be high in intensity, longer term (exceeding 2 years), larger in extent, and affecting common resources.

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 of low intensity, localized in extent, and temporary to long-term in duration. 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 transportation to the project staging area could occur during 2 construction seasons between May and November, and equipment refueling activities during those times. If a spill occurred on land the impact would be short term in duration, local in extent, and high in intensity to a common resource. If a spill occurred in wetlands or a water body, the impact would be long-term, and larger in extent, and high in intensity. Without known fuel volumes required for the project, in general, impact of a fuel spill would be considered minor to moderate.

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 construction 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 is high intensity and short duration (typically 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 4.3.1-4. Several types of equipment are shown here; not all of these are expected to be used for this construction project.

Table 4.3.1-4 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 the air quality analysis (see Section 4.3.1.1), and includes the equipment. 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 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 in the Izembek National Wildlife Refuge boundary, 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 decibels 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 effects of this construction may be increased use of other resources (such as roadways and rock crushing operations used for construction materials). These activities would also be temporary. Increased road use (on existing roads) would likely produce negligible increases to noise levels. Although rock crushing operations would potentially exhibit high noise levels, this is not expected to increase noise levels at an existing site, but rather 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

The direct effects on noise from the construction of Alternative 2 would be moderate intensity, but temporary in duration, local extent, and common context (as the parcel would be managed as state lands). Noise effects would be from the potential noise generating equipment and operations. These moderate effects would occur only during the 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 was made using the Federal Highway Administration Traffic Noise Model® (FHWA 2004). An estimate of 10 medium trucks and 3 heavy trucks per hour was made based on a total annual trip estimate of 19,000 (NEI 1999), 365 days per year, over 8 hours per day. 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 road is to be used for noncommercial purposes, 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 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 have an effect on noise. 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.

In addition to the new road segment, this alternative would reduce the hovercraft operations from 3 days per week to zero. Noise associated with the hovercraft operations are described in the 2003 EIS and are described in detail below for Alternative 4 in Section 4.5.1.6. The reduction in noise levels due to the removal of hovercraft operations occurs in a separate, distant location from the new roadway noise. Therefore, the reduction of hovercraft operational noise does not have any effect on the operational noise from the new road alignment; it is a separate and distinct noise reduction.

Summary

The direct effects on noise from the operation and maintenance of Alternative 2 are expected to be medium in magnitude, long-term duration, local extent, and of common context (as the parcel would be managed as state lands). 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 event) may have a moderate effect on noise. Indirect effects on noise are expected to be negligible. This alternative would also create a reduction in noise along the existing hovercraft route. These effects are also expected to be a minor improvement to the noise levels in that immediate area. Thus the direct and indirect effects to noise in the project area are expected to be minor.

Mitigation Measures

Due to the predicted minor effects on the noise environment, no additional mitigation measures are expected for Alternative 2.

Cumulative Effects

Construction, operation, and maintenance of Alternative 2 would generate direct and indirect effects to the noise environment. A current project that would have the potential to affect noise in the area is the completion of the King Cove Access Project road, with completion estimated in late 2012. 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. The Cold Bay Airport Runway Safety Area 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. Thus, Alternative 2 would have a minor contribution to cumulative effects on noise.

Conclusion

Alternative 2 would have a minor direct and indirect effect on the noise environment in the immediate vicinity of the southern road alignment. Noise would consist of intermittent episodes, intermittently occurring over the life of the project, spread out over a relatively large area. Indirect effects would be negligible and the alternative would have a negligible contribution to cumulative effects on noise. The overall effect of Alternative 2 on noise would be negligible.

4.3.2 Biological Environment

4.3.2.1 Terrestrial and Aquatic Plant Communities

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.

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 4.3.2-1. 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 high quality habitats of Izembek and Kinzarof Lagoons, utilized 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 and Cross Wind Cove hovercraft terminals.

Table 4.3.2-1 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 a 100-foot wide road corridor.

[2]Includes King Cove Corporation lands and National Wildlife Refuge lands within the construction foot print; 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 1 acre of beach and coastal vegetation at 2 temporary barge landing sites. These effects would be high intensity, permanent in duration and local in extent. These vegetation communities are considered to be unique because of the current wilderness designation and Ramsar designation. Indirect effects from construction would include changes in the composition of vegetation communities due to the change in hydrology immediately adjacent to the road. These effects would be medium intensity, permanent in duration, and local in extent for these unique plant communities. The direct and indirect effects to vegetation from construction of Alternative 2 would be moderate.

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 traffic from traveling outside the road corridor and into the Izembek Wilderness, it is likely that some traffic will circumvent the barriers and pioneer new trails on the adjacent landscape, resulting in indirect effects on vegetation. In a report by the Corps (USACE 2009), efforts to exclude all-terrain vehicles from an area in Washington County, Texas, through the use of physical barriers continually failed. Guard post and cable barriers became stretched, cut and removed, barbed-wire barriers were cut, steel posts were pulled up or bent to the ground, and a constructed/welded pipe fence was pushed or pulled to the ground allowing all-terrain vehicles to cross. Even though the proposed road

under this alternative would experience much less all-terrain vehicle traffic than in the Texas example, some motorized trespass is likely to result, causing indirect effects to vegetation such as the loss of vegetative cover and soil erosion. 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. In addition, Alternative 2 has beneficial effects for terrestrial and aquatic plant communities that would result from the proposed land exchanges. The federal government would gain approximately 52,583 acres while relinquishing ownership of 1,820 acres, resulting in a substantial net gain of terrestrial and aquatic plant communities managed within the National Wildlife Refuge System. The majority of those acquired lands would be managed under wilderness designation. The lands gained by the federal government through the land exchanges, however, are not considered equal in value to land affected by this alternative. 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 be medium in intensity, permanent in duration, and local in extent for these unique vegetation resources. The indirect effects to vegetation would be considered moderate.

Mitigation Measures

A barrier (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 the Izembek National Wildlife Refuge and Izembek Wilderness.

Additional recommended mitigation measures include an invasive species management plan, developed by the Service, to limit the spread of non-native plant species, and pre-construction rare plant surveys. In addition, as the owner/operator of the road corridor, the State should be required to develop an integrated pest management plan that includes annual invasive species monitoring and treatment plans in perpetuity for the operation and maintenance of the proposed road.

Cumulative Effects

Past actions affecting vegetation in or adjacent to the project area are few and minor because this remote location is largely undeveloped. 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 Hovercraft Terminal has already provided access for all-terrain vehicles to that area, resulting in numerous all-terrain vehicle trails within the Izembek Wilderness with impacts to native plant communities.

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 also 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 1,820 acres of native land cover types; a net gain of approximately 50,763 acres, while also maintaining ownership of 5,430 acres of native land cover types on the King Cove Corporation selected parcel.

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 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, the extent would be local and the context would be unique because of the juxtaposition of the proposed corridor relative to designated wilderness. The summary impact of Alternative 2 on vegetation would be considered moderate. Implementing an invasive species management plan and pre-construction rare plant surveys with annual invasive species monitoring and treatment plans, should lessen this impact.

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.

Implementation of Alternative 2 would result in a land exchange between the federal government, State of Alaska, and King Cove Corporation. 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 (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 the road corridor along the 19.4-mile long southern alignment (containing an estimated 13 acres of wetland within the corridor proposed for exchange). The footprint of the road would cover 107 acres, including the filling of approximately 3 acres of lowland wet low sedge/scrub wetlands and less than 1 acre (estimated 0.8) of lowland wet sedge meadow wetlands.

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 or 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. Cross drainage culverts 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.

In summary, the federal government would gain approximately 12,726 acres of wetland while relinquishing ownership of 993 acres of wetland. An estimated total of 3.8 acres of wetland would be filled and 162 stream crossings would be constructed.

Direct Effects and Indirect Effects from Construction

Construction associated with Alternative 2 consists of an 18.5-mile road within a 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.

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, resulting in a change of wetland functional capacity.

As summarized on the wetland functions table (Table 3.2-7), these affected wetlands may serve to moderate the flows in streams running into Kinzarof Lagoon. Their continually saturated condition 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 resulting turbidity and sedimentation. These wetlands likely have moderately high primary productivity. Nutrient and element cycling is moderate in these tundra system wetlands because water table decline through the season could allow various elements to be reduced and later oxidized. 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. Song birds and ptarmigans also use these wetlands. 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.

Direct effects would occur from the of lost wetland functions when 1,200 cubic yards of fill would be placed in about 1.0 acre of beach system wetland for the construction of temporary barge landing sites.

An 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; habitats that support vulnerable, endangered species or threatened ecological communities; the presence of populations of plants and/or animals important for maintaining biological diversity; the presence of habitats that support plants and/or animals at a critical state in their life cycles; the presence of 20,000 or more waterbirds; and the support of 1 percent of the individuals in a population of a species or subspecies of waterbird. Because the Ramsar Diploma, issued in 1986, designates the entirety of the Izembek National Wildlife Refuge as a Wetland of International Importance, the entire length of the proposed road corridor for Alternative 2 would be within the Ramsar site (see Section 3.2.2.2).

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 a regulatory regime and has no punitive sanctions for violations of or defaulting upon treaty commitments, the terms of the Ramsar Convention constitutes a solemn treaty and are binding in international law (RAMSAR 2010). 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. Based upon a review of the Ramsar criteria, the proposed adjustment of the wilderness status for the area within the 201-acre corridor and the fill of 2.7 acres of wetland, within the 416,207-acre Ramsar site, would not diminish the qualities of Izembek National Wildlife Refuge to the extent that it would change the justification for Ramsar designation. If Alternative 2 is selected for implementation, the Service would report the proposed change in wetlands to the Ramsar Convention.

Summary

The direct and indirect effects from construction would be high intensity for the 3.8 acres of lowland wet low sedge/scrub and lowland wet sedge wetlands and the 1.0 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 in intensity due to modifications of wetland hydrology and likely alterations to wetland vegetation. The effects would be permanent and local for these wetlands considered unique because of their Ramsar designation.

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 2 would have indirect effects on wetlands, such as road dust on vegetation from the gravel road surface, and possibly an increase in human traffic in wetlands.

Although road dust is often limited because of the amount of rainfall common to the region, the frequent winds can rapidly dry out gravel road beds and increase its 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. 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 will circumvent the barriers and pioneer new trails on the adjacent landscape resulting in indirect effects on wetlands. In a report by the Corps (USACE 2009) efforts to exclude all-terrain vehicles from an area in

Washington County, Texas, through the use of physical barriers continually failed. Guard-post and cable barriers became stretched, cut and removed; barbed-wire barriers were cut; steel posts were pulled up or bent to the ground; and a constructed/welded pipe fence was pushed or pulled to the ground allowing all-terrain vehicles to cross. Even though the proposed road under this alternative would experience much less all-terrain vehicle traffic than in the Texas example, some motorized access is likely to result, causing indirect effects to wetlands such as the loss of vegetative cover and soil erosion. Existing all-terrain vehicle trails observed in the Kinzarof Lagoon area, that have resulted from trespass or non-traditional access for subsistence purposes, reveal that the vehicles often travel several miles, following drainages or wet graminoid meadows because the terrain is smother and easier to travel. Alterations in the vegetative cover, soil compaction, and erosion that results would reduce the functional capacity of impacted wetlands, which function to slow runoff, moderate stream flows, and provide important habitats, such as nesting and escape cover.

Summary

Indirect effects from operation and maintenance would include 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 effects from dust would be minor, but the effects from motorized vehicles would be moderate, because they are medium in intensity, long-term, and local or beyond in extent for these unique wetlands. In addition, Alternative 2 has beneficial effects for wetlands that would result from the proposed land exchanges. The federal government would gain approximately 12,726 acres of wetland while relinquishing ownership of 993 acres of wetland, resulting in a substantial net gain of wetlands managed within the National Wildlife Refuge System. The majority of those acquired wetlands would be managed under wilderness designation. All of the wetlands gained by the federal government through the land exchange with the state are not considered equal in value to wetlands affected by this alternative, because of their isolated location in relation to the high density waterfowl use areas of the Izembek and Kinzarof Lagoons. Many of the wetlands of the Kinzarof parcel, to be gained through the exchange with the King Cove Corporation, and the wetlands on the northern portion of the selected parcel that would be retained by the Service, are quite similar in value to those wetlands lost to Service management within the proposed corridor. 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 and recognized internationally by the Ramsar Convention. The overall effect as a result of operation and management is therefore moderate.

Mitigation Measures

A barrier (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 measures, 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 affecting vegetation in or adjacent to the project area are negligible because this wilderness location is undeveloped. 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 result of implementing Alternative 2 would 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 also result in the addition of approximately 12,726 acres of wetlands to the National Wildlife Refuge System, while relinquishing ownership of approximately 993 acres of wetland; a net gain of approximately 11,733 acres, while also maintaining ownership of 1,917 acres of wetlands on the King Cove Corporation selected parcel.

The completion of the King Cove Access Project (USACE 2003) would also contribute to effects on wetlands. As a result of this project, approximately 6 acres of wetland have been filled along the segment from King Cove Airport to Lenard Harbor, and 3 acres were filled at the Northeast Hovercraft Terminal site. The remainder of the project, which consists of a 12-mile long, 14-foot wide access road from the Leonard Harbor site to the Northeast Hovercraft 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.

Alternative 2 would have a moderate contribution to cumulative effects on 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 416,207 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 and the juxtaposition of the proposed corridor relative to designated wilderness. There would also be beneficial effects for wetlands that would result from the proposed land exchanges. Some of the wetlands in the Kinzarof parcel gained by the Service through the land exchange and some wetlands to be retained in the selected parcel would have similar values to those impacted by road construction. Other wetlands gained by the Service would not provide equal wetland values to those affected by this alternative. Therefore, considering the additional wetlands added to the National Wildlife Refuge system, along with their values in comparison to the Kinzarof area wetlands that would be directly and indirectly affected by this alternative, there 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. 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. Quantities of water would be needed for embankment compaction and dust control. The road material should remain moist due to typically wet weather; therefore, water requirements would be relatively low. 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 Hovercraft 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 (150 acres, not connected to anadromous streams) at the western terminus of Alternative 2. Locations and preliminary estimates of quantities are shown in Appendix E.

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. It is not anticipated that any effects on the other exchange parcels would result from the land exchange 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

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.

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. 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.

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 utilizing 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, temporary in duration, and local in extent. The habitat may be considered unique, due to its status as essential fish habitat under the *Sustainable Fisheries Act*. However, effects to anadromous fish are not expected to be measurable. 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. 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 often surpass design standards due to practicability and financial considerations. 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.

Another important 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 through an area currently confined to foot travel is likely to increase fishing pressure in these newly accessible streams. 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. 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 anticipated indirect effects, such as effects to water quality, would be of low intensity, long-term duration (intermittent but persistent for the life of the project), local in extent, but would impact unique resources resulting in a negligible effect. However, indirect effects on the fish resources from increased harvest pressure resulting from improved access have the potential to be much greater. If overharvesting were to occur, effects on anadromous fish in the impacted streams would be of high intensity, long-term or potentially permanent in duration, local in extent, and would impact unique resources (due to limited populations). Therefore, the indirect effects from operation and maintenance under Alternative 2 would be major.

Mitigation Measures

Mitigation measures proposed as part of the 2003 EIS have been carried forward, where appropriate. The mitigation measures from the 2003 EIS directed at controlling the introduction of foreign and potentially deleterious substances into the waterways include:

- Implementation of an erosion and sediment control plan
- Implementation of a storm water pollution prevention plan
- Implementation of a hazardous material and petroleum product control plan
- Implementation of a fuel handling and spill response plan

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, a fish and wildlife protection plan 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. The following text is excerpted directly from the 2003 EIS and details the mitigation measures aimed directly at fish and stream crossings.

> "i) Construction affecting fish streams will conform to the August 3, 2001 MOA [Memorandum of Agreement] between ADOT&PF [Alaska Department of Transportation and Public Facilities] and ADF&G [Alaska Department of Fish and Game] regarding streams (ADOT&PF 2001) and will occur during times approved by the State of Alaska. Typically, in-water work is allowed between May 15 and August 7. This in-water work window could be extended beyond August 7 on a case-by-case basis if systematic surveys by the AEB [applicant] Environmental Monitor (MM-10, or qualified fisheries professional) indicate

no adult salmon are near the in-water work areas and after consultation and approval by the State of Alaska and the Corps.

ii) Unavoidable construction within floodplains and stream channels will incorporate the following design and construction measures:

a. All culverts will be sized to pass the design flood of Q10 for non-fish streams, and Q50 for fish streams.

b. All disturbed stream banks and slopes will be effectively revegetated with native species suited for the area.

c. For all in-water work and areas subject to flooding (high water events), only clean rock, gravel, and granular fill will be used. ADOT&PF [Alaska Department of Transportation and Public Facilities] Specifications for Selected Materials are based on the percentage (by weight) of material passing a #200 sieve. Silts and clays both pass the #200 sieve but the lower the percentage of material passing the sieve[sic], the more resistant the fill would be to erosion. Only granular fill that meets or exceeds ADOT&PF [Alaska Department of Transportation and Public Facilities] Specifications for Selected Material, Type A or better (less than 6% #200 sieve passage) will be used in active channels. Active channels are considered areas below the Ordinary High Water Mark (OHWM) as defined by the Corps. Only granular fill that meets or exceeds ADOT&PF [Alaska Department of Transportation and Public Facilities] Specifications for Selected Material, Type B or better (less than 10% #200 sieve passage) will be used in floodplains not in active channels.

d. During culvert installation activities (e.g., during road crossing construction) on any fish stream, the downstream stream flows will be maintained with a sufficient quantity of clean water to support aquatic life found in the stream channel. The design, construction, and maintenance of road crossings shall not disrupt the migration or other movement of those aquatic species of aquatic life inhabiting the water body.

e. No vehicles may be operated within fish steams without prior approval from the State of Alaska. Any vehicle permitted to operate in these waters will be free of grease, oils, or other materials that could contaminate the stream. Any petroleum product sheen reasonably associated with a vehicle having been in contact with flowing or standing water would constitute noncompliance.

f. All waters pumped from the work area shall be discharged into a settling basin, a silt fence, or otherwise treated to prevent the release of turbid water back into the fish stream.

iii) Project personnel, their contractors, and others will not use construction project access to fishing areas that are not open to the general public for fishing or other harvest activities.

iv) Water withdrawal for construction purposes will be done in conformance with a permit from ADNR [Alaska Department of Natural Resources].

v) Water withdrawals from a fish bearing stream will be done in accord with a habitat permit from the State of Alaska."

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. Additionally, culverts and drainage structures should be monitored for hydrologic and structural function post storm events and on an annual basis.

Additional recommended mitigation measures include appropriate adjustments of bag limits and open seasons by the Alaska Board of Fisheries for harvesting from these streams with new access, along with information, education, 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.

Implementation of Alternative 2 would include effects to anadromous fish through increased harvest pressure in specific streams, such as Southeast Kinzarof Stream (283-34-10700), and increased impacts to riparian habitats from increased foot traffic by fishermen. This negative effect could be substantial, if not mitigated. [Recommended mitigation that has not been approved by the managing agency is not considered in the analysis; if adopted, the impacts would be reduced.] Thus, the contribution to cumulative effects on fish and essential fish habitat from the implementation of Alternative 2 would be major.

Conclusion

Effects on fish and essential fish habitat from most aspects of the southern road alignment would be of low intensity, long-term to permanent in duration, and local in extent for these unique resources. However, the potential for overharvesting of anadromous resources would be of high intensity in specific anadromous streams along the new road alignment. The contribution to cumulative effects on fish and essential fish habitat would be major. Therefore, the combined negative effects on fish and fish habitat under Alternative 2 would be major. Implementing mitigation measures to address the threat of overharvest should lessen this impact.

4.3.2.4 Birds

The southern road alignment would be located along the southern edge of the Izembek isthmus, from ½ mile to 1 mile north of Kinzarof Lagoon. The route was designed to minimize the impact of the proposed road on 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.

To simplify the discussion, general impacts to bird species are presented first, along with mitigation measures proposed to reduce impacts. This is 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. The groups are:

- Tundra Swan and Other Breeding Birds
- 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. Migrating/wintering birds are those species that are present in the project area only during spring and/or fall migration and may winter there, but do not nest there. Both breeders and migrants are expected to forage in the project area. Seabirds are those species that spend the majority of their time on the ocean. These species nest on cliffs or shorelines so are not expected to be nesting in the project area. Please refer to Chapter 3 for 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.

General Impacts

Direct Effects and Indirect Effects from Construction

The direct and indirect effects of the construction of Alternative 2 on birds could include behavioral disturbance and habitat loss. The direct and indirect effects of construction also include the attraction of some species to newly created edge habitat or the gravel surface resulting from road construction. Semipalmated Plover, a shorebird that nests in gravel habitats, is attracted to nesting in gravel roads of the Cold Bay area. Although adults should be able to avoid collisions with vehicles in most circumstances, their eggs and chicks cannot. Constant disturbances could cause adults to abandon their nests. Other species that may be attracted to the road surface to forage for invertebrates in the gravel or on grass seeds along the margins of the road include, American Pipit, Lapland Longspur, and a variety of post-breeding or migrant shorebirds. Willow Ptarmigan go to gravel roads to collect grit for their gizzards and other small bird species may be attracted to gravel roads for taking dust baths.

While the disturbance during construction would be short-term, the loss of habitat and the modified habitat would be long-term to permanent. The behavioral disturbance would be caused by construction noise and vehicle and human presence along the proposed road alignment, most of which is previously undisturbed. For the purpose of this EIS, construction is assumed to take place between May and October, while many species of birds are present and may be nesting in

the project area. The disturbance caused by 2 years of construction noise, heavy equipment moving around and human presence could cause birds to change their migrating, feeding, or breeding behavior. Behavioral changes could lead to reduced breeding success or reduced fitness for the energy demands of migration. Each species has their own tolerance levels for disturbance from construction activities and avoidance of disturbed areas. The result would be a loss of habitat and underuse of habitats in an area larger than the road footprint.

Land Exchange

The exchange of land parcels would occur prior to construction. The exchange could affect birds because a change in ownership could change the way these lands, mostly high quality bird habitat, are managed prior to road construction. The following summarizes the current bird use of each parcel along with the proposed management changes.

Road Corridor

The 236 acre road corridor would consist of 201 acres transferred from the Izembek National Wildlife Refuge. One hundred seven (107) acres of the corridor would be impacted by the footprint of road construction. This area is likely to contain or be directly adjacent to nesting habitat for Tundra Swans, Mallards, Black Scoters, other ducks, Bald Eagles, Willow Ptarmigan, other landbirds, Rock Sandpipers, Dunlin, and other shorebirds. Migrating Brant, Cackling Geese, other waterfowl, landbirds, and shorebirds also could be present. Gyrfalcons hunt for prey along the Izembek isthmus. The isthmus also serves as the main flight path for staging and wintering Emperor Geese, Brant, Tundra Swans, other waterfowl, and other waterbirds as they move between Izembek and Moffet Lagoons on the north side of the isthmus to Kinzarof Lagoon and Cold Bay on the south side.

Much of the land that would be transferred from the Izembek National Wildlife Refuge is currently managed as wilderness. The road corridor would be owned and managed by the State of Alaska as part of the Izembek State Game Refuge.

Sitkinak Island

The 1,619 acres on Sitkinak Island is primarily low wetlands. Emperor Geese have been documented in the adjacent lagoon in winter. The large lake and adjacent wetlands likely support a variety of nesting and migrating waterfowl, other waterbirds, shorebirds, and landbirds. The land would be transferred from the Coast Guard and Service, currently managed as part of an airstrip for a Coast Guard Base, to the State of Alaska. The Alaska Department of Natural Resources would manage the land for general uses, consistent with the *Kodiak Area Plan*.

State Lands

The 41,887 acres of State of Alaska land northeast of the Izembek National Wildlife Refuge boundary has not been covered by many bird surveys. The southern half is primarily upland habitat and includes higher elevation areas. It likely provides good nesting and foraging habitat for ptarmigan and other landbirds, as well as Rough-legged Hawk, Golden Eagle, and Gyrfalcon. The northern half has many wetland areas suitable for nesting Tundra Swans, Black Scoters, and other waterfowl, waterbirds, and shorebirds. The parcel includes shoreline along Bristol Bay that provides habitat for gulls, waterfowl, and shorebirds.

The land would be transferred from the State of Alaska, currently managed for general use; the parcel would become wilderness and part of the Alaska Peninsula National Wildlife Refuge.

Generally allowed uses under state management include activities such as off-road vehicle travel, camping, hunting, and fishing, although these lands are very remote and the difficult access greatly restricts human uses at present. As refuge land, the area would be managed to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, waterfowl, shorebirds and other migratory birds, brown bears, and salmonids.

Mortensens Lagoon

The 8,092 acres of King Cove Corporation land contains primarily wetland areas and shoreline habitat along Mortensens Lagoon. The wetlands 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 likely supports a variety of other nesting landbirds. The shoreline and intertidal areas of Mortensens Lagoon are important foraging and resting habitat for migrating shorebirds and some waterbirds. It is also likely used by Gyrfalcons and other migratory raptors for hunting shorebirds and waterfowl. The land would be transferred from the King Cove Corporation to the Alaska Peninsula National Wildlife Refuge. Activities that are presently allowable and that may adversely affect birds would likely be restricted under national wildlife refuge management.

Kinzarof Lagoon

The 2,604 acres of King Cove Corporation land likely provide nesting habitat to the same species described above for the road corridor. These parcels lie between Kinzarof Lagoon and Cold Bay, both important foraging and resting areas for waterfowl, waterbirds, and shorebirds. The shorelines and intertidal areas of these parcels are important to a number of species year round. The land would be transferred from the King Cove Corporation to the Izembek National Wildlife Refuge to be managed as wilderness.

King Cove Corporation Selected Lands

The 5,430 acres of King Cove Corporation selected lands lie inland from the Northeast Hovercraft Terminal and do not border any marine waterbodies. The area is a mixture of wetland habitats in the northern half and upland habitats in the south. The area likely provides nesting and foraging habitat for the same species nesting in the road corridor. 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. Under Alternative 2, the lands would remain part of Izembek National Wildlife Refuge and continue to be managed as wilderness. These lands would not be conveyed to the King Cove Corporation and be subject to development as private lands.

Land Exchange Summary

The net result of the land exchange would be an increase in the acreage of land managed as wilderness and national wildlife refuge. Nearly all the lands involved are undeveloped with little development planned. However, the long-term management would reduce the threat of potential development and provide protection to the biological integrity of the lands acquired by the Service. Lands relinquished by the Service under the exchange would be subject to development, particularly the road corridor and would not necessarily protect biological integrity; management would be subject to guidelines of the *Izembek State Game Refuge Management Plan* and the *Kodiak Area Plan*.

Summary

The direct and indirect effects of the construction of Alternative 2 on birds could include behavioral disturbance, habitat loss and the creation of edge habitat and gravel surfaces that may be attractive to some bird species. The proposed land exchange could affect birds because a change in ownership could change the way these lands, mostly high quality bird habitat, are managed in the future.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects of the operation and maintenance of Alternative 2 on birds could include habitat avoidance caused by increased human and predator access, and risk of injury or mortality from vehicle collisions.

The risk of vehicles colliding with birds would be low due to the slow speed limit and low number of vehicles expected. However, it is possible that vehicles could collide with and injure or kill birds, especially during bad weather or other times when visibility is low. Juvenile and molting birds would be especially vulnerable. The number of birds potentially affected by collisions is expected to be small.

The effect of roads on birds has been well studied (Kociolek and Clevenger 2011) but remains difficult to accurately predict for any given project. While some birds may become habituated to predictable use of the road by vehicles, behavior changes are more likely to be caused by particularly noisy vehicles, 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 become habituated to it.

The aspect of road operation and maintenance that has the potential for the greatest adverse impact on birds is the potential increase in human access into the project area. Not only will 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. The area affected by human disturbance would be larger than the road footprint, and would vary by species and season. While some species are fairly tolerant of human activity, others react more strongly and would avoid a wide area around the road. Mortality to gamebirds such as ptarmigan and waterfowl could increase if more hunters are able to access the area.

Due to the importance of the bird habitat potentially affected by this project, ABR (2010) evaluated disturbance buffers for waterfowl species (specifically Brant) for this project. They determined that most of the road would be visible from areas used by Brant in Kinzarof Lagoon, but the noise level from cars or pick-up trucks would be less than the background noise level. The ABR study concluded that a minimum buffer of ½ mile would be necessary to minimize disturbance to waterfowl using the intertidal areas of Kinzarof Lagoon. Given the likelihood that people will use the road to access Kinzarof Lagoon with all-terrain vehicles and by foot, this ½ buffer zone is unlikely to be realized in different locations of the lagoon, leading to substantial increases in disturbance and subsistence harvest of waterfowl and other species in the area. The intensity of these indirect effects could be much larger than the direct effects of disturbance from traffic on the road.

Summary

The effect of the operation and maintenance of roads on birds has been well studied but remains difficult to accurately predict. While some birds may become habituated to predictable use of the road by vehicles, behavior changes are more likely to be caused by particularly noisy vehicles, 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 vehicle collisions, and some species, subject to harvest by sport or subsistence hunters, will be directly impacted in the vicinity of the road because of the improved access for hunters. Although the direct and indirect effects would be high and long term within the localized area resulting in moderate to major effects for some of these common resource species, the effects for the entire project area would be low, long term for these common resource species, resulting in minor effects to the populations.

Common Mitigation Measures

The following mitigation measures were implemented to reduce impacts to birds from the King Cove Access Project (USACE 2003). Similar measures should be implemented for this project.

- 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.

The following additional mitigation measures specific to this project would also be implemented.

- 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, AEB [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.

- Motorized vehicle access beyond the roadway corridor would be prohibited. Barriers, 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 would be posted along the road.

- Most commercial use of the road would be prohibited. 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

The effects of past and present actions are described as the project baseline in Section 3.2.4. Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through 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.

Conclusion

The general direct and indirect effects of the construction of Alternative 2 on birds would be negative because of the loss of habitat, but the creation of edge habitats and gravel surfaces may attract some species. The operation and maintenance of the road would result in minor effects for these species within the project area; however, moderate to major effects would occur for localized populations near the road.

Tundra Swan and Other Breeding Birds

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. Tundra Swans from migratory populations may also occur at the Izembek National Wildlife Refuge (Service 2009b). Tundra Swans require large water bodies as suitable nesting and/or molting sites and actively defend large nesting territories (Limpert and Earnst 1994: Kear 2005). Depending on the distribution of large ponds on the isthmus between Kinzarof and Izembek lagoons, fewer individuals or pairs occupy the same area as smaller sized goose or duck species.

Both Aleutian and Arctic Terns nest within the proposed corridor area, but Aleutian Terns are highly sensitive to disturbance and will abandon colonies in response to human disturbance (Haney et al. 1991; Litvinenko and Shibaev 1991). Other breeding birds in the project area could include raptors, shorebirds, gulls, 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 Effects and Indirect Effects from Construction

The direct and indirect effects of the construction of Alternative 2 on Tundra Swans and other breeding birds could include behavioral disturbance and habitat loss. The southern road alignment crosses through high density swan habitat with numerous observations of pairs and nests occurring in close proximity. Behavioral disturbance is expected along the roadway corridor during construction. Individuals present will likely be displaced and may miss a breeding season if they are not able to find an alternate breeding site quickly. The unique population of Tundra Swans that resides year round in the Izembek National Wildlife Refuge has a low productivity rate due to high rates of mortality of eggs and young, and persists primarily due to adult longevity (Service, unpublished data, cited in Sowl and Poetter 2004). The low productivity rate makes this population more vulnerable to the effects of any nesting failure. Tundra Swans are known to return to the same breeding territories annually; adults neckbanded on breeding territories on the Izembek National Wildlife Refuge and the North Slope, Alaska, were observed occupying the same territories in subsequent years (Izembek National Wildlife Refuge unpub. data, Sladen 1973, cited in Limpert and Earnst 1994). While the disturbance during construction would be short-term, the direct loss of 107 acres of nesting habitat would be permanent.

Other breeding birds 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 would take place outside of the nesting season, but construction would take place between May and October, while these species are present and may be nesting in the project area. The disturbance caused by 2 years of construction noise, heavy equipment moving around, and human presence could cause birds to change their migrating, feeding, or breeding behavior. The intensity of these behavior changes could range from high (if a nest is disturbed or birds are unable to find a suitable nest site far enough away from the construction to avoid disturbance) to low (bird flies away from area). In addition to Tundra Swans, other large, highly territorial birds such as Common Loons or Sandhill Cranes, would likely be sensitive to disturbance over a large area.

Approximately 107 acres of habitat loss would result from the construction of the roadway. The habitat is potential nesting area for many species of shorebirds, gulls, turns, and passerines. Birds nesting in or near the project area would be displaced by the construction, which could reduce breeding success. The displaced individuals may move to similar adjacent habitat, or if nesting density is high, may be forced to move to another area.

Summary

The direct and indirect effects to Tundra Swans and other breeding birds from the construction of Alternative 2 would be medium to high intensity with short-term disturbance to behavior and permanent displacement of habitat within the road construction area. Effects would be localized or limited in extent, and would affect unique (Tundra Swans) and common (other breeding birds) resources. Construction of Alternative 2 would result in major direct and indirect effects to Tundra Swans and moderate effects to other breeding birds.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects to Tundra Swans and other breeding birds from the operation and maintenance of Alternative 2 could include long-term behavioral disturbance from increased human access and risk of collision with vehicles. The southern road alignment lies closer to Kinzarof Lagoon and further from Izembek Lagoon. Swans are very sensitive to disturbance, especially pedestrian traffic, and may have an unsuccessful breeding season if high levels of human activity occur near their chosen nesting site (Henson and Grant 1991, cited in Sowl and Poetter 2004). The literature has shown that swans are intolerant of human disturbance while breeding or molting, frequently leaving nests in response to approaching humans, sometimes nearly a mile away, and will rarely return to nests as long as humans are in sight. Repeated disturbance would lead to nest abandonment (Henson and Grant 1991, cited in Sowl and Poetter 2004). On the Izembek National Wildlife Refuge, Tundra Swan families that have been disturbed off their brood-rearing lakes have moved up to 6 miles overland (Service, unpublished data, cited in Sowl and Poetter 2004). Recent research indicates that the population of Tundra Swans breeding near the Cold Bay road system has steadily declined over the past 2 decades (Sowl 2007*)*. If the new road is established and traffic begins, it is likely that swans would choose nest sites far enough away from the road to nest undisturbed. This would lead to an effective loss of habitat much larger than the footprint of the road. However, any use of vehicles or access of pedestrians outside of the road corridor would likely cause additional disturbance with the potential for nesting disruption. The potential extent of all-terrain vehicles and foot traffic outside of the road corridor is not known, but it could become substantial over the years as unauthorized trails become established and subsistence harvest of various species expands into the area.

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 use of the road by smaller vehicles, behavior changes are more likely to be caused by noisier vehicles, vehicles that stop on the road, and pedestrians. Some birds may avoid the road when vehicles or pedestrians are present, other species may be attracted to the road. Passerines may take dust baths in the roadway, shorebirds may forage for invertebrates amongst the gravel, and ptarmigan may use the road as a source of small rocks for their gizzards.

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 waterfowl (and other birds). Not only would the road allow more human access to the area, but an indirect effect may be that more people visit the area due to the presence of the new road. 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 predation if the adult(s) leave them in reaction to disturbances.

The increased access may also increase hunting pressure on birds, both by humans and other predators. This would increase the amount of disturbance outside the roadway corridor. It is expected that the permanent effect of the road will be a reduction in bird density in an area larger than the project footprint.

The risk of swans or other breeding birds colliding with vehicles would be low due to the low speed limit and low number of vehicles expected. However, it is possible that vehicles could collide with swans especially during bad weather or other times when visibility is low and the birds were crossing or traveling along the road with flightless young. Due to the small and declining size of the population, the impact of any swan mortalities would be high. Semipalmated Plovers nest in gravel and use the gravel roads at Cold Bay as suitable breeding habitat. Incubating birds that nest on the edge of roads will habituate to traffic as long as it is slow and steady, but often nests are abandoned or destroyed by frequent traffic. After hatching, small chicks have been seen to forage on the road and have been killed by vehicles (Sowl personal observation).

Summary

The direct and indirect impacts to Tundra Swans and other breeding birds from the operation and maintenance of Alternative 2 would be medium to high intensity with long-term (behavioral disturbance) to permanent (habitat loss) duration of effects with a localized or limited extent. Unique (Tundra Swan) and common resources (other breeding species) could be affected. For Tundra Swans, implementation of Alternative 2 would result in major direct and indirect effects. For other breeding birds, implementation of Alternative 2 would result in moderate direct and indirect effects.

Mitigation Measures

All the mitigation measures listed under the Common Impacts discussion 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. 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 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 negatively impacted.

Cumulative Effects

Past and present actions that have and may continue to affect Tundra Swans in the project area include activities associated with the Cold Bay road system. The number of swans breeding in the vicinity of Cold Bay appears to be more depressed than the number breeding in more remote areas of Izembek National Wildlife Refuge (Service, unpublished data, cited in Sowl 2004). High density breeding areas historically included lakes in the vicinity of the Cold Bay road system (Service 1996), but few swans nest near the Cold Bay roads today (Sowl 2004). The population of Tundra Swans in the project area has been declining over the last 2 decades, possibly due to human activities in the vicinity of the Cold Bay road system (Sowl 2007*)* and nest predation by brown bears (Meixell 2007). The past and present actions have caused increases in human disturbance and the reasonably foreseeable future actions would also cause an increase in human activity in the project vicinity, including more traffic on the proposed road. Alternative 2 would contribute to the additive effect of disturbance from human activities to this population.

Birds breeding in the project area are being affected by many past and present actions throughout their ranges including: habitat conversion and degradation, transportation infrastructure, energy production and mining, hunting, disturbance from human activities, and pollution. The populations of many species have been declining. There are many reasons for declines in landbird populations including loss, degradation, and fragmentation of habitat on breeding and wintering grounds and along migratory routes (Boreal Partners in Flight 1999). Important habitats that are used by Alaska's shorebirds during the nonbreeding season are being eliminated or compromised by seawall construction and estuarine reclamation along the Yellow Sea, oil spills in Korea and San Francisco Bay, loss of native mangroves in Panama Bay, alteration of grasslands in Brazil, Uruguay and Argentina, and the spread of invasive mangroves in New Zealand (Alaska Shorebird Group 2008). Threats to shorebirds in Alaska include habitat conversion and degradation, transportation infrastructure, energy production and mining, biological resource harvesting, recreation and work in natural habitats, pollution, invasive and problematic species, disease and climate change and severe weather (Alaska Shorebird Group 2008).

The effect of past and present actions on breeding birds has been a loss or degradation of habitat, either through direct conversion or increased human activity. The completion of the King Cove Access Road is expected to result in more waterfowl and ptarmigan hunting at Kinzarof Lagoon and the northeast side of Cold Bay.

Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through 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 proposed road. The increase in the number of fisheries observers in King Cove could add more traffic to the road.

Alternative 2 would contribute to the additive effect of habitat loss and disturbance from human activities to breeding birds. Because the human activities, although increasing, are still limited to certain areas, leaving the majority of breeding bird habitat undisturbed, the overall effect of Alternative 2 when added to the effects of past, present, and future actions would be moderate.

Conclusion

Direct and indirect impacts to Tundra Swans and other breeding birds from Alternative 2 would be medium to high intensity with long-term disturbance to behavior and permanent loss of habitat. Effects would be localized or limited in extent, and would affect unique (Tundra Swan) and common resources. Alternative 2 would have a major effect on Tundra Swans and a moderate effect on other breeding birds.

Brant, Emperor Goose, and Other Migrating/Wintering Birds

Izembek Lagoon and nearby coastal areas support almost all of the Pacific Flyway Brant during spring and fall migrations, where they feed on the extensive eelgrass beds and other marsh plants (Reed et al. 1998). Izembek Lagoon is the preferred winter habitat, but it is shallow and will often freeze, thereby becoming unavailable to Brant. 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 2010). 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 Pacific Flyway Brant, this species is considered unique in the effects analysis.

The proposed road corridor is a low density use area for Emperor Geese, providing some upland foraging habitat. The isthmus area also serves as a flight corridor between the Izembek and Kinzarof lagoons. Emperor Geese forage heavily on eelgrass in the lagoons, but also eat mussels and other invertebrates on the beaches and tidal flats, and crowberries on the tundra uplands (Petersen 1983; Hupp and Safine 2002). With its limited distribution, it is possibly the rarest goose species in North America (Wells 2007). The project area is a staging site for spring and fall migrating Emperor Geese, a primary wintering site, and alternative site for wintering and/or migrating individuals when water bodies are frozen elsewhere on the Alaska Peninsula (Petersen et al. 1994; Hupp et al. 2008). For spring and fall migrating and overwintering Emperor Geese, the close proximity of suitable habitats (bay edges, tidal flats, and uplands) on both sides of the Izembek isthmus allows these birds to select the best habitat based on ice conditions, weather, and tidal stage. Emperor Goose seasonal and annual survival rates are below those compared with other goose species (Schmutz et al. 1994, Hupp et al. 2008). 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 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; Western Sandpiper, Pacific Golden-Plover and other shorebirds; Lapland Longspur and other passerines; and falcons. Species that occur in low densities on upland habitats during the winter include Willow Ptarmigan, Snow and McKay's Buntings, and the occasional Snowy Owl. These species are widespread and considered common in the effects analysis.

Direct Effects and Indirect Effects from Construction

The direct and indirect effects of the construction of Alternative 2 on Brant, Emperor Geese, and other migrating/wintering birds could include behavioral disturbance and habitat loss. The construction disturbance would be short-term and limited to the roadway corridor, but the loss of 107 acres of habitat would be permanent.

Brant, Emperor Geese, or other migrating/wintering birds flying over or foraging in the area would be temporarily displaced by the construction noise and activity, but would likely move to adjacent similar habitat. The loss of 107 acres of foraging habitat would have a minor effect due to the abundance of adjacent similar habitat.

Summary

The direct and indirect impacts to Brant, Emperor Geese, and other migrating/wintering birds from the construction of Alternative 2 would be low intensity¸ temporary (behavioral disturbance) to permanent duration (habitat loss), local extent, and would affect unique resources (Brant), important resources (Emperor Goose), and common resources (other migrating/wintering species). Construction of Alternative 2 would result in moderate direct and indirect effects to these resources.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects to Brant, Emperor Geese, and other migrating/wintering birds from the operation and maintenance of Alternative 2 could include behavioral disturbance from increased human access.

Because the road under this alternative is further from Izembek Lagoon, where large numbers of birds stage during spring and fall migration, it would affect fewer migrating/wintering birds than Alternative 3. Birds staging at either Kinzarof or Izembek Lagoons could be affected by the sight of vehicles or people using the road.

Increased access to the area could affect migrating/wintering birds through increased disturbance and greater hunting pressure. Disturbance during migration or winter could lead to decreased survival if feeding is interrupted repeatedly.

Brant are sensitive to human disturbance, especially during migration when they need to recover energy (fat reserves) for breeding in spring and long migration flights in fall. Staging Brant are sensitive to the noise and visual disturbance of low flying aircraft, helicopters, and small boats, and such activity can cause interruption of feeding and displacement from feeding areas (Ward and Stehn 1989). Frequent disturbance of staging Brant causes a reduction in body weight which could compromise migration readiness and survival rates (Ward and Stehn 1989).Frequent disturbance from road traffic could distract Emperor Geese from feeding or displace them to less favorable habitat. Increased access to previously remote staging areas could interrupt foraging activities and displace birds from feeding areas, compromising migration readiness and survival (Ward and Stehn 1989).

Wintering waterfowl concentrated along the south and east ends of Kinzarof Lagoon are sensitive to excessive disturbance because they need to spend a considerable portion of their daily activity cycle foraging to meet the energetic demands of wintering in such a harsh environment (Laubhan and Matzner 1999, cited in Sowl and Poetter 2004). Due to the

importance of the bird habitat potentially affected by this project, ABR, Inc. conducted a review of scientific literature on waterfowl disturbance and evaluated disturbance buffers for waterfowl species for this project (ABR 2010). The literature revealed the following (ABR 2010). Despite a large body of research on disturbance effects on waterfowl, it remains difficult to accurately predict the specific effects of a proposed road based on research conducted elsewhere and often on different species. The responses of animals to disturbance varies by type of disturbance; distance from the disturbance vector(s); frequency, predictability, and location of disturbance; environmental conditions; group or flock size; season; and species. In addition, there is individual variation (within species) in responses to disturbance, which makes prediction difficult. However, ABR found that most research indicates that large, unusual, or loud vehicles, as well as those that slow and/or stop, elicit more reactions from waterfowl than do constantly moving passenger vehicles. In the North Slope oilfields, common vehicular traffic typically did not elicit strong reactions (e.g., running or flying) from any of the geese species studied, unless the vehicles were loud or exceptionally large (Murphy and Anderson 1993), or were either faster than average or slowed and/or stopped **(**Burgess et al. 1992). Studies in Scotland showed that Pink-footed Geese and Whooper Swans flushed at greater distances in response to large vehicles and farm vehicles (Keller 1991, Rees et al. 2005) than to passenger vehicles. Pedestrians usually were the disturbance type that elicited the strongest or second strongest response (often second to aircraft or boats) from waterfowl in studies that examined multiple types of human activity (Owens 1977; Klein 1993; Stock 1993; Riddington et al. 1996; Burger and Gochfeld 1998; Rees et al. 2005, cited in ABR 2010).

Disturbance during the migration or wintering periods may displace birds from feeding areas or reduce foraging efficiency. Ward and Stehn (1989) studied how Brant and other geese respond to aircraft and other disturbances at Izembek Lagoon. Their results showed that if waterfowl spend less time feeding, or use energy flying away, rates of fat deposition and storage of critical nutrients may be reduced (Ward and Stehn 1989). Increased flight caused by disturbance may lead to separation of family members, or increased hunting mortality. Ward et al. (2009a) showed that in heavy ice regimes from 1980 – 2005 Brant numbers dramatically decreased in Izembek Lagoon and increased in Kinzarof Lagoon, demonstrating a greater dependence on Kinzarof Lagoon and more subject to disturbances from the Alternative 2 corridor route, which lies closer to Kinzarof Lagoon.

Increased access may also increase hunting pressure on birds, both by humans and other predators. Access to portions of the refuge outside the roadway corridor using motorized vehicles is also expected to occur despite measures to prevent it. This and increased foot traffic would increase the amount of disturbance outside the roadway corridor. It is expected that the permanent effect of the road will be a reduction in bird density in an area larger than the project footprint.

With the distance buffer, most of the road would be visible from areas used by Brant in Kinzarof Lagoon, but the noise level from cars or pick-up trucks would be less than the background noise level (ABR 2010). Their study concluded that a minimum buffer of ½ mile is necessary to minimize disturbance to waterfowl using the intertidal areas. Alternative 2 proposes the road be located ½ mile to 1 mile north of Kinzarof Lagoon, therefore the disturbance effects to Brant, Emperor Geese, and other migrating/wintering birds are dependent on the types and intensity of human activities along the route. Large equipment used for maintenance, cars, pick-up trucks or all-terrain vehicles stopping along the route, and increased human activity in the area resulting

from this improved access, could cause major disturbances to Brant, Emperor Geese, and other migrating/wintering birds.

Summary

The direct and indirect impacts to Brant, Emperor Geese, and other migrating/wintering birds from the operation and maintenance of Alternative 2 would be low intensity¸ permanent duration (behavioral disturbance and habitat loss), local extent, and would affect unique resources (Brant), important resources (Emperor Goose), and common resources (other migrating/wintering species). Operation and maintenance of Alternative 2 would result in major (Brant and Emperor Goose) and moderate (other species) direct and indirect effects to these resources.

Mitigation Measures

All mitigation measures listed above under General Impacts, 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

Past and present actions that have and may continue to affect Brant, Emperor Geese, and other migrating/wintering birds in the project area are described in Section 3.2.4. Birds that migrate through or spend the winter in the project area are being affected by many past and present actions throughout their ranges including habitat conversion and degradation, transportation infrastructure, energy production and mining, hunting, disturbance from human activities, and pollution. The populations of many species have been declining. There are many reasons for declines in landbird populations including loss, degradation, and fragmentation of habitat on breeding and wintering grounds and along migratory routes (Boreal Partners in Flight 1999). The effect of past and present actions on migrating/wintering birds has been a loss or degradation of habitat, either through direct conversion or increased human activity.

Outside the project area, increasing human developments in coastal areas along the Pacific Flyway have resulted in loss of wetland habitats in Brant non-breeding areas and increases in disturbance (Reed et al. 1998). Past and present actions that have and may continue to affect Emperor Geese in the project area are described in Section 3.2.4, Birds. The population trend for Emperor Geese over the past 10 years (2000 to 2009) has been an annual increase of over 2 percent, following several decades of decline (Dau and Mallek 2009). In addition to hunting pressure, aircraft disturbance and chronic oil pollution are conservation concerns for Emperor Geese staging and wintering at Izembek National Wildlife Refuge (Sowls 2004). Waterfowl staging at Izembek National Wildlife Refuge already experience disturbance from hunters and aircraft from the Cold Bay Airport (Sowl 2004). Subsistence hunting of Brant at Izembek National Wildlife Refuge and other staging areas in the Arctic constitute substantial sources of mortality.

Past and present actions that have and may continue to affect migrating and wintering waterfowl in the project area include disturbance from hunters and overflights of aircraft from the Cold Bay Airport. 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. Increased use of all-terrain vehicles, both unauthorized and non-traditional use by subsistence hunters, extending out from

the newly constructed Northeast Hovercraft Terminal has caused disturbance to waterfowl. These past and present actions have increased human disturbance to several species of waterfowl.

Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through King Cove and upgrades to the Cold Bay Airport. The reasonably foreseeable future actions would also cause an increase in human activity in the project area, including more traffic on the proposed road. Alternative 2 would contribute to the additive effect of disturbance from human activities to these birds. While human activities are increasing disturbance to Brant, Emperor Geese, and other migrating/wintering birds, the activities are limited to certain areas, leaving the majority of bird habitat in the refuge undisturbed. Some areas of Izembek National Wildlife Refuge, including the proposed road corridor, are difficult to access and provide escape habitat where birds that use upland habitats can forage largely undisturbed (Sowl 2004). Alternative 2 would have a moderate contribution to cumulative effects on Brant, Emperor Geese, and other migrating/wintering birds.

Conclusion

Direct and indirect effects to Brant, Emperor Geese, and other migrating/wintering birds from Alternative 2 would be low intensity¸ permanent duration (behavioral disturbance and habitat loss), local in extent, 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. Alternative 2 would have a major to moderate 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 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 this effects analysis.

Direct Effects 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.

Summary

Direct and indirect impacts to seabirds from the construction of Alternative 2 would be low intensity, temporary in duration, local in extent, and would affect a common resource. Direct and indirect effects to seabirds from construction of Alternative 2 would be minor.

Direct Effects 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 much time in the project area as their foraging and nesting resources are located closer to the sea. 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, boats, and hovercraft operations between Cold Bay and King Cove. A reduction in aircraft flights and boat traffic could reduce seabird disturbance.

Summary

Direct and indirect impacts to seabirds from the operation and maintenance of Alternative 2 would be low intensity, long-term, local extent, and would affect a common resource. The direct and indirect effects to seabirds from implementation of Alternative 2 would be minor.

Mitigation Measures

All the mitigation measures listed above under General Impacts, 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

Past and present actions that have and may continue to affect seabirds in the project area include interactions with extensive commercial fishing operations in the Bering Sea, Aleutians, and the Gulf of Alaska, with some species being more susceptible to capture in fishing gear and oil pollution on the water (NOAA Fisheries 2004). Additional threats to seabirds include oil pollution, human disturbance, introduced predators, and plastic trash (Service 2008). Past and present actions include disturbance effects on seabirds from hovercraft operation in Cold Bay and overflights of aircraft from the Cold Bay Airport (USACE 2003).

Reasonably foreseeable future actions include an increase in the number of fisheries observers coming through King Cove and upgrades to the Cold Bay Airport. These future actions would add to the increase in human activity in the project area, including more traffic on the proposed road. The potential beneficial effect of Alternative 2 on seabirds would reduce the effects of past and present actions that have resulted in more over-water disturbances. The overall effect of Alternative 2 when added to the effects of past, present, and future actions would be minor.

Conclusion

Direct and indirect effects to seabirds from Alternative 2 would be low intensity, long-term duration, local extent, and would affect common resources, resulting in a minor impact. Alternative 2 would have a minor effect in reducing the cumulative effects on seabirds. The summary impact of Alternative 2 on seabirds is considered minor.

Overall Conclusion

The land exchange would result in a net increase in the amount of land managed as national wildlife refuge and wilderness. Izembek Wilderness and its bird habitat would be fragmented by the land exchange.

Alternative 2 would have a major effect on Tundra Swans, Brant and Emperor Geese, a moderate effects on other breeding birds and other migrating/wintering birds, and minor effects on seabirds.

4.3.2.5 Land Mammals

Alternative 2 would involve the construction of 18.5 miles of single lane gravel road through a - 236 acre corridor across the Izembek isthmus. The 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 road alternatives considered. The construction footprint would cover 107 acres of tundra habitat. Alternative 2 would also exchange several other parcels of land, between the State of Alaska, the King Cove Corporation, and the Service.

One effect of the land exchange is that state lands in the northern portion of the project area would be beneficial to caribou because the lands are used as a high density migration corridor and are adjacent to calving areas. These lands were considered for an oil and gas lease sale in the 2005 best interest finding for the Alaska Peninsula Areawide lease sale, but have since been excluded in a 2010 supplement to the finding. Alternative 2 would create a road corridor through the isthmus, but would eliminate the threat of potential development within the other exchange parcels.

The effects of Alternative 2 are analyzed by group based on the use of the area and the expected type of impact. The groups are large mammals, furbearers, and small mammals. A separate analysis for brown bear, caribou, and wolves is provided within the large mammal section. To avoid repetition, common mitigation measures are presented first, while species-specific mitigation measures are presented within the group sections.

Common Mitigation Measures

The following mitigation measures to reduce impacts to land mammals from the 2003 EIS would be implemented for this project.

- 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, also from the 2003 EIS, is to prevent uncontrolled vehicle access to the Izembek Wilderness or important wildlife concentration areas in upper Cold Bay.

- Effective barriers to motorized vehicles will be installed and maintained at the Northeast Hovercraft Terminal to prevent motorized vehicles from leaving the terminal area or road.

- The Aleutians East Borough [applicant] shall prohibit use of the hovercraft ramp for boat launches. The Aleutians East Borough [applicant] shall place signs at the northeast hovercraft 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, 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. 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

The direct and indirect effects of the construction of Alternative 2 on large land mammals would include long-term habitat loss on 107 acres plus temporary disturbance over a larger area. Large mammals in the project area would be temporarily displaced during construction by noise and human activity near the road alignment. Caribou use the area for migrating and wintering; brown bears, wolves, and rarely moose, forage there.

Summary

Direct and indirect impacts to large mammals from the construction of Alternative 2 would be low intensity, temporary (behavioral disturbance) to permanent (habitat loss) duration, local extent (or regional for caribou and brown bear), and common and important (caribou and brown bear) context. Construction of Alternative 2 would result in minor direct and indirect effects to large mammals. The potential exception is caribou; if construction activities interrupt their migration, the impact could be moderate for this important species.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects from the operation and maintenance of Alternative 2 on large mammals could include behavioral changes caused by increased human access, and collisions with vehicles. The level of the behavioral changes would vary by species, from complete avoidance of the roadway and surrounding area, to using the road for easier travel. Even when direct habitat loss is small, increased human activity may cause wildlife to abandon optimal habitats or alter traditional migration routes.

The risk of injury or mortality of land mammals from vehicle collisions would be low due to the slow speed of vehicles and low number of vehicles expected. However, it is possible that collisions could occur during bad weather or other times when visibility is low. The number of large mammals potentially affected by collisions is expected to be small. The duration of effects would be long-term (intermittent but persistent for the life of the project), and the context would include common and important (caribou) resources.

The potential behavioral changes differ by species and so are analyzed separately below.

Brown Bears

The project area lies in 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) gathered the following information on the effect of roads on brown bears for an analysis of the potential impact of off-road vehicle use on wildlife in the Izembek National Wildlife Refuge.

> "The literature has extensive documentation of the negative impact of roads and human activities on brown bear behavior and mortality (Schallenberger 1980, Mattson et al. 1987, Kasworm and Manley 1990, McLellan and Shackleton 1998, and Gibeau et al. 2002). Bears tend to avoid human developments and roads, especially females with cubs of the year, 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, and this disturbance has 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). Adult females were the most likely group to avoid human disturbances, even if it meant avoiding high quality habitats, and thus these females were at higher risk of mortality and were likely to have lower fecundity rates (Mattson et al. 1987, Mace et al. 1996, Gibeau et al. 2002). Increased human-bear interactions frequently lead to increased human-caused mortality of bears (Suring and Del Frate 2002). Bears also distribute themselves across the landscape in relation to other bears. Females with young cubs and subadults avoid adult males, while adult males-seek out breeding females. Compression of bears into smaller areas leads to more, potentially hazardous, interactions amongst the crowded bears and displaces maternal sows into poorer quality habitats.
>
> Because of their sensitivity to human disturbance, construction and use of a road on the east side of Cold Bay will negatively impact the brown bear population in this region by causing individuals to abandon some traditional foraging areas and denning sites. Public activities that occur off of roads (hiking, fishing, and berry picking) have been shown to alter the behavior of and displace bears that are within 3 km (1.9 mi) of the human activity (Schleyer et al. 1984). Increased access will also increase the level of legal and illegal harvest 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)".

The behavioral changes described in the Sowl and Poetter analysis could occur as a result of the operation and maintenance of Alternative 2. Prior experience has shown that brown bears can be displaced from prime feeding and denning areas by road construction and use (Service 1998). Human activity resulting from the operation and maintenance of a road through the isthmus area could include vehicle traffic, all-terrain vehicle travel beyond the barrier (as discussed in section 4.3.2.2) waterfowl hunting, berry picking, and coho salmon fishing. These activities can result in alterations in bear behavior, displacement of bears from preferred habitats, and disruption of foraging activities. These disturbances would have the greatest negative impact during post-denning in the spring and prior to denning in the fall. 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 activities as a result of a road through the isthmus may include improper disposal of trash, fish and waterfowl guts, or blood remaining in the back of a parked pick-up truck from a previously harvested animal. Improperly cleaned or disposed of items attract bear, leading to a habituated behavior associating humans with food. Improved access provided by the road would also increase bear harvest by sport or subsistence hunters within the vicinity of the road.

Dau (1989) 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, their cubs, and sub-adults. Adult males are uncommon in the area. Improved access and increased human activities within the isthmus area, resulting from Alternative 2, would likely worsen this situation.

Frequent low overcast and high wind conditions common to the Cold Bay area limit the State's and Service's ability to routinely conduct wildlife surveys. Therefore, effects to wildlife populations (such as brown bears) by the proposed action may avoid timely recognition. With the low reproductive potential and inability to monitor the population closely for effects, negative effects could easily reach serious levels before being detected.

It is expected that the permanent effect of the road would be a reduction in brown bear density in an area larger than the project footprint.

Caribou

The project area lies in an important wintering area and migration corridor for the Southern Alaska Peninsula Caribou herd. It supports a high density of caribou during the winter and migration seasons. 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 project area is located on the narrowest point of the major migratory corridor – the isthmus between Izembek and Kinzarof Lagoons. The southern road alignment was chosen specifically to minimize the effect on migrating caribou.

Caribou and human development have a long history of coexistence in northern latitudes. Generally, caribou quickly adapt to physical structures or buildings (National Research Council 2003; Lindenmayer and Fischer 2006). Conflict occurs with degree of disturbance based on frequency, intensity, duration, and seasonality. Individual responses to disturbance may range from increased awareness demonstrated through alert posture in anticipation to "flight," to total abandonment of selected sites by herd members (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 et al. 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 et al. 1986). Deer activities were more interrupted by humans than snow machines (Freddy et al. 1986). Deer in this study ran longer, ran more frequently, and expended more energy (up to 3-5 percent of daily metabolized energy) avoiding

human presence. Numerous exposures to human presence potentially have the same effects as snow machines or aircraft.

Causal factors in strong responses to human presence are twofold: the silent approach (compared with machines), and sudden appearance, resulting in closer proximity before detection and alarm 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 (Anderson et al. 1996). Subtle noises that are difficult to pinpoint are more likely to be generated by potential predators (Jakimchuk 1980).

Repeated disturbance by humans on foot during calving greatly increases the risk of calf abandonment and/or physical injury. Additionally, repeated disturbance 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 on areas or favorable access to forage to less optimal sites.

The combination of noise and human disturbance, e.g., all-terrain vehicle traffic, during the calving period could have significant impact and displace caribou from the road alignments. In the examples provided here, snow machines may be used interchangeably with all-terrain vehicles with regard to disturbance – the combination of human presence, movement, and noise.

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 at 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 4 to 10 miles wide in this area. 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 would have a high intensity, long-term, adverse effect on caribou in the whole region. It has been shown in numerous studies that human developments, roads, and vehicle traffic are disruptive at some level to traditional caribou movements and habitat use (Child 1973; Smith and Cameron 1983; Dau and Cameron 1986; Cameron et al. 1992; James and Stuart-Smith 2000, cited in Sowl and Poetter 2004). If caribou are reluctant to cross the road, reduced use of the habitat south of the roadway could result. If so, then the southern road alignment would cause a smaller amount of reduced-use habitat than Alternative 3 because Alternative 2 has less land between the road and Kinzarof Lagoon.

The following factors can determine how caribou will react to roads.

- traffic levels and human activities associated with the road– more vehicles and human activities cause more of a barrier
- time of year – more likely to cross during migration
- degree of visual obstruction – caribou are reluctant to cross when they cannot(see the other side
- reproductive status – caribou with calves are more reluctant to cross

Forman et al. (2003) analyzed numerous studies on caribou response to roads and concluded that, "Taking all of the research results together, it appears that although caribou are highly sensitive to traffic, they seem 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 will 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.

The traffic levels of the proposed road are expected to be low (averaging less than 50 one-way trips per day), the caribou would be near the road during both the migration and winter seasons, and the road prism is fairly flat for most of the route, which would allow caribou to see both sides. However, caribou migration through the isthmus occurs during the period August through October, which coincides with peak waterfowl hunting and coho salmon fishing seasons. Cold Bay is famous for its waterfowl hunt and coho salmon fishing and has a large population of hunters and fishermen concentrated on the limited Cold Bay road system. New road options for hunters to reach streams or waterfowl hunting sites would result in peak traffic levels during this critical period for caribou. Caribou with calves would be present in the project area during the migration from the calving area to the wintering areas.

Caribou may be attracted to the plowed road during the winter as it may provide an easier travel route, 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.

Injury or mortality from collision with vehicles is another potential effect of the road. The risk is expected to be low due to the slow speed of vehicles and low number of vehicles expected. However, it is possible that collisions could occur during bad weather or other times when visibility is low. The number of caribou potentially affected by collisions is expected to be small.

Perhaps the greatest effect of the operation and maintenance of the road may be that caribou could avoid the road and the area around it due to increased human and predator access. James and Stuart-Smith (2000, cited in Oberg 2001) found that mortalities of caribou from both human harvest and natural predation (wolves) increased in areas closer (571–669 feet, respectively) to roads, 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). In Dyer's study, 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, 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 much closer access to caribou in the project area. The ability to reach the middle of the narrowest point of the major migratory corridor in the area (the isthmus between Izembek and Kinzarof lagoons) would be expected to increase the sport and subsistence harvest in that area. The road would also allow wolves and other predators easier access to caribou, especially during winter. Road corridors that receive little human use may be 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 as well as alter traditional migration patterns.

Avoidance of the road and adjacent habitats could cause caribou to lose the use of high quality habitat. Recent studies in Denali National Park (Burson et al. 1999 and Yost and Wright 2000) have found that wildlife, including caribou and brown bears, have become habituated to traffic and human presence on the park road. Habituation to traffic could explain the reduction in adverse responses of animals between 1973-74 and 1995-97 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, cited in Burson et al.

1999) avoidance responses to the road increased when visitors were out of their vehicles versus when vehicles alone were present. Yost and Wright (2000) concluded that caribou and grizzly 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 (Jalkotzey 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. The project area is currently closed to caribou hunting, but it is expected to eventually be re-opened as the population increases to within management objectives.

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 amounts of 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.

Wolves

Several wolf packs inhabit the area surrounding Cold Bay. Wolves could occur in the project area year round and likely use the area for hunting, specifically caribou. Direct and indirect effects on wolves from the operation and maintenance of Alternative 2 could include behavior changes caused by increased human access, and collisions with vehicles.

The behavioral changes could include a shift in hunting methods, such as using the road to gain easier access to prey species, especially during the winter. Wolves were studied in southcentral Alaska and were found to frequent roads with little human presence, but they avoided areas that were used by humans (Thurber et al. 1994, cited in Trombulak and Frissell 2000). Wolves appear to benefit from living in landscapes with roads, as long as human density is low (Musiani and Paquet 2004, cited in Bowman et al. 2010), because roads can be used as efficient travel corridors (James et al. 2004, cited in Bowman et al. 2010). Wolves may also feed on animals killed along the road. While these behavioral changes may be beneficial to wolves, the road would also increase human access which could adversely affect wolves. If the road causes changes in caribou or other prey species populations, that would also affect wolves. Currently, the Alaska Department of Fish and Game reports that relatively little wolf hunting occurs in the project area. This is likely due to the limited accessibility of the area. More human access could lead to more wolf hunting and trapping.

Injury or mortality from collisions with vehicles is another potential effect on wolves. The risk is expected to be low due to the slow speed of vehicles and low number of vehicles expected. However, it is possible that collisions could occur during bad weather or other times when visibility is low. The number of wolves potentially affected by collisions is expected to be small. The duration of effects would be long-term (intermittent but persistent for the life of the project) and the context common. The impact of this effect would be minor.

Summary

Direct and indirect impacts to brown bears would be high intensity within the vicinity of the road corridor (local) but medium intensity throughout the project area (regional). The effects would be long-term (behavioral disturbance) and permanent (habitat alteration) in duration for this important resource. Bear habitat within the Izembek Controlled Use Area is considered an important resource. The summary impact of Alternative 2 on brown bear is considered major for the isthmus area but moderate for the project area.

Direct and indirect impacts to caribou would be medium intensity, long-term (behavioral disturbance) and permanent (habitat alteration) in duration, could extend to an area larger than the road corridor (regional extent), and would affect important resources. 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.

Direct and indirect impacts to wolves would be low to medium intensity, 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. The summary impact level of Alternative 2 on wolves is considered 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; if adverse effects are observed, then additional mitigation measures may be implemented such as limiting the number or timing of vehicle use, or plowing paths through roadside snow drifts to facilitate caribou passage

- During construction, caribou behavior during migration would be monitored. 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

Past and present actions that have and may continue to affect large mammals in the project area include sport and subsistence hunting, wildlife viewing, and wildlife management. Because the project area is in a national wildlife refuge, past and present actions that would affect wildlife have been purposely limited. Very few land-disturbing activities have taken place in the refuge. Some past actions have been undertaken to manage large mammals. For example, the Joshua Green River region was established as a Controlled Use Area in 1993 to protect brown bears, and the Alaska Department of Fish and Game killed 28 wolves on caribou calving grounds adjacent to the refuge in 2008, 6 wolves in 2009, and 2 in 2010 to protect caribou. 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. Evidence of all-terrain vehicle activity extending out from the Northeast Hovercraft Terminal into the Joshua Green

watershed (in Izembek Wilderness) (Sowl 2008c), also indicates additional disturbances 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 activity in the area and an increase in human disturbance to land mammals. The majority of visitors to Izembek National Wildlife Refuge utilize the western, roaded portion of the refuge. Alternative 2 would contribute to the additive effect of disturbance from human activities to large mammals from the Cold Bay road system and existing non-motorized trails. The impacts of this project would add to the existing level of human presence in the project area.

Increased access to caribou for hunting, when the caribou season is reopened, may alter herd composition and behavior (Mysterud et al. 2002; McLoughlin et al. 2005; Milner et al. 2007; Proaktor et al. 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.

While human activities are causing increased disturbance to large mammals, the activity is limited to certain accessible areas, leaving the majority of habitat on the refuge undisturbed. However, if off-road vehicle access from the road is not effectively limited by the chain barrier, then human impacts can spread to a much greater area. Alternative 2 would result in a moderate contribution to cumulative effects on large mammals due to increased human activity in the project area.

Conclusion

Direct and indirect effects to large mammals from Alternative 2 would be low to high intensity, long-term (behavioral disturbance) to permanent (habitat alteration) duration, regional extent, and would affect common and important resources, resulting in a moderate impact.

The effect of the land exchange is expected to result in a net increase in the amount of undisturbed habitat managed in perpetuity for wildlife. The acquisition of state lands in the northern portion of the project area would be beneficial to caribou because they are used as a high density migration corridor and are adjacent to calving areas. Alternative 2 would create a road corridor through the isthmus, but would reduce the threat of potential development in the other exchange parcels.

Alternative 2 would have a moderate contribution to cumulative effects on large mammals. The summary impact level of Alternative 2 on large mammals is considered moderate.

Furbearers

Direct Effects and Indirect Effects from Construction

Furbearing mammals, such as North American river otter, red fox, and short-tailed weasel are found in the project area. Although these species inhabit upland areas, they travel and forage close to any shoreline or water body, and follow roadways. The direct and indirect effects of the construction of Alternative 2 on furbearers would include temporary disturbance, permanent habitat loss of 107 acres, and increased hunting and trapping pressure. Furbearers would be

displaced during construction by the noise and human activity near the road alignment. Displaced animals would likely move to adjacent similar habitat.

Summary

Direct and indirect impacts to furbearers from the construction of Alternative 2 would be low to medium intensity, temporary (behavioral disturbance) to permanent (habitat loss) duration, local extent, and would affect common resources, resulting in a minor impact.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects on furbearers from the operation and maintenance of Alternative 2 could include behavior changes caused by increased human access and collisions with vehicles. Wolverines would 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) reports that wolverines are thought to be the most sensitive species with regard to habitat changes and human disturbance. Trapping effort would increase because of the new access to furbearer habitat.

The behavior changes for all furbearers would likely include avoidance of the road and surrounding area while vehicles or humans are present. Due to the low numbers of vehicles using the road, it is expected that most animals would be able to cross. Predator species such as short-tailed weasel and red fox may use the road as easier access to their prey. While this would be a beneficial effect, it would also increase their risk of collisions with vehicles. This risk is expected to be low due to the slow speed of vehicles and low number of vehicles expected. However, collisions could occur during bad weather or other times when visibility is low. The number of furbearers potentially affected by collisions is expected to be small, the duration would be long-term (intermittent but persistent for the life of the project), and the context is common. Other furbearers may avoid the road, thus reducing the amount of habitat available to them. The increased access to the area caused by the road will also increase the trapping pressure on furbearers.

Summary

Direct and indirect impacts to furbearers from Alternative 2 would be low to medium intensity, long-term (behavioral disturbance) to permanent (habitat alteration) duration, local extent, and would affect common resources. The summary impact of Alternative 2 on furbearers is considered minor.

Mitigation Measures

Mitigation measures that would minimize the impact of construction, operation, and maintenance of Alternative 2 on land mammals are described above.

An additional recommended mitigation measure is the design and implementation of wolverine and other furbearer population monitoring studies to provide management level information for wildlife managers to regulate harvest limits.

Cumulative Effects

Past and present actions that have and may continue to affect furbearers in the project area include hunting and trapping, wildlife viewing, and wildlife management. Because the project area is in a national wildlife refuge, past and present actions that would affect wildlife have been purposely limited. Very few land-disturbing activities have occurred in the project area. The completion of the King Cove Access Road is expected to result in greater hunter and trapper access to furbearers 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 activity in the area and an increase in human disturbance to furbearers. The majority of visitors to Izembek National Wildlife Refuge utilize the western, roaded portion of the refuge. Alternative 2 would contribute to the additive effect of disturbance from human activities to furbearers from the Cold Bay road system and existing non-motorized trails. While the construction and operation of Alternative 2 could impact individual furbearers directly, it is not expected to have population-level effects on furbearers. While human activities would cause increased disturbance to furbearers, the activity would be limited to the road corridor area, leaving the majority of habitat undisturbed. Alternative 2 would result in a minor contribution to cumulative effects on furbearers due to increased human activity in the project area.

Conclusion

Direct and indirect impacts on furbearers from Alternative 2 would be low to medium intensity, long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent (habitat alteration) duration, local extent, and would affect common resources resulting in a minor impact. The effect of the land exchange is expected to result in a net increase in the amount of undisturbed habitat managed in perpetuity for wildlife. Alternative 2 would create a road corridor through the isthmus but would reduce the threat of potential development in the other exchange parcels. Alternative 2 would have a minor contribution to cumulative effects on furbearers. The summary impact level of Alternative 2 on furbearers is considered minor.

Small Mammals

Direct Effects and Indirect Effects from Construction

Small mammals in the project area include porcupine, tundra hare, Arctic ground squirrel, masked shrew, dusky shrew, northern red-backed vole, tundra (root) vole, brown lemming, Greenland collared lemming, and meadow jumping mouse. The direct and indirect effects of the construction of Alternative 2 on small mammals would include temporary disturbance and long-term habitat loss of 107 acres. However, road construction would also result in the creation of edge habitats and an open area (the road) which would attract some small mammals such as Arctic ground squirrels. Small mammals in the project area would be displaced during construction by the noise and human activity near the road alignment. Displaced animals would likely move to adjacent similar habitat.

Summary

Direct and indirect impacts to small mammals from the construction of Alternative 2 would be low to medium intensity, long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent (habitat alteration) duration, local extent, and would affect a common resource. Construction of Alternative 2 would have minor direct and indirect effects on small mammals.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects on small mammals from the operation and maintenance of Alternative 2 could include behavior changes caused by increased human access, and collisions with vehicles.

The behavior changes would likely include avoidance of the road and surrounding area while vehicles or humans are present. Due to the low numbers of vehicles expected on the road, it is expected that most animals would be able to cross. Some of the smaller species may avoid the road because of the lack of cover; however, altered vegetation along the roadway may attract many small mammals to forage, or shelter in increased vegetative growth. The road itself would reduce the amount of habitat available to them and could cause habitat fragmentation and isolation of populations.

The operation and maintenance of the road would increase the risk of injury or mortality of small mammals from vehicles collisions. This risk is expected to be low due to the slow speed of vehicles and low number of vehicles expected. However, collisions could occur during bad weather or other times when visibility is low. It is expected that a small number of small mammals would be affected by collisions. Predation of small mammals along the road would likely increase because of the ease of travel along the road for some predators and the lack of cover for protection when Arctic ground squirrels or other small mammals attempt to cross or spend time in the roadway.

Summary

Direct and indirect impacts to small mammals from the operation and maintenance of Alternative 2 would be low to medium intensity, long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent (habitat alteration) duration, local extent, and would affect a common resource. Operation and maintenance of Alternative 2 could have a moderate to major effect on small mammals within the immediate vicinity of the road, but there would be only minor direct and indirect effects on small mammals within the project area.

Mitigation Measures

Common mitigation measures that would minimize the impact of the operation and maintenance of Alternative 2 on land mammals are described above. No additional mitigation measures specifically for small mammals are necessary.

Cumulative Effects

Past and present actions that have and may continue to affect small mammals in the project area include habitat loss and hunting/trapping. Because the project area is in a national wildlife refuge, past and present actions that would affect wildlife have been purposely limited. Very

few land-disturbing activities have occurred in the project area. Some small amounts of habitat loss have occurred from past transportation projects. The completion of the King Cove Access Road is expected to result in greater human access into 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 activity in the area and an increase in human disturbance to land mammals. The majority of visitors to Izembek National Wildlife Refuge utilize the western, roaded portion of the refuge. Alternative 2 would contribute to the additive effect of disturbance from human activities to small mammals from the Cold Bay road system and existing non-motorized trails. The impacts of this project would add to the existing level of human presence in the project area.

While the construction and operation of Alternative 2 could impact individual small mammals directly, it is not expected to have population-level effects on any small mammals. Although human activities would cause increased disturbance to small mammals, the increased activity would be limited to the road corridor area, leaving the majority of habitat undisturbed. Alternative 2 would result in a minor contribution to cumulative effects on small mammals due to increased human activity in the project area.

Conclusion

Direct and indirect impacts on small mammals from the construction, operation, and maintenance of Alternative 2 would be low to medium intensity, long-term (behavioral disturbance) to permanent (habitat alteration) duration, local extent, and would affect a common resource, resulting in a minor impact. The effect of the land exchange is expected to result in a net increase in the amount of undisturbed habitat managed in perpetuity for wildlife. Alternative 2 would create a 236 acre road corridor through the isthmus, but would eliminate the threat of potential development in the other exchange parcels. Alternative 2 would have a minor contribution to cumulative effects on small mammals. The summary impact level of Alternative 2 on small mammals is considered minor.

4.3.2.6 Marine Mammals

The primary actions under Alternative 2 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 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 from Construction

The road from the Northeast Hovercraft 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 a half a 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.

2003 EIS Mitigation Measures 1 through 4 and components of Mitigation Measure 6 provide measures to 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.

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, which could provide additional protective measures that may be beneficial to harbor seals. The parcels on Sitkinak would be transferred to the State. It is unclear what affect that would have on regulations and use of 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. The land exchange would have no effect on these species.

Summary

Construction of the southern alignment road is unlikely to affect harbor seals, killer whales, harbor porpoise, or gray whales. If disturbance to harbor seals were to occur, it would be of low intensity, long-term duration (intermittent but persistent for the life of the project), and localized. 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 not be disturbed or displaced by such 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.

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*, and the Kinzarof parcel owned by King Cove Corporation would be transferred to federal ownership. Both of these changes in land management would provide additional protections to habitats used by harbor seals and other marine mammals using those areas.

The new road could provide increased access for waterfowl hunting. Hunters shooting toward marine habitat could potentially disturb adult 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 sufficiently distant from marine waters of upper Cold Bay, outer Kinzarof Lagoon, and Izembek Lagoon and would not be detected.

Summary

Operation and maintenance of the southern alignment road is unlikely to affect harbor seals, killer whales, harbor porpoise, and gray whales. If noise disturbance were to occur, it would be of low intensity, long-term duration (intermittent but persistent for the life of the project), localized, and would affect important resources. The summary impact level is considered negligible to minor.

Mitigation Measures

Protective measures stipulated in the Marine Mammal Protection Plan of the 2003 EIS Mitigation Measure 6 could help alleviate impacts of human disturbance, other than noise associated with vehicle travel on the road. Please refer to Section 4.2.2.6 for details.

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 2 would result in a negligible contribution to cumulative effects on harbor seals, killer whales, harbor porpoise, and gray whales.

Conclusion

The direct and indirect impacts of Alternative 2 on harbor seals, killer whales, harbor porpoise, and gray whales would be considered negligible to 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 negligible. The summary impact of Alternative 2 on killer whales, harbor porpoise, and gray whales is considered negligible. The summary impact of Alternative 2 on harbor seals is considered negligible to 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 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 Hovercraft Terminal across the Izembek isthmus would range from ½ to 1 mile from Kinzarof Lagoon. ABR (2010) 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. 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 during the construction season and could therefore be more affected by noise disturbance. Noise from construction activities during the fall could, however, 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, molting, 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 (Mitigation Measure 5), 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 when flying over the area.

Eider, loon, or murrelet habitat could be affected if construction activities impact important feeding areas or prey. Mitigation Measures 1 through 4 and components of Mitigation Measure 5 provide measures to reduce or prevent impacts to coastal habitats during construction of the road. Please refer to Section 4.2.2.7 for details.

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 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. The transfer of the Kinzarof Lagoon parcel to the Izembek National Wildlife Refuge could provide additional protective measures to these lands that could be beneficial to Steller's Eiders. The parcels on Sitkinak would be transferred to the State. It is unclear what affect that would have on regulations and use of the area.

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 experience disturbance effects throughout the construction season but the disturbance would occur only when they fly over the area. Effects would be of low to medium intensity, temporary duration, local extent, and would affect important resources.

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 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 1300 feet (0.25 miles). 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, 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 at the time. 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 parts of Izembek Lagoon and Kinzarof Lagoon closest to the road corridor. 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 and Kinzarof lagoons 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 off road vehicle access, but not all activities that could cause disturbance or displacement. 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 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. 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. 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, and would affect important resources. The direct and indirect impact is considered moderate for Steller's Eiders and minor for Yellow-billed Loons and Kittlitz's Murrelets.

Mitigation Measures

Elements of the Fish and Wildlife Protection Plan (Mitigation Measure 5 in the 2003 EIS) would mitigate disturbance effects associated with Alternative 2. Please refer to Section 4.2.2.7 for details on mitigation measures. 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 minor effect 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, long-term duration (intermittent but persistent for the life of the project), and localized. 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, long-term duration (intermittent but persistent for the life of the project), and localized. Steller's Eiders are federally 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 declining populations. The land exchange would not likely affect use patterns by Steller's Eiders, Yellow-billed Loons, or Kittlitz's Murrelets, but may provide additional acres of habitat in national wildlife refuge management. The contribution to cumulative impacts would be moderate. 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 minor.

Northern Sea Otter: Southwest Alaska Distinct Population Segment

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 Hovercraft Terminal across the Izembek isthmus would range from ½ to 1 mile from Kinzarof Lagoon, an important habitat for 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 a half a 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.

Mitigation Measures 1 through 4 and components of Mitigation Measures 5 and 6 provide measures to alleviate or prevent impacts to coastal habitats during construction of the road. Please refer to Section 4.2.2.7 for details.

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 Kinzarof Lagoon parcel to the Izembek National Wildlife Refuge could provide additional protective measures that could be beneficial to sea otters. The parcels on Sitkinak would be transferred to the State. It is unclear what affect that would have on regulations and use of the area.

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, 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

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 or the southern edge of Izembek 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 (0.25 miles). 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 and southern Izembek Lagoons. Disturbance effects from vehicle noise are not known, but could be of low to medium intensity, 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, and would affect an important resource. Although 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 and the Marine Mammal Protection Plan of the 2003 EIS could help alleviate impacts of human disturbance associated with construction, operation, and maintenance of the road. Please refer to Section 4.2.2.7 for details on mitigation measures. 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, temporary and localized. Year round operation and maintenance of the road could result in disturbance effects 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. Although 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. 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 land exchange would not likely affect use patterns by sea otters, but may provide beneficial protection. 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 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 2003 EIS Mitigation Measures 1 through 4 (see Section 4.2.2.7).

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 trend 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 3.2-25), Steller sea lions do not use the parcels.

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

Applicable measures to mitigate potential habitat impacts during construction (2003 EIS Mitigation Measures 1 through 4) or to minimize potential, albeit unlikely, disturbance to Steller sea lions (2003 EIS Mitigation Measures 5 and 6) are described in detail in Section 4.2.2.7.

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.

4.3.3 Social Environment

4.3.3.1 Land Ownership and Use

Direct Effects and Indirect Effects of Land Exchange

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. This acreage represents 10.8 percent of the Corporation's entitlement under ANCSA. King Cove Corporation would also relinquish its ANCSA village selection of 5,430 acres within the Izembek Wilderness, and select this acreage elsewhere within a withdrawal area established by the Service and Bureau of Land Management for the purpose of meeting ANCSA selection entitlements. The Aleut Corporation would retain its ownership of the subsurface estate in the approximately 8,092 acres of the Mortensens Lagoon tract.
- The State would convey the surface and subsurface estates of the uplands of 2 townships containing approximately 41,887 acres to the federal government.
- The U.S. would convey approximately 201 acres of refuge lands for the proposed road alignment (southern alignment), which corresponds to less than ½ percent of the estimated acreage of Izembek National Wildlife Refuge. The U.S. would also convey 1,619 acres on Sitkinak Island in fee simple to the State of Alaska.
- The addition of state-owned tide and submerged lands of Kinzarof Lagoon to the Izembek State Game Refuge would be finalized.

Land Use and 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 preserve provisions. State owned and King Cove Corporation owned/selected lands would be transferred to or be retained in federal ownership for management under wilderness or wildlife refuge provisions. Specific management changes for each parcel are shown in Table 4.3.3-1. 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 below:

Road Corridor. 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. Under the exchange that would take place under Alternative 2, the corridor would be transferred from the federal estate to the State and managed as a single lane gravel access road within the Izembek

State Game Refuge. The *Izembek State Game Refuge Management Plan* (ADFG 2010) anticipates the possibility of a road connecting King Cove and Cold Bay, as stated 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.

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, eliminating 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.

Izembek National Wildlife Refuge. The road corridor would pass through the Izembek National Wildlife Refuge. Although the *Izembek State Game Refuge Management Plan* and *Izembek National Wildlife Refuge Comprehensive Conservation 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 and minimal management in the *Izembek National Wildlife Refuge Comprehensive Conservation Plan* (USFWS 1985a). It would differ substantially from the surrounding land use in an area where no improved or maintained roads currently exist. It would also bisect the 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.

Alaska Peninsula National Wildlife Refuge. After leaving the Izembek National Wildlife Refuge on the west, 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* (USFWS 1985b) classifies this area as minimal management, focusing on protection of fish and wildlife populations and habitats with provisions for public use and access. Here, land use is essentially 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.

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.

Table 4.3.3-1 Land Use and Management Comparison Alternative 2

Exchange Parcel	Existing Condition			Under Alternative 2		
	Ownership	Management Plan(s)	Management Regime	Ownership	Management Plan	Manage-ment Regime
Proposed Road Corridor	Federal/Service	Izembek and Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plans	Minimal Management	State	Izembek State Game Refuge	Road Corridor in Izembek State Game Refuge
	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	State	Kodiak Area Plan	Grazing, Settlement
	Federal/Coast Guard	None	Coast Guard Base			
State Parcels	State	Bristol Bay Area Plan	General Use	Federal/ Service	Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan	Wilderness
Mortensens Lagoon	King Cove Corporation	None	Private	Federal/ Service	Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan	Minimal Management
Kinzarof Lagoon	King Cove Corporation	None	Private	Federal/ Service	Izembek National Wildlife Refuge Comprehensive Conservation Plan	Wilderness
King Cove Corporation Selected	Federal/Service	Izembek National Wildlife Refuge Comprehensive Conservation Plan	Wilderness	Federal/ Service	Izembek National Wildlife Refuge Comprehensive Conservation Plan	Wilderness

King Cove Corporation Lands. 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, but outside the Izembek Wilderness boundary. They are subject to the provisions of ANCSA 22(g) and thus, land use must be

compatible with the management policies of the refuge. Here, land use is essentially undeveloped, but a road would not be prohibited by either federal or state management plans.

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. No facilities are allowed to be built and public programs are kept to a minimum. 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.

Under the exchange effected by Alternative 2, these lands would be transferred to the State of Alaska for management under the *Kodiak Area Plan*. The parcels on the main island would be classified as Grazing and Settlement. The spit would likely be classified as General Use. 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 mainland 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.

State Parcels. The State parcels proposed for exchange 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*. The area plan classifies these lands as General Use, which allows a variety of activities, focused on the maintenance of sensitive habitats, wildlife, and fisheries; and dispersed public recreation and harvest use. The area plan considers these lands generally unsuitable for intensive development.

Under the exchange implemented by Alternative 2, these lands would be managed by the Service under the Alaska Peninsula National Wildlife Refuge; however, submerged lands within the parcel would be retained by the State. The parcel would be incorporated into the North Creek Unit and classified as wilderness. Management of this newly designated wilderness would focus on maintaining wilderness values and qualities as guided by the purposes of ANILCA for the Alaska Peninsula National Wildlife Refuge and the *Wilderness Act*. Direct and indirect impacts of Alternative 2 related to wilderness are discussed more fully in Section 4.3.3.10.

Federal management 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 will be managed under the wilderness guidelines in the *Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan*.

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. However, because this refuge was created after ANCSA, the 22(g) provisions do not apply and these properties are not subject to compatibility with the management policies of the refuge. No management plan is currently in effect for this parcel.

Under the exchange implemented by Alternative 2, these lands would be transferred to the Service and managed under the Alaska Peninsula National Wildlife Refuge. They would be classified as minimal management, a category described in Attachment B to the Record of Decision for the *Alaska Peninsula National Wildlife Refuge Comprehensive Conservation Plan* as follows:

> <u>Minimal Management (III)</u>
> Management under this category is directed at maintaining the existing conditions of areas that have high fish and wildlife values or other resource values. Minimal management areas are suitable for wilderness designation, although the Service's wilderness proposals do not necessarily include all lands in the minimal management category. Areas proposed for wilderness designation would be placed in minimal management until actually designated by Congress. Opportunities for public use and access would be available for subsistence purposes and for traditional activities such as hunting, fishing, and trapping. Traditional motorized access via floatplanes, snowmachines, and motorboats would be permitted. Guiding and outfitting would be permitted in minimal management areas. Oil and gas studies would be permitted where compatible with refuge purposes. Prescribed burning and minor habitat improvements could be permitted in minimal management areas where compatible with refuge purposes. Fishery development facilities may be built in these areas if they are compatible with the purposes of the refuge and it can be demonstrated that they are necessary to achieve management objectives. The Service would focus its efforts primarily on management studies and survey/inventory programs to increase the refuge's resource data base, and examine refuge management techniques.

The land exchange would introduce a management regime on this property for protection of wildlife and natural habitats where none currently exists today. It is likely that the *Alaska*

Peninsula National Wildlife Refuge Comprehensive Conservation Plan would need revision to update management guidelines associated with the land exchange.

Kinzarof Lagoon Parcel. The Kinzarof Lagoon parcel, owned by the King Cove Corporation, lies within the boundaries of Izembek National Wildlife Refuge, but outside the Izembek Wilderness boundary. They are subject to the provisions of ANCSA 22(g) and land use on these properties would need to be consistent with the management policies of the refuge.

Under the exchange implemented by Alternative 2, these lands would be managed by the Service under the Izembek National Wildlife Refuge and reclassified as wilderness. Incorporation of these lands into the Izembek Wilderness would be consistent with, but more restrictive than, the existing resource management policies that apply to the property. It would also allow all lands surrounding Kinzarof Lagoon to be managed under a common and consistent set of management policies through inclusion in the Izembek Wilderness. It is likely that the *Izembek National Wildlife Refuge Comprehensive Conservation Plan* would need revision to update management guidelines associated with the land exchange.

King Cove Corporation Selected Lands. The King Cove Corporation selected lands east of Cold Bay are currently owned by the federal government and lie entirely within the Izembek National Wildlife Refuge and are designated as wilderness. These parcels have been selected by the King Cove Corporation and formal transfer of ownership is pending. If transferred to the Corporation, the provisions of ANCSA 22(g) would apply. However, under the exchange implemented by Alternative 2, the King Cove Corporation would relinquish its selection and these lands would be retained in federal ownership. The Service would continue to manage this parcel as part of the Izembek Wilderness and the Corporation would be eligible to select a substitute parcel within the Alaska Peninsula National Wildlife Refuge.

Summary

The direct and indirect effects of Alternative 2 on land ownership would have a regional impact, as the proposed land exchange would involves multiple parcels at several geographic locations. The magnitude of the impact would vary, however. In the Cold Bay area, the impacts would be permanent and of high intensity.

Although King Cove Corporation would relinquish its selection of the lands east of Kinzarof Lagoon, the opportunity exists to select equivalent acreage in the Alaska Peninsula National Wildlife Refuge in a withdrawal area established by the Service and Bureau of Land Management (See Figure 3.3-1). However, the replacement acreage may not have the same characteristics as the selected lands, which directly adjoin patented King Cove Corporation land and are reasonably accessible from the City of King Cove.

The federal government would receive over 49,979 acres of land to be added to the Alaska Peninsula National Wildlife Refuge, and 2,604 acres to be added to the Izembek National Wildlife Refuge. The federal government would permanently retain ownership of 5,430 acres within the Izembek Wilderness that are slated for transfer to King Cove Corporation.

Alternative 2 would result in changed land use and land management conditions within the Izembek National Wildlife Refuge and on the associated exchange lands. It would facilitate construction of a single lane road within the Izembek National Wildlife Refuge, Izembek Wilderness, and the Alaska Peninsula National Wildlife Refuge, 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; however, an alternate land selection would be made within the Alaska Peninsula National Wildlife Refuge.

The direct and indirect effects of Alternative 2 on land ownership on Sitkinak Island are of low magnitude and local extent. At present, the State of Alaska owns nearly 56,700 acres on Sitkinak Island and the conveyance of the remaining federal land, comprising approximately 3 percent of the island, would bring the entire island under State of Alaska ownership.

The direct and indirect impacts of this alternative on land use and management would be high 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. 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 corridor would be constructed within the Izembek Wilderness and the exchange parcels would create a new wilderness area. 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 (alternate land selections would however be made within the Alaska Peninsula National Wildlife Refuge). In consideration of the potential adverse impacts to internationally important wildlife habitat and wilderness, under Alternative 2, the federal government would receive 30 times more acreage in the exchange than it would convey.

Much of the land conveyed to the Service would be managed as wilderness. Not included in the state exchange lands are submerged lands, which would in effect create numerous inholdings that could compromise the Service's ability to protect the wilderness character of the area, as required under the *Wilderness 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. 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

The direct and indirect effects of Alternative 2 on land ownership would have a regional impact, as the proposed land exchange involves multiple parcels at several geographic locations.

Relevant past actions would include the entitlement and selection of King Cove Corporation land under ANCSA and the enactment of ANILCA that designated wilderness areas throughout the state, including 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. However, given the nature and implications of the ownership change, the contribution to cumulative effects related to land ownership is considered major.

The direct and indirect impacts of Alternative 2 on land use and management are also considered major. Relevant past, present, and reasonably foreseeable future actions are the same as stated in the preceding paragraph for land ownership. Past actions resulted in a highly restrictive wilderness land use classification. The incremental contribution of Alternative 2 to cumulative effects to land use and management is also considered major.

Conclusion

Alternative 2 would have a major impact on land ownership in the area surrounding Cold Bay. A road corridor would be removed from designated wilderness and conveyed to the State of Alaska for the purpose of building and operating a road. The King Cove Corporation would convey to the Service the patented lands in Mortensens and Kinzarof Lagoons and relinquish lands selected in Izembek Wilderness and select a substitute parcel within the Alaska Peninsula National Wildlife Refuge. The State of Alaska would convey 2 townships of land to be managed as wilderness in the Alaska Peninsula National Wildlife Refuge and implement legislation transferring state tidelands and waters to the Izembek State Game Refuge. On Sitkinak Island, the land exchange would consolidate state ownership of the island and would have only minor effect on that area.

Alternative 2 would result in changed land use and land management conditions within the Izembek National Wildlife Refuge and on the associated exchange lands. It would facilitate construction of a single lane road within the Izembek Wilderness. These effects would be regional in nature, permanent in duration, and unique in that designated wilderness would be affected through both the establishment of a road corridor and relinquishment of King Cove Corporation selections. 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 2 related to land use and management is considered major.

4.3.3.2 Socioeconomics

Direct Effects and Indirect Effects from 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 $20.7 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 King Cove 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 that 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.

Direct Effects and Indirect Effects from Operation and Maintenance

This section discusses the long-term impacts resulting from operations and maintenance of Alternative 2 from several perspectives:

- The direct and indirect effects of the alternative on passenger trips and travel costs.
- The direct and indirect effect of the alternative in terms of employment—how many and what kinds of jobs will be generated under the alternative
- The indirect and induced effects of the alternative on economic activity— is the alternative likely to generate a substantial change in the pattern of economic activities in the affected communities

- The population and demographic effects
- The fiscal effects on local governments

Direct and Indirect Effects of the Alternative on 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. Given the alternative's greater reliability, flexibility in travel timing, and lower travel costs, residents, Peter Pan personnel, and other organizations operating in the communities would benefit from non-commercial passenger trips between the communities.

Travel Cost Impacts on Key Economics Groups of Alternative 2

This section discusses the impacts of Alternative 2 of the key economic groups defined earlier. 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 travel assumed in 2014 and 2015 are not included, nor are increases assumed in the total number of trips between the communities of King Cove and Cold Bay. These additional trips would not be directly related to travel outside of the region, but instead are "inter-community" trips induced by the availability of relatively low cost travel on the road. It is assumed in this section of the analysis that all of these inter-community trips would be taken by the resident and non-fishing related travelers.

Table 4.3.3-2 summarizes the estimated baseline trips and travel cost by mode and group under Alternative 2. The additional induced trips and travel costs are not included in this table, but are summarized in Table 4.3.3-3 below. As shown in Table 4.3.3-2, forecast travel costs are lower in every year relative to Alternative 1 if ground travel costs are included. In years 2013 – 2015, passengers would only use the air taxi service because no other option would be available for regular travel. Total costs during these 3 years are approximately $80,000 less than in Alternative 1 in which 18.1 percent of passenger trips were assumed to use hovercraft. The per passenger cost savings in these 3 years are estimated at $18.20.

Travel via the southern road would begin in 2016. The hovercraft is assumed to cease operations and 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 processing workers, plus 72 other fishery related trips would use the road, while the 323 remaining fishery trips would continue to use the air taxi because of the shorter travel times. These assumptions are discussed in more detail below. Resident and non-fishing related trips using the road would average 1,282 trips between the years 2016 and 2020, or approximately 62 percent of the baseline trips made by this group. During the years 2016 to 2020, the average annual cost savings to all groups is estimated to approach $263,000 per year (56 percent of estimated costs under Alternative 1), while the average passenger over all groups would save $59 per trip.

Table 4.3.3-2 Estimated Baseline Trips and Travel Cost by Travel Mode and Group under Alternative 2, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Baseline Trips and Travel Cost for Passengers Using the Southern Road									
Resident and Non-Fishing Road Passengers	-	-	-	1,248	1,266	1,283	1,299	1,316	1,391
Fishery Related Road Passengers	-	-	-	2,072	2,072	2,072	2,072	2,072	2,072
Total Estimated Road Passengers	-	-	-	3,320	3,338	3,355	3,371	3,388	3,463
Total Cost of Road Trips ($ 2010)	-	-	-	$85,233	$86,036	$86,794	$87,507	$88,266	$91,611
Additional Cost of Vehicle Travel ($ 2010)	-	-	-	-	-	-	-	-	-
Estimated Baseline Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	1,953	1,979	2,003	779	784	790	796	801	826
Fishery Related Air Trips	2,400	2,400	2,400	328	328	328	328	328	328
Total Estimated Air Trips	4,353	4,379	4,403	1,107	1,112	1,118	1,124	1,129	1,154
Total Cost of Air Trips ($ 2010)	$426,594	$429,142	$431,494	$108,486	$108,976	$109,564	$110,152	$110,642	$113,092
Additional Cost of Vehicle Travel ($ 2010)	$30,780	$30,962	$31,130	$9,744	$9,779	$9,821	$9,863	$9,898	$10,073
Estimated Baseline Trips and Travel Cost for Passengers Using Both Modes									
Total Trips All Modes	4,353	4,379	4,403	4,427	4,450	4,473	4,495	4,517	4,617
Total Cost of Trips for All Modes ($ 2010)	$457,374	$460,104	$462,624	$203,463	$204,791	$206,179	$207,523	$208,806	$214,776
Cost Difference from Alternative 1 ($ 2010)	$76	$85	$92	-$261,580	-$262,661	-$263,681	-$264,640	-$265,660	-$270,160
Diff. in Average Cost/Passenger ($ 2010)	$0.02	$0.02	$0.02	-$59.09	-$59.02	-$58.95	-$58.87	-$58.81	-$58.51

Note: Trips induced by construction and new demand are excluded.

In addition to the cost savings, Alternative 2 is estimated to induce additional travel between the communities of King Cove and Cold Bay. The induced trips are assumed to equal 10 percent of the trips that are forecast for the road. The induced trips and travel costs are shown in Table 4.3.3-3 along with estimates of total trips and travel costs (i.e., total = baseline + induced). Between 2016 and 2020, induced trips would average 335 per year. Because these trips are optional, the induced trips are viewed as a benefit of the alternative from an economic perspective.

Table 4.3.3-3 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 Resident & Non-Fishing Road Passengers	-	-	-	332	335	335	337	338	346
Cost per Passenger ($ 2010)	-	-	-	$44.60	$44.60	$44.60	$44.60	$44.60	$44.60
Travel Costs of Induced Trips ($ 2010)	-	-	-	$131,598	$132,251	$132,950	$133,602	$134,255	$137,237
Baseline and Induced Trips and Travel Cost for Passengers Using the Southern Road									
Baseline Trips under Alternative 2	4,353	4,379	4,403	4,427	4,450	4,473	4,495	4,517	4,617
Baseline Travel Cost under Alternative 2 ($ 2010)	$457,374	$460,104	$462,624	$203,463	$204,791	$206,179	$207,523	$208,806	$214,776
Total Trips under Alternative 2	4,353	4,379	4,403	7,251	7,288	7,326	7,362	7,398	7,562
Total Travel Cost Under Alternative 2 ($ 2010)	$457,374	$460,104	$462,624	$335,062	$337,042	$339,129	$341,125	$343,061	$352,013

Note: trips induced by construction and new demand excluded

Estimates of Fish Processor Crew Travel Costs

The number of processor 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 Peter Pan would use the newly constructed road to transport all of its processing crew members between the City of King Cove and Cold Bay Airport. To accomplish this, Peter Pan would need to purchase 1 or more schools buses and hire 1 or more drivers to drive and maintain the buses. On average, 20 processing crew members would be transported per trip, and therefore buses would make 100 round-trips per year on the road. The average cost per bus passenger is estimated to be $13.13. (See Table 4.3.3-4.) Because of liability reasons, it is assumed that the buses would only carry processing crew members or other employees or contractors of Peter Pan. As shown in Table 4.3.3-4, using buses rather than air or hovercraft services are estimated to result in overall savings of $180,546 per year.

Table 4.3.3-4 Processing Crew Transportation under Alternative 2 and Alternative 1

	Travel and Cost Under Alternative 2			Travel and Cost Under Alternative 1			Difference
	Road	**Air**	**All Modes**	**Hovercraft**	**Air**	**All Modes**	**All Modes**
Estimated One-Way Processing Crew Trips per Year	2,000	0	2,000	362	1,638	2,000	0
Average One-Way Cost on Primary Mode ($ 2010)	$13.13	$98.00	$13.13	$76.00	$98.00	$94.02	-$80.89
Total Cost on Primary Travel Mode ($ 2010)	$26,260	$0	$26,260	$27,512	$160,524	$188,036	-$161,776
Additional Cost of Vehicle Travel ($ 2010)	$0	$0	$0	$5,530	$13,241	$18,770	-$18,770
Total Cost of Travel on All Modes ($ 2010)	$26,260	$0	$26,260	$33,042	$173,765	$206,806	-$180,546
Total Cost per Passenger ($ 2010)	$13.13	$0.00	$13.13	$91.28	$106.08	$103.40	-$90.27

Estimates of Processing Managers/Technician Travel Costs

Peter Pan 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, at the same proportion of trips as in Alternative 1. In other words, they would travel by air for 81.9 percent of the 200 one-way trips. When the managers and technicians travel by road, it is assumed that they would use a shuttle that is presumed to become available once the road is opened. As described in Table 4.3.3-5, the cost of a shuttle between the communities of King Cove and Cold Bay is calculated to be $46.00 per trip, representing a savings of $111.47 per trip compared to the cost of the hovercraft and the assumed ground expenses of travel for managers and technicians between the Northeast Hovercraft Terminal and the City of King Cove. Total savings over the 36 annual trips are estimated to equal $4,013.

Estimates of Fishing Crew and Fishery Observer Travel Costs

Fishing crew and fishery observers would likely use the southern road shuttles to travel between the City of King Cove and the Cold Bay Airport in same proportion that they would use the hovercraft under Alternative 1 (i.e., 18.1 percent). As with Alternative 1, an estimated 200 crew/observer trips per year would be taken, thus 36 road trips and 164 air trips between the City of King Cove and Cold Bay Airport under Alternative 2. At $46.00 per trip, the road is estimated to generate savings of $63.00 per trip compared to the estimated costs of using the hovercraft. As with Alternative 1, fish harvesters and observers were assumed to use the shuttle between the hovercraft terminal and the City of King Cove, with a total cost including the hovercraft of $109.00 ($76 for the hovercraft + $33.00 for the shuttle). Annual total savings for the groups are estimated to equal $2,268.

Travel Costs of Residents and Other Persons Not Associated with Fisheries

Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 2 and Alternative 1 are shown for 2016 in Table 4.3.3-5, noting that induced trips are not included. Under Alternative 2, residents and other persons not associated with fisheries are estimated to take an average of 1,248 trips of their 2,027 baseline trips via the road in 2016, the

first year the road is open. The remaining 779 baseline trips would continue to use the air taxi service. Under Alternative 1 for 2016, this group was assumed to take 368 trips on the hovercraft and 1,659 by air. Total travel costs are projected to decline by $74,754 for the year with an average cost savings of $36.88 per trip. Under Alternative 2, trips via the road for the group are assumed to be split between shuttles ($46 per passenger) and private vehicles with 2 passengers ($43.20 per passenger).

Table 4.3.3-5 Resident and Other Non-Fishery Transportation in Alternative 2 and Alternative 1

	Travel and Cost Under Alternative 2			Travel and Cost Under Alternative 1			Difference
	Road	Air	All Modes	Hovercraft	Air	All Modes	All Modes
Estimated One-Way Resident & Non-Fishery Trips per Year	1,248	779	2,027	368	1,659	2,027	0
Average One-Way Cost on Primary Mode ($ 2010)	$44.60	$98.00	$65.12	$76.00	$98.00	$94.01	-28.88
Total Cost on Primary Travel Mode ($ 2010)	$55,661	$76,342	$132,003	$27,968	$162,582	$190,550	-$58,547
Additional Cost of Vehicle Travel ($ 2010)	$0	$5,453	$5,453	$10,046	$11,613	$21,659	-$16,206
Total Cost of Travel on All Modes ($ 2010)	$55,661	$81,795	$137,456	$38,014	$174,195	$212,209	-$74,754
Total Cost per Passenger ($ 2010)	$44.60	$105.00	$67.81	$103.30	$105.00	$104.69	-$36.88

Direct and Indirect Employment Effects

Total direct employment is estimated between 1 to 2 jobs for the maintenance of 17.6 miles of road between the King Cove Airport and the Northeast Hovercraft Terminal, in addition to maintenance of the length of the southern road alignment (18.5 miles). Routine road maintenance could be performed year round by 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 motivated 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 shuttles and taxis 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.

In addition to the direct jobs, the expenditures on ground transportation services, and the spending by residents of the realized cost savings are likely to generate additional full or part time jobs, such as mechanics 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. There would also be fewer jobs in marine transportation services. In net terms, no indirect employment effect would be expected in the 2 communities.

The overall direct and indirect employment effect is likely to be between 6 and 12 jobs. Data from the Alaska Department of Labor (ADOLWD 2011f) suggest that these could be filled by resident workers. In 2010, 32 workers were employed in the trade, transportation, and utilities industries in the City of King Cove, representing 15 percent of all resident non-federal wage and salary workers in the community. On the other hand, the community had 99 workers with experience in the trade (81), transportation and warehousing (16), and utilities (2) sectors during the past 5 years (ADOLWD 2011f). Overall, a total direct effect on employment is estimated to be from 6 to 12 persons in the transportation sector under Alternative 2.The effect would be permanent but of a low intensity of about 5 percent of the total resident wage and salary jobs in the local area of the cities of King Cove and Cold Bay.

Indirect Population and Demographics Effects

No effects on population would be expected if the new positions were filled by permanent residents. If they were filled by nonresidents, the alternative could lead to an increase in population of up to 35 persons, assuming the average household size of 2.9 persons in 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 borough would not be responsible for maintaining the road; therefore, there would be no fiscal effects to local governments. The annual operation and maintenance costs for the alternative are estimated at $149,000.

Summary

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 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, travel between the cities of King Cove and Cold Bay would be by air taxi services as under the baseline conditions.

Once the road is operational in 2016, the majority of passengers would likely shift to ground transportation between the communities of King Cove and Cold Bay. The shift would result in a medium level of cost savings on an annual basis. A low level but permanent net increase in employment in transportation services is expected. It is likely that 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, the fiscal impact of the alternative to local governments is expected to be negligible.

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 3.3.6.1). Fiscal effects to the local government have been influenced by the 2003 EIS and the operations of the hovercraft. Alternative 2 would eliminate fiscal losses to the Aleutians East Borough, because the hovercraft subsidy would not continue, contributing a moderate beneficial cumulative impact. 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. This increase in traffic, combined with the traffic generated by the alternative, would have a negligible contribution to cumulative effects on socioeconomic indicators.

Conclusion

Alternative 2 would reduce consumer transportation costs, and eliminate the borough's hovercraft subsidy. There would be few effects to any other socioeconomic indicators. Effects to employment, population and demographics would be of low intensity, over a permanent duration, with a local extent, and a common context. Effects to consumer transportation costs and fiscal effects to local governments would be medium intensity, over a permanent duration, with a regional extent, and a common context. The overall effects would be negligible for employment, population and demographics and moderate for fiscal effects to local governments, and consumer transportation costs.

4.3.3.3 Transportation

Direct Effects and Indirect Effects from Construction

Alternative 2 would consist of the construction of an 18.5-mile, single lane road segment from the terminus of the incomplete/permitted road in the vicinity of the Northeast Hovercraft Terminal westward to the boundary of state lands near the community of Cold Bay. The southern route would transect the Izembek National Wildlife Refuge and Izembek Wilderness.

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 foot print. 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 2 200-day construction seasons. The estimated $20.7 million project would directly employ approximately 30 construction workers, including those locally hired. Indirect employment would likely temporarily increase, 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 cities, 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 4.3.3-6 reflects an increase in air traffic during projected construction years 2014 and 2015.

While pedestrians and bicycles are not common in the project area, some residents and visitors have access to motorized off-road vehicles. During construction, these vehicles would have increased potential to access to the Izembek National Wildlife Refuge and other areas, though this could be mitigated, as discussed below.

Summary

The direct and indirect impacts of construction of this alternative on transportation would be medium in magnitude, since it would add surface, marine, and air traffic during the construction phase. As described in Chapter 3, surface traffic levels in the communities of Cold Bay and King Cove are relatively low, but the existing road system is limited. Therefore, traffic congestion or disruption would occur occasionally. Impacts would be of temporary duration because construction would occur seasonally, and end after 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. The impacts would occur in a unique context, since the road would be constructed in an area with no existing roads. The summary impact for construction in Alternative 2 on transportation is considered to be moderate.

Direct Effects and Indirect Effects from Operation and Maintenance

The road described as 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 at Blinn Lake. The road is expected to be available for year round vehicular traffic access

beginning in 2016. The speed limit would be 20 mph. As shown in Table 4.2.3–8, the estimated travel time for Alternative 2 is 130 minutes. The trip would start in the City of King Cove and end at the Cold Bay Airport. Operation and maintenance costs would be an estimated annual cost of $149,000. The lifecycle cost of the road, estimated at about $23.4 million, is based on 35 years to use the same method as the other modal alternatives. The useful life of the road, if maintenance continues, either via the state or borough, 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, Socioeconomics, and summarized in Table 4.2.3–9. The travel time of trips is an important parameter for consideration, because it would affect 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. Because the trip time is greater than 2 hours, Alternative 2 would take more time than a hovercraft, aircraft, or ferry for emergency trips (Table 4.2.3–8). This alternative would be at low cost ($45), reliable (98 percent), and nearly always available for City of King Cove residents and visitors to get to the Cold Bay Airport for access to advanced medical care, and other services, goods, and commerce located out of the region (Table 4.2.3–9).

Table 4.3.3-6 reflects a 10 percent increase in general demand, because 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 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. The estimate assumes that 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 3,726 annually and air taxi passengers at 1,129.

Table 4.3.3-6 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 2

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Alternative 2 Southern Road		**Construction**		**Service**					
Air Taxi Passengers	4,354	4,879	4,903	1,107	1,113	1,118	1,124	1,129	1,154
Road Travelers	0	0	0	3,652	3,672	3,690	3,708	3,726	3,809

Alternative 2 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.

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 2 operations and maintenance would result in distinctive changes in transportation options, providing a reliable, nearly always available, and low cost mode of transportation between the cities of King Cove and Cold Bay. Annual maintenance costs are estimated at $149,000. The 35-year life cycle cost is estimated to be $23.4 million. The direct and indirect impacts of this alternative would be high magnitude and permanent in duration in that it introduces a fixed major facility to the area. The impacts would have a regional impact by providing a new, year round transportation link between the communities of King Cove and Cold Bay, and unique because it is currently an absent mode. The summary impact of Alternative 2 on transportation would be considered major.

Mitigation Measures

As indicated in the 2003 EIS, Alternative 2 requires the installation of a barrier 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, 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.

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 cities 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.

Conclusion

The effects of construction and cumulative effects on transportation patterns and facilities are considered moderate. The operation of a new mode of transportation is considered major because of the unique impact to the transportation system as a whole. It would create more affordable, available, and reliable transportation for the region. The overall impact is considered major.

4.3.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

The construction phase for this alternative involves building the southern road alignment and associated drainage structures for 18.5 miles of single lane gravel road. 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. OSHA reports yearly non-fatal recordable injuries and illnesses by industry type (OSHA 2011). OSHA reported 4.6 non-fatal OSHA recordable injuries and illnesses per 100 equivalent full time employees per year for highway, street, and bridge construction workers in 2009 (OSHA 2009a). It has been estimated that 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 OSHA 2009 non-fatal recordable injury and illness incidence of 4.6 per 100 equivalent full time employees per year, approximately 1 non-fatal OSHA recordable incident is predicted for construction of the road. Road work has traditionally been associated with relatively high fatality rates (Pegula 2010). OSHA 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 OSHA 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 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. However, the potential need to treat a predicted single OSHA recordable incident would not measurably impact the ability of the King Cove and Cold Bay clinics to serve those communities. Treatment of a serious injury (e.g., requiring a medical evacuation) would be more problematic due to the lack of safe and reliable transportation to the Cold Bay Airport.

Indirect effects on public health and safety could include an increased use of limited local medical facilities by out-of-town workers who were mobilized to build the road.

Summary

Construction of the road in Alternative 2 could directly affect public health and 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. Negative direct effects of the construction phase of Alternative 2 on public health and safety would be low in intensity, temporary in duration, regional in geographic extent (extending throughout the EIS project area), and unique in context. The direct and indirect effects of the construction phase of Alternative 2 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 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, assuming that the road would be closed only about 4 days/year due to snow. The trip to the Cold Bay Airport would take approximately 130 minutes (assuming a driving speed of 20 mph), as shown in Table 4.2.3-8. Medical evacuation patients could reach the Cold Bay Airport with fewer delays and, depending on weather conditions, the transportation process could be safer when the road is used.

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. In 2008, there were 2,676 non-fatal accidents on rural roads in Alaska, including 1,907 with property damage only, 660 with minor injury, and 109 with major injury (ADOT&PF 2010a). Therefore, there were a total of 769 injuries from driving on rural roads in Alaska versus 48 fatalities (about 16 times as many injuries as fatalities).

Alternative 2 could have a direct positive impact on public health (e.g., for specialized medical care referrals and emergency medical evacuation patients) and public safety (e.g., for those who transport patients during medical evacuations). The positive impacts would last as long as the road remains open and would have the potential to impact persons throughout the EIS project area. Alternative 2 would primarily impact the City of King Cove which meets the definition of a minority community and medically underserved area.

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) would depend on how often the road is used, whether the road would be patrolled, and how much road maintenance is required. 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 road would give residents 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.

The City of King Cove has a small police department. The City of Cold Bay does not currently have a police force. Patrolling the new road could increase the workload for local law enforcement agencies or for Alaska State Troopers, which could directly impact public health and safety in the communities.

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 positively directly impact public health and safety for persons who need specialized (non-emergency) 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.

Positive direct effects of the operations and maintenance phase of Alternative 2 on public health and safety would be medium in intensity, permanent in duration, regional in geographic extent (extending throughout the EIS project area), and unique in context. The direct and indirect effects of the operation and maintenance phase of Alternative 2 on public health and safety would be considered major.

Mitigation Measures

Standard practices related to worker health and safety could help mitigate the potential public safety impacts to workers during construction of the road. Practices related to construction (numerous 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. 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.

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. Potential direct and indirect impacts to public health and safety in Alternative 2 are related to incidences of potential illnesses, injuries, and fatalities for workers during construction of the road, the capability of local medical clinics, safe and reliable transportation during medical evacuations, and the capability of local law enforcement agencies.

Construction of a road could temporarily increase incidences of potential illnesses, injuries, and fatalities to workers in the project area. 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 significantly to the amount of driving occurring in the King Cove and Cold Bay communities, and could increase the number of motor vehicle accidents.

The Aleutians East Borough 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). Therefore, any increase in the current need for medical services in the project area based on the construction of the southern road alignment and the use of the access road and the southern road alignment could cumulatively further strain the existing infrastructure.

However, Alternative 2 would benefit the need in the King Cove community for available, safe and reliable transportation during medical evacuations. When there are no delays and weather conditions are not adverse, the other current types of medical evacuation transport could be just as safe as but faster than predicted for motor vehicle transport. 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 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, hovercraft, plane, and helicopter) could be selected for each specific medical evacuation incident.

The City of King Cove has a small police department. The City of Cold Bay does not currently have a police force. Additional responsibilities for local law enforcement from patrolling and responding to accidents on the 12 miles of access road (to be completed in 2012) and the 18.5 miles of new road through the southern road alignment could increase the workload for local law enforcement agencies which could cumulatively strain the existing infrastructure. A decreased ability to effectively enforce motor vehicle safety laws could lead to higher incidents of traffic accidents and greater need for medical treatment in the communities.

Operation and maintenance of Alternative 2 would have major direct and indirect effects to public health and safety and a major contribution to cumulative effects on this resource.

Conclusion

The negative direct and indirect effects of the construction phase of Alternative 2 on public health and safety are considered negligible. Standard practices related to worker health and safety could help mitigate the public safety impacts to road workers.

The positive impact of the operation and maintenance phase of Alternative 2 is considered major due to the availability of safe and reliable transportation to advanced medical services for the King Cove community.

Negative 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 that are due to specific driver behaviors, such as drunk driving or speeding. The overall direct, indirect, and cumulative impact would be considered major.

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 effect residents from increased use of limited local medical facilities. Negative direct and indirect effects of Alternative 2 would be low in intensity, temporary in duration, regional in extent, and unique in context.

Impacts to subsistence resources would occur within the road corridor due to the presence of heavy equipment and construction noise. The small scale of the road construction project would not increase the permanent population of subsistence and non-subsistence users, thereby no increase in competition. The intensity of the construction impact would be low, temporary in duration (lasting only 2 seasons, May through November), local to regional in extent, and affecting resources that are common to important in context.

Summary

Construction associated with Alternative 2 would have a negligible negative impact on human health and a negligible to minor impact to subsistence.

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. The travel time using the southern road alignment would increase over the travel time for the hovercraft, but the road would be a reliable and consistent transit method with road closure only occurring a few days per year. Alternative 2 would meet the project purpose with beneficial impacts that are medium in intensity, permanent in duration, regional in extent, and unique in context.

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). The intensity of impact would be low, long-term in duration, local to regional in extent, and affect resources that are common to important (e.g., waterfowl) in context.

Summary

Operation and maintenance associated with Alternative 2 would have major (beneficial) direct and indirect effects on human health and negligible to minor effects to subsistence.

Mitigation Measures

Standard practices of road design, worker health and safety procedures during road construction, and law enforcement by the City of King Cove (the City of Cold Bay does not have a police department) would help mitigate the incidence of motor vehicle accidents.

In consultation with regional subsistence resource users, limit construction during specific days to allow for subsistence harvests and use safety guards to help reduce impacts to subsistence access.

Cumulative Effects

The contribution of Alternative 2 to cumulative effects is that King Cove residents would receive safe and reliable transportation 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. However, Alternative 2 could increase the workload for local law enforcement, which could decrease the ability to enforce motor vehicle safety laws thereby leading to higher incidents of traffic accidents and greater need for medical treatment in the 2 communities. The additive beneficial effect of Alternative 2 to cumulative effects on human health would be major.

Past, ongoing, and reasonably foreseeable future actions are estimated to have a minor impact on subsistence resources and use patterns. Alternative 2 would result in minor improvements in access to subsistence resources and a negligible contribution to cumulative effects on subsistence resources or competition for subsistence resource as subsistence activities are unlikely to increase above present levels.

Conclusion

Alternative 2 would have a major beneficial impact on human health and a minor impact on subsistence activities for the minority and low-income communities of King Cove and Cold Bay. Alternative 2 would not have a disproportionate adverse impact to minority or low-income communities.

4.3.3.6 Public Use

Direct Effects and Indirect Effects from Construction

Construction of the road would have medium intensity, temporary disruption of public use activities, such as berry picking and hunting. Similar disruptions in public use were reported during road construction to the Northeast Hovercraft Terminal on King Cove Corporation lands. Effects would be localized, within the construction areas of the road corridor. The context of the effects is considered important, as residents return to favored sites for these activities. 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.

Summary

The direct and indirect effects to public use from construction of Alternative 2 would include temporary displacement. Effects would be at a medium intensity, potentially affecting favored times for access. Important resources (traditionally accessed sites) could be affected, but impacts would be local and could be mitigated through construction timing and adding security to provide for public access during identified periods. The direct and indirect effects to public use from construction would be minor.

Direct Effects and Indirect Effects from the Land Exchange

Road Corridor

Under Alternative 2, the southern road alignment, the land exchange would transfer 201 acres of the Izembek National Wildlife Refuge (131 acres of which is designated wilderness). During construction, the road corridor proposed for exchange would be temporarily inaccessible to the public for all uses.

Sitkinak Island

Alaska Maritime National Wildlife Refuge would transfer to the State of Alaska the Sitkinak Island lands for use as grazing or settlement (see Land Use Section 4.2.1), which would not allow for general public use. Under current Coast Guard management, no public use of the Sitkinak Island parcels is permitted; however under state management, lands used for grazing will be managed to support a variety of public benefits, including public recreation and public access.

State Lands

The state-owned parcels (41,887 acres) are remote, and generally not considered suitable for development, but they were managed for general use. Not included as a part of the parcel are tidelands and submerged lands along the coast and the beds of all inland navigable waters within and adjoining the parcel. After the land exchange, the land would be managed as wilderness within the Alaska Peninsula National Wildlife Refuge. Current public use includes hunting, trapping, and some fishing; and recreational activities are allowed (Meehan 2010). These public uses would likely continue under the federal management regime because they are compatible with the purpose of the establishment of the refuge.

Corporation Lands

The Mortensens Lagoon parcel (8,092 acres) would be transferred to the Alaska Peninsula National Wildlife Refuge adding approximately 0.3 percent to the 3.7 million acre refuge. Motorized and non-motorized hunting and recreational activities by shareholders and by permitted non-shareholders would change to open access to the general public for waterfowl and game hunting, trapping, fishing, and recreational activities without a fee. Special use permits (for activities ranging from hunting guides, commercial air taxis, filming and research) would be allowed. The most popular areas would likely be those in close proximity to existing roads and trails.

The Kinzarof Lagoon (2,604 acres) and King Cove Corporation selected parcels (5,430 acres) would be added or retained (respectively) to Izembek Wilderness. Future public use of these lands would be similar to that described for the Mortensens Lagoon parcel; except the use of motorized access would in accord with ANILCA provisions.

Summary

The change from state and private to federal ownership represents approximately 52,583 additional acres available for public use under federal management. In addition, King Cove Corporation selected parcel (5,430 acres) would be retained as Izembek Wilderness, but the corporation can select other lands (non-wilderness) within the Alaska Peninsula National Wildlife Refuge. The impact to public use from the this exchange of parcels is medium intensity because the change of use from limited (private) to general public (federal) use would constitute a noticeable change in management of public use. The transfer of state and Corporation lands to federal management would restrict activities to those allowed in a wilderness or national wildlife refuge.

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 clearly change the type of public use. However, the federal acreage relinquished in the exchange is small in relation to the total size of the refuge and the additional acreage acquired.

The transfer of all lands would be a permanent action. The extent of the impact to public use would be extended in scope because visitors to the project area also come from beyond the EIS project area and the area is valued as a national resource by the general public. The affected resource is considered important in context for public use as a national wildlife refuge. The direct and indirect effects on public use from the land exchange would be major.

Mitigation Measures

A mitigation measure proposed in the 2003 EIS addresses public uses allowed under the land exchange, “Provide additional, but unfunded, USFWS [Service] staff under Alternatives 1 and 6 to monitor vehicle trespass in the Izembek NWR [National Wildlife Refuge] Wilderness Area and other illegal actions on Federal lands.” Issues of trespass or inappropriate use of the southern road alignment would be mitigated by the design of the road through use of signs and barriers; it is acknowledged that this will not be sufficient to keep all vehicles on the road.

Cumulative Effects

Past and present actions affecting public use are described in Chapter 3 (Section 3.3.6).

Public use of motorized vehicles in the isthmus between Kinzarof Lagoon and Izembek Lagoon has been documented in a photographic survey by the U.S. Geological Survey (Anthony n.d.). It is assumed that an indirect effect of Alternative 2 would include use of motorized vehicles off the roadway in restricted areas during any phase of Alternative 2 road development. The level or intensity at which this would occur is unknown, but the extent of the disruption would likely be local in scope, as prior use was also local. The public uses that could be affected (berry picking, fishing, hunting, photography, and bird watching) would be important in context. The contribution of the Alternative 2 to cumulative effects on public use would be minor.

Conclusion

The construction period of the southern road alignment would have minor direct and indirect effects to public use. The land exchange and operation of the road would cause permanent changes to public use. The direct effects would be regional in extent, but the indirect effects would be extended and the context would be important, as the area is valued by the general public as a national wildlife refuge. The change in public use, from wilderness to a road corridor, would be a high intensity; however, the federal acreage relinquished in the exchange would be small in relation to the total size of the refuge and the additional acreage acquired. Alternative 2 would have a minor contribution to cumulative effects on public use and an overall major impact on this resource.

4.3.3.7 Subsistence

Direct Effects and Indirect Effects from Construction

Under Alternative 2, the southern road alignment, direct impacts would occur to subsistence resources as a result of construction of the 18.5-mile single lane gravel road segment from the Northeast Hovercraft 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 (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, a safety guard could be used to ensure safe access to resources during construction.

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; however construction activities are likely to displace subsistence users during the construction period. The intensity of the impact would be low, temporary in duration (lasting only the length of the construction period[s]), local to regional 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 populations 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 of 1986. These resources would be important in context.

Summary

The construction phase of Alternative 2 would have low intensity, temporary (lasting only the length of the construction period[s]), and local to regional in extent impacts to resources that are common to important in context. The summary impact of construction activities to subsistence would be considered negligible to minor.

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. The displacement of these subsistence resources could have a negative 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. 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, long-term duration, 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 and wetlands/habitat values of Kinzarof Lagoon.

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 behind and conduct the subsistence activities on foot. 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 positive impact to subsistence users as a result of this alternative. 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 Kinzarof Lagoon.

Increased Competition for Subsistence Resources

Increased competition for resources from non-subsistence users (sport hunters) who could now also more easily access the area via the road could occur. Waterfowl hunting by residents of the cities of King Cove and Cold Bay and by non-local waterfowl hunters 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; however the barriers along the proposed road would restrict use of vehicles. If increased harvest by sport hunters occurs, waterfowl and caribou subsistence harvests by local residents could be negatively impacted. The impact of increased competition for subsistence resources could be of low to medium 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 migratory waterfowl and wetlands/habitat values of Kinzarof Lagoon.

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, providing a priority for harvesting subsistence resources to rural residents from the communities of King Cove, Cold Bay, False Pass, Akutan, and Sand Point. However, as the federal caribou season is currently closed due to low caribou populations, and competition from non-rural residents for the harvest of brown bear, moose and furbearers, is minimal, the beneficial effect of this action would be negligible.

Summary

Direct and indirect effects from implementation of Alternative 2 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, long-term in duration, local to regional in extent and affect resources that are common in context. The summary impact of operation and maintenance activities to subsistence would be considered negligible to minor.

Mitigation Measures

No mitigation measures would be anticipated for subsistence resources, other than elements outlined in the Act.

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. No reasonably foreseeable future actions would affect subsistence in the project area. 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 have minor cumulative effects on subsistence resources or harvest patterns.

Conclusion

Implementation of Alternative 2 would have negligible to minor direct and indirect effects on subsistence; this alternative would result in a minor contribution to cumulative effects on subsistence.

4.3.3.8 Cultural Resources

Damage to cultural resources is 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 impacts are defined as any action which reduces the eligibility of the site for listing. 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 are likely to encounter previously unknown archaeological sites within the areas of road construction.

Direct Effects and Indirect Effects from 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 and staging areas could result in direct effects to surface or subsurface prehistoric or historic archaeological sites.

Potential indirect effects to cultural resources could also occur during the construction of the southern 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 impact of construction on cultural resources could be of low to high intensity, temporary to permanent in duration, local to regional in extent, and affect resources that are important to unique in context. The resources that are unique or important in context include archaeological, cultural, and historic resources that may be located in or adjacent to the proposed road.

Summary

Potential direct effects and 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. The 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 and 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

Because cultural resources inventories have not been completed for the entire land exchange area, it is not possible to identify all potential impacts to cultural resources. An appropriate level of investigation, including intensive surveys; evaluations of all resources potentially eligible for listing on the National Register of Historic Places; assessments of adverse effects; and applicable mitigation of identified impacts, would be completed before any potentially destructive activities could begin.

Mitigation measures to reduce impacts to archaeological, historic, and cultural resources can take a variety of forms, including but not limited to avoidance, data recovery, off-site mitigation, collection of oral histories, or architectural documentation.

Compliance with existing federal, state, and local archaeological regulations and policies regarding the discovery of archaeological resources and the provision to avoid disturbing archaeological resources, will reduce or eliminate most impacts to archaeological resources. If avoidance is not feasible, monitoring, data recovery, or other mitigation measures may be conducted. Therefore, no impacts or only minor impacts to archaeological resources are anticipated.

Cumulative Effects

Cumulative effects from uncontrolled excavation or looting, which is low to medium intensity, long-term in duration, would affect cultural resources that are important to unique throughout the existence of the road. As a result, the project components of this alternative are expected to contribute to cumulative effects on cultural resources.

Conclusion

Implementation of Alternative 2 may have moderate to major direct and indirect effects on cultural resources. This alternative is expected to contribute to cumulative effects on cultural resources. The summary impact level for cultural resource is expected to be moderate to major.

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 grading 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, temporary in duration, local in extent, and important in context.

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 that is 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 that 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 affects 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, permanent, regional in geographic extent, and affecting a unique resource.

Summary

Direct effects and indirect effects of operation and maintenance on visual resources would be considered moderate, as they would be medium in intensity, permanent in duration, local in extent, and unique in context.

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
- Restore areas of exposed dirt with native vegetation
- Manage off-road vehicle use to prevent proliferation of trails

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 and relocation of the hovercraft terminal. Alternative 2 is expected to have a moderate contribution to cumulative effects on visual resources.

Conclusion

Direct impacts to visual resources due to the implementation of Alternative 2 would be medium intensity, long-term in duration, and local extent. Unique resources of the Izembek Wilderness would be affected. The summary impact level for visual resources is expected to be moderate.

4.3.3.10 Wilderness

Direct Effects and Indirect Effects

Alternative 2 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, 18.5-miles of new single lane gravel road would be constructed, and would be owned and maintained by the State of Alaska. A total of approximately 131 acres would be removed from Izembek Wilderness for the road corridor that would follow a southern alignment through the isthmus between Kinzarof Lagoon and Izembek Lagoon (Figure 2-2). This removal of designated wilderness acres from the Wilderness Preservation System would be a permanent, regional, direct impact to a unique resource. The ecological fragmentation of Izembek Wilderness that the Alternative 2 road corridor would create would be considered a high magnitude impact. The permanent changes to the wilderness character of the isthmus would be highly noticeable.

As part of the proposed land exchange identified in Alternative 2, 44,491 acres would be added to wilderness (see Section 2.4.2 for complete description of components of the proposed land exchange). The State would convey 2 parcels of land adjacent to the North Creek Unit of the Alaska Peninsula National Wildlife Refuge to the Service to be managed as part of a new wilderness area in the Alaska Peninsula National Wildlife Refuge (41,887 acres). The Kinzarof Lagoon parcel (2,604 acres), also 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 on the border within 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). The Mortensens Lagoon parcel (8,092 acres) owned by the King Cove Corporation would be transferred to the Alaska Peninsula National Wildlife Refuge. These additions would be permanent, regional, direct impacts to a unique resource. The magnitude of this impact would be considered medium; the parcels that are identified for addition to Izembek Wilderness are adjacent to existing wilderness and would not noticeably change the overall character of existing wilderness.

Untrammeled Quality

As discussed in Chapter 3, the untrammeled quality of wilderness can be assessed by focusing on actions that intentionally manipulate or control ecological systems within wilderness boundaries (Landres et al. 2008). The addition of the State and Kinzarof Lagoon land exchange parcels to Izembek Wilderness, and construction and operation of the road identified in Alternative 2 would not introduce any actions to manipulate or manage the biophysical environment. Therefore, Alternative 2 would have no impact to the untrammeled quality of wilderness character in Izembek Wilderness under Alternative 2.

Natural Quality

The natural quality of wilderness character focuses on the intentional and unintentional effects from actions taken inside wilderness and effects from external forces on these systems (Landres et al. 2008). The construction of the single lane gravel road under Alternative 2 would have regional, permanent, high intensity direct impacts to the natural quality of wilderness character through the ecological fragmentation of previously contiguous wilderness lands. Fragmentation

affects large-scale ecological processes, flows of energy and materials, and disturbance regimes (Cole 1994). With Alternative 2, the proposed road corridor would fragment approximately 7,665 acres of wilderness south of the road (excluding Kinzarof Lagoon parcel). The presence of a road corridor through Izembek Wilderness would have a noticeable influence on the visitor experience by creating intrusions in the natural landscape and soundscape, equating to a high intensity impact. The proposed road corridor would span from the northeast terminal Cold Bay to Outer Marker Road, and would bisect existing Izembek Wilderness across the isthmus between Kinzarof Lagoon and Izembek Lagoon. The State parcels and the Kinzarof Lagoon parcel identified for addition to Izembek Wilderness would maintain ecological connectivity with existing Izembek Wilderness.

The construction of a road through the isthmus located within Izembek Wilderness could lead to indirect effects on the ecological systems found within the wilderness. While the southern alignment 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 permanent, regional, medium intensity 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). Fill associated with the proposed road would disrupt subsurface flows, which could cause ponding and dewatering along the road corridor, creating a clearly detectable change. This change could ultimately result in a shift in the species composition of vegetation communities immediately adjacent to the road. Air pollutants from roads have the ability to affect wilderness vegetation, soils, and aquatic systems. 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. Maintaining the integrity of the natural quality of wilderness character focuses on allowing ecological systems to exist without the unintended effects of civilization (Landres 2008). The addition of the Kinzarof Lagoon and State parcels to Izembek Wilderness would not impair the ecological functions of natural systems currently found within Izembek Wilderness.

The construction, operation, and maintenance of the road proposed under Alternative 2 may 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 introduction of invasive vegetation would be a medium intensity, long-term, local to regional impact to the natural quality of wilderness character.

Based on the potential major impact from the loss of connectivity with the surrounding landscape, the major impact to ecological system function, and the moderate impact from the creation of a pathway for invasive species resulting from the construction and operation of the road proposed under Alternative 2, the summary impact rating for the natural quality of wilderness character would be major. The likelihood of the spread of invasive species is low, the

intensity of impacts would vary, and the unique wilderness resource character would experience long-term to permanent impacts regionally along the road corridor.

Undeveloped Quality

The undeveloped quality of wilderness character 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). ANILCA does allow for certain motor vehicles, motorboats, and airplanes in designated wilderness for traditional activities, including subsistence activities, and for access to inholdings.

As a result of the proposed land exchange, the Alternative 2 road corridor would be owned by the State of Alaska. This change in land ownership would create an inholding within the Izembek Wilderness. The motorized access and use that would occur within this inholding creates impacts to the biophysical characteristics of wilderness, but also the wilderness experience of users (Tanner 2004). The road proposed under Alternative 2 would receive low levels of daily traffic between the cities of King Cove and Cold Bay. The motorized use along the road would impact the undeveloped quality of the surrounding Izembek Wilderness character through the association with motorized use and people’s ability to develop, occupy, and modify wilderness (Landres et al. 2008).

The inholding for the road corridor across Izembek Wilderness would allow motorized access through designated wilderness, and increase the potential for unauthorized motorized use within designated wilderness. 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. Increases in legal (along the road corridor) motorized use through an inholding within the wilderness, and increases in potential unauthorized motorized use on the adjacent wilderness lands would have high intensity, permanent, regional impacts to a unique resource. The Kinzarof Lagoon and State parcels identified for wilderness designation would have no impact to the undeveloped quality of wilderness character. However, similar to the effects of the road corridor, state ownership of submerged lands within the exchange parcels would result in numerous state inholdings within the new wilderness area, potentially compromising the Service's ability to protect the wilderness character of the area. The summary impact rating for the undeveloped quality of wilderness character as a result of Alternative 2 would be major.

Solitude or Primitive and Unconfined Recreation Quality

As a component of wilderness character, solitude can be considered as 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 is conceptualized more narrowly than solitude, often referring 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). Outstanding opportunities for unconfined recreation would most likely occur in wilderness areas

that are large, have many acres suitable for off-trail exploration, have relatively low levels of use, and are free from management restrictions over visitor access (Landres et al. 2008).

The construction phase and operation of vehicles on the proposed road under Alternative 2 would produce noise above ambient levels (50 dBA) that would be audible within Izembek Wilderness (USACE 2003). Noise levels would be expected to be higher during the construction phase, and would continue over 2 seasons. The low levels of traffic projected for the operation of the road would produce intermittent episodes of disturbance occurring over the life of the project (long-term duration), localized impacts to the soundscape of users within Izembek Wilderness that would persist for the life of the project. The magnitude of these impacts as experienced by users of Izembek Wilderness would be medium due to the intermittent nature of impacts to the soundscape in specific areas of the wilderness.

The proposed road would transform the visual landscape of Izembek Wilderness by introducing a road to a currently roadless area (see Section 3.3.9, Visual Resources). 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. A contrast in color and line would be created between the road and the existing landscape. These changes to the visual landscape, as associated with the solitude or primitive and unconfined recreation quality of wilderness character, would result in high intensity, permanent, localized impacts to a unique resource. The road would be screened by topography for the majority of its length, but would be visible by users at particular locations within the wilderness.

Izembek National Wildlife Refuge receives an average of approximately 5,000 visitors per year (Service 2010g). However, the Service does not track public uses of Izembek Wilderness separate from the entire refuge, and public use of Izembek Wilderness is estimated to be quite low. Local residents use the Izembek Wilderness lands during waterfowl hunting season (September to November), primarily along the south shore of Izembek Lagoon and within the waters of Kinzarof Lagoon (Hoffman 2011a). Fishing, hunting for brown bear and ptarmigan, wildlife viewing, hiking, and camping are popular activities within Izembek National Wildlife Refuge. 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 a permanent, regional, high intensity 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.

Based on the potential moderate impacts from the changes to the soundscape within Izembek Wilderness, the major impacts from the changes to the visual landscape, and the major impacts to opportunities for primitive and unconfined recreation, the summary impact rating for the solitude or primitive and unconfined recreation quality of wilderness character would be major.

Wilderness Values

While the proposed land exchange would occur in southwestern Alaska, indirect effects from the decommissioning of a portion of Izembek Wilderness could also be felt beyond the region. Existence value can be defined as the satisfaction felt by an individual just knowing that wilderness exists (Cordell et al. 2003). The definition of existence value can also be expanded to include an altruistic desire to preserve wilderness for the good of humanity and the spiritual well-being that may result from wilderness experience (Schuster et al. 2005). Bequest value is

derived from being able to hand down natural resources to future generations so they could also experience wilderness values (Walsh et al. 1984; Schuster et al. 2005). People outside of Alaska could become aware that changes to the acreages of Izembek Wilderness were taking place under this alternative, so existence and bequest values could be impacted.

Summary

Under Alternative 2, a total of 131 acres would be removed from Izembek Wilderness for the road corridor. Approximately 49,921 acres would be retained or added to wilderness through the conveyance of the Kinzarof Lagoon parcel to the Service from King Cove Corporation, conveyance of the State parcels to the Service, and the relinquishment of King Cove Corporation selected lands.

The implementation of Alternative 2 would also result in no direct and indirect impacts to the untrammeled quality, major impacts to the natural quality of wilderness character, major impacts to the undeveloped quality, and major impacts to the solitude or primitive and unconfined recreation quality. Due to the unique context of the Izembek Wilderness, the direct and indirect impacts to wilderness character resulting from Alternative 2 would be major.

Mitigation Measures

Several mitigation measures would help to reduce adverse impacts to wilderness character under Alternative 2. These include:

- A barrier (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).
- 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).
- An invasive species management plan implemented to limit the spread of non-native species within Izembek Wilderness.
- An additional Service staff member to monitor vehicle trespass in Izembek Wilderness (USACE 2003).

Cumulative Effects

Past, present, and reasonably foreseeable future actions that could contribute to cumulative effects to wilderness character within Izembek Wilderness were 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 likely increase beyond current levels. Alternative 2 would have a major contribution to cumulative effects on wilderness character within Izembek Wilderness.

Conclusion

Due to the unique context of the Izembek Wilderness, the direct and indirect impacts to wilderness character resulting from Alternative 2 would be considered major. The intensity of impacts would be high due to the highly noticeable influence on visitor experience. The extent would be regional, and long-term to permanent in duration. The summary impact level for cumulative effects under Alternative 2 to wilderness character within Izembek Wilderness is considered major. The implementation of mitigation measures discussed above could reduce adverse impacts to the natural quality, the undeveloped quality, and the solitude or primitive and unconfined recreation quality of Izembek Wilderness character, but will not eliminate adverse impacts.

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 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 4.4.1-1 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

The direct and indirect effects on air quality from the construction of Alternative 3 are expected to be medium in magnitude on a short-term basis (24-hour or less), due to localized emissions of air pollutants. These minor effects 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 construction would have only a minor effect on air quality.

Table 4.4.1-1 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 hp)	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 hp)	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 hp)	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 hp)	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 City of King Cove. 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 4.4.1-2 shows the direct emission estimates for the vehicular travel along the central road alignment. As with Alternative 2, the estimates of particulate matter emissions from fugitive dust are conservatively high, based on the estimating methodology from EPA. Indirect effects of this alternative may include increased use of other resources, 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. The expected emission reductions from the removal of the hovercraft operation are also shown in Table 4.4.1-2.

Summary

The effects on air quality from the operation and maintenance of Alternative 3 are expected to be negligible from emissions, because they would be low in magnitude, long-term in duration (reoccurring short-term events), local extent, and common context. 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 a moderate effect on air quality, but these reoccurring short-term events would likely remain long-term in duration, local in extent, and common in context. Indirect effects on air quality are expected to be minor. The effects from the removal of hovercraft operations are also expected to be a minor improvement to the air quality in the immediate vicinity of the hovercraft route.

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 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

Alternative 3 would have negligible to minor direct effects on air quality in the immediate vicinity of the central road alignment. Indirect and cumulative effects would be minor. This alternative would reduce emissions from hovercraft operations to zero, but would contribute to an overall increase in emissions. 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. Indirect and cumulative effects may be minor. The overall effect of Alternative 2 on air quality would be minor.

Table 4.4.1-2 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**
HOVERCRAFT REMOVAL								
Main Propulsion Engines (2 x 1205 hp)	-4,401 MMBtu/yr	-6.48	-1.72	-0.003	-0.12	-0.12	-0.17	-334
Cushion Lift Engines (2 x 905 hp)	-3,041 MMBtu/yr	-4.87	-1.29	-0.002	-0.09	-0.09	-0.13	-251
Service Power Engines (3 x 8kW)	-54 MMBtu/yr	-0.12	-0.03	-0.008	-0.008	-0.008	-0.01	443
TOTAL (tons per year)		**-11.5**	**-3.04**	**-0.01**	**-0.21**	**-0.21**	**-0.30**	**-590**
NET TOTAL (tons per year)		**12.3**	**2.07**	**1.55**	**28.5**	**4.13**	**1.64**	**293**

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.

Hovercraft engine sizes from (Buls 2006).

Usage value for combustion emissions for hovercraft operations based on project description: Estimated annual travel is 3 times per week between April and October (30 weeks), or 90 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. Assume use of ultra low sulfur diesel with sulfur content of 0.0015%, by weight. 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.

4.4.1.2 Climate

Direct Effects and Indirect Effects from Construction

Effects to climate from constructing the central road alignment (Alternative 3) would be the same as those for constructing the southern road alignment (Alternative 2), which are low magnitude, long-term duration, extended, and important.

Summary

Overall construction-related effects to climate change associated with Alternative 3 are considered negligible. Although climate change effects are considered to be long-term, extended, and affect important resources, the overall direct and indirect effects are considered negligible since the magnitude is so low.

Direct Effects and Indirect Effects from Operation and Maintenance

Effects associated with climate change that are a result of Alternative 3 would be the same as Alternative 2, except for a small difference in carbon dioxide equivalent emissions (Table 4.4.1-3). Alternative 3 would emit approximately 35 tons per year more carbon dioxide equivalent than Alternative 2. However, when compared at the state level, Alternative 3 would also contribute to approximately 0.02% of the State of Alaska's estimated emissions from on-road vehicles and less than 0.01% 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 3 is considered low. The duration, extent, and context of impacts to climate would be the same as Alternatives 1 and 2, which are: long-term duration, extended, and important. Indirect effects could result from more recreationists and wildlife viewers visiting the area due to better access to sites. Due to the remote location, the indirect impacts to climate change would be negligible. See the discussion under Alternative 1 for the assumptions related to intensity, duration, extent, and context.

Table 4.4.1-3 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
State Ferry	2 round trips/month (May-September)	30
TOTAL		**912**

Note: Refer to Section 4.4.1.1 for complete details and assumptions regarding emissions calculations.

Summary

Overall direct and indirect effects to climate change associated with Alternative 3 are considered negligible. Although climate change effects are considered to be long-term, extended, and affect important resources, the overall direct and indirect effects are considered negligible since the magnitude is so 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 912 tons of carbon dioxide per year, which is 292 tons per year more than Alternative 1, and 35 tons per year more than Alternative 2. However, Alternative 3 is expected to have negligible direct and indirect effects due to the low magnitude, although the duration would be long-term, the extent is extended and the context is important. 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 the 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 through 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 surface and shallow subsurface soil along the road corridor and 1.0 acres at the barge landing areas adjacent to the Northeast and Cross Wind Cove hovercraft ramps. Approximately 99,000 cubic yards of geologic resource 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 Hovercraft Terminal impacting 7 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.

Potential direct and indirect effects could also result from the 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 4.4.1.5 as are the measures to reduce this risk.

An indirect effect to other resources common in context would be using rock unsuitable for construction. Such geologic resources include rocks with a high concentration of sulfide minerals that could result in acid rock drainage if used to fill wetlands or placing that rock at the water surface. 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 the rock would be placed within.

Summary

Direct impacts on soils as a result of Alternative 3 would be permanent, of high intensity, covering local extent, and common soils. Effects would include excavation, grading and compaction, and direct loss of soil cover by exposure in the area of the new road, and exposure of soils to localized runoff and erosion. These moderate effects would include the disturbance of about 101 acres, with the potential to release fuel or other hazardous materials during the construction process.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct impacts from the Alternative 3 are similar to those in Alternative 2 and would be highest during construction, and reduced during operation and maintenance activities. Of the total 231,000 cubic yards of fill from the material site, 10,000 cubic yards would be processed and stockpiled for future road maintenance. 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

Moderate direct and indirect effects on soils would occur under this alternative and these effects would be high in intensity, long-term to permanent in duration, with local extent and affecting resources that are common in context. These moderate 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.

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. The implementation of Alternative 3 could directly result in disturbance of ground cover on a total of up to 107 acres of regionally common soils when including the disturbance at the material sites. The area subject to excavation would total 99,000 cubic yards. These additive incremental effects would be considered moderate because they are high intensity, permanent, local (extent), and common (context).

Conclusion

Soil removal/excavation and road construction would result in direct and indirect impacts to geologic resources and soils that would be high in intensity, permanent in duration, over a local to regional extent and affect resources that are common in context. There would be a moderate contribution to cumulative effects and an overall moderate impact to more than 100 acres of land.

4.4.1.4 Hydrology/Hydrologic Processes

Direct Effects and Indirect Effects from Construction

Direct impacts from the 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 through 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, 1 bridge, 1 stream crossing culvert, 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. The road material should remain moist due to typically wet weather; therefore, water requirements would be relatively low. 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 Hovercraft 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 (150 acres, not connected to anadromous streams) at the western terminus of Alternative 3. Locations and preliminary estimates of quantities are shown in Appendix E.

One box culvert 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 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, of high intensity, covering both local and regional extent, and would include crossings of unique streams, and infill of hydrologic wetlands in the area of the new road. This activity would expose water resources to localized, temporary, sediment discharges from disturbance 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 to other resources common in context would be a decrease in water quality from an increase in turbidity (sediment load) generated by disturbance of stream shorelines or discharge of excavated material during emplacement of the 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 of high intensity, permanent, and local to regional for this unique resource. The direct and indirect effects would be moderate with the applied mitigation measures identified below.

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 would increase the sediment load into surrounding streams that would continue to move through the system as a result of the reestablishment of hydrologic processes within each stream.

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. 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, and often surpass design standards due to practicability and financial considerations.

Indirect effects on hydrologic resources may also occur as a result of increased sedimentation in streams resulting from soil erosion of trails resulting from all-terrain vehicle use. 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 (2011x), will likely increase.

These effects would be high in intensity, long-term to permanent in duration, with local extent and affecting resources that are unique in context because of the stream designation as essential fish habitat designation.

Direct and indirect effects at the staging area near the Northeast Hovercraft Terminal would be highest during construction, but would continue at a reduced level during operation and maintenance activities. These may include isolated areas where surface water runoff is concentrated by erosion control methods to discharge in select areas near the staging area.

Summary

Direct and indirect effects would continue during the operation and maintenance stage of the alternative as a result of continued movement of sediment and the associated reestablishment of hydrological processes. These effects would be medium intensity, long-term and local for this unique resource, 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. These effects would result from the mobilization of equipment, fuel, and supplies; excavation; potential temporary rerouting of stream courses during installation of drainage structures; and potential natural re-routing/reestablishment of stream courses from existing ones. The implementation of Alternative 3 could directly result in disturbance of hydrologic resources on a total of about 3 acres of regionally common water resources, 2 stream crossings and tidelands when including the barge landing sites. The incremental effects attributable to implementation of this alternative would be considered moderate and permanent. 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. Long-term maintenance of stream crossings would be additive to those impacts derived during construction activities. Indirect effects would include potential non-point source pollution and unlawful stream crossings along the margins of the road corridor by the general public.

Conclusion

Construction, operation, and maintenance of Alternative 3 would result in direct and indirect impacts to hydrologic resources and water quality that would be medium to high in intensity, permanent in duration, over a local extent and affect resources that are unique in context. The impact would be moderate, due to implementation of mitigation measures.

4.4.1.5 Hazardous Materials

Direct Effects and Indirect Effects from Construction

Direct and indirect impacts as a result of the land exchange and 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 is comparatively low, the duration would be temporary, the extent would be local, and the potential for adverse effects would be minor.

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 is comparatively low, and the potential for adverse effects would be minor, because the intensity would be low, the duration temporary to long-term, and the extent local for these common resources.

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 of low intensity, localized in extent, and temporary to long-term in duration. 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 transportation to the project staging area could occur during 2 construction seasons between May and November, and equipment refueling activities during those times. If a spill occurred on land the impact would be short term in duration, local in extent, and high in intensity to a common resource. If a spill occurred in wetlands or a water body, the impact would be long-term, and larger in extent, and high in intensity. Without known fuel volumes required for the project, in general, impact of a fuel spill would be considered minor to moderate.

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

The direct effects on noise from the construction of Alternative 3 would be very similar to Alternative 2. Effects would be moderate intensity, but the duration would be temporary, with a local extent and common context (as the parcel would be managed as state lands). Effects would be from the potential noise generating equipment and operations. These moderate effects would occur only during the actual construction activity, and in the immediate vicinity of the 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 increased use of other resources, 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.

As with Alternative 2, this alternative also includes the reduction of hovercraft operations from 3 days per week to zero. The reduction in noise levels due to the removal of hovercraft operations occurs in a separate, distant location from the new roadway noise. Therefore, the reduction of hovercraft operational noise does not have any effect on the operational noise from the new road alignment; it is a separate and distinct noise reduction.

Summary

The direct effects on noise from the operation and maintenance of Alternative 3 are expected to be minor because it will be medium in magnitude, temporary duration, local extent, and of common context. The noise sources from the new road are 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 event) may have a moderate effect on noise, but would likely remain minor in duration, extent, and context. Indirect effects on noise are expected to be negligible. This alternative would also create a reduction in noise along the existing hovercraft route. These effects are also expected to be a minor improvement to the noise levels in that immediate area.

Mitigation Measures

Due to the predicted minor effects on the noise environment, no additional mitigation measures are expected for Alternative 3.

Cumulative Effects

Cumulative effects associated with Alternative 3 would be similar to cumulative effects associated with Alternative 2. The acreage of the road corridor parcel proposed for exchange would be greater under Alternative 3, but the footprint of the proposed road would be less. The contribution to cumulative effects would remain negligible.

Conclusion

Alternative 3 would have minor direct and indirect effects on the noise environment in the immediate vicinity of the southern road alignment. Noise would consist of intermittent episodes, intermittently occurring over the life of the project, spread out over a relatively large area. Indirect effects would be negligible and the alternative would have a negligible contribution to cumulative effects on noise. The overall effect of Alternative 3 on noise would be negligible.

4.4.2 Biological Environment

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.

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 4.3.2-1. 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 and Cross Wind Cove hovercraft terminals.

Table 4.4.2-1 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 a 100-foot wide road corridor.

[2]Includes King Cove Corporation lands and National Wildlife Refuge lands within the construction foot print; 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 100 acres of native plant communities from construction of the road and 1.0 acre of beach and coastal vegetation at temporary barge landing sites. These vegetation communities are considered to be unique because of the juxtaposition of the proposed corridor relative to designated wilderness and Ramsar designation. Indirect effects from construction would include changes in composition of vegetation communities due to changes in hydrology immediately adjacent to the road. These effects would be medium intensity, permanent in duration, and local in extent for these unique plant communities. The indirect effects to vegetation would be considered moderate.

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. In addition, Alternative 3 would have beneficial effects for terrestrial and aquatic plant communities that would result from the proposed land exchanges. The federal government would gain approximately 52,583 acres while relinquishing ownership of 1,846 acres, resulting in a substantial net gain of terrestrial and aquatic plant communities managed within the National Wildlife Refuge System. The majority of those acquired lands would be managed under wilderness designation. The lands gained by the federal government through the land exchanges, however, are not considered of equal value to land affected by this alternative. The lands affected as a result of implementation of Alternative 3 are uniquely located adjacent to high quality habitats of Izembek and Kinzarof lagoons, utilized by thousands of waterfowl and other species and recognize internationally by the Ramsar Convention. The indirect effects to vegetation from operations and maintenance of Alternative 3 would be medium in intensity, permanent in duration, and local in extent for these unique vegetation resources. The indirect effects to vegetation would be considered moderate.

Mitigation Measures

A barrier (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 the Izembek National Wildlife Refuge and Izembek Wilderness.

Additional recommended mitigation measures include an invasive species management plan, developed by the Service, to limit the spread of non-native plant species, and pre-construction rare plant surveys. In addition, as the owner/operator of the road corridor, the State should be required to develop an integrated pest management plan that includes annual invasive species

monitoring and treatment plans in perpetuity for the operation and maintenance of the proposed road.

Cumulative Effects

Past actions affecting vegetation in or adjacent to the project area are few and minor because this remote location is largely undeveloped. 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 Hovercraft Terminal has already provided access for all-terrain vehicles to that area, resulting in numerous all-terrain vehicle activities within the Izembek Wilderness with impacts to native plant communities.

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 also 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 1,846 acres of native land cover types; a net gain of approximately 50,737 acres, while also maintaining ownership of 5,430 acres of native land cover types on the King Cove Corporation selected parcel (but the corporation can select a substitute parcel within the Alaska Peninsula National Wildlife Refuge).

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 for the 100 acres of plant communities that would be lost to the road footprint. 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, the extent would be local, and the context would be unique because of the juxtaposition of the proposed corridor relative to designated wilderness. The summary impact of Alternative 3 on vegetation would be considered moderate. Implementing an invasive species management plan and pre-construction rare plant surveys with annual invasive species monitoring and treatment plans, should lessen this impact.

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.

Implementation of Alternative 3 would result in a land exchange between the federal government, State of Alaska, and King Cove Corporation. Approximately 41,887 acres of the State parcel (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 (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 the road corridor along the 21.6 mile long central alignment (containing approximately 9 acres of wetland within the corridor proposed for exchange). The footprint of the road would cover 100 acres, including filling of less than 2 acres (estimated 1.7 acres) of lowland wet low sedge/scrub wetlands and less than 1 acre (estimated 0.7 acres) of lowland wet sedge meadow wetlands.

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. Cross drainage culverts 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.

In summary, the federal government would gain approximately 12,726 acres of wetland while relinquishing ownership of 989 acres of wetland. An estimated total of 2.4 acres of wetland would be filled and 173 stream crossings would be constructed.

Direct Effects and Indirect Effects from Construction

Construction associated with Alternative 3 consists of a 20-mile road segment within a 100 -foot wide corridor. Wetlands would be directly affected as a result of 11,000 to 15,000 cubic yards of deposited fill within 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 lost wetland functions when 1,200 cubic yards of fill would be placed in about 1.0 acre of wetland for the construction of the construction staging areas. Impacts to wetlands would be similar to analysis presented for Alternative 2 (Section 4.3.2.2).

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 effects would be permanent and local for these wetlands considered unique because of their Ramsar designation.

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 traffic in wetlands. 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 from operation and maintenance would 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 effects from dust would be minor, but the effects from motorized vehicles would be moderate, because they are medium in intensity, long-term, and local or beyond in extent for these unique wetlands. In addition, Alternative 3 has beneficial effects for wetlands that would result from the proposed land exchanges. The federal government would gain approximately 12,726 acres of wetland while relinquishing ownership of 989 acres of wetlands, resulting in a substantial net gain of wetlands managed within the National Wildlife Refuge System. The majority of those acquired wetlands would be managed under wilderness designation. The wetlands gained by the federal government through the land exchanges, however, are not considered equal in value to wetlands affected by this alternative. The wetlands affected as a result of implementation of Alternative 3 are uniquely located adjacent to high quality habitats of Izembek and Kinzarof lagoons, utilized by thousands of waterfowl and other species and recognized internationally by the Ramsar Convention. The overall effect as a result of operation and management is moderate.

Mitigation Measures

A barrier (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 measures, 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 installing stream crossings.

Cumulative Effects

Past actions affecting vegetation in or adjacent to the project area are negligible because this wilderness location is undeveloped. 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 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 hovercraft site, and the reduction of wetland functions on adjacent wetlands. Alternative 3 would also result in the addition of approximately 12,726 acres of wetlands to the National Wildlife Refuge system while relinquishing ownership of 989 acres of wetland; a net gain of approximately 11,737 acres, while also maintaining ownership of 1,917 acres of wetlands on the King Cove Corporation selected parcel (but the corporation can select a substitute parcel within the Alaska Peninsula National Wildlife Refuge which would likely include wetlands).

The completion of the King Cove Access Project (USACE 2003) would also contribute to effects on wetlands. As a result of this project, approximately 6 acres of wetland have been filled along the segment from King Cove Airport to Lenard Harbor, and 3 acres were filled at the Northeast Hovercraft Terminal site. The remainder of the project, which consists of a 12-mile long, 14-foot wide access road from the Leonard Harbor site to the Northeast Hovercraft 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.

Alternative 3 would have a moderate contribution to cumulative effects on 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 3 acres within this 416,207 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 and the juxtaposition of the proposed corridor relative to designated wilderness. There would also be beneficial effects for wetlands that would result from the proposed land exchanges, but these wetlands would not provide equal wetland values to those affected by this alternative. Therefore, considering the additional wetlands added to the National Wildlife Refuge System, along with their values in comparison to the area wetlands that would be directly and indirectly affected by this alternative, there would be a moderate 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. 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. Quantities of water would be needed for embankment compaction and dust control. The road material should remain moist due to typically wet weather; therefore, water requirements would be relatively low. 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 Hovercraft 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 (150 acres, not connected to anadromous streams) at the western terminus of Alternative 3. Locations and preliminary estimates of quantities are shown in Appendix E.

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. It is not anticipated that any effects on the other exchange parcels would result from the land exchange 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 detailed in Alternative 3 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).

Summary

Anticipated effects from the construction of the central road alignment outlined in Alternative 3 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, temporary in duration, and local in extent. The habitat may be considered unique, due to its status as essential fish habitat under the *Sustainable Fisheries Act*. However, effects to anadromous fish are not expected to be measurable. 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 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 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.

Summary

No direct effects on fish resources or essential fish habitat would result from the operation and maintenance of the central road alignment outlined in Alternative 3. Most anticipated indirect effects, such as effects to water quality, would be of low intensity, long-term duration (intermittent but persistent for the life of the project), and local in extent, but would impact unique resources, resulting in a negligible effect. However, indirect effects from increased harvest pressure resulting from improved access have the potential to be much greater. If overharvesting were to occur, effects on anadromous fish in the impacted streams would be of high intensity, long-term or potentially permanent in duration, local in extent, and would impact unique resources (due to limited populations). Therefore, the indirect effects from operation and maintenance under Alternative 3 would be major.

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). The contribution to cumulative effects on fish and essential fish habitat from the implementation of Alternative 2 would be major.

Conclusion

Effects to fish and essential fish habitat from most aspects of the central road alignment would be of low intensity, long-term to permanent in duration, and local in extent for these unique resources. However, the potential for overharvesting of anadromous resources in 2 streams would potentially be of high intensity. The contribution to cumulative effects on fish and essential fish habitat would be major. Therefore, the combined effects on fish and fish habitat under Alternative 3 would be major. Implementing mitigation measures to address the threat of over harvest should lessen this impact.

4.4.2.4 Birds

The central road alignment would lie approximately ¾ mile 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 movement and habitat use of the isthmus. The central road 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 impact 100 acres. The main difference between Alternative 3 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 is true of Alternative 2. Because Alternative 3 could 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 additional analysis where differences would occur due to the road location.

General Impacts

Alternative 3 could cause the same general impacts to birds as those described under Alternative 2 (Section 4.3.2.4).

Tundra Swan and Other Breeding Birds

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), this species is considered unique in this impact analysis. Tundra Swans from migratory populations may also occur at the Izembek National Wildlife Refuge (Service 2009b). Tundra Swans require large water bodies as suitable nesting and/or molting sites and actively defend large nesting territories (Limpert and Earnst 1994: Kear 2005). Depending on the distribution of large ponds on the isthmus between Kinzarof and Izembek lagoons, fewer individuals or pairs occupy the same area as smaller sized goose of duck species.

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

Direct Effects and Indirect Effects from Construction

The direct and indirect effects of the construction of Alternative 3 on Tundra Swans and other breeding birds are essentially the same as described under Alternative 2. The differences are that 7 less acres of habitat would be lost and the road alignment would be closer to Izembek Lagoon rather than Kinzarof Lagoon. The central road alignment was chosen to avoid swan nesting areas and wetlands and to maximize the distance from both lagoons. The central road alignment would still cross through high density swan habitat, but would not be as close to as many known locations of pairs and nests as the southern road alignment (Service, unpublished data). This may result in fewer Tundra Swan nests being disturbed under Alternative 3.

The effect of the exchange of parcels under Alternative 3 is similar to that discussed under Alternative 2 (Section 4.3.2.4), but the exchange parcel for the road corridor would differ as described above. The net result of the land exchange would be an increase in the acreage of land managed as wilderness and national wildlife refuge.

Summary

The direct and indirect impacts to Tundra Swans and other breeding birds from the construction of Alternative 3 would be medium to high intensity with long-term (behavioral disturbance) to permanent (habitat loss) duration, local extent, and would affect unique (Tundra Swans) and common resources (other breeding species). For Tundra Swans, implementation of Alternative 3 would result in major direct and indirect effects from construction. For other breeding birds, implementation of Alternative 3 would result in moderate direct and indirect effects.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects to Tundra Swans and other breeding birds from the operation and maintenance of Alternative 3 are similar to those described under Alternative 2. The primary difference is the location of the road may reduce the numbers of swans disturbed, but would not substantially change the type or level of effects. Alternative 3 would potentially disturb similar numbers of other breeding birds as Alternative 2.

Summary

The direct and indirect impacts to Tundra Swans and other breeding birds from the operation and maintenance of Alternative 3 would be medium to high intensity with long-term (behavioral disturbance) and permanent duration (habitat loss), local extent, and would affect unique and common resources. For Tundra Swans, implementation of Alternative 3 would result in major direct and indirect effects from operation and maintenance. For other breeding birds, implementation of Alternative 2 would result in moderate direct and indirect effects.

Mitigation Measures

All the mitigation measures listed under 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 negatively impacted.

Cumulative Effects

The cumulative effects associated with Alternative 3 are the same as those associated with Alternative 2; Alternative 3 would have a major contribution to the cumulative effects on Tundra Swans and a moderate contribution to the cumulative effects on other breeding birds.

Conclusion

Direct and indirect impacts to Tundra Swans and other breeding birds from Alternative 3 would be medium intensity, long-term (behavioral disturbance) to permanent duration (habitat loss), local extent, and would affect unique and common resources, resulting in a major impact to Tundra Swans and moderate impact to other breeding birds. Alternative 3 would have a major or moderate contribution to cumulative effects on these respective species. The summary impact of Alternative 3 on Tundra Swans would be major and other breeding birds would be moderate.

Brant, Emperor Geese, and Other Migrating/Wintering Birds

Izembek Lagoon and nearby coastal areas support almost all of the Pacific Flyway Brant during spring and fall migrations, where they feed on the extensive eelgrass beds and other marsh plants (Reed et al. 1998). Izembek Lagoon is the preferred winter habitat, but it is shallow and will often freeze, thereby becoming unavailable to Brant. 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 2010). 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 Pacific Flyway Brant, this species is considered unique in the effects analysis.

The proposed road corridor is a low density use area for Emperor Geese; it serves as a flight corridor between the lagoons and has some upland foraging habitat. The isthmus area also serves as a flight corridor between the Izembek and Kinzarof lagoons. Emperor Geese forage heavily on eelgrass in the lagoons, but also eat mussels and other invertebrates on the beaches and tidal flats, and crowberries on the tundra uplands (Petersen 1983; Hupp and Safine 2002). With its limited distribution, it is possibly the rarest goose species in North America (Wells 2007). The project area is a staging site for spring and fall migrating Emperor Geese, a primary wintering site, and alternative site for wintering and/or migrating individuals when water bodies are frozen elsewhere on the Alaska Peninsula (Petersen et al. 1994; Hupp et al. 2008). For spring and fall migrating and overwintering Emperor Geese, the close proximity of suitable habitats (bay edges, tidal flats, and uplands) on both sides of the isthmus allows these birds to select the best habitat based on ice conditions, weather, and tidal stage. Emperor Goose seasonal and annual survival rates are below those compared with other goose species (Schmutz et al. 1994, Hupp et al. 2008). 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 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; Western Sandpiper, Pacific

Golden-Plover and other shorebirds; Lapland Longspur and other passerines; and falcons. Species that occur in low densities on upland habitats during the winter include Willow Ptarmigan, Snow and McKay's Buntings, and the occasional Snowy Owl. These species are widespread and considered common in the effects analysis.

Direct Effects and Indirect Effects from Construction

The direct and indirect effects on Brant, Emperor Geese, and other migrating/wintering birds from the construction of Alternative 3 could include short-term behavioral disturbance and permanent habitat loss. These effects would be similar to those described under Alternative 2; the differences are that 7 less acres of habitat would be lost and the road alignment would be closer to Izembek Lagoon rather than Kinzarof Lagoon. Because more waterfowl use Izembek Lagoon than Kinzarof Lagoon (ABR 2010), Alternative 3 could affect more waterfowl than Alternative 2. However, this difference is not expected to change the type or level of impacts.

Summary

The direct and indirect impacts to Brant, Emperor Geese, and other migrating/wintering birds from the construction of Alternative 3 would be low intensity, temporary (behavior) to permanent (habitat) duration, limited extent, and would affect unique resources (Brant), important resources (Emperor Goose), and common resources (other migrating/wintering species). Construction of Alternative 3 would have moderate direct and indirect effects to these resources.

Direct Effects and Indirect Effects from Operation and Maintenance

The direct and indirect effects to Brant, Emperor Geese, and other migrating/wintering birds from the operation and maintenance of Alternative 3 could include long-term behavior disturbance from increased human access. These effects are described under Alternative 2. Because the road under this Alternative is closer to Izembek Lagoon, where large numbers of birds stage during spring and fall migration, it could affect more migrating/wintering birds than Alternative 2. However, the central road alignment would not cause different types of impacts than the southern road alignment, as these birds use both the Izembek and Kinzarof lagoons. Both road alignments are far enough (greater than ½ mile) from the lagoons to minimize disturbance to Brant according to a local study (ABR 2010).

However, the closer approach to Izembek Lagoon with the Alternative 3 road alignment would make it more likely that waterfowl hunters would use the road to access Izembek Lagoon on foot or with all-terrain vehicles. Blaine Point is a favored hunting location because of its high concentration of Brant and other species and the improved access because of the road could substantially increase the numbers of hunters using this area in the fall. This increased hunting pressure would increase mortality on Brant and other species and increase disturbance from gunshots, all-terrain vehicles, and the presence of people. During the hunting season, which runs from early September to early October, these hunting related disturbances would cause large flocks of Brant and other waterfowl to take flight repeatedly. This would interrupt their feeding and cause them to expend energy, decreasing their ability to recover from the breeding season and add fat reserves for migration, potentially reducing survival if disturbance levels are high and chronic. It may also cause some birds to abandon preferred foraging areas, at least while

hunters are present. These indirect effects of the road could be much greater than the direct effects of the road.

Summary

The direct and indirect impacts to Brant, Emperor Geese, and other migrating/wintering birds from the operation and maintenance of Alternative 3 would be low to high in intensity, permanent duration (behavioral disturbance) to permanent duration (habitat loss), local extent, and would affect unique resources (Brant), important resources (Emperor Goose), and common resources (other species). Operation and maintenance of Alternative 3 would result in major effects on Brant and Emperor Goose if hunting pressure increases substantially in Izembek Lagoon and moderate direct and indirect effects to other 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

The cumulative effects associated with Alternative 3 are similar to those associated with Alternative 2; Alternative 3 would have major (Brant and Emperor Goose) to moderate (other species) contributions to cumulative effects on these resources.

Conclusion

Direct and indirect impacts to Brant, Emperor Geese, and other migrating/wintering birds from Alternative 3 would be low to high in intensity, permanent (behavioral disturbance) to permanent duration (habitat loss), local extent, and would affect unique resources (Brant), important resources (Emperor Goose), and common resources (other species), resulting in major (Brant and Emperor Goose) and moderate (other species) impacts to these resources. Alternative 3 would have a major to moderate contribution to cumulative effects on Brant, Emperor Geese, and other migrating/wintering birds. The summary impact of Alternative 3 on Brant, Emperor Goose, and other migrating/wintering birds is considered major (Brant and Emperor Goose) to moderate (other species).

<u>Seabirds</u>

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.

Direct Effects and Indirect Effects from Construction

The effects of the construction of Alternative 3 on seabirds would be essentially the same as described under Alternative 2, and 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.

Summary

Direct and indirect impacts to seabirds from the construction of Alternative 3 would be low intensity, temporary in duration, local in extent, and would affect a common resource. Direct and indirect effects to seabirds from construction of Alternative 3 would be minor.

Direct Effects and Indirect Effects from Operation and Maintenance

The effects of the construction of Alternative 3 on seabirds would be essentially the same as described under Alternative 2, and 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. A reduction in flights and marine operations could reduce disturbance to seabirds.

Summary

Direct and indirect effects to seabirds from the operation and maintenance of Alternative 3 would be low intensity, long-term duration, local extent, would affect a common resource. The direct and indirect effects to seabirds from implementation of Alternative 3 would be minor.

Mitigation Measures

All the mitigation measures listed under General Impacts, 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

The cumulative effects associated with Alternative 3 are the same as those associated with Alternative 2; Alternative 3 would have a minor contribution to cumulative effects on these resources.

Conclusion

Direct and indirect impacts to seabirds from Alternative 3 would be low intensity, long-term duration, local extent, and would affect a common resource, resulting in a minor impact. Alternative 3 would have a minor contribution to cumulative effects on seabirds. The summary impact of Alternative 3 on seabirds is considered minor.

Overall Conclusion

The land exchange would result in a net increase in the amount of land managed as national wildlife refuge and wilderness. Izembek Wilderness and its bird habitat would be fragmented by the land exchange.

Alternative 3 would have a major effect on Tundra Swans, Brant, and Emperor Goose, a moderate effect on other breeding birds and other migrating/wintering birds, and minor effects on seabirds.

4.4.2.5 Land Mammals

Alternative 3 differs from Alternative 2 in the road location (central road alignment rather than the southern road alignment) and the amount of habitat loss. The difference of 7 acres of habitat loss in the road footprint would not substantially change the effects on land mammals. The road location would increase the chance for an adverse effect on migrating caribou, but would not change the level of effect, it would remain moderate. Rather than repeat the entire effects analysis from Alternative 2, what follows are summaries of the effect levels with additional analysis where any differences occur.

The primary distinction between the central road alignment and the southern road alignment, with regard to land mammals, is that the central road alignment would fragment more habitat than the southern road alignment (Alternative 2). This is because the central road alignment essentially bisects the isthmus between Izembek and Kinzarof lagoons.

Common Mitigation Measures

The mitigation measures recommended for Alternative 2 would also reduce the impacts of Alternative 3. No additional mitigation measures are needed specifically for Alternative 3.

Large Mammals

The direct and indirect effects of the construction, operation, and maintenance of Alternative 3 on large mammals are essentially the same as described under Alternative 2. The impact levels for construction would be low intensity, temporary (behavioral disturbance) to permanent (habitat loss) duration, local extent (or regional for caribou and brown bear), and common and important (caribou and brown bear) context. Construction of Alternative 3 would result in minor direct and indirect effects to large mammals. The potential exception is caribou; if construction activities interrupt their migration, the impact could be moderate for this important species.

For operation and maintenance, the direct and indirect impacts to brown bears would be high intensity within the vicinity of the road corridor (local) but medium intensity throughout the project area (regional). The effects would be long-term (behavioral disturbance) and permanent (habitat alteration) in duration for this important resource. Bear habitat within the Izembek Controlled Use Area is considered an important resource. The summary impact of Alternative 3 on brown bear is considered major for the isthmus area but moderate for the project area.

Caribou would be affected differently by the central road location. With the road closer to Izembek Lagoon, more in the center of the isthmus, it would be harder for caribou to avoid crossing it during their semi-annual migration. The Alaska Department of Fish and Game recommended the southern road alignment specifically to minimize the effect on migrating caribou. While the level of response migrating caribou would have to either road alignment remains unknown, if there is an adverse response, the central road location would likely have more of an impact because it lies more directly in the migration route. When the caribou population is high, they can use the entire isthmus (Butler 2011). If caribou are reluctant to cross the road, it would cause reduced use of the habitat south of the road. The area south of the central road alignment is larger than the area south of the southern road alignment. Therefore, Alternative 3 could have a greater impact on caribou habitat in the unlikely event that the road becomes a barrier to their movement.

Cumulative Effects

Cumulative effects associated with Alternative 3 would be similar to those associated with Alternative 2. Although potential direct and indirect impacts to caribou could be greater under Alternative 3, the contribution to cumulative impacts would remain moderate.

Conclusion

Direct and indirect impacts to large mammals from the implementation of Alternative 3 would be low to high intensity, long-term (behavioral disturbance) to permanent (habitat alteration) duration, regional extent, and would affect common and important resources, resulting in a moderate impact.

The effect of the land exchange is expected to result in a net increase in the amount of undisturbed habitat managed in perpetuity for wildlife habitat. The acquisition of state lands in the northern portion of the project area would be beneficial to caribou because they are used as a high density migration corridor and are adjacent to calving areas. Alternative 3 would create a road corridor through the isthmus, but would eliminate the threat of potential development in the other exchange parcels.

Alternative 3 would have a moderate contribution to cumulative effects on large mammals. The summary impact level of Alternative 3 on large mammals is considered moderate.

Furbearers

Direct Effects and Indirect Effects from Construction

The type and level of direct and indirect effects from the construction of Alternative 3 on furbearers would be the same as those described for Alternative 2. The difference in road location and the difference of 7 acres of habitat loss would not cause different effects or change the level of effect.

Direct Effects and Indirect Effects from Operation and Maintenance

The type and level of direct and indirect effects from the operation and maintenance of Alternative 3 on furbearers would be the same as those described for Alternative 2. The difference in road location and the difference of 7 acres of habitat loss would not cause different effects or change the level of effect.

Mitigation Measures

The mitigation measures recommended for Alternative 2 would also reduce the impacts of Alternative 3.

Cumulative Effects

Cumulative effects associated with Alternative 3 would be similar to cumulative effects associated with Alternative 2. The acreage of the road corridor proposed for exchange would be greater under Alternative 3, but the footprint of the proposed road would be less. The contribution to cumulative effects would remain minor.

Conclusion

Direct and indirect impacts on furbearers from Alternative 3 would be low to medium intensity, long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent (habitat alternation) duration, local extent, and would affect a common resource, resulting in a minor impact. The effect of the land exchange is expected to result in a net increase in the amount of undisturbed habitat managed in perpetuity for wildlife. Alternative 3 would create a road corridor through the isthmus but would eliminate the threat of potential development in the other exchange parcels. Alternative 3 would have a minor contribution to cumulative effects on furbearers. The summary impact level of Alternative 3 on furbearers is considered minor.

Small Mammals

Direct Effects and Indirect Effects from Construction

The type and level of direct and indirect effects of the construction of Alternative 3 on small mammals would be the same as those described for Alternative 2. The difference in road location and 7 acres of habitat loss would not cause different effects or change the level of effect.

Direct Effects and Indirect Effects from Operation and Maintenance

The type and level of direct and indirect effects from the operation and maintenance of Alternative 3 on small mammals would be the same as those described for Alternative 2. The difference in road location and the difference of 7 acres of habitat loss would not cause different effects or change the level of effect.

Mitigation Measures

The mitigation measures recommended for Alternative 2 would also reduce the impacts of Alternative 3. No additional mitigation measures are needed specifically for Alternative 3.

Cumulative Effects

Cumulative effects associated with Alternative 3 would be similar to cumulative effects associated with Alternative 2. The acreage of the road corridor proposed for exchange would be greater under Alternative 3, but the footprint of the proposed road would be less. The contribution to cumulative effects would remain minor.

Conclusion

Direct and indirect impacts on small mammals from Alternative 3 would be low to medium intensity, long-term (intermittent but persistent behavioral disturbance for the life of the project) to permanent (habitat alteration) duration, local extent, and would affect a common resource, resulting in a minor impact. The effect of the land exchange is expected to result in a net increase in the amount of undisturbed habitat managed in perpetuity for wildlife. Alternative 3 would create a road corridor through the isthmus but would eliminate the threat of potential development in the other exchange parcels. Alternative 3 would have a minor contribution to cumulative effects on furbearers. The summary impact level of Alternative 3 on small mammals is 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 harbor seals, killer whales, harbor porpoise, and gray whales would be 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. 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 have any effects on harbor seals, killer whales, harbor porpoise, and gray whales. If disturbance to harbor seals were to occur, it would be of low intensity, long-term duration (intermittent but persistent for the life of the project), and localized. 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 harbor seals, killer whales, harbor porpoise, and gray whales. If noise disturbance were to occur, it would be of low intensity, long-term duration (intermittent but persistent for the life of the project), localized, and would affect important resources. The summary impact level is considered negligible to minor.

Mitigation Measures

Protective measures stipulated in the Marine Mammal Protection Plan of the 2003 EIS Mitigation Measure 6 could help alleviate impacts of human disturbance, other than noise associated with vehicle travel on the road. Please refer to Section 4.2.2.6 for details.

Cumulative Effects

Past, present and reasonably foreseeable future actions and their respective effects on harbor seals, killer whales, harbor porpoise, and gray whales would be the same as described in Section 4.2.2.6. Implementation of Alternative 3 would result in a negligible contribution to cumulative effects on harbor seals, killer whales, harbor porpoise, and gray whales.

Conclusion

The direct and indirect impacts of Alternative 3 on harbor seals, killer whales, harbor porpoise, and gray whales would be considered negligible to 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 negligible. The summary impact of Alternative 2 on killer whales, harbor porpoise, and gray whales is considered negligible. The summary impact of Alternative 2 on harbor seals is considered negligible to 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.

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

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, and localized, and would affect important resources. 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 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). 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. Direct disturbance effects could be of medium intensity, and long-term duration if traffic and noise volumes remain low (intermittent but persistent for the life of the project), and localized in extent. Increased traffic volume or frequent and repeated use by loud vehicles could lead to longer term displacement. Indirect effects of disturbance from increased waterfowl hunting pressure in Izembek Lagoon in the fall could be of high intensity and outweigh the direct effects of road traffic. The direct and indirect impacts are considered moderate for Steller's Eider and minor for Yellow-billed Loon and Kittlitz's Murrelet.

Mitigation Measures

Elements of the Fish and Wildlife Protection Plan (Mitigation Measure 5 in the 2003 EIS) would mitigate disturbance effects associated with Alternative 3. Please refer to Section 4.2.2.7 for details on mitigation measures. 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 minor effect 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, temporary and localized. 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, 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, but could provide beneficial protection. 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 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 and the Marine Mammal Protection Plan of the 2003 EIS could help alleviate impacts of human disturbance associated with construction, operation, and maintenance of the road. Please refer to Section 4.2.2.7 for details. 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.

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

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 2003 EIS Mitigation Measures 1 through 4 (see Section 4.2.2.7).

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 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 (2003 EIS Mitigation Measures 1 through 4) or to minimize potential, albeit unlikely, disturbance to Steller sea lions (2003 EIS Mitigation Measures 5 and 6) are described in detail in Section 4.2.2.7.

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.

4.4.3 Social Environment

4.4.3.1 Land Ownership and Use

Direct Effects and Indirect Effects of Land Exchange

The direct and indirect effects on land ownership, use, and management would be nearly identical to Alternative 2 (Section 4.3.3.1). Under Alternative 3, the land exchange would proceed and a corridor would be created for the central road alignment. The proposed alignment for Alternative 3 lies farther north of Kinzarof Lagoon and would include more than 3 miles of existing trail 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 and 1,619 acres of federal land on Sitkinak Island, the federal government would receive 41,887 acres of State of Alaska 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. State-owned tide and submerged lands of Kinzarof Lagoon would be added to the Izembek State Game Refuge.

Under Alternative 3, the federal government would receive 30 times more acreage in the exchange than it would convey. The direct and indirect impacts of this alternative on ownership and management would be nearly identical to Alternative 2, except for the specific location and size of the corridor parcel. Specific ownership and land use/management changes for each parcel are shown in Table 4.3.3-1 in Section 4.3.3.1. Other provisions of the land exchange and their corresponding direct and indirect effects are the same as described in Alternative 2.

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 and size of the corridor parcel. The direct and indirect effects of Alternative 3 on land ownership would have a local to regional impact, as the proposed land exchange involves multiple parcels at several geographic locations. The action would be permanent in duration, but the magnitude of the impact would vary. In the Cold Bay region, the impacts would be of high intensity, but on Sitkinak Island effects would be of a low magnitude.

Although King Cove Corporation would relinquish its selection of the lands east of Kinzarof Lagoon, the opportunity exists to select equivalent acreage in the Alaska Peninsula National Wildlife Refuge in a withdrawal area established by the Service and Bureau of Land Management. However, the replacement acreage may not have the same characteristics as the selected lands, which directly adjoin patented King Cove Corporation land and are reasonably accessible from the village.

The federal government would receive over 49,979 acres of land to be added to the Alaska Peninsula National Wildlife Refuge and 2,604 acres to be added to the Izembek National Wildlife Refuge. The U.S. would permanently retain ownership of 5,430 acres within the Izembek Wilderness that are slated for transfer to King Cove Corporation.

Alternative 3 would result in changed land use and land management conditions within the Izembek National Wildlife Refuge and on the associated exchange lands. It would facilitate construction of a single lane road within the Izembek National Wildlife Refuge, Izembek

Wilderness, and the Alaska Peninsula National Wildlife Refuge, 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.

At present, the State of Alaska owns nearly 56,700 acres on Sitkinak Island and the conveyance of the remaining federal land, comprising approximately 3 percent of the island, would bring the entire island under State ownership. The federal land on Sitkinak Island is moderately developed and the exchange would consolidate management of the island.

The direct and indirect impacts of this alternative on land use and management would be high 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. 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 corridor 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 4.3.3.6 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 3, other than the terms of the land exchange outlined in the Act. In exchange for 227 acres of refuge land and 1,619 acres of federal land on Sitkinak Island, the federal government would receive 41,887 acres of State of Alaska 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, however alternate lands within the Alaska Peninsula National Wildlife Refuge would be available for selection. In consideration of the potential adverse impacts to internationally important wildlife habitat and wilderness, under Alternative 3, the federal government would receive 30 times more acreage in the exchange than it would convey.

Much of the land conveyed to the Service would be managed as wilderness. Not included in the state exchange lands are submerged lands, which would in effect create numerous inholdings that could compromise the Service's ability to protect the wilderness character of the area, as required under the *Wilderness 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. 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, as well as adjacent lands.

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. The direct and

indirect impacts of Alternative 3 on land ownership would have a regional impact, as the proposed land exchange involves multiple parcels at several geographic locations. Relevant past actions would include the entitlement and selection of King Cove Corporation land under ANCSA, and the enactment of ANILCA that designated wilderness areas throughout the state, including 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. However, given the nature and implications of the ownership change, the incremental contribution and total cumulative effects of Alternative 3 related to land ownership are considered major.

The direct and indirect impacts of Alternative 3 on land use and management are considered major. Relevant past, present, and reasonably foreseeable future actions are the same as mentioned in the preceding paragraph for land ownership. Past actions resulted in a highly restrictive land use classification. The incremental contribution of alternative 3 to cumulative effects to land use and management is also considered major.

Conclusion

Alternative 3 would have a major impact on land ownership in the area surrounding Cold Bay. A road corridor would be removed from designated wilderness and conveyed to the State for the purpose of building and operating a road. The King Cove Corporation would convey to the Service the patented lands in Mortensens and Kinzarof Lagoons, and relinquish lands selected in Izembek Wilderness and select a substitute parcel within the Alaska Peninsula National Wildlife Refuge. The State of Alaska would convey 2 townships of land to be managed as wilderness in the Alaska Peninsula National Wildlife Refuge and implement legislation transferring state tidelands and waters to the Izembek State Game Refuge. On Sitkinak Island, the land exchange would consolidate state ownership of the island and would have only minor effect on that area.

Alternative 3 would result in changed land use and land management conditions within the Izembek National Wildlife Refuge and on the associated exchange lands. It would facilitate construction of a single lane road within the Izembek Wilderness. These effects would be regional in nature, permanent in duration, and unique in that designated wilderness would be affected through both the establishment of a road corridor and relinquishment of King Cove corporation selections. 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.

4.4.3.2 Socioeconomics

Direct Effects and Indirect Effects from Construction

The land exchange would be very similar to that described for Alternative 2, though 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, King Cove Corporation, and the Service. State and federal staffing levels 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 20.0 miles of single lane gravel road with an estimated capital cost of $22.7 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.

Analysis and impacts for Alternative 3 are very similar to Alternative 2 and are not repeated in this section.

Direct Effects and Indirect Effects from Operation and Maintenance

Analysis and impacts for Alternative 3 are very similar to Alternative 2; differences are noted in this section.

Direct and Indirect Effects of the Alternative on Passenger Trips and Travel Costs

From an economic perspective, Alternative 3 is very similar to Alternative 2. The central road of 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.

Travel Cost Impacts on Key Economics Groups

Table 4.4.3-1 summarizes the estimated baseline trips and travel cost by mode and group under Alternative 3. The additional induced trips and travel costs are not included in this table, but are summarized in Table 4.4.3-2 below. Forecast travel costs are lower in every year relative to Alternative 1 if ground travel costs are included. In the years 2013 – 2015, passengers would only use the air taxi service because no other option would be available for regular travel. Total costs during these 3 years are approximately $80,000 less than in Alternative 1 in which 18.1 percent of passenger trips were assumed to use hovercraft. The per passenger cost savings in these 3 years are estimated at $18.20.

Travel on the road via the central road would begin in 2016. The hovercraft is assumed to cease operations and 75 percent of baseline trips are assumed to 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 72 other fishery related trips use the road, while the 323 remaining fishery related trips continue to use the air taxi because of the shorter travel times. These assumptions are discussed in more detail below. Resident and non-fishing related trips using the road average 1,282 trips

between 2016 and 2020, which is approximately 62 percent of the baseline trips made by this group. During the years 2016 – 2020, average annual cost savings to all groups are estimated to approach $260,000 per year (56 percent of estimated costs under Alternative 1), while the average passenger over all groups saves $58 per trip.

Table 4.4.3-1 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 Baseline Trips and Travel Cost for Passengers Using the Central Road									
Resident and Non-Fishing Road Passengers	-	-	-	1,248	1,266	1,283	1,299	1,316	1,391
Fishery Related Road Passengers	-	-	-	2,072	2,072	2,072	2,072	2,072	2,072
Total Estimated Road Passengers	-	-	-	3,320	3,338	3,355	3,371	3,388	3,463
Total Cost of Road Trips ($ 2010)	-	-	-	$88,973	$89,812	$90,604	$91,349	$92,142	$95,637
Additional Cost of Vehicle Travel ($ 2010)	-	-	-	-	-	-	-	-	-
Estimated Baseline Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	1,953	1,979	2,003	779	784	790	796	801	826
Fishery Related Air Trips	2,400	2,400	2,400	328	328	328	328	328	328
Total Estimated Air Trips	4,353	4,379	4,403	1,107	1,112	1,118	1,124	1,129	1,154
Total Cost of Air Trips ($ 2010)	$426,594	$429,142	$431,494	$108,486	$108,976	$109,564	$110,152	$110,642	$113,092
Additional Cost of Vehicle Travel ($ 2010)	$30,780	$30,962	$31,130	$9,744	$9,779	$9,821	$9,863	$9,898	$10,073
Estimated Baseline Trips and Travel Cost for Passengers Using Both Modes									
Total Trips All Modes	4,353	4,379	4,403	4,427	4,450	4,473	4,495	4,517	4,617
Total Cost of Trips for All Modes ($ 2010)	$457,374	$460,104	$462,624	$207,203	$208,567	$209,989	$211,365	$212,682	$218,802
Cost Difference from Alternative 1 ($ 2010)	$76	$85	$92	-$257,840	-$258,885	-$259,871	-$260,798	-$261,784	-$266,134
Diff. in Average Cost/Passenger ($ 2010)	$0.02	$0.02	$0.02	-$58.24	-$58.18	-$58.10	-$58.02	-$57.96	-$57.64

Note: Does not include induced passenger trips
Source: Northern Economics

The induced trips and travel costs are shown in Table 4.4.3-2 along with estimates of total trips and travel costs (i.e., total = baseline + induced).

Table 4.4.3-2 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 Resident & Non-Fishing Road Passengers	-	-	-	332	335	335	337	338	346
Cost per Passenger ($ 2010)	-	-	-	$46.60	$46.60	$46.60	$46.60	$46.60	$46.60
Travel Costs of Induced Trips ($ 2010)	-	-	-	$15,471	$15,611	$15,611	$15,704	$15,751	$16,124
Baseline and Induced Trips and Travel Cost for Passengers Using the Central Road									
Baseline Trips under Alternative 3	4,353	4,379	4,403	4,427	4,450	4,473	4,495	4,517	4,617
Baseline Travel Cost under Alternative 3 ($ 2010)	$457,374	$460,104	$462,624	$207,203	$208,567	$209,989	$211,365	$212,682	$218,802
Total Trips under Alternative 3	4,353	4,379	4,403	4,759	4,785	4,808	4,832	4,855	4,963
Total Travel Cost Under Alternative 3 ($ 2010)	$457,374	$460,104	$462,624	$222,674	$224,178	$225,600	$227,069	$228,433	$234,926

Note: Trips induced by construction and new demand are excluded.

Estimates of Fish Processor Crew Travel Costs

The average cost per bus passenger is estimated to be $13.68. As shown in Table 4.4.3-3, using buses rather than air or hovercraft services are estimated to result in overall savings of $179,446 per year.

Table 4.4.3-3 Processing Crew Transportation in Alternative 3 and Alternative 1

	Travel and Cost Under Alternative 3			Travel and Cost Under Alternative 1			Difference
	Road	Air	All Modes	Hovercraft	Air	All Modes	All Modes
Estimated One-Way Processing Crew Trips per Year	2,000	0	2,000	362	1,638	2,000	0
Average One-Way Cost on Primary Mode ($ 2010)	$13.68	$98.00	$13.68	$76.00	$98.00	$94.02	-$80.34
Total Cost on Primary Travel Mode ($ 2010)	$27,360	$0	$27,360	$27,512	$160,524	$188,036	-$160,676
Additional Cost of Vehicle Travel ($ 2010)	$0	$0	$0	$5,530	$13,241	$18,770	-$18,770
Total Cost of Travel on All Modes ($ 2010)	**$27,360**	**$0**	**$27,360**	**$33,042**	**$173,765**	**$206,806**	**-$179,446**
Total Cost per Passenger ($ 2010)	**$13.68**	**$0.00**	**$13.68**	**$91.28**	**$106.08**	**$103.40**	**-$89.72**

Estimates of Processing Managers/Technician Travel Costs

As described in Table 4.2.3-6, the cost of a shuttle between the communities of King Cove and Cold Bay is calculated to be $48.00 per trip; this represents a savings of $109.74 per trip compared to the cost of the hovercraft and the assumed ground expenses of travel for managers and technicians between the Northeast Hovercraft Terminal and the City of King Cove. Total savings over the 36 annual trips are estimated to equal $3,940.80. For additional analysis, refer to Alternative 2 (Section 4.3.3.2).

Estimates of Fishing Crew and Fishery Observer Travel Costs

At $48.00 per trip, the road is estimated to generate savings of $61.00 per trip compared to estimated costs using the hovercraft. Under Alternative 1, fish harvesters and observers were assumed to use the shuttle between the Northeast Hovercraft Terminal and the City of King Cove, with a total cost including the hovercraft of $109.00 ($76 for the hovercraft + $33.00 for the shuttle). Annual total savings for the group is estimated to equal $2,196.

Travel Costs of Residents and Other Persons Not Associated with Fisheries

Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 3 and Alternative 1 are shown for 2016 in Table 4.4.3-4, noting that induced trips are not included. Total travel costs are projected to decline by $72,258 for the year with an average cost savings of $35.65 per trip. Under Alternative 3, trips via the road for the group are assumed to be split between shuttles ($48 per passenger) and private vehicles with 2 passengers ($45.20 per passenger).

Table 4.4.3-4 Resident and Other Non-Fishery Transportation under Alternative 3 and Alternative 1

	Travel and Cost Under Alternative 3			Travel and Cost Under Alternative 1			Difference
	Road	**Air**	**All Modes**	**Hovercraft**	**Air**	**All Modes**	**All Modes**
Estimated One-Way Resident & Non-Fishery Trips per Year	1,248	779	2,027	368	1,659	2,027	0
Average One-Way Cost on Primary Mode ($ 2010)	$46.60	$98.00	$66.35	$76.00	$98.00	$94.01	-$27.65
Total Cost on Primary Travel Mode ($ 2010)	$58,157	$76,342	$134,499	$27,968	$162,582	$190,550	-$56,051
Additional Cost of Vehicle Travel ($ 2010)	$0	$5,453	$5,453	$10,046	$11,613	$21,659	-$16,206
Total Cost of Travel on All Modes ($ 2010)	**$58,157**	**$81,795**	**$139,952**	**$38,014**	**$174,195**	**$212,209**	**-$72,258**
Total Cost per Passenger ($ 2010)	**$46.60**	**$105.00**	**$69.04**	**$103.30**	**$105.00**	**$104.69**	**-$35.65**

Direct and Indirect Employment Effects

Overall, a total direct effect on employment from 6 to 12 persons in the transportation sector under Alternative 3 is estimated. The effect would be permanent, but of a low intensity of about 5 percent of the total resident wage and salary jobs in the local area of the cities of King Cove and Cold Bay. Therefore, the employment effect of operation activities after 2016 under Alternative 3 is considered negligible. For additional analysis, refer to Alternative 2.

Indirect 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 2.9 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 borough would not be responsible for maintaining the road; therefore, no fiscal effects to local governments would be expected. The annual operation and maintenance costs for the alternative are estimated at $158,000.

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 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.

Once the road is operational in 2016, the majority of passengers would likely shift to ground transportation between the communities of King Cove and Cold Bay. The shift would result in a medium level of cost savings on an annual basis. A low level but permanent net increase in employment in transportation services is expected. It is likely that 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, the fiscal impact of the alternative to local governments is expected to be negligible.

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). Fiscal effects to the local government have been influenced by the 2003 EIS and the operations of the hovercraft. Alternative 3 would eliminate fiscal losses to the Aleutians East Borough, because the hovercraft subsidy would not continue, contributing a moderate beneficial cumulative impact. 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. This increase in traffic, combined with the traffic generated by the alternative, would have a negligible contribution to cumulative effects on socioeconomic indicators.

Conclusion

Alternative 3 would reduce consumer transportation costs, and eliminate the borough's hovercraft subsidy. There would be few effects to any other socioeconomic indicators. Effects to employment, population and demographics would be of low intensity, over a permanent duration, with a local extent, and a common context. Effects to consumer transportation costs and fiscal effects to local governments would be medium intensity, over a permanent duration, with a regional extent, and a common context. The overall effects would be negligible for employment, population and demographics and moderate for fiscal effects to local governments, and consumer transportation costs.

4.4.3.3 Transportation

Direct Effects and Indirect Effects from Construction

Alternative 3 would consist of the construction of a 20-mile, single lane road segment from the terminus of the incomplete/permitted road in the vicinity of the Northeast Hovercraft Terminal westward to the boundary of state lands along Outer Marker Road near the community of Cold Bay. The central route would transect the Izembek National Wildlife Refuge and Izembek Wilderness.

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. Temporary barge landing sites would likely be required to transport materials, equipment, and supplies into the project area from outside the region. Construction activities would be similar to those described under Alternative 2, and 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 2 200-day construction seasons. The estimated $22.7 million project would directly employ approximately 30 construction workers, including those locally hired. Indirect employment would likely temporarily increase, as suppliers build capacity to transport workers, equipment, and materials, as discussed in Section 4.2.3.2, Socioeconomics. This activity would slightly increase road and air traffic in the cities, to and from barge landing sites, and to and from the airport over the construction period. The road system is limited, and instances of temporary congestion could occur. Table 4.4.3-5 reflects an air traffic increase during projected construction years 2014-2015.

While pedestrians and bicycles are not common in the project area, some residents and visitors have access to motorized off-road vehicles. During construction, these vehicles would have increased potential to access the Izembek National Wildlife Refuge and other areas. Alternative 3 includes a plan for a barrier along the length of the road, and signage to deter off-road access, but this would not likely be in place early in the construction phase.

Summary

The direct and indirect impacts of construction of this alternative on transportation would be medium in magnitude, since it would add surface and air traffic during the construction phase. As described in Chapter 3, surface traffic levels in the communities of Cold Bay and King Cove are relatively low, but the existing road system is limited. Therefore, traffic congestion or disruption would occur occasionally. Impacts would be of temporary duration because construction would occur seasonally, and end after 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. The impacts would occur in a unique context, since this would be constructed in an area with no existing roads. 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 as Alternative 3 would be a single lane road with spaced turnout areas, connecting the City of King Cove road system with the existing Cold Bay road system near Blinn Lake. The road is expected to be available for year round vehicular traffic access beginning in 2016. The speed limit would be 20 mph. As shown in Table 4.2.3–8, the estimated travel time for Alternative 3 is 136 minutes. Operation and maintenance costs would be an estimated annual cost of $158,000. The lifecycle cost of the road, estimated at about $25.7 million, is based on 35 years, to use the same method as the other modal alternatives. The useful life of the road, if maintenance continues, either via the state or borough, could be indefinite, as would be any environmental consequences associated with its presence.

Consumer considerations and cost estimates are shown in Section 4.2.3.2, Socioeconomics, and summarized in Table 4.2.3–9. The travel time of trips is an important parameter for consideration, because it would affect 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. Because trip time is greater than 2 hours, Alternative 3 would take more time than a hovercraft, aircraft, or ferry for emergency trips (Table 4.2.3–8). This alternative would be affordable ($47) and reliable (98%) for City of King Cove residents and visitors to get to the Cold Bay Airport for access to advanced medical care, and other services, goods, and commerce located out of the region.

Table 4.4.3-5 reflects a 10 percent increase in general demand, because 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 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. The estimate assumes that the road would displace about 75 percent of air passengers, many of whom would be seafood industry workers (see Section 4.2.3.2, 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 3 are estimated at 3,726 annually and air taxi passengers at 1,129.

Table 4.4.3-5 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	4,354	4,879	4,903	1,107	1,113	1,118	1,124	1,129	1,154
Road Travelers	0	0	0	3,652	3,672	3,690	3,708	3,726	3,809

Alternative 3 assumes air taxi passengers increase with construction activity. Alternative 3 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.

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 reliable, nearly always available, and lower cost transportation between the cities of King Cove and Cold Bay. Annual maintenance costs are estimated at $158,000. The 35-year life cycle cost is estimated at $25.7 million. The direct and indirect impacts of this alternative would be high magnitude and permanent in duration in that it would introduce a fixed major facility to the area. The impacts would have a regional impact, in that it provides a new, year round transportation link between the communities of King Cove and Cold Bay, and unique because it is currently an absent mode. The summary impact of Alternative 3 on transportation would be considered major.

Mitigation Measures

Mitigation measures would be the same as those described in Alternative 2.

Cumulative Effects

Cumulative effects would be the same as described in Alternative 2.

The contribution of Alternative 3 to cumulative effects on transportation is considered major.

Conclusion

The effects of construction and cumulative effects on transportation patterns and facilities are considered moderate. The operation of a new mode of transportation is considered major because of the unique impact to the transportation system as a whole. It would create affordable, available, and reliable transportation in the region. The overall impact on transportation is considered major.

4.4.3.4 Public Health and Safety

Direct Effects and Indirect Effects from Construction

The construction phase for this alternative involves building the road section and associated drainage structures for 20 miles of single lane gravel road. 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. Negative direct effects of the construction phase of Alternative 3 on public health and safety would be low in intensity, temporary in duration, regional in geographic extent, and unique in context. The direct and indirect effects of the construction phase of Alternative 3 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 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 4.2.3-8). 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 the road will be patrolled, and how much road maintenance is required. 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.

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 positively 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.

Positive direct effects of the operations and maintenance phase of Alternative 3 on public health and safety would be medium in intensity, permanent in duration, regional in geographic extent, and unique in context. The direct and indirect effects of the operation and maintenance phase of Alternative 3 on public health and safety would be considered major.

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).

Alternative 3 would have a major contribution to cumulative effects on public health and safety.

Conclusion

The negative direct and indirect effects of the construction phase of Alternative 3 on public health and safety are considered negligible. Standard practices related to worker health and safety could help mitigate the public safety impacts to road workers. The positive impact of the operation and maintenance phase of Alternative 3 is considered major due to the availability of safe and reliable transportation to needed medical services for the King Cove community.

Negative 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 central road alignment would also help mitigate motor vehicle accidents that are due to specific driver behaviors, such as drunk driving or speeding. The overall direct, indirect, and cumulative impacts of Alternative 3 would be considered major.

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 negative impact on human health.

Direct and indirect effects to subsistence from Alternative 3 would also be similar to those described for Alternative 2. Construction associated with Alternative 3 would have a negligible to minor impact to subsistence.

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 2 would have a major (beneficial) effect on human health and a minor impact to subsistence.

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. Alternative 3 would improve access to subsistence resources, but contribute little to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resource above present levels.

Conclusion

Alternative 3 would have a major beneficial impact on human health and a minor impact on subsistence activities. Alternative 3 would not have a disproportionate adverse impact to minority or low-income communities.

4.4.3.6 Public Use

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 in Alternative 2 (see Section 4.3.3.6).

Summary

The direct and indirect effects to public use from construction of Alternative 3 would include temporary displacement. Effects would be at a medium intensity, potentially affecting favored times for access. Important resources (traditionally accessed sites) could be affected, but impacts would be local and could be mitigated through construction timing and adding security to provide for public access during identified periods. The direct and indirect effects to public use from construction would be minor.

Direct Effects and Indirect Effects from the Land Exchange

The impacts to public use from the operation and maintenance phase of Alternative 3 are nearly identical to Alternative 2 (see Section 4.3.3.6). The following text discusses aspects of Alternative 3 that are slightly different than for Alternative 2. These differences are primarily related to the small differences in the length of the 2 roads and the size of the parcel conveyed. The central road alignment would transfer 227 acres of the refuge (152 of which is designated wilderness), managed for non-motorized recreational and commercial general public use, into a transportation corridor owned by the State of Alaska.

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. Alternative 3 would have a minor contribution to the cumulative effects on public use.

Conclusion

The construction period of the central road alignment would have minor direct and indirect effects to public use. The land exchange and operation of the road would cause permanent changes to public use. The direct effects would be regional in extent, but the indirect effects would be extended and the context would be important, as the area is valued by the general public as a national wildlife refuge. The change in public use, from wilderness to a road corridor, would be a high intensity; however, the federal acreage relinquished in the exchange would be small in relation to the total size of the refuge and the additional acreage acquired. Alternative 3 would have a minor contribution to cumulative effects on public use and an overall major impact on this resource.

4.4.3.7 Subsistence

Direct Effects and Indirect Effects from 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 wetland 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 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, temporary in duration (lasting only the length of the construction periods), 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 Kinzarof Lagoon.

Summary

The construction phase of Alternative 3 would have low intensity, temporary (lasting only the length of the construction periods) and local to regional in extent impacts to resources that are common to important in context. The impact of construction activities to subsistence would be considered negligible to 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). The impact to subsistence resources could be of low to medium 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 migratory waterfowl and wetlands/habitat values of Kinzarof Lagoon.

Summary

Direct and indirect effects from implementation of Alternative 3 would be similar to Alternative 2. Effects 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, long-term in duration, local to regional in extent, and affect resources that are common in context. The summary impact of operation and maintenance activities to subsistence would be considered negligible to minor.

Mitigation Measures

No mitigation measures would be anticipated for subsistence resources, other than elements outlined in the Act.

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 in the project area. Alternative 3 would improve access to subsistence resources. Implementation of Alternative 3 would contribute little to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resource as subsistence activities are unlikely to increase above present levels. As a result, the project components of this alternative are expected to make a negligible to minor contribution to cumulative effects on subsistence resources or harvest patterns.

Conclusion

Implementation of Alternative 3 would have negligible to minor direct and indirect effects on subsistence; this alternative would make a negligible to minor contribution to cumulative effects on subsistence.

4.4.3.8 Cultural Resources

Damage to cultural resources is 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 impacts are defined as any action which reduces the eligibility of the site for listing. 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 are likely to 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 and staging areas could result in direct effects to surface or subsurface prehistoric or historic archaeological sites.

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 impact of construction on cultural resources could be of low to high intensity, temporary to permanent in duration, local to regional in extent, and affect resources that are important to unique in context. The resources that are unique or important in context include archaeological, cultural, and historic resources that may be located in or adjacent to the proposed road.

Summary

Potential direct effects and 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. The 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 and 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

Because cultural resources inventories have not been completed for the entire land exchange area, it is not possible to identify all potential impacts to cultural resources. An appropriate level of investigation, including intensive surveys; evaluations of all resources potentially eligible for listing on the National Register of Historic Places; assessments of adverse effects; and applicable mitigation of identified impacts, would be completed before any potentially destructive activities could begin.

Mitigation measures to reduce impacts to archaeological, historic, and cultural resources can take a variety of forms, including but not limited to avoidance, data recovery, off-site mitigation, collection of oral histories, or architectural documentation.

Compliance with existing federal, state, and local archaeological regulations and policies regarding the discovery of archaeological resources and the provision to avoid disturbing archaeological resources, will reduce or eliminate most impacts to archaeological resources. If avoidance is not feasible, monitoring, data recovery, or other mitigation measures may be conducted. Therefore, no impacts or only minor impacts to archaeological resources are anticipated.

Cumulative Effects

Cumulative effects from uncontrolled excavation or looting, which is low to medium intensity, long-term in duration, would affect cultural resources that are important to unique throughout the existence of the road. As a result, the project components of this alternative are expected to contribute to cumulative effects on cultural resources.

Conclusion

Implementation of Alternative 3 may have moderate to major direct and indirect effects on cultural resources. This alternative is expected to contribute to cumulative effects on cultural resources. The summary impact level for cultural resource is expected to be moderate to major.

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 grading 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, this reduction is not considered sufficient to change expected constriction-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. Beneficial indirect effects are expected to occur as a result of the proposed project, as visual access would be improved.

Summary

Direct effects and indirect effects of construction on visual resources are considered minor as they would be medium in intensity, temporary in duration, local in extent, and important in context.

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 identical across both alternatives.

Summary

Direct effects and indirect effects of operation and maintenance on visual resources would be considered moderate, as they would be medium in intensity, permanent in duration, local in extent, and unique in context.

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, as described under Alternative 2 (Section 4.3.3.9).

Conclusion

Direct impacts to visual resources due to the implementation of Alternative 3 would be medium intensity, long-term in duration, and local extent. Unique resources of the Izembek Wilderness would be affected. The summary impact level for visual resources is expected to be moderate.

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 20.0-mile, 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). This removal of designated wilderness acres from the Wilderness Preservation System would be a permanent, regional, direct impact to a unique resource. The ecological fragmentation of Izembek Wilderness that the Alternative 3 road corridor would create would be considered a high magnitude impact. Changes to wilderness character within the isthmus would be highly noticeable and permanently altered.

As part of the proposed land exchange in Alternative 3, 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 parcels 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), also 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 on the border within 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). The Mortensens Lagoon parcel (8,092 acres) owned by the King Cove Corporation would be transferred to the Alaska Peninsula National Wildlife Refuge. These additions would be permanent, regional, direct impacts to a unique resource. The magnitude of this impact would be considered medium; the parcels that are identified for addition to Izembek Wilderness are adjacent to existing wilderness and would not noticeably change the character of existing wilderness.

Direct and indirect effects on the 4 components of wilderness 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 larger sections of fragmented wilderness lands on either 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 addition of the Kinzarof Lagoon parcel to the Izembek Wilderness through the proposed land exchange would have no impact to the overall wilderness character of Izembek Wilderness.

Summary

Under Alternative 3, 152 acres would be removed from Izembek Wilderness for the road corridor. Alternative 3 would add or maintain 49,921 acres to wilderness through the conveyance of the Kinzarof Lagoon parcels to the Service from King Cove Corporation, the

conveyance of the State of Alaska parcels to the Service, and the relinquishment of King Cove Corporation selected lands.

The implementation of Alternative 3 would also result in no direct and indirect impacts to the untrammeled quality, major impacts to the natural quality of wilderness character, major impacts to the undeveloped quality, and major impacts to the solitude or primitive and unconfined recreation quality. Due to the unique context of the Izembek Wilderness, the direct and indirect impacts to wilderness character resulting from Alternative 2 would be major.

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 were 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. Alternative 3 would have a major contribution to cumulative effects on wilderness character within Izembek Wilderness.

Conclusion

Due to the unique context of the Izembek Wilderness, the direct and indirect impacts to wilderness character resulting from Alternative 3 would be considered major. The intensity of impacts would be high due to the highly noticeable influence on visitor experience. The extent would be regional, and long-term to permanent in duration. The summary impact level for cumulative effects under Alternative 3 to wilderness character within Izembek Wilderness is considered major. The implementation of mitigation measures could reduce adverse impacts to the natural quality, the undeveloped quality, and the solitude or primitive and unconfined recreation quality of Izembek Wilderness character.

4.5 Alternative 4 – Hovercraft Operations from the Northeast Hovercraft Terminal to Cross Wind Cove (Six days per Week)

4.5.1 Physical Environment

4.5.1.1 Air Quality

As the Draft EIS was approaching completion, the Aleutians East Borough sent the Service a letter stating that they will not resume hovercraft service in the foreseeable future. Alternative 4 does not assume that the Borough is the operator of this alternative, only that the existing hovercraft would be used. All other aspects of the alternative remain the same. The Final EIS will reflect this change and other changes that are made in response to public comments.

Direct Effects and Indirect Effects from Construction

No construction activities involving combustion equipment or other air pollution generating activities would occur under Alternative 4 for hovercraft operations. 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 4.5.1-1 shows the direct emission estimates for the hovercraft operations, along with the net difference from the emissions of hovercraft operations under Alternative 1 (No Action). Indirect effects of this alternative may include increased use of other resources, such as additional travel (including to and from hovercraft landing areas) and other activities which may have an effect on air quality, such as 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 is mobile, across a relatively large area (approximately 9 miles over water). The effects on air quality from the operation and maintenance of the hovercraft are expected to be low in magnitude, long-term duration (reoccurring short-term events), local extent, and common in context. Direct effects to air quality from increased emissions would be negligible. Indirect effects on air quality 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 the alternative to cumulative effects would be negligible.

Conclusion

Alternative 4 would have negligible direct effects on air quality in the immediate vicinity of the hovercraft. 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. The overall effect of Alternative 4 on air quality would be negligible.

Table 4.5.1-1 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 hp)	14,036 MMBtu/yr	22.5	5.97	0.01	0.40	0.40	0.58	1159
Cushion Lift Engines (2 x 905 hp)	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**
HOVERCRAFT REDUCTION								
Main Propulsion Engines (2 x 1205 hp)	-4,401 MMBtu/yr	-6.48	-1.72	-0.003	-0.12	-0.12	-0.17	-334
Cushion Lift Engines (2 x 905 hp)	-3,041 MMBtu/yr	-4.87	-1.29	-0.002	-0.09	-0.09	-0.13	-251
Service Power Engines (3 x 8kW)	-54 MMBtu/yr	-0.12	-0.03	-0.008	-0.008	-0.008	-0.01	443
TOTAL (tons per year)		**-11.5**	**-3.04**	**-0.01**	**-0.21**	**-0.21**	**-0.30**	**-590**
NET TOTAL (tons per year)		**28.3**	**7.50**	**0.03**	**0.52**	**0.52**	**0.74**	**1455**

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).

Usage value for combustion emissions for the reduction in hovercraft operations (Alternative 1) based on project description: Estimated annual travel is 3 times per week between April and October (30 weeks), or 90 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%, 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 but would also include an increase in hovercraft trips. 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 2,075 tons per year of carbon dioxide equivalent, which is approximately 1,198 tons per year more than Alternative 2 (Table 4.5.1-2). However, when compared at the state level, Alternative 4 would contribute to approximately 0.08% of the State of Alaska's estimated emissions from marine vessels and 0.01% 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. The duration, extent, and context of impacts to climate would be the same as Alternatives 1, 2, and 3, which are: long-term duration, extended, and would affect important resources.

Table 4.5.1-2 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
State Ferry	2 round trips/month, (May-September)	30
TOTAL		**2,075**

Note: Refer to Section 4.5.1.1 for complete details and assumptions regarding emissions calculations.

Summary

Overall direct effects to climate change associated with Alternative 4 are considered negligible. Although climate change effects are considered to be long-term, extended, and affect important resources, the overall direct effects are considered negligible since the magnitude is so low.

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 1,455 tons per year more than Alternative 1, approximately 1,198 tons per year more than Alternative 2, and 1,163 tons per year more than Alternative 3. 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 more than double the amount of greenhouse gas emissions than any other alternative. However, Alternative 4 is expected to have negligible direct effects due to the low magnitude, although the duration would be long-term, the extent is extended, and the context is important. 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. The overall contribution to climate change would be negligible.

4.5.1.3 Geology and Soils

Direct Effects and Indirect Effects from Construction

As no land exchange or additional ground disturbance within the project area would result from Alternative 4, geologic processes and soils would not be altered. There would be no excavations in marine waters (USACE 2003).

Summary

Alternative 4 would result in no direct or indirect effects from construction.

Direct Effects and Indirect Effects from Operation and Maintenance

With Alternative 4, hovercraft operations are expected to resume from the Northeast Hovercraft Terminal to Cross Wind Cove after completion of the access road, 6 days per week, year round. The indirect effects on soils from hovercraft operations may include shoreline erosion from wave action generated by the hovercraft during departures and arrivals. These effects are expected to be somewhat greater than under Alternative 1 due to the increase in frequency of operations to 6 days per week throughout the year. The hovercraft would be refueled on land. 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 erosion control measures.

Summary

Indirect effects to geologic resources would be of medium intensity, long-term in duration, localized in extent, and common in context. Therefore, the effects from operation and maintenance would be negligible to minor.

Mitigation Measures

Erosion of soil disturbed during construction of the Northeast Hovercraft Terminal would be controlled by mitigation measures described in an Erosion and Sediment Control Plan and Storm Water Pollution Prevention Plan identified in the 2003 EIS. No additional mitigation measures are recommended.

Cumulative Effects

Cumulative effects would be the same as described under Alternative 1. Although the frequency of hovercraft operations under this alternative would be greater, the incremental addition to cumulative effects would remain negligible.

Conclusion

Effects to geologic resources and soils related to the implementation of Alternative 4 would be negligible. These effects were analyzed in the 2003 EIS. Erosion of soils would be the largest impact to geologic resources related to the implementation of Alternative 4. At both the Northeast Hovercraft 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. These effects would be high to medium intensity, temporary to long-term in duration, and local extent for these common resources, resulting in an overall negligible impact.

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 or water quality 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. 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

With Alternative 4, hovercraft operations would resume between the new Northeast Hovercraft Terminal and the existing hovercraft terminal at Cross Wind Cove in 2013, 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 site via road. No fuel would be stored at the Cross Wind Cove hovercraft terminal. No refueling would be conducted at the Cross Wind Cove terminal. The hovercraft would be refueled on land at the northeast terminal facility.

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. Although effects would be long-term in duration, they would be low intensity, local in extent, and common in context. Fuel spills are a low probability event, but could affect water quality.

Mitigation Measures

As described in the 2003 EIS, 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 which also includes 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. 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, and the effects from other past, present, and reasonably foreseeable future activities are presented under Alternative 1. These effects 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. The effects would be low intensity, long-term, and local in extent to these common resources. 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. Implementation of Alternative 4 would have a negligible effect to geologic resources and soils.

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 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, no direct or indirect effects from hazardous materials would result of construction.

Direct Effects and Indirect Effects from Operation and Maintenance

With Alternative 4, hovercraft operations would resume from the Northeast Hovercraft Terminal to Cross Wind Cove after completion of the access road, 6 days per week, year round. During operation, fuel for the hovercraft would be trucked from the City of King Cove to the hovercraft 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. 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.

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 because they would be temporary in duration, low in intensity, local in extent, and common in context. Fuel spills are a low probability event, but could affect water quality.

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 in the 2003 EIS, which includes a Fuel Handling and Spill Response Plan. 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 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 negligible direct and indirect impacts regarding hazardous materials, and a negligible contribution to cumulative effects. Fuel spills are a low probability event, but could affect water quality.

Conclusion

Implementation of Alternative 4 would have no impacts to 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 because any possible effects under routine operations would be temporary in duration, low intensity, local in extent and common in context. Fuel spills are a low probability event, but could affect water quality. This alternative would have a negligible contribution to cumulative effects on water quality and an overall negligible effect.

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 be no new construction and therefore no noise effects.

Direct Effects and Indirect Effects from Operation and Maintenance

The 2003 EIS provided expected noise levels, including contours, from a newer generation hovercraft; the actual hovercraft that has operated in the past, and is expected to restore service in 2012, was unknown at the time of the 2003 EIS preparation. As stated in Alternative 1, the estimated noise level at 1,000 feet was 68 dBA. This value is slightly higher than the existing hovercraft, which has a manufacturer rating of 65 dBA at 1,000 feet (Buls 2006). 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 existing hovercraft, along with the natural environment, these values are expected to be conservative.

Compared to Alternative 1, Alternative 4 would include 3 additional trips per week and operation for a longer season (year round). Service would not increase the operation on a daily basis or alter location or equipment operating levels. Noise effects do not accumulate over time. Therefore, the noise environment is not expected to change due to the additional trips per week, as compared to the Alternative 1 projected operations. Although Alternative 4 would have an increase in the frequency or occurrence of noise impacts, the noise level would still be expected to have a moderate effect on the environment.

Indirect effects of this alternative may include increased use of other resources, such as additional travel (including to and from hovercraft landing areas) and other activities which may have an effect on noise, such as 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. The underwater noise generated by hovercraft is typically lower than those of conventional marine vessels of similar size (Blackwell and Greene 2005).

Summary

The source of noise from Alternative 4 would be mobile, across a relatively large area (approximately 9 miles over water). This noise source is expected to be in existence when hovercraft operations resume, after the completion of the King Cove Access Road. The noise

level from the hovercraft operation is expected to be medium in magnitude, long-term duration, local in extent, and common in context, resulting in an overall negligible effect.

Mitigation Measures

The mitigation measures currently in place to reduce impacts for the operation of the hovercraft, described in the 2003 EIS, should be effective in reducing potential adverse effects to land mammals. 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 around 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. Cumulative effects associated with Alternative 4 would be similar to cumulative effects associated with Alternative 1. Due to the logarithmic nature of additive noise levels, the relative distance to these actions, and the intermittent nature of all of these sources, the cumulative noise effects due to Alternative 4 would be negligible.

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. 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. However, as a result of this decision, approximately 5,430 acres of King Cove Corporation selected lands would be withdrawn from the Izembek National Wildlife Refuge and conveyed to the King Cove Corporation.

Summary

Alternative 4 would have no direct or indirect effects on vegetation.

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 indirect effect would be medium, the duration would be long-term, and the extent local for this common resource. The direct and indirect effect to vegetation from implementation of Alternative 4 would be minor.

Mitigation Measures

An invasive species management plan is recommended to limit the spread of non-native plant species.

Cumulative Effects

Past actions affecting vegetation in or adjacent to the project area are few and minor because this remote location is largely undeveloped. Past actions include impacts to vegetation through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. 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 would be conveyed out of Izembek Wilderness.

The completion of the King Cove Access Project (USACE 2003) also contributes to effects on 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, an indirect effect could be the spread of invasive species from increased human and vehicle transportation due to increased hovercraft service. Any indirect effects to vegetation would be medium in intensity, permanent in duration, local in extent, and common in context. The summary impact of Alternative 4 on vegetation would be considered minor. Implementing an invasive species management plan should lessen this impact.

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 Hovercraft 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 or indirect effects on wetlands from construction would result.

Summary

Alternative 4 would have no direct or indirect effects on wetlands from construction.

Direct Effects and Indirect Effects from Operation and Maintenance

Operation and maintenance of the hovercraft from the Northeast Hovercraft 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.

Mitigation Measures

No mitigation measures relative to wetlands are identified for this alternative.

Cumulative Effects

With no direct or indirect effects to wetlands, implementation of Alternative 4 would not have a contribution to cumulative effects to wetlands.

Conclusion

Implementation of Alternative 4 would have no direct or indirect impacts to wetlands.

4.5.2.3 Fish and Essential Fish Habitat

Alternative 4 is the Proposed Action from the 2003 EIS and is very similar to Alternative 1 in this EIS. However, it incorporates more regular hovercraft service, and therefore 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 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

Direct and indirect effects from operation and maintenance resulting from the implementation of Alternative 4 would be similar to those under Alternative 1. However, as the hovercraft would operate 6 days per week throughout the year as compared to 3 days per week from April to October, as described under Alternative 1, the scale of these effects would be greater.

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 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 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 wildfowl (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 takeoff and landing 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 Hovercraft 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. No effects to essential fish habitat are expected under Alternative 4.

Oil 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, long-term in duration (intermittent but persistent for the life of the project), local in extent, and would only impact common resources. Therefore, the direct and indirect effects from operation and maintenance under Alternative 4 would be negligible.

Mitigation Measures

The mitigation measures identified in the 2003 EIS 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 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;

- Prohibiting use of the hovercraft ramps for public boat launch or retrieval. This measure would ensure that the marine resources around the ramps would be exposed only to the infrequent hovercraft traffic; and
- A Hydro-Acoustic Assessment 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 4.2.2.6) for a discussion of the hydro-acoustic assessment.]

Cumulative Effects

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 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, long-term duration (intermittent but persistent for the life of the project), local in extent, and would only impact common resources. 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.

Direct Effects and Indirect Effects from Operation and Maintenance

Alternative 4 is similar to hovercraft operations described in Alternative 1, except for frequency of operation. Birds other than seabirds and waterfowl are not expected to occur in the vicinity of the hovercraft except the terminal and Cross Wind Cove. 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 operate 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.

No land exchange would be associated with the alternative; the parcel selected by King Cove Corporation would 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 operation and maintenance of Alternative 4 would be low intensity, long-term duration (intermittent but persistent for the life of the project), local in extent, and common in context. The summary impact level of Alternative 4 on seabirds and waterfowl would be considered minor.

Mitigation Measures

All the mitigation measures listed under General Impacts (Section 4.3.2.4), and the prohibition of travel north of a straight line between the Northeast Hovercraft Terminal and Cross Wind Cove, except in the case of a life threatening emergency (listed in Section 4.2.2.7), 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 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, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect common resources, resulting in a minor impact. Birds using the King Cove Corporation selected lands could be adversely affected by development after the lands are conveyed. 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 resume hovercraft operations at a frequency of 6 days per week from the Northeast Hovercraft 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.

Direct Effects and Indirect Effects from Operation and Maintenance

The noise and sight of the hovercraft as it begins operations at the Northeast Hovercraft 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 Hovercraft Terminal. The area adjacent to the Northeast Hovercraft 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 (ADFG 2010), high density winter range/migration habitat for caribou, and likely contains the same furbearers and small mammals found at the Northeast Hovercraft Terminal.

Human activities at the Northeast Hovercraft 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 Hovercraft 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 Hovercraft Terminal and Cross Wind Cove have been addressed in the 2003 EIS. The difference

between the No Action alternative (Alternative 1) and Alternative 4 is that under Alternative 4 the hovercraft would operate 6 days per week throughout the year, compared to 3 days per week April through October under Alternative 1. Therefore, the effects of operation of the hovercraft on land mammals under Alternative 4 would be similar to what exists under Alternative 1, although slightly more frequent and throughout the year. The intensity of disturbance however, would remain low.

Summary

Direct and indirect impacts to land mammals from the operation and maintenance of Alternative 4 would be low intensity, long-term (intermittent but persistent behavioral disturbance for the life of the project) duration, local extent, and would affect both common and important resources. The summary impact of Alternative 4 on land mammals would be negligible.

Mitigation Measures

The mitigation measures currently in place to reduce impacts for the operation of the hovercraft, described in the 2003 EIS and listed below, should be effective in reducing potential 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.

- 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. 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 in limited areas, and would generally affect common resources. The conveyance of the King Cove Corporation selected lands could affect important resources (caribou). Caribou are considered important because their current population is below management objectives, which precludes subsistence harvest opportunities in the EIS project area. Effects would be at a low intensity, permanent duration, and local extent. 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 remaining elements of the 2003 EIS Proposed Action (Alternative 1). Under this alternative, the hovercraft would operate 6 days per week, year round, between the Northeast Hovercraft Terminal and Cross Wind Cove. The primary difference lies in the road, building and other infrastructure elements constructed or permitted since 2003. Evaluations included build upon the earlier determinations for Alternative 1 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 4.5.2.7, 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 Hovercraft Terminal and construction of the hovercraft terminal facility.

Summary

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

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects of Alternative 4 on harbor seals, killer whales, harbor porpoise, and gray whales, and the mechanisms by which they occur, would be the same as described for Alternative 1 in Section 4.2.2.6. The difference between these alternatives is in the frequency of service, with twice as many days of operation per week and operations during the winter months under Alternative 4.

Seasonal differences in seal distribution could affect times, locations, and likelihood of effects from operation of the hovercraft. For example, disruption of foraging on schooling salmon near Cross Wind Cove would only occur during the summer months of operation and not year round.

Seasonal differences in whale and porpoise distribution could also affect times, locations, and likelihood of effects from operation of the hovercraft. 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. Extended service throughout the winter months would, therefore, not increase the likelihood of the hovercraft interacting with gray whales.

Increased frequency of operation could result in increased incidence of disturbance to harbor seals, killer whales, and harbor porpoise. Regular, year round operation could 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 more frequent crossings of Cold Bay.

Implementing the mitigation measures developed in the 2003 EIS would minimize impacts such that the overall impacts of Alternative 4 would not likely differ from those expected under Alternative 1.

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 included in the 2003 EIS should minimize adverse effects.

The impact of Alternative 4 on harbor seals, killer whales, harbor porpoise, and gray whales would be considered negligible to minor.

Mitigation Measures

The mitigation measures proposed in the 2003 EIS and described under Alternative 1 of this EIS also apply to Alternative 4. Please refer to Section 4.2.2.6 for details.

Cumulative Effects

Past, present and reasonably foreseeable future actions and their respective effects on harbor seals are the same as described in Section 4.2.2.6. Implementation of Alternative 4 would result in a negligible contribution to 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 2003 EIS Proposed Action (Alternative 1). Under this alternative, the hovercraft would operate 6 days per week, year round, between the Northeast Hovercraft Terminal and Cross Wind Cove. The primary difference lies in the road, building and other infrastructure elements constructed or permitted since 2003. 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.

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

The types of direct and indirect effects of Alternative 4 on Steller's Eider, Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet would be the same as described for Alternative 1 in Section 4.2.2.7. The difference between these alternatives is in the frequency of service, with twice as many days of operation per week and operation during the winter months under Alternative 4.

Increased frequency of operation could result in increased incidence of disturbance. Since 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 could be susceptible to disturbance from the hovercraft operating during the winter months in Cold Bay. Yellow-billed Loons are rare in the EIS project area, but are also most likely to occur during fall through spring. 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.

The year round no transit zone (see 2003 EIS Mitigation Measure 5 below) prohibits hovercraft travel north of the direct route between the Northeast Hovercraft 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. 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.

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 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.

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 (2003 EIS Mitigation Measure 5) 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 declining populations. The summary impact of Alternative 4 on these 3 species is considered minor.

Mitigation Measures

The mitigation measures proposed in the 2003 EIS and described under Alternative 1 of this EIS also apply to Alternative 4. Please refer to Section 4.2.2.7 for details.

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 a 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 due to their declining populations. The overall impact of Alternative 4 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

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 Hovercraft 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

The types of direct and indirect effects of Alternative 4 on sea otters would be the same as described for Alternative 1 in Section 4.2.2.7. The difference between these alternatives is in the frequency of service, with twice as many days of operation per week and during the winter months under Alternative 4.

Increased frequency of operation could result in increased incidence of disturbance. Regular, year round operation could also lead to habituation of sea otters to the hovercraft's presence and noise. Implementing the mitigation measures developed in the 2003 EIS would minimize impacts such that the overall impacts of Alternative 4 would not likely differ from those expected under Alternative 1.

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

The mitigation measures proposed in the 2003 EIS and described under Alternative 1 of this EIS also apply to Alternative 4. Please refer to Section 4.2.2.7 for details.

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 a 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 Hovercraft 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

The types of direct and indirect effects of Alternative 4 on Steller sea lions would be the same as described for Alternative 1 in Section 4.2.2.7. The difference between these alternatives is in the frequency of service, with twice as many days of operation per week and during the winter months under Alternative 4.

Seasonal differences in Steller sea lion distribution could affect times, locations, and likelihood of effects from operation of the hovercraft. Although Steller sea lions are sighted year round in Cold Bay, they are more common during summer months. Extended service throughout the winter months would not significantly increase the likelihood of the hovercraft disturbing Steller sea lions.

Implementing the mitigation measures developed in the 2003 EIS would minimize impacts such that the overall impacts of Alternative 4 would not likely differ from those expected under Alternative 1.

Summary

Behavioral effects on Steller sea lions from the hovercraft operating between the Northeast Hovercraft Terminal and Cross Wind Cove 6 days per week year round would be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), and localized. 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 included in the 2003 EIS should minimize adverse effects.

Mitigation Measures

The mitigation measures proposed in the 2003 EIS and described under Alternative 1 of this EIS also apply to Alternative 4. Please refer to Section 4.2.2.7 for details.

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 a 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, 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. The contribution to cumulative effects would be negligible. Steller sea lions are federally protected under the *Marine Mammal Protection Act* and the *Endangered Species Act*, so are considered important in context. 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 Use

Direct Effects and Indirect Effects of Land Exchange

The direct and indirect effects of Alternative 4, with respect to land ownership, management, and use are identical to those of Alternative 1.

Under Alternative 4, the land exchange would not proceed and existing land ownership would remain the same for the foreseeable future, with the exception of conveyance of selected land to King Cove Corporation. A road corridor would not be established under this alternative. 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 King Cove Corporation land would be unchanged, with the exception above. State-owned tide and submerged lands in Kinzarof Lagoon would not be added to the Izembek State Game Refuge.

Summary

As with Alternative 1 (Section 4.2.3.1), Alternative 4, direct effects to land ownership, land use, and land management within the project area would result from the conveyance of King Cove Corporation selected lands within Izembek Wilderness. The direct and indirect impacts of this alternative would be low in magnitude because the conveyance of Corporation selected lands in Izembek Wilderness would result in some changes in land uses and management, but would be subject to Section 22(g) of ANCSA. Impact duration would be permanent. The impacts would have a local extent since effects would occur in the vicinity of the conveyed parcel from Izembek Wilderness. The impacts would involve lands common in context since the right to select this parcel pre-dates the establishment of Izembek Wilderness. The summary impact of Alternative 1 on land use and management would be considered minor; due to the localized nature of the impacts and that the lands are contiguous with other parcels conveyed to King Cove Corporation. 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

While Alternative 4 would result in a change in ownership, and potential land use and management (associated with the conveyance of selected lands to King Cove Corporation), no mitigation measures are recommended.

Cumulative Effects

The direct and indirect impacts of Alternative 4 are identical to Alternative 1 and are considered minor, because while no land exchange would occur, conveyance of King Cove Corporation selected lands would be completed, with uncertain implications for land use and management. 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 are considered minor.

Conclusion

Alternative 4 would have identical impacts to Alternative 1, with respect to land ownership, management, and use. Alternative 4 would result in the conveyance of King Cove Corporation selected lands, including 5,430 acres lands currently in Izembek Wilderness. Due to uncertain implications to land use and management, and the requirements of Section 22(g) of ANCSA, the direct and indirect effects to land use and management would be minor. The contribution to cumulative effects would be minor and would not require mitigation. The overall impact of Alternative 4 on land ownership, use, and management would be minor.

4.5.3.2 Socioeconomics

Direct Effects and Indirect Effects from Construction

No new construction would be required to implement Alternative 4. Facilities required for the hovercraft operations and the associated access roads would be in place at the time of implementation.

Direct Effects and Indirect Effects from Operation and Maintenance

This section discusses the long-term impacts resulting from operation and maintenance of Alternative 4 from several perspectives:

- The direct and indirect effects of the alternative on passenger trips and travel costs
- The direct effect of the alternative in terms of employment—how many and what kinds of jobs will be generated under the alternative
- The indirect and induced effects of the alternative on economic activity— is the alternative likely to generate a substantial change in the pattern of economic activities in the affected communities
- The population and demographic effects
- The fiscal effects on local governments

Direct and Indirect Effects of the Alternative on Passenger Trips and Travel Costs

With 6 days per week hovercraft service operating out the Northeast Hovercraft Terminal, travel on the hovercraft is assumed to double relative to Alternative 1 and trips via air taxi are assumed to be reduced by the same amount. Overall, the same baseline number of trips as forecast in Alternative 1 is assumed. This section estimates total travel costs for the 4 economic groups.

Table 4.5.3-1 summarizes the estimated baseline trips and travel cost by mode and group under Alternative 4. Forecast travel costs are marginally lower in every year relative to Alternative 1 if ground travel costs are included. On average, total cost savings are estimated to be roughly $6,100 per year, with an average cost savings per passenger of $1.38.

Table 4.5.3-1 Estimated Baseline Trips and Travel Cost by Travel Mode and Group under Alternative 4, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Baseline Trips and Travel Cost for Passengers on the Hovercraft with 6 Days per Week Service									
Resident and Non-Fishing Hovercraft Passengers	781	790	799	807	816	824	832	840	876
Fishery Related Hovercraft Passengers	796	796	796	796	796	796	796	796	796
Total Estimated Hovercraft Passengers	1,577	1,586	1,595	1,603	1,612	1,620	1,628	1,636	1,672
Total Cost of Hovercraft Trips ($ 2010)	$119,852	$120,536	$121,220	$121,828	$122,512	$123,120	$123,728	$124,336	$127,072
Additional Cost of Vehicle Travel ($ 2010)	$36,501	$36,747	$36,993	$37,211	$37,457	$37,675	$37,894	$38,112	$39,095
Estimated Baseline Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	1,172	1,189	1,204	1,220	1,234	1,249	1,263	1,277	1,341
Fishery Related Air Trips	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604
Total Estimated Air Trips	2,776	2,793	2,808	2,824	2,838	2,853	2,867	2,881	2,945
Total Cost of Air Trips ($ 2010)	$272,048	$273,714	$275,184	$276,752	$278,124	$279,594	$280,966	$282,338	$288,610
Additional Cost of Vehicle Travel ($ 2010)	$22,810	$22,929	$23,034	$23,146	$23,244	$23,349	$23,447	$23,545	$23,993
Estimated Baseline Trips and Travel Cost for Passengers Using Both Modes									
Total Trips All Modes	4,353	4,379	4,403	4,427	4,450	4,473	4,495	4,517	4,617
Total Cost of Trips for All Modes ($ 2010)	$451,211	$453,926	$456,430	$458,937	$461,336	$463,738	$466,034	$468,331	$478,769
Cost Difference from Alternative 1 ($ 2010)	-$6,087	-$6,093	-$6,102	-$6,107	-$6,115	-$6,122	-$6,129	-$6,136	-$6,166
Diff. in Average Cost/Passenger ($ 2010)	-$1.40	-$1.39	-$1.39	-$1.38	-$1.37	-$1.37	-$1.36	-$1.36	-$1.34

Estimates of Fish Processor Crew Travel Costs

The number of processor related trips in and out of the City of King Cove is not expected to increase in any noticeable way under any of the alternatives, nor is the number of trips expected to increase over time. Relative to Alternative 1, Peter Pan would double the number of trips on the hovercraft by processing crew members. As in Alternative 1, processing crew members are assumed to be transported to and from the Northeast Hovercraft Terminal via a Peter Pan owned van carrying 8 passengers on average and a cost per passenger of $15.28. (See Table 4.2.3-6) Overall savings accruing to Peter Pan are estimated to be $5,361 per year. This represents over 88 percent of all savings estimated for the alternative.

Table 4.5.3-2 Processing Crew Transportation in Alternative 4 and Alternative 1

	Travel and Cost Under Alternative 4			Travel and Cost Under Alternative 1			Difference
	Hovercraft	Air	All Modes	Hovercraft	Air	All Modes	All Modes
Estimated One-Way Processing Crew Trips per Year	724	1,276	2,000	362	1,638	2,000	0
Average One-Way Cost on Primary Mode ($ 2010)	$76.00	$98.00	$90.04	$76.00	$98.00	$94.02	-$3.98
Total Cost on Primary Travel Mode ($ 2010)	$55,024	$125,048	$180,072	$27,512	$160,524	$188,036	-$7,964
Additional Cost of Vehicle Travel ($ 2010)	$11,059	$10,314	$21,373	$5,530	$13,241	$18,770	$2,603
Total Cost of Travel on All Modes ($ 2010)	**$66,083**	**$135,362**	**$201,445**	**$33,042**	**$173,765**	**$206,806**	**-$5,361**
Total Cost per Passenger ($ 2010)	**$91.28**	**$106.08**	**$100.72**	**$91.28**	**$106.08**	**$103.40**	**-$2.68**

Source: Northern Economics

Estimates of Processing Managers/Technician Travel Costs

Peter Pan managers and technicians (because of their high opportunity costs of time) would likely continue to travel by air between the communities of King Cove and Cold Bay, at the same proportion of trips as in Alternative 1. This group is assumed not to be affected by the alternative.

Estimates of Fishing Crew and Fishery Observer Travel Costs

Fishing crew and fishery observers would likely travel by hovercraft in the same proportion they use for the hovercraft under Alternative 1 (i.e., 18.1 percent). This group is assumed not to be affected by the alternative.

Travel Costs of Residents and Other Persons Not Associated with Fisheries

Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 4 and Alternative 1 are shown for 2016 in Table 4.5.3-3. Under Alternative 4, residents and other persons not associated with fisheries are estimated to increase the number of trips they take on the hovercraft such that the total hovercraft trips for all groups is twice the number of hovercraft trips under Alternative 1. In 2016, resident and other non-fishery related trips are projected to increase to 807. Under Alternative 1 for 2016, this group was assumed to take 368 trips on the hovercraft. Overall travel costs are projected to decline by $746 for the year or $0.37 per passenger.

Table 4.5.3-3 Resident and Other Non-Fishery Transportation in Alternative 4 and Alternative 1

	Travel and Cost Under Alternative 4			Travel and Cost Under Alternative 1			Difference
	Hovercraft	Air	All Modes	Hovercraft	Air	All Modes	All Modes
Estimated One-Way Resident & Non-Fishery Trips per Year	807	1,220	2,027	368	1,659	2,027	0
Average One-Way Cost on Primary Mode ($ 2010)	$76.00	$98.00	$89.24	$76.00	$98.00	$94.01	-$4.76
Total Cost on Primary Travel Mode ($ 2010)	$61,332	$119,560	$180,892	$27,968	$162,582	$190,550	-$9,658
Additional Cost of Vehicle Travel ($ 2010)	$22,031	$8,540	$30,571	$10,046	$11,613	$21,659	$8,912
Total Cost of Travel on All Modes ($ 2010)	**$83,363**	**$128,100**	**$211,463**	**$38,014**	**$174,195**	**$212,209**	**-$746**
Total Cost per Passenger ($ 2010)	**$103.30**	**$105.00**	**$104.32**	**$103.30**	**$105.00**	**$104.69**	**-$0.37**

Source: Northern Economics

Direct and Indirect Employment Effects

Two crews of 3 persons each would be required for operating the hovercraft based at the Northeast Hovercraft Terminal under Alternative 4. In addition, 2 other full time jobs may be needed. One job would be for a manager to handle the accounting and promotion of the hovercraft services, and the other would support hovercraft operations (engineering, etc.). 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 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 is likely to 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 for operating the hovercraft. Data from the Department of Labor (ADOLWD 2011f) suggest that these could be filled by resident workers. In 2010, 32 workers were employed in the trade, transportation and utilities industries in King Cove, representing less than 20 percent of all resident non-federal wage and salary workers in the community. On the other hand, the community had 99 workers with experience in the trade (81), transportation and warehousing (16), and utilities (2) sectors during the past 5 years. Overall, Alternative 4 would have an estimated total direct effect on employment from 9 to17 persons 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 $2.16 million in annual operating expenses for Alternative 4 (see Chapter 2), 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 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. Therefore, Alternative 4 would have a minor impact on employment.

Indirect Population and Demographics Effects

No effects on population would be expected if the new positions are filled by permanent residents. If the total additional 12 to 20 jobs were filled by nonresidents, then the alternative could lead to an increase in population of about 35 to 58 persons, assuming the average household size of 2.9 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 would eventually obtain the necessary training and certification and would fill the position. The other jobs could most likely 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

Hovercraft operations are anticipated to result in about $2 million of annual losses to an operator. If operated by the borough, this amount represents 30 to 40 percent of discretionary expenses in a fiscal year (expenses other than debt service, bonds, and school expense items in the budget). The operation and maintenance costs would not be fully covered with the estimated $.12 million of annual revenues from the hovercraft operations. No acquisition capital costs would be required because the borough owns a hovercraft that is currently idle and available to resume operations. However, the Aleutians East Borough would be responsible for the replacement cost for new hovercraft in 2035, estimated at approximately $12 million.

As indicated in the baseline summary, the Aleutians East Borough has had a history in recent years of budget surpluses that have exceeded the projected net losses of the hovercraft. The borough also has a Permanent Fund and other undesignated capital funds of nearly $24 million. In theory, the budget surpluses and available capital funds could cover (i.e., subsidize) the net operating costs of the hovercraft for an indefinite period. However, subsidizing the hovercraft would limit the growth of the borough's capital funds, remove available discretionary funds for use in other borough communities, and potentially curtail the ability to fund other projects in the future. Alternative 4 would have moderate fiscal effects to the Aleutians East Borough.

Summary

Alternative 4 would have negligible socioeconomic effects to the cities of King Cove and Cold Bay because the expected changes in employment, economic activity in transportation, and population would all be of low intensity, with a local extent. Transportation costs between to the cities would continue in excess of $100 per passenger trip, if ground travel costs are included. An operator would need to continue to subsidize the hovercraft at roughly $2 million annually, although at a slightly lower rate over time, as travel is assumed to increase with population, while costs and ticket prices are assumed to remain constant in real terms. The fiscal effects to the Aleutians East Borough, if it operated the hovercraft, would be of high intensity, permanent duration, regional extent, and common context. The summary fiscal impact is therefore considered major.

Mitigation Measures

Measures to mitigate the negative fiscal impacts to the borough could include adjustments in fares and efforts to increase the hovercraft's revenues from mail and freight transportation, and external grant sources to subsidize operations.

Cumulative Effects

Socioeconomic conditions in the project area, including effects from past actions, are described in Chapter 3 (Section 3.3.2). Effects to the local government have been influenced by the 2003 EIS and the operations of the 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. Alternative 4 would have a major direct impact on local governments and a negligible impact to other socioeconomic indicators. This alternative would have a major contribution to cumulative effects on fiscal resource for local government and a negligible contribution to cumulative effects on other socioeconomic indicators.

Conclusion

The direct and indirect effects to transportation costs (to the user), employment, and population and demographics would be negligible. Effects to these indicators would be of low intensity, over a permanent duration, with a local extent, and a common context. Effects to fiscal resources for the local government would be of a high intensity due to the projected level of subsidy required for the hovercraft operations. Effects would be of a permanent duration with a regional extent, affecting availability of fiscal resources to other communities in the borough. The context, as a regional government, is considered common. The contribution to cumulative effects on socioeconomic indicators would be negligible for all factors except local government fiscal resources, which would be major. The overall effects would be negligible for population and demographics, minor for transportation costs and employment, and major for local government fiscal resources.

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 permitted. Hovercraft transportation facilities would be in place at the time of implementation, as authorized in the 2003 EIS. Alternative 4 would involve the same considerations as Alternative 1, but instead of seasonal hovercraft operations 3 times a week, it would operate year round, 6 days a week. It would originate at the Northeast Hovercraft Terminal, scheduled for completion in 2012. Wave and wind conditions at the new site could improve hovercraft operability over that experienced in Lenard Harbor. Service would be implemented in January 2013, after completion of the new hovercraft terminal and access road.

Summary

No new construction would be associated with this alternative other than what has already been 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 4.4.3.4, Public Health and Safety. Operating conditions may improve at this location, although by how much is unknown.

Public revenues and expenditures would be affected by hovercraft operations. The lifecycle cost over 35 years is estimated at $44.4 million, with passenger revenues recovering about 10 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 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 $70,000 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 $100, similar to that of air travel (Table 4.2.3–9). 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 4.2.3–8).

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 4.5.3-4. However, some passengers would still use air taxis and air freight would still be transported between King Cove and Cold Bay. By 2020, hovercraft passengers in the Alternative 4 scenario are estimated at 1,636 annually and air taxi passengers at 2,881. 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 4.5.3-4 Estimated Annual Average Daily Passengers 2013 – 2025, Alternative 4

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Alternative 4 Hovercraft 6x a week 2013									
Air Taxi Passengers	2,777	2,793	2,808	2,824	2,839	2,853	2,867	2,881	2,945
Hovercraft or Ferry Passengers	1,577	1,586	1,595	1,603	1,612	1,620	1,628	1,636	1,672

Trips to the King Cove Airport or to the Northeast Hovercraft 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 major annual operating cost shortfalls of roughly $2 million for the hovercraft operator, double that of Alternative 1. The 35-year life cycle is estimated at about $44.4 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. It also provides for 4 full time, year round jobs. The direct and indirect impacts of this alternative would be medium magnitude, as the hovercraft would operate the same as previously, just more frequently, and with improved facilities than previously. 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. The impacts would occur in a common context, since transportation operations and facilities would be operated as before. The summary impact for Alternative 4 on transportation is considered to be moderate.

Mitigation Measures

Mitigation measures would be the same as described in Alternative 1.

Cumulative Effects

Cumulative effects would be the similar to those described in Alternative 1, with the addition of a higher subsidy to the Aleutians East Borough.

The overall cumulative effect of Alternative 4 on transportation would be considered major.

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 $2 million, and places a major fiscal burden on an operator. Reliability may be improved over the Lenard Harbor location, but it could still be problematic given the operation limitations of the hovercraft. The direct and indirect effects of Alternative 4 on transportation would be moderate, with a-major contribution to cumulative effects. The overall impact of Alternative 4 on transportation is considered moderate.

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 operation and maintenance phase for this alternative involves the use the hovercraft for transportation and maintenance of the access road. 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, the 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 (instead of 3 days a week from April to October for Alternative 1), 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 4.2.3-8. Therefore, this alternative could have a direct positive impact on 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). The positive impacts would last as long as the hovercraft was in operation and would have the potential to impact persons throughout the EIS project area. Alternative 4 would primarily impact the City of King Cove which meets the definition of a minority community.

However, conditions where it is not possible to complete medical evacuations via the hovercraft would still occur. It has been estimated that the road to the hovercraft terminal would be closed about 3 days a year due to snow. 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, 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). Additionally, medical evacuations by hovercraft may be completed under dangerous weather conditions that pose a threat to the safety of all of those involved. Weather restrictions

prevent normal operation of the hovercraft in seas above 6 feet and/or winds above 30 knots per hour. Medical evacuations by hovercraft can be completed under more extreme conditions; however, such practices may pose a threat to the safety of all of those involved. Therefore, use of the hovercraft for medical evacuations could also have a negative direct effect on public safety both for the medical evacuation patients and those who transport the patients under extreme weather conditions. Under Alternative 4, there could still be unavailability during extended periods of inclement weather that prevent marine and air travel for advanced medical services. Alternative 4 also requires maintenance of the access road (including signage, regular grading, and snow removal) which could directly impact public safety if workers are injured.

Summary

Positive direct effects of Alternative 4 on public health and safety would be medium in intensity, long-term in duration, regional in geographic extent, and unique in context. The direct effects of the operation and maintenance phase of Alternative 4 on public health and safety would be considered major.

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.

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 increase the availability of transportation to needed medical services as compared to current (baseline) conditions. If Alternative 4 was implemented, other current types of medical evacuation transportation (plane and helicopter) would still be available on a limited basis. When there are no delays and weather conditions are not adverse, the other current types of medical evacuation transport could be just as safe as but faster than predicted for the hovercraft. 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, plane, helicopter) could be selected for each specific medical evacuation incident. Operation and maintenance of Alternative 4 would have major direct and indirect effects to public health and safety and a moderate contribution to cumulative effects on this resource; a year round option for medical evacuation (hovercraft) would be available, subject to weather operability.

Conclusion

No direct or indirect impacts to public health and safety from construction would occur because no construction is necessary in this alternative. The positive impact of the operation and maintenance phase of Alternative 4 is considered major due to the increased availability of transportation to needed medical services for the King Cove community as compared to current (baseline) conditions. Potential negative impacts are related to limited availability of the hovercraft and potential for accidents when transporting medical evacuation patients in unsafe weather 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. Alternative 4 would have a moderate contribution to cumulative effects on public health and safety, as a year round option for medical evacuation (hovercraft) would be available, subject to weather operability. The overall positive impact of Alternative 4 is considered major.

4.5.3.5 Environmental Justice

Direct Effects and Indirect Effects from Construction

Alternative 4 has no associated construction and so construction will not affect human health and safety and subsistence lifestyles.

Summary

No construction will occur under Alternative 1. No direct or indirect effects from construction will occur.

Direct Effects and Indirect Effects from Operation and Maintenance

Hovercraft operations from the Northeast Hovercraft Terminal would have a similar travel time as Alternative 1, but Alternative 4 would represent greater emergency transit availability and consistency. The positive direct effects to public health and safety from the use of hovercraft 6 days per week would be medium in intensity, long-term in duration, regional in geographic extent, and unique in context.

The increased operation under Alternative 4 (6 days per week year round as opposed to 3 days per week and April to October operation under Alternative 1) would represent a limited increase in the impacts to the availability of subsistence resources in the terminal areas and along the access road. Access to subsistence resources and increased competition for subsistence resources would also be low in intensity, short term (temporary), local to regional in extent, and common to important in context.

Summary

The direct and indirect (positive) effects of the operation and maintenance of Alternative 4 to human health would be considered major and negligible to subsistence.

Mitigation Measures

As described in the 2003 EIS, 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. No new mitigation measures for subsistence are recommended for this alternative.

Cumulative Effects

Alternative 4 would increase the availability of transportation to medical services as compared to current (baseline) conditions. Depending on the weather, severity of the injury, and availability of the various modes of transportation, the best mode could be selected for each medical emergency. The contribution of Alternative 4 to cumulative effects would be minor. Implementation of Alternative 4 would not contribute to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources.

Conclusion

Alternative 4 would have a major beneficial impact on human health and a negligible impact on subsistence activities. Alternative 4 would not have a 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, no construction and therefore no impacts to public use would result from construction activities.

Summary

Under Alternative 4, no construction and therefore no impacts to public use would result from construction activities.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect effects of Alternative 4 would be the same as for Alternative 1. 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 could continue concurrently with this alternative, as discussed under Alternative 1.

Summary

The direct and indirect impacts of this alternative would 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. The impacts would have a local extent since effects would occur in the vicinity of the conveyed parcel from Izembek Wilderness. 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 4 on public use would be considered negligible.

Mitigation Measures

Although this alternative would result in a negligible 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 negligible, 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 would have negligible 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 for more frequent hovercraft service. It would not require additional facilities or ground disturbing activities beyond what was authorized in the 2003 EIS and subsequent permits. No new construction would be required to implement this alternative. No direct or indirect effects are anticipated.

Summary

Under Alternative 4, no construction, and therefore no impacts to subsistence, would occur.

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. The hovercraft would transit between the Northeast Hovercraft Terminal and Cross Wind Cove on the west side of Cold Bay. Neither terminal would be 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 Hovercraft 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, rather than 3 days a week April through October, and so some increase in traffic to the hovercraft terminal would occur, and this could result in a minor addition to 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, short term (temporary), local to regional in extent, and common to important in context. The resources that are important in context include the migratory waterfowl.

Effects on Access to Subsistence Resources

Under Alternative 4, access to subsistence resources would not be restricted and could be positively affected by operation and maintenance of road access to the Northeast Hovercraft 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 Hovercraft 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. Implementation of more frequent hovercraft operations under

Alternative 4 is 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 Hovercraft 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. Impacts of increased competition for subsistence resources would be low in intensity, long-term, 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.

Summary

Impacts to subsistence from more frequent operation of the hovercraft and year round road access to the Northeast Hovercraft Terminal would include displacement of subsistence resources, and increased subsistence uses in that area. Impacts would be of low intensity, long-term in duration, local to regional in extent and affect resources that are common in context. The summary impact of operation and maintenance activities to subsistence under Alternative 4 would be considered negligible.

Mitigation Measures

No mitigation measures are associated with this resource, other than continuation of practices already employed for operation of the hovercraft and access road.

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 in the project area. Implementation of Alternative 4 would contribute little to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources. As a result, the project components of this alternative would make a negligible contribution to cumulative effects on subsistence resources or harvest patterns.

Conclusion

Implementation of Alternative 4 would have negligible direct and indirect effects on subsistence; this alternative would make a negligible 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 a construction phase. Consequently, no impacts to visual resources are expected to result from construction-related activities.

Summary

No construction is associated with this alternative and therefore visual resources would not be impacted.

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 improve 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 and long-term in duration, but in a local area and affecting resources that are common in context.

Summary

No direct effects to visual resources would be expected in Alternative 4. Indirect effects to visual resources would be negligible, 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 improve 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.

Conclusion

Direct and indirect impacts to visual resources due to the implementation of Alternative 4 would be low intensity and long-term in duration, but in a local area and affecting resources that are common in context. Alternative 4 would have a negligible contribution to cumulative effects on visual resources. The summary impact of Alternative 4 on visual resources is considered negligible.

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. The parcel of land currently selected by King Cove Corporation, and located within Izembek Wilderness, would continue to be managed as wilderness by the Service until the parcel was eventually conveyed to the King Cove Corporation. 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 boundary. The right to select this parcel pre-dates the establishment of Izembek Wilderness.

Direct and indirect effects on the 4 components of wilderness character within Izembek Wilderness, both in terms of construction and operational phases, would be similar to analysis presented under Alternative 1 (Section 4.2.3.10). However, the increased frequency of hovercraft service to 6 days per week, 1 round trip per day, April through October, under Alternative 4 would intensify the localized impacts of hovercraft operations on 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 Hovercraft Terminal from the City of King Cove. These long-term visual and noise disturbances would persist through the life of the project. The magnitude of these impacts as experienced by users of Izembek Wilderness would be moderate due to the detectable changes in 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 Hovercraft Terminal could be reduced in Izembek Wilderness, as the wilderness boundary would become more distant from that location. The selected lands could also be subject to development, subject to the provisions of ANCSA Section 22 (g), but there are no known plans for development at this time. Although there would be a change in intensity of effects associated with the more frequent hovercraft service under this alternative as compared to Alternative 1, there would be no change in the summary impact level. As the change in this wilderness quality indicator would occur on lands that are unique in context, the overall direct and indirect effects to the solitude or primitive and unconfined recreation quality would be moderate.

Summary

Under Alternative 4, the parcel selected by King Cove Corporation within Izembek Wilderness would continue to be managed as wilderness by the Service until the parcel was eventually conveyed to the King Cove Corporation.

The implementation of Alternative 4 would also result in moderate intensity, long-term, localized, unique context effects to wilderness character. 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 moderate impacts to the solitude or primitive and unconfined recreation quality, primarily due to the long-term alteration of the soundscape at localized areas within Izembek Wilderness. Due to the unique context of the Izembek Wilderness, the overall

direct and indirect impacts to wilderness character resulting from Alternative 4 would be minor to moderate.

Mitigation Measures

Mitigation measures for Alternative 4 would continue as described in the 2003 EIS.

Cumulative Effects

Past, present, and reasonably foreseeable future actions that could contribute to cumulative effects to wilderness character within Izembek Wilderness were discussed under Alternative 1 (Section 4.2.3.10). The construction of the road to the Northeast Hovercraft Terminal could increase opportunities for unauthorized and non-traditional subsistence use of motorized vehicles within Izembek Wilderness, potentially creating low intensity, long-term, localized impacts to a unique resource.

The increased frequency of 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, 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 occurring over the life of the project. The intensity would be moderate, and the extent would be local. The summary 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, and 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. Therefore, to be 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 4.6.1-1 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 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 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

The direct and indirect effects on air quality from the construction of Alternative 5 are expected to be low in magnitude on a short-term basis (24-hour or less), due to localized emissions of air pollutants. These moderate effects would occur in the local vicinity of the construction activity and would be of temporary duration. Over the period of construction, emissions of air pollutants are expected to be below 5 tons per year (except for greenhouse gases). Therefore, the construction would have only a minor effect on air quality.

Table 4.6.1-1 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 hp)	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 hp)	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 hp)	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 hp)	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 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 4.6.1-2 shows the direct emission estimates for the ferry operations, along with the net difference from the emissions of hovercraft operations under Alternative 1 (No Action). No credits are taken for the existing ferry use, which occurs approximately 2 times per month and is assumed to have negligible emissions. Indirect effects of this alternative may include increased use of other resources, such as additional travel (including to and from ferry terminals) and other activities which may have an effect on air quality, 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 air quality are also expected to be negligible.

Summary

The source of emissions from Alternative 5 is mobile, 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 because they would be low in magnitude, with a long-term duration (reoccurring short-term events), local extent, and common context. Indirect effects on air quality are expected to be negligible.

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. However, the increased demand for transit to the City of King Cove 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. 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. The overall effect of Alternative 2 on air quality would be negligible to minor.

Table 4.6.1-2 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 hp)	9,435 MMBtu/yr	15.1	4.01	0.007	0.27	0.27	0.39	779
Service Power Engine (200 hp)	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**
HOVERCRAFT REDUCTION								
Main Propulsion Engines (2 x 1205 hp)	-4,401 MMBtu/yr	-6.48	-1.72	-0.003	-0.12	-0.12	-0.17	-334
Cushion Lift Engines (2 x 905 hp)	-3,041 MMBtu/yr	-4.87	-1.29	-0.002	-0.09	-0.09	-0.13	-251
Service Power Engines (3 x 8kW)	-54 MMBtu/yr	-0.12	-0.03	-0.008	-0.008	-0.008	-0.01	443
TOTAL (tons per year)		**-11.5**	**-3.04**	**-0.01**	**-0.21**	**-0.21**	**-0.30**	**-590**
NET TOTAL (tons per year)		**7.10**	**1.72**	**0.22**	**0.30**	**0.30**	**0.37**	**318**

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.

Usage value for combustion emissions for the reduction in hovercraft operations (Alternative 1) based on project description: Estimated annual travel is 3 times per week between April and October (30 weeks), or 90 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 (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%, 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% 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. Despite the intensity, once greenhouse gases are emitted they have the same duration, extent, and context which are long-term duration, extended, and important.

Summary

Overall construction-related effects to climate change associated with Alternative 5 are considered negligible. Although climate change effects are considered to be long-term, extended, and affect important resources, the overall direct and indirect effects are considered negligible since the magnitude is so low.

Direct Effects and Indirect Effects from Operation and Maintenance

Effects associated with climate change that are a result of Alternative 5 are attributed to 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 5 would include all of the transportation modes used in Alternative 1 except that the hovercraft would not be used and there would be an additional ferry that would make 6 round trips per week, year round.

Effects of global climate change could, overtime, affect the transportation operations included in Alternative 5. 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 ferry transportation.

Alternative 5 would contribute approximately 938 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 4.6.1-3). When compared at the state level, it would contribute to approximately 0.04% of the State of Alaska's estimated emissions from marine vessels and 0.01% 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 5 is considered low. The duration, extent, and context of impacts to climate would be the same as Alternatives 1, 2, 3, and 4 which are: long-term duration, extended, and important

Table 4.6.1-3 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
State Ferry	2 round trips/month (May-September)	30
TOTAL		**938**

Note: Refer to Section 4.6.1.1 for complete details and assumptions regarding emissions calculations.

Summary

Direct and indirect effects to climate change associated with Alternative 5 are considered negligible. Although climate change effects are considered to be long-term, extended, and affect important resources, the overall direct and indirect effects are considered negligible since the magnitude is so low.

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, 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 5 would directly emit approximately 938 tons of carbon dioxide per year, which is 1,137 tons per year less than Alternative 4 and more than all other 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 low magnitude, although the duration would be long-term, the extent is extended and the context is important. 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 5 is expected to have a negligible contribution to cumulative effects. The overall contribution 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 on approximately 0.4 acre of wetland and an estimated 0.2 acre of state owned tidelands, and improvements to the existing Cold Bay dock. Dredging and pile driving would occur at the Lenard Harbor ferry terminal and at the Cold Bay dock. This activity would disturb submerged sediments. In addition, construction of a temporary barge landing and staging area at the Lenard Harbor site would include the placement of fill material in less than 0.1 acre of wetland and 0.1 acre of state owned tideland 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 common resources would result from using rock with a high concentration of sulfide minerals to fill wetlands and placing the rock at the water surface. This action may propagate the generation of acid rock drainage which would impact the quality of the water bodies the rock would be placed in. 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 would include the disturbance of less than 1 acre, with the potential to release fuel or other hazardous materials during the construction process. This moderate direct effect would be high intensity, permanent (duration), local (extent) and common (context). With implementation of mitigation measures, effects from construction in these small areas 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.

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 and Storm Water Pollution Prevention Plan identified in the 2003 EIS. Follow-up geotechnical studies 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

Impacts to geologic resources and soils related to the construction of Alternative 5 would be high in intensity, permanent in duration, local in extent and common in context. Operation and maintenance of the ferry would have no effects on geologic resources and soils. The overall effect would be minor.

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 and construction would be limited to less than 1 acre adjacent to the existing hovercraft site, replacing the terminal structure, upgrades to the parking area and security fencing, and 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. Dredging and pile driving would occur at the Lenard Harbor ferry terminal, and 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 of high intensity to a localized area 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. These effects would be of high intensity, temporary duration, and local extent for common resources.

Direct Effects and Indirect Effects from Operation and Maintenance

Direct and indirect impacts to water resources or water quality may occur under Alternative 5 during ferry operations. The extent of the effects would be local to regional 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 during 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 negligible with implementation of the mitigation measures identified. These effects would be low intensity, temporary duration, and local to regional extent for common resources.

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 minimal incremental additions to cumulative effects on water resources and water quality within Cold Bay. The impacts from ferry vessels may include fuel and sewage releases at the docking locations and along the preferred routes of the ferry vessels. These effects were considered and analyzed in the 2003 EIS. The implementation of Alternative 5 could directly result in the increase of turbidity at near shore locations of the staging areas at Lenard Harbor and Cold Bay dock. These effects, along with the other past, present, and reasonably foreseeable future actions discussed in Alternative 1 would provide negligible cumulative effects to the hydrology and hydrologic processes within the project area.

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 and modifications at the Cold Bay dock and refueling of the ferry in open water at the Cold Bay dock. No fuel would be stored at the Lenard Harbor terminal. These effects, which were analyzed in the 2003 EIS, would be low to high in intensity, of temporary duration, and local to regional in extent for common resources.

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 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. 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. Dispersal of contaminated sediments during construction activities would be high in intensity, temporary in duration, localized in extent, and common in context.

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 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 the greater risk of a fuel spill of hazardous materials. No fuel would be stored at Lenard Harbor.

Summary

Alternative 5 would have negligible direct and indirect effects on hazardous materials. Effects that result from a fuel spill would be low intensity, temporary duration, and local in extent for common resources.

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. 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 or from operation and maintenance of the ferry.

Conclusion

Implementation of Alternative 5 would have negligible direct and indirect effects to hazardous materials and waste management handling. Potential effects under routine operations would be temporary in duration, low intensity, local in extent, and common in context. Fuel spills are a low probability event. This alternative would have a negligible contribution to cumulative effects and an overall negligible effect.

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 this equipment is modeled to be equivalent sound level (L_{eq}) of 82.5 dBA, primarily due to the impact pile driver. Without this equipment, the noise level would drop to 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 effect on noise (with or without pile driving). These effects would be high magnitude, temporary in duration, and would occur in the immediate vicinity of construction activities.

Indirect effects of this construction may be increased use of other resources (such as roadways used to transport construction equipment). These activities would also be temporary. Increased road use (on existing roads) would likely produce negligible increases to noise levels. The indirect effects would occur at different locations than the actual construction activities and are expected to be negligible.

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 (local extent), and affect common resources.

Direct Effects and Indirect Effects from Operation and Maintenance

The 2003 EIS provided information on ferry noise indicating that noise levels from ferry operation would be lower than those for a hovercraft. To be conservative, noise levels are assumed to be the same as hovercraft operations, which are identified as being medium in magnitude, but long-term in duration, local extent, and common context. 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.

In addition to the increased ferry service, this alternative would reduce the hovercraft operations from 3 days per week to zero. Noise associated with the hovercraft operations are described above in Section 4.5.1.6. The reduction in noise levels due to the removal of hovercraft operations would occur in some of the area that the ferry operates, on the west end of travel near Cross Wind Cove. As stated above, the hovercraft noise levels are expected to be higher than those for the ferry. Therefore, the reduction of hovercraft operations would show an overall noise reduction on the days when that vessel would have operated.

Underwater noise was discussed in the 2003 EIS. The underwater noise level produced by the ferry would be higher than that produced by the hovercraft; however, the impacts would still be considered negligible.

Summary

The noise level from the ferry operation is expected to be medium in magnitude, long-term in duration, local extent, and common context. With the removal of hovercraft operations (3 days per week), noise levels would actually be decreased in the Cross Wind Cove area resulting in a beneficial effect on noise. 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 additional 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. Construction, operation, and maintenance of Alternative 5 would generate negligible direct and indirect effects to the noise environment. 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, intermittently occurring over the life of the project, spread out over a relatively large area. 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.

Alternative 5 would also result in approximately 5,430 acres of King Cove Corporation selected lands being withdrawn from the Izembek Wilderness and conveyed to the King Cove Corporation.

Summary

The direct and indirect effects from construction would be the loss of less than 1 acre of native shoreline plant communities. This effect would be medium intensity, permanent duration, and local extent for this common resource, resulting in an overall minor effect.

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 terminal. 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, the duration would be long-term and the extent local for this common resource. The direct and indirect effect to vegetation from implementation of Alternative 5 would be minor.

Mitigation Measures

An invasive species management plan is recommended to limit the spread of non-native plant species, and pre-construction rare plant surveys should be conducted to determine if any rare plant species occur within the construction footprint.

Cumulative Effects

Past actions affecting vegetation in or adjacent to the project area are few and minor because this remote location is largely undeveloped. Past actions include impacts to vegetation through road and trail development dating back to the 1940s when the Cold Bay Airport was constructed. The result of implementing Alternative 5 would include no additional loss of vegetation

communities. However, approximately 5,430 acres of lands on the King Cove Corporation selected parcel would be conveyed from the Izembek National Wildlife Refuge.

The completion of the King Cove Access Project (USACE 2003) also contributes to effects to vegetation. 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. Therefore, implementation of Alternative 5 would have a minor contribution to cumulative effects to vegetation.

Conclusion

Direct effects of Alternative 5 would be the loss of less than 1 acre of native shoreline plant communities. An indirect effect could be the spread of invasive species from human and vehicle transportation due to operation of the ferry. The direct and indirect effects to vegetation would be low in intensity, permanent in duration, local in extent and common in context. The summary impact of Alternative 5 on vegetation would be considered minor. Implementing an invasive species management plan should lessen this impact.

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. As a result of the improvements at the Lenard Harbor terminal, an estimated 0.4 acre of beach system wetland and 0.2 acre of state owned tidelands would be filled with riprap armor. In addition, construction of a temporary barge landing and staging area at the Lenard Harbor site would include the placement of fill material in less than 0.1 acre of wetland and 0.1 acre of state owned tideland adjacent to the construction area footprint. Other wetlands previously located at the Lenard Harbor Ferry site were filled, as authorized by the 2003 EIS Record of Decision and subsequent permits.

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 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. In addition, 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, these affected 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 animal use. The variety of habitat types allows animals 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, permanent, and local (less than 1 acre) effect to a common resource. The effects to wetlands from implementation of Alternative 5 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 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

Mitigation measures and best management practices would be identified on Corps and Alaska Department of Fish and Game permits required when 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 wetland have been filled along the segment from King Cove Airport to Lenard Harbor, and 3 acres were filled at the Northeast Hovercraft Terminal site. The remainder of the project, which consists of a 12-mile long, 14-foot wide access road from the Leonard Harbor site to the Northeast Hovercraft Terminal site (currently under construction), will fill an additional 11 acres of primarily lowland wet sedge meadow wetland.

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 for less than 1 acre of wetland that would be filled. 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 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. 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 complete, it is anticipated that 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. 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 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 local in extent for each site, and would only impact common resources. The direct and indirect effects on fish resources from construction under Alternative 5 would 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 even less frequently under Alternative 5 than they currently do, as the ferry would be a more regular mode of transportation.

Oil 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 of low intensity, long-term duration (intermittent but persistent for the life of the project), local in extent, and would impact common resources. Therefore, the direct and indirect effects from operation and maintenance under Alternative 5 would be negligible.

Mitigation Measures

The mitigation measures identified in the 2003 EIS 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 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; and
- Prohibiting use of the hovercraft ramps for public boat launch or retrieval. While this measure was aimed at the facilities associated with hovercrafts, it is assumed that it would also apply to a ferry terminal constructed at Lenard Harbor. This measure would ensure that the marine resources around the dock would only be exposed to the infrequent ferry traffic.

Cumulative Effects

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 infrequent operation of a ferry across Cold Bay. The effects would be of low intensity, long-term duration (intermittent but persistent for the life of the project), local in extent, and would only impact common resources. Therefore, 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.

Summary

Direct and indirect impacts to seabirds and waterfowl from the construction of Alternative 5 would be low (flushing) to high (nest disturbance) intensity, temporary duration, local extent, and common context. The summary 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 schedule, the frequency of these encounters would be low, and because other watercraft currently operate 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 the 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.

No land exchange would be associated with the alternative; the parcel selected by King Cove Corporation would 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 operation and maintenance of Alternative 5 would be low intensity, long-term duration (intermittent but persistent for the life of the project), local extent, and common context. 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 General Impacts (Section 4.3.2.4), and the prohibition of travel north of a straight line between the Northeast Hovercraft 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 intensity, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect common resources. The summary impact level of Alternative 5 on seabirds and waterfowl would be considered minor.

<u>Other Birds</u>

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 important context. 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, and common context. 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, described in the 2003 EIS, 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 intensity, long-term but intermittent duration, local extent, and common context, resulting in a minor impact. Birds using the King Cove Corporation selected lands could be adversely affected by development when the lands are conveyed. Alternative 5 would have a minor contribution to cumulative effects on other birds. The summary impact level of the operation and maintenance of Alternative 5 on other birds would be considered 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 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.

Summary

Direct and indirect impacts to land mammals from the construction of Alternative 5 would be low intensity, temporary duration, local extent, and would affect both common and important resources, resulting in a minor impact.

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 2010). 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, long-term (intermittent but persistent for the life of the project) to long-term duration, local extent, and would affect both common and important resources, resulting in a negligible impact.

Mitigation Measures

The mitigation measures currently in place to reduce impacts from the operation of the hovercraft, described in the 2003 EIS and listed below, should be effective in reducing potential adverse effects to land mammals for ferry operations.

- No hovercraft, ferry, or helicopter will travel north of a straight line between Northeast Hovercraft 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. 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 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 minor 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 resources. The conveyance of the King Cove Corporation selected lands could affect important resources (caribou). Caribou are considered important because their current population is below management objectives, which precludes subsistence harvest opportunities in the EIS project area. Effects would be at a low intensity, permanent duration, and local extent. 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 minor.

4.6.2.6 Marine Mammals

Alternative 5 is similar to the 2003 EIS Alternative 4. The primary difference lies in the road and other infrastructure elements constructed or permitted since 2003. 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 4.5.2.7, 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

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. 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. 2003 EIS Mitigation Measures 3 and 4 (refer to Section 4.2.2.6) provides 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 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 (USACE 2003). If the daily trip of the ferry intersects 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 (Mitigation Measure 6 of the 2003 EIS) 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 2003 EIS Mitigation Measure 4.

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 potential disturbance effects that would be of low to medium intensity, long-term duration (intermittent but persistent for the life of the project), localized, and would affect important resources. The overall impact of the operation and maintenance of Alternative 5 is considered negligible to minor.

Mitigation Measures

Most of the mitigation measures discussed under Alternative 1 (Section 4.2.2.6) would apply to Alternative 5, particularly Mitigation Measures 1 through 4 and the Marine Mammal Protection Plan of Mitigation Measure 6. Please refer to Section 4.2.2.6 for details.

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 contribution to cumulative effects on 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 phase of Alternative 5. Some disturbance is also possible during operation of the ferry. Effects, if they occur, would likely be of low to medium intensity, long-term in 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. The contribution to cumulative effects would be negligible. The summary impact of Alternative 5 on harbor seals, killer whales, harbor porpoise, and gray whales would be negligible to minor.

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 since 2003. 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.

Steller's Eider, Yellow-billed Loon, and Kittlitz's Murrelet

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 (2003 EIS Mitigation Measure 5) 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. 2003 EIS Mitigation Measures 3 and 4 (refer to Section 4.2.2.7) 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. Kittlitz's Murrelets are not likely to occur near the Cold Bay dock. Effects would be of low to medium intensity, temporary, and localized. The context is important for all 3 species. 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 is about 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 included in 2003 EIS Mitigation Measure 4.

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, long-term duration (intermittent but persistent for the life of the project), local extent, and would affect important resources. The context for all 3 species is important. The direct and indirect impact is considered negligible to minor.

Mitigation Measures

Most of the mitigation measures discussed under Alternative 1 would apply to Alternative 5, particularly 2003 EIS Mitigation Measures 1 through 4 and the Fish and Wildlife Protection Plan of 2003 EIS Mitigation Measure 5. Please refer to Section 4.2.2.7 for details.

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, long-term duration (intermittent but persistent for the life of the project), local extent¸ and would affect important resources. 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 of 2003 EIS Mitigation Measures 5 and 6 (Section 4.2.2.7) would mitigate disturbance effects of construction activities.

Fuel leaks or other hazardous material spills into marine waters during construction could affect nearshore marine habitats. 2003 EIS Mitigation Measures 3 and 4 (refer to Section 4.2.2.7) 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 the 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 (Mitigation Measure 6 of the 2003 EIS) 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 included in 2003 EIS Mitigation Measure 4.

Summary

Northern sea otters would primarily experience disturbance effects during operation and maintenance of the ferry as proposed under Alternative 5. 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. The summary impact level is considered negligible.

Mitigation Measures

Most of the mitigation measures discussed under Alternative 1 would apply to Alternative 5, particularly 2003 EIS Mitigation Measures 1 through 4 and the Marine Mammal Protection Plan of 2003 EIS Mitigation Measure 6. Please refer to Section 4.2.2.7 for details.

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, 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.

<u>Steller Sea Lion: Western Distinct Population Segment</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 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. 2003 EIS Mitigation Measures 3 and 4 (refer to Section 4.2.2.7) 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 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 to feed 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 (Mitigation Measure 6 of the 2003 EIS) 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 included in 2003 EIS Mitigation Measure 4.

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, 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.

Mitigation Measures

Most of the mitigation measures discussed under Alternative 1 would apply to Alternative 5, particularly 2003 EIS Mitigation Measures 1 through 4 and the Marine Mammal Protection Plan of 2003 EIS Mitigation Measure 6. Please refer to Section 4.2.2.7 for details.

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, long-term in duration (intermittent but persistent for the life of the project), and localized, 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 Use

Direct Effects and Indirect Effects of Land Exchange

The direct and indirect effects of Alternative 5 with respect to land ownership are identical to those of Alternatives 1 and 4.

Under Alternative 5, the land exchange would not proceed and existing land ownership would remain the same for the foreseeable future, with the exception of conveyance of selected land to King Cove Corporation. A road corridor would not be established under this alternative. 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 King Cove Corporation land would be unchanged, with the exception above. State-owned tide and submerged lands in Kinzarof Lagoon would not be added to the Izembek State Game Refuge.

Summary

As with Alternative 1 (Section 4.2.3.1), Alternative 5 direct effects to land ownership, land use, and land management within the project area would result from the conveyance of King Cove Corporation selected lands within Izembek Wilderness. The direct and indirect impacts of this alternative would be low in magnitude because the conveyance of Corporation selected lands in Izembek Wilderness would result in some changes in land uses and management, but would be subject to Section 22(g) of ANCSA. Impact duration would be permanent. The impacts would have a local extent since effects would occur in the vicinity of the conveyed parcel from Izembek Wilderness. The impacts would affect lands common in context since the right to select this parcel pre-dates the establishment of Izembek Wilderness. The summary impact of Alternative 5 on land use and management would be considered minor due to the localized nature of the impacts and that the lands are contiguous with other parcels conveyed to King Cove Corporation. 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

While Alternative 5 would result in a change in ownership, and potential land use and management (associated with the conveyance of selected lands to King Cove Corporation), no mitigation measures are recommended.

Cumulative Effects

The direct and indirect impacts of Alternative 5 are identical to Alternative 1 and are considered minor, because while no land exchange would occur, conveyance of King Cove Corporation selected lands would be completed, with uncertain implications for land use and management. 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 are considered minor.

Conclusion

Alternative 5 would have identical impacts to Alternative 1, with respect to land ownership, management, and use. Alternative 5 would result in the conveyance of King Cove Corporation selected lands, including 5,430 acres lands currently in Izembek Wilderness. Due to uncertain implications to land use and management, and the requirements of Section 22(g) of ANCSA, the direct and indirect effects to land use and management would be minor. The contribution to cumulative effects would be minor and would not require mitigation. The overall impact of Alternative 5 on land ownership, use, and management would be minor.

4.6.3.2 Socioeconomics

Direct Effects and Indirect Effects from Construction

Under Alternative 5, each dock would take about 3 months to construct, assuming 8 construction workers. A total of 16 workers would be hired for construction activities related to the dock improvements. These jobs would be temporary and short-term as the dock improvements could be completed in the course of a single year. 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 new 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 are assumed to be funded with federal grants; no fiscal effect to local government from construction under Alternative 5 is assumed.

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:

- The direct and indirect effects of the alternative on passenger trips and travel costs
- The direct effect of the alternative in terms of employment—how many and what kinds of jobs will be generated under the alternative
- The indirect and induced effects of the alternative on economic activity— is the alternative likely to generate a substantial change in the pattern of economic activities in the affected communities
- The population and demographic effects
- The fiscal effects on local governments

Direct and Indirect Effects of the Alternative on Passenger Trips and Travel Costs

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). 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); and the differences in ground travel time and costs. As shown in Table 4.2.3-5, 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 Hovercraft Terminal is estimated at 65 minutes. As with the other alternatives, specific assumptions have been made regarding ground travel costs for each of the 4 key economic groups:

- Processing crews are assumed to be transported in company vans with an average of 8 passengers per van. Estimated travel cost between Lenard Harbor and the City of King Cove is $6.96/person.

- Managers and technicians are assumed to prefer the air taxi, but when they do travel by ferry, they are assumed to travel in company vehicles with an average cost of $37.13 per passenger for the ground transit. The cost differential between managers and processing crew is due to an assumed reduction in average passengers to 1.5 persons when managers and technicians are travelling.
- Fish harvesters and fishery observers are assumed to prefer the air taxi, but when they do travel by ferry, they are assumed to travel by shuttle with an average cost of $19.00 per passenger for ground transit, or $14.00 less than the calculated shuttle price from the Northeast Hovercraft Terminal.
- Residents and non-fishery related passengers are assumed to evenly split their trips between the shuttle ($19.00 per passenger) and personal vehicles ($9.60 per passenger). The average cost from Lenard Harbor for this group is estimated at $14.30 per passenger.

Table 4.6.3-1 summarizes the estimated baseline trips and travel cost by mode and group under Alternative 5. Forecast travel costs are marginally lower in every year relative to Alternative 1 if ground travel costs are included. On average, total cost savings are estimated to be roughly $24,774 over all of the groups, with an average cost savings per passenger of $5.58.

Table 4.6.3-1 Estimated Baseline Trips and Travel Cost by Travel Mode and Group under Alternative 5, 2013 – 2020 and 2025

	2013	2014	2015	2016	2017	2018	2019	2020	2025
Estimated Baseline Trips and Travel Cost for Passengers on the Ferry with 6 Days per Week Service									
Resident and Non-Fishing Ferry Passengers	781	790	799	807	816	824	832	840	876
Fishery Related Ferry Passengers	796	796	796	796	796	796	796	796	796
Total Estimated Ferry Passengers	1,577	1,586	1,595	1,603	1,612	1,620	1,628	1,636	1,672
Total Cost of Road Trips ($ 2010)	$119,852	$120,536	$121,220	$121,828	$122,512	$123,120	$123,728	$124,336	$127,072
Additional Cost of Vehicle Travel ($ 2010)	$18,230	$18,359	$18,487	$18,602	$18,730	$18,845	$18,959	$19,074	$19,588
Estimated Baseline Trips and Travel Cost for Passengers Using the Air Taxi									
Resident and Non-Fishing Air Trips	1,172	1,189	1,204	1,220	1,234	1,249	1,263	1,277	1,341
Fishery Related Air Trips	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604	1,604
Total Estimated Air Trips	2,776	2,793	2,808	2,824	2,838	2,853	2,867	2,881	2,945
Total Cost of Air Trips ($ 2010)	$272,048	$273,714	$275,184	$276,752	$278,124	$279,594	$280,966	$282,338	$288,610
Additional Cost of Vehicle Travel ($ 2010)	$22,810	$22,929	$23,034	$23,146	$23,244	$23,349	$23,447	$23,545	$23,993
Estimated Baseline Trips and Travel Cost for Passengers Using Both Modes									
Total Trips All Modes	4,353	4,379	4,403	4,427	4,450	4,473	4,495	4,517	4,617
Total Cost of Trips for All Modes ($ 2010)	$432,940	$435,537	$437,925	$440,327	$442,610	$444,908	$447,100	$449,292	$459,263
Cost Difference from Alternative 1 ($ 2010)	-$24,358	-$24,482	-$24,607	-$24,716	-$24,842	-$24,952	-$25,063	-$25,174	-$25,673
Diff. in Average Cost/Passenger ($ 2010)	-$5.60	-$5.59	-$5.59	-$5.58	-$5.58	-$5.58	-$5.58	-$5.57	-$5.56

Source: Northern Economics

Estimates of Fish Processor Crew Travel Costs

The number of processor related trips in and out of the City of King Cove is not expected to increase in any noticeable way under any of the alternatives, nor is the number of trips assumed to increase over time. Because of the increase to 6 days a week service, relative to Alternative 1, Peter Pan would likely double the number of trips on the ferry by processing crews. Overall

savings accruing to Peter Pan are estimated to be $11,379 per year or an average of $5.69 per crew member, as shown in Table 4.6.3-2.

Table 4.6.3-2 Processing Crew Transportation in Alternative 5 and Alternative 1

	Travel and Cost Under Alternative 5			Travel and Cost Under Alternative 1			Difference
	Ferry	**Air**	**All Modes**	**Hovercraft**	**Air**	**All Modes**	**All Modes**
Estimated One Way Processing Crew Trips per Year	724	1,276	2,000	362	1,638	2,000	0
Average One Way Cost on Primary Mode ($ 2010)	$76.00	$98.00	$90.04	$76.00	$98.00	$94.02	-$3.98
Total Cost on Primary Travel mode ($ 2010)	$55,024	$125,048	$180,072	$27,512	$160,524	$188,036	-$7,964
Additional Cost of Vehicle Travel ($ 2010)	$5,041	$10,314	$15,355	$5,530	$13,241	$18,770	-$3,415
Total Cost of Travel on All Modes ($ 2010)	**$60,065**	**$135,362**	**$195,427**	**$33,042**	**$173,765**	**$206,806**	**-$11,379**
Total Cost per Passenger ($ 2010)	**$82.96**	**$106.08**	**$97.71**	**$91.28**	**$106.08**	**$103.40**	**-$5.69**

Source: Northern Economics

Estimates of Processing Managers/Technician Travel Costs

Peter Pan managers and technicians (because of their high opportunity costs of time) would likely continue to travel by air between the communities of King Cove and Cold Bay, at the same proportion of trips as in Alternative 1. The only monetary change relative to Alternative 1 is a reduction on ground travel cost of $44.33 per trip. Over the 36 trips assumed, the total savings would be $1,596 per year.

Estimates of Fishing Crew and Fishery Observer Travel Costs

Fishing crew and fishery observers would likely travel by ferry in the same proportion they use for the hovercraft under Alternative 1 (i.e., 18.1 percent). The only monetary change relative to Alternative 1 is a reduction on ground travel cost of $14.00 per trip. Over the 36 trips assumed, the total savings would be $504 per year.

Travel Costs of Residents and Other Persons Not Associated with Fisheries

Forecast trips and travel costs of residents and other persons not associated with fisheries under Alternative 5 and Alternative 1 are shown for 2016 in Table 4.6.3-3. Under Alternative 5, residents and other persons not associated with fisheries are estimated to increase the number of trips they take on the ferry, such that total ferry trips for all groups is twice the number of hovercraft trips taken under Alternative 1. In 2016, resident and other non-fishery related trips are projected to increase to 807. Under Alternative 1 for 2016, this group was assumed to take 368 trips on the hovercraft. Overall travel costs are projected to decrease by $11,237 for the year or $5.54 per passenger.

Table 4.6.3-3 Resident and Other Non-Fishery Transportation in Alternative 5 and Alternative 1

	Travel and Cost Under Alternative 5			Travel and Cost Under Alternative 1			Difference
	Ferry	**Air**	**All Modes**	**Hovercraft**	**Air**	**All Modes**	**All Modes**
Estimated One Way Resident & Non-Fishery Trips per Year	807	1,220	2,027	368	1,659	2,027	0
Average One Way Cost on Primary Mode ($ 2010)	$76.00	$98.00	$89.24	$76.00	$98.00	$94.01	-$4.76
Total Cost on Primary Travel Mode ($ 2010)	$61,332	$119,560	$180,892	$27,968	$162,582	$190,550	-$9,658
Additional Cost of Vehicle Travel ($ 2010)	$11,540	$8,540	$20,080	$10,046	$11,613	$21,659	-$1,579
Total Cost of Travel on All Modes ($ 2010)	**$72,872**	**$128,100**	**$200,972**	**$38,014**	**$174,195**	**$212,209**	**-$11,237**
Total Cost per Passenger ($ 2010)	**$90.30**	**$105.00**	**$99.15**	**$103.30**	**$105.00**	**$104.69**	**-$5.54**

Source: Northern Economics

Direct and Indirect Employment Impacts

Two complete crews would be needed to operate the ferry. Crews would consist of 3 persons and therefore 6 full time crew positions would be expected to be created. In addition, 2 onshore 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 would 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.

With ferry service 6 days per week, Alternative 5 could create an opportunity to develop a small number of jobs 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. Data from the Department of Labor (ADOLWD 2011f) suggest that these could be filled by resident workers. In 2010, 32 workers were employed in the trade, transportation and utilities industries in the City of King Cove, representing less than 20 percent of all resident non-federal wage and salary workers in the community. On the other hand, the community had 99 workers with experience in the trade (81), transportation and warehousing (16), and utilities (2) sectors during the past 5 years. Overall, the total direct effect on employment would be from 9 to 14 persons 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 10-17 jobs under this alternative. This is less about 5 percent of the total number of jobs in the cities of King Cove and Cold Bay. Therefore, Alternative 5 would have a negligible impact on employment.

Population and Demographics

No effects on population would be expected if the new positions are filled by permanent residents. If the additional 10-17 jobs were filled by nonresidents, then the alternative could lead to an increase in population of about 29-46 persons, assuming the average household size of 2.9 persons in the City of King Cove. The ferry pilot jobs are skilled positions that require certification and licensing. These positions would likely be filled initially by non-residents, but residents would eventually obtain the necessary training and certification and would 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 the Aleutians East Borough would operate the ferry, which would have major fiscal effects to the borough. Ferry operations are anticipated to result in about $2 million of annual losses to the borough. This amount represents almost 40 percent of the borough's discretionary expenses in a fiscal year (expenses other than debt service, bonds, and school expense items in the budget). The borough would be responsible for 100 percent of the operation and maintenance costs estimated at over $2 million per year (including the costs of $100,000 per year into a sinking fund for major repair and overhaul during the 35-year life of the vessel). The operation and maintenance costs would not be fully covered with the estimated $0.16 million of annual revenues from the ferry operations. The Aleutians East Borough would be responsible for the replacement cost for new ferry in 2036, estimated at approximately $9 million.

As indicated in the baseline summary, the Aleutians East Borough has had a history in recent years of budget surpluses that have exceeded the projected net losses of the ferry. The borough also has a Permanent Fund and other undesignated capital funds of nearly $24 million. In theory, the budget surpluses and available capital funds could cover (i.e., subsidize) the net operating costs of the ferry for an indefinite period. However, subsidizing the ferry would limit the growth of the borough's capital funds, remove available discretionary funds for use in other borough communities, and potentially curtail the ability to fund other projects in the future.

Summary

Alternative 5 would have negligible socioeconomic effects to the cities of King Cove and Cold Bay because the expected changes in employment, economic activity in transportation, and population would all be of low intensity, with a local extent. The duration would be long-term to permanent, with a common context. Transportation costs between the cities would continue in excess of $100 per passenger trip, if ground travel costs are included. The Aleutians East Borough would need to continue to subsidize the ferry, although at a slightly lower rate over

time, as travel is assumed to increase with population, while costs and ticket prices are assumed to remain constant in real terms. The fiscal effects to the Aleutians East Borough would be of high intensity, permanent duration, regional extent, and common context. The summary fiscal impact is therefore considered major.

Mitigation Measures

Measures to mitigate the negative fiscal impacts to the borough could include adjustments in fares, efforts to increase the ferry's revenues from mail and freight transportation, and external grant sources to subsidize operations.

Cumulative Effects

Socioeconomic conditions in the project area, including effects from past actions, are described in Chapter 3 (Section 3.3.2) and in the assumptions for analysis (Section 4.1.4). Fiscal effects to the local government have been influenced by the 2003 EIS and the operations of the 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. The projected increase in transportation needs due to additional fishery observers in the area were described in Alternative 1. Alternative 5 would have a major direct impact on local governments and a negligible impact to other socioeconomic indicators. This alternative would have a major contribution to cumulative effects on fiscal resource for local government and a negligible contribution to cumulative effects on other socioeconomic indicators.

Conclusion

The direct and indirect effects to transportation costs (to the user), employment, and population and demographics would be negligible. Effects to these indicators would be of low intensity, over a permanent duration, with a local extent, and a common context. Effects to fiscal resources for the local government would be of a high intensity due to the projected level of subsidy required for the ferry operations. Effects would be of a permanent duration with a regional extent, affecting availability of fiscal resources to other communities in the borough. The context, as a regional government, is considered common. The contribution to cumulative effects on socioeconomic indicators would be negligible for all factors except local government fiscal resources, which would be major. The overall effects would be negligible for population and demographics, minor for transportation costs and employment, and major for local government fiscal resources.

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, 100-150 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 hovercraft terminal already 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.

Each dock would take about 3 months to construct, assuming 8 construction workers. This could be completed in 1 construction season of 180 days, extending from April to October.

Summary

The transport of the 8 construction workers and the shipment of equipment and supplies would increase commercial barge and air transport service activity and revenues 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 seasons. 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 summary impact for construction in Alternative 5 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 $70.2 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 4.6.3-4. By 2020, ferry passengers for the 6 days a week schedule are estimated to be 1,636 and 2,881 for air.

Table 4.6.3-4 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									
King Cove Air Taxi Passengers	2,777	2,793	2,808	2,824	2,839	2,853	2,867	2,881	2,945
King Cove Hovercraft or Ferry Trips	1,577	1,586	1,595	1,603	1,612	1,620	1,628	1,636	1,672

Operating costs include about $22,000 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, at about $2 million.

Consumer costs would be similar to that of the hovercraft and air alternatives, at about $90, as shown in Table 4.2.3–9. As shown in Table 4.2.3-8, 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 alternatives, 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 operate similarly to that of the hovercraft service, with greater frequency and reliability in poor weather. Impacts would be of long term duration since there would be no transportation changes 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 transportation operations and facilities would be operated as before. The summary impact for Alternative 5 on transportation would be moderate.

Mitigation Measures

A mitigation measure would be to acquire additional outside funding to cover shortfalls in operating revenue. Efforts to increase cargo revenue and recover medical charter costs could also be continued.

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. Dust and emission control measures would be implemented to reduce temporary impacts to air and water quality during construction activities.

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 fiscal losses for an operator. The overall cumulative effect of Alternative 5 on transportation is considered major.

Conclusion

Operation of the ferry 6 days a week would continue into the future and add a reliable transportation choice for transit to the Cold Bay Airport. However, the shortfall in operating costs and high lifecycle costs present a major economic burden for the ferry operator. Beyond the necessity of additional subsidy to cover operations costs, the direct and indirect effects of Alternative 5 on transportation would be moderate, with a major contribution to cumulative effects. The overall impact of Alternative 5 on transportation is considered moderate to major.

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 EIS 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, these are relatively small construction projects (each requiring only an estimated 8 workers about 3 months to complete) that would likely not significantly impact overall public health and safety in the project area.

Negative 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. However, these are relatively small construction projects that would likely not significantly impact overall public health in the project 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. Alternative 5 has the potential to impact a small number of people (construction workers) potentially from communities throughout the project area, including the City of King Cove, which meets the definition of a minority community and a medically underserved area. Negative direct effects of the construction phase of Alternative 5 on public health and safety would be low in intensity, temporary in duration, regional in geographic extent, and unique in context. 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 year round (instead of 3 days a week from April to October for the hovercraft in the No Action alternative), 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 hovercraft. Unlike transport by air and 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 4.2.3-8. Medical evacuation patients could reach the Cold Bay Airport more often without delays, and depending on weather conditions, the transportation process could be safer when the ferry is used (as compared to transport by helicopter, airplane, fishing vessel, or hovercraft). Therefore, this alternative could have a direct positive 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 positive 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.

However, conditions where it may not be possible to complete medical evacuations via the ferry would still occur. It is assumed that the road to the ferry terminal would be closed about 2 days a year due to snow. The ferry would be removed from service for an average of 7 days every 2 years to comply with Coast Guard dry dock inspections. Major maintenance work could require the vessel to be out of service for an additional 2 to 3 weeks per year. Alternative 5 would also require maintenance of the access road to Lenard Harbor (including signage, regular grading, and snow removal) which could impact public safety if workers are injured. Positive indirect effects on public health and safety could include members of the King Cove community having increased access to health care.

Summary

Positive direct effects of Alternative 5 on public health and safety would be high in intensity, long-term in duration, regional in geographic extent, and unique in context. The direct effects of the operation and maintenance phase of Alternative 5 on public health and safety would be considered major.

Mitigation Measures

Standard practices related to worker health and safety 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. Because the ferry can operate safely under most weather conditions, Alternative 5 would provide for 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, helicopter, plane) could be selected for each specific medical evacuation incident.

Operation and maintenance of Alternative 5 would have major direct and indirect effects to public health and safety and a moderate contribution to cumulative effects on this resource.

Conclusion

The negative direct and indirect effects of the construction phase of Alternative 5 on public health and safety are considered negligible. Standard practices related to worker health and safety could help mitigate the public safety impacts to construction workers. The positive impact of the operation and maintenance phase of Alternative 5 is considered major due to the availability of safe and reliable transportation to needed medical services for the King Cove community. Alternative 5 would have a moderate contribution to cumulative effects on public health and safety, as there would be a year round option for medical evacuation (ferry), subject to operability. The overall positive impact of Alternative 5 is considered major.

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 would be relatively small construction projects resulting in no impact to public health and safety associated with illness, injury, or fatality of workers or indirect increased use of limited local medical facilities. Negative 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 Cold Bay under weather conditions not amenable to travel by helicopter, plane, boat, or hovercraft. Unlike the other forms of transport by air and sea, the ferry is predicted to be able to operate weatherwise most of the time. Positive direct effects of Alternative 5 on public health and safety would be high in intensity, long-term in duration, regional in geographic extent, and unique in context.

The new ferry would operate within concentrated subsistence use areas for waterfowl, salmon, and crab in Lenard Bay and a waterfowl concentration area near Delta Point and Nurse Lagoon. Impacts to the availability of subsistence resources, access to subsistence resources, and increased competition for subsistence resources would be considered of low intensity, long-term, local to regional in extent, and common to important in context.

Summary

The direct and indirect effects of ferry operation and maintenance would be a major (beneficial) effect for human health and a negligible effect to subsistence activities.

Mitigation Measures

Standard worker health and safety procedures during ferry and dock construction could help reduce worker injury or fatality. No new mitigation measures for subsistence are recommended for this alternative other than measures identified in the 2003 EIS.

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. The overall contribution of Alternative 5 to cumulative effects on public health and safety would be moderate.

Implementation of Alternative 5 would not contribute to cumulative effects on subsistence.

Conclusion

Alternative 5 would have a major beneficial impact on human health and a negligible impact on subsistence activities. Alternative 5 would not have a 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

Direct and indirect effects of Alternative 5 would be the same as for Alternative 1. 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 could continue concurrently with this alternative, as discussed in Alternative 1.

Summary

The direct and indirect impacts of this alternative would 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. The impacts would have a local extent since effects would occur in the vicinity of the conveyed parcel from Izembek Wilderness. 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 negligible.

Mitigation Measures

Although this alternative would result in a negligible 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 5 are considered negligible, 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 5 to cumulative effects on public use is considered negligible.

Conclusion

Alternative 5 would have negligible 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

Alternative 5 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 users of the communities of King Cove and False Pass. Lenard Harbor terminal construction and related transportation activity would 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 (1 to 2 years) at both ferry terminals. The intensity of the impact would be low, temporary in duration (lasting only the length of the construction period[s]), 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.

Summary

Impacts to subsistence from implementation of Alternative 5 would be low intensity, temporary 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 migratory waterfowl. The summary impact to subsistence due to construction of Alternative 5 is considered minor. The transfer of the land currently selected by the King Cove Corporation, and located within the Izembek Wilderness to the west of Cold Bay, would proceed under Alternative 5. This would remove land from federal subsistence regulation, but would be expected to have little impact to subsistence access or resources, particularly because most subsistence users in this area would be shareholders of the King Cove Corporation.

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, with the trip originating in Lenard Harbor. Ferry service would include 1 round trip per day, 6 days per week, throughout the year. The ferry would be operated within concentrated subsistence use areas for waterfowl, salmon, and crab in Lenard Bay. 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 activities. Icebreaking activities are likely to be infrequent and the impact of disturbance to subsistence resources would be considered local and short term (temporary) for the length of this activity. Impacts to the availability of subsistence resources in the ferry terminal areas and along the access roads would be considered of low intensity, long-term, local to regional in extent, and common to important in context. The resources that are important in context include the migratory waterfowl and marine mammals.

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 of subsistence resources in the ferry terminal areas and along the access roads would be low in intensity, long-term, local to regional 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 4. Impacts of increased competition for subsistence resources would be low in intensity, long-term, local to regional in extent and common to important in context.

Summary

Impacts to subsistence would include displacement of subsistence resources and increased subsistence uses. 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 impact of operation and maintenance activities to subsistence under Alternative 5 would be considered negligible.

Mitigation Measures

No mitigation measures would be anticipated for subsistence resources, other than measures identified for this alternative in the 2003 EIS.

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 in the project area. Implementation of Alternative 5 would contribute little to cumulative effects on subsistence resources, access to subsistence resources, or competition for subsistence resources. As a result, the project components of this alternative would have negligible effects on subsistence resources or harvest patterns.

Conclusion

Implementation of Alternative 5 would have negligible to minor direct and indirect effects on subsistence; this alternative would have negligible 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.

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 during the construction phase of the project. Indirect impacts may occur, resulting from ground-disturbing activities that encounter cultural materials.

Summary

Direct effects and indirect effects of construction on cultural resources are considered minor as they are medium in intensity, temporary 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.

Summary

No direct effects on cultural resources are expected; indirect effects of operations and maintenance would be considered minor, as they would be medium in intensity, temporary in duration, local in extent, and important in context.

Mitigation Measures

Under Alternative 5, mitigation would be required. An appropriate level of investigation would be completed before any potentially destructive activities could begin.

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 minor direct, indirect, and cumulative effects on cultural resources. The summary 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.

Summary

Impacts to visual resources from construction of Alternative 5 are expected to be low intensity, temporary, extremely localized, and affecting a common resource.

Direct Effects and Indirect Effects from Operation and Maintenance

Beneficial 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 contribute in a positive way to the overall landscape character of the communities of King Cove and Cold Bay. Any perceived contrast of the structures against the surrounding landscape is expected to be viewed favorably, as 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 beneficial 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.

Beneficial indirect effects to visual resources may be realized as a result of increased visual access to surrounding views. The open 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 would 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 impacts are expected to be low intensity, long-term to permanent, localized, and affecting a common resource. Beneficial indirect effects are expected to be moderate intensity, long term, and localized. 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 summary impact level for visual resources is expected to be minor, with anticipated impacts outweighed by overall beneficial effects.

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 overall beneficial impacts to visual resources in the communities of Cold Bay and King Cove. Cumulative effects of the combined actions are expected to be minor.

Conclusion

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 summary impact of Alternative 5 on visual resources is considered beneficial to scenic quality and visual resources. Overall effects would be considered minor.

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, would continue to be managed 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) when 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 boundary. The right to select this parcel pre-dates the establishment of Izembek Wilderness.

Direct and indirect effects on the 4 components of wilderness character within Izembek Wilderness, both in terms of construction and operational phases, would be similar to analysis presented under Alternative 1 (Section 4.2.3.10) with a few exceptions. 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 temporary, moderate-intensity, localized impacts to some visitors to Izembek Wilderness through a diminished opportunity for experiencing natural quiet and opportunities for primitive recreation. The changes in the wilderness quality of solitude and primitive or unconfined recreation would occur on lands that are unique in context. As a result, the direct and indirect effects to the solitude or primitive and unconfined recreation quality would be minor.

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 (USACE 2003). Visual disturbances caused by ferry service would 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. The magnitude of these impacts as experienced by users of Izembek Wilderness would be low due to 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). As the change in this wilderness quality indicator would occur on lands that are unique in context, the direct and indirect effects to the solitude or primitive and unconfined recreation quality would be minor.

Summary

Under Alternative 5, the parcel selected by King Cove Corporation located within Izembek Wilderness would continue to be managed 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) when conveyed to King Cove Corporation.

The implementation of Alternative 5 would also result in low intensity, long-term, localized, unique context effects to wilderness character. 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. Due to the unique context of the Izembek Wilderness, the overall direct and indirect impacts to wilderness character resulting from Alternative 1 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). 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 negative impacts to solitude or primitive and unconfined recreation

Cumulative Effects

Past, present, and reasonably foreseeable future actions that could contribute to cumulative effects to wilderness character within Izembek Wilderness were discussed under Alternative 1. 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

Due to the unique context of the Izembek Wilderness, 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 intensity would be low, and the extent would be local. The summary impact of Alternative 5 on wilderness character within Izembek Wilderness is considered minor.

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