APPENDIX I

ESSENTIAL FISH HABITAT AND BIOLOGICAL ASSESSMENT

I.1 INTRODUCTION

The National Marine Fisheries Service (NMFS) has notified the Federal Aviation Administration (FAA) that actions proposed at the Juneau International Airport (JNU or Airport) would have potential to adversely affect essential fish habitat (EFH). These actions would also have potential to impact species listed as threatened and endangered under the Endangered Species Act (ESA) of 1973, as amended. The FAA is the lead agency tasked with preparation of an Environmental Impact Statement (EIS) for the proposed Airport actions. Therefore, this EFH Assessment/Biological Assessment (EFH/BA) has been prepared by FAA in conjunction with the EIS and in conformance with the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (see FR 62, 244, December 19, 1997) and in accordance with Section 7 of the ESA. This EFH/BA contains:

- A description of the project;
- An analysis of the potential adverse effects of the project on EFH, managed fish species, and federally listed threatened and endangered species;
- FAA's conclusions regarding the effects of the project on EFH and federally listed species; and
- Proposed conservation measures.

This EFH/BA is part of the integrated environmental review and consultation process for the proposed Airport actions, conducted in accordance with the National Environmental Policy Act (NEPA) and applicable state and federal laws including Magnuson-Stevens, the Endangered Species Act (ESA), and the Fish and Wildlife Coordination Act.

I.1.1 PROJECT OBJECTIVES

The projects proposed for JNU that are being evaluated in the EIS would be implemented to meet various facility needs including aviation safety enhancements, correction of deficiencies in aviation and support facilities, reduction of the potential for wildlife strikes with aircraft, and increased operational efficiency of the Airport. Objectives for two of the proposed projects include bringing the Airport's runway safety area (RSA) into compliance with FAA standards and improving aircraft navigational alignment for approaches to Runway 26. Other projects would increase the aviation facilities such as hangars and tiedown space to meet existing demands and accommodate projected future growth. A new snow removal equipment and maintenance facility (SREF) would be constructed, and access to the fuel farm would be improved. A number of activities would be undertaken to reduce wildlife habitat or repel birds creating hazardous conditions for aircraft departures and arrivals.

I.1.2 DESCRIPTION OF THE PROJECT

The following sections briefly summarize the actions identified by FAA as its preferred alternatives to meet the purposes and needs of the Airport as identified in Section 1.4 of the Final Environmental Impact Statement (FEIS). All of the actions and their alternatives considered by the FAA are described in further detail in Chapter 2 of the FEIS. Figure 1-2 in the FEIS illustrates locations of major existing facilities on the Airport.

I.1.2.1 RUNWAY SAFETY AREA (RSA)

To bring the Airport into compliance with FAA standards for RSA, the City and Borough of Juneau (CBJ) has proposed implementation of Alternative RSA-5E to meet the FAA's RSA requirements. FAA has also identified RSA-5E as its preferred RSA alternative. The Runway 08 departure threshold would remain in approximately its existing location, but the landing threshold would be displaced 120 feet to the east. There is already approximately 250 feet of RSA on the west end of the runway. To achieve the full RSA of 600 feet for undershoot protection for Runway 08, an additional 230 feet of fill would be added to the west runway end. This construction would require relocation of the emergency vehicle access road, Float Plane Pond access road, and Dike Trail, which would require an additional 96 linear feet more of disturbance west of the runway. The Runway 26 thresholds would be relocated 520 feet to the east. Approximately 850 feet of fill would be placed on the east runway end for the threshold relocation and construction of the RSA. The parallel taxiway would also be extended approximately 520 feet eastward so that aircraft could taxi to the new Runway 26 departure threshold. The east end of the RSA would be sloped at a 4:1 grade down to the existing ground surface. The west end of the RSA would be sloped at a 2:1 grade from the RSA down to the relocated Dike Trail/EVAR and then at a 1.5:1 grade from the Dike Trail/EVAR down to the existing ground surface adjacent to the Mendenhall River. In addition, the lateral RSA along approximately 4,600 feet of the south side of the runway would be extended outward an additional 132 feet to meet the FAA's 500-foot width requirements for RSA. The slope of the lateral RSA would be constructed at a 1:1 grade down to the existing ground surface. Meeting these width requirements would also entail that the RSA be extended over the existing open reach of Jordan Creek on the north side of the runway, between the runway and Taxiway A. Figure 2-10 of the FEIS shows the disturbance footprint for RSA-5E.

The widening of the lateral RSA would require an extension of the Jordan Creek runway culvert, causing it to join the taxiway culvert and resulting in the formation of a single passage approximately 770 feet long. The existing culverts under the runway and taxiway are corrugated metal pipe (CMP) culverts. Under RSA-5E, bottomless arch culverts would be installed under the lateral RSA to connect the existing runway and taxiway culverts. At such time in the future as the runway is substantively repaired or reconstructed or the CMPs reach the end of their useful life, the CMPs would be replaced with bottomless arch culverts. Thus, the entire 770-foot long culvert system under the RSA, runway, and taxiway would eventually consist of bottomless arch culverts. Light grates would be installed at practicable intervals to allow sunlight into the culvert.

The main tidal slough channel around the east end of the runway, East Runway Slough, would be blocked by the construction of the RSA, thereby eliminating the hydrologic connectivity between the areas north and south of the current runway's east end. In order to address this issue, RSA-5E would include reconstruction of the tidal slough channel around the new end of Runway 26. This channel would be longer, and therefore slightly less steep, than the current tidal channel, but would re-establish hydrologic connectivity of areas north and south of the runway.

Duck Creek would need to be relocated in order to construct the RSA. The resulting realigned channel would be approximately 200 feet shorter than its current length. The confluence of the creek with the Mendenhall River would be slightly further north than its current location, but south of the Mendenhall Wastewater Treatment Plant's Regulatory Mixing Zone. A no-build buffer would be established along the entire relocated creek corridor.

I.1.2.2 Navigational Improvements: Install MALSR on Runway 26 Approach

To improve aircraft navigational alignment with Runway 26 at night and in poor weather conditions during east approaches to the Airport, FAA has identified Alternative NAV-2B, installation of a medium-intensity approach lighting system with runway alignment indicator lights (MALSR), as the preferred navigational improvements alternative. The MALSR is a series of lights on standards that align with the runway centerline. There would be 14 light configurations spaced at 200-foot intervals, extending 2,400 feet east of the Runway 26 threshold. Three of these would be placed on short frangible supports within the RSA and 11 additional tower systems ranging from approximately 5 feet above ground level to about 20 feet above ground level. Access to the MALSR for maintenance and emergency service would be through use of a permanent, at-grade access road. Figure 2-16 of the FEIS illustrates the locations for the MALSR light towers and access road, as installed with FAA's preferred RSA alternative, RSA-5E. Figure 2-32 of the FEIS shows a typical configuration for the light tower and a cross section of the access road.

I.1.2.3 Airport Facility Development Projects

Section 1.4.3 of the FEIS describes the need to improve some facilities at JNU to improve operational efficiency, increase airfield capacity, and accommodate future growth in aviation activity. The following sections describe the actions proposed by JNU to satisfy those needs.

I.1.2.3.1 Snow Removal Equipment and Maintenance Facility (SREF)

JNU presented as its Proposed Action to construct a new SREF, co-located with a new sand and chemical storage building as outlined in the SREF-3B1 alternative. FAA has identified Alternative SREF-3B1 as its preferred SREF alternative. Current estimates developed by JNU for the FEIS indicate that approximately 44,616 ft^2 of inside storage would be necessary to accommodate parking for vehicles and equipment, and loading and storage areas for de-icing compounds. A separate, 12,000 ft^2 sand storage building would be constructed adjacent to this building. A total of about 6.7 acres would be dedicated to the buildings, equipment turnaround space, and parking. Figures 2-18 and 2-33 of the FEIS illustrate the proposed location for and design of the SREF.

I.1.2.3.2 Fuel Farm Access Road

JNU presented as its Proposed Action to construct a new road that leads south from the fuel farm into the main Airport facilities as outlined in Alternative FF-1. FAA has identified Alternative FF-1 as its preferred fuel farm access alternative. This roadway would directly link the bulk fuel storage facility with the aircraft operating area, and the proposed roadway alignment would require a bridge crossing of Duck Creek to connect with the general aviation ramp. The proposed road location is shown on Figure 2-19 in the FEIS. A cross-section of the road design is illustrated in Figure 2-44 in the FEIS.

I.1.2.3.3 Aircraft Parking and Storage Needs

Recognizing the current facility deficiencies at the Airport and relying on aviation demand estimates generated for the Airport Master Plan, as illustrated on Table 1-2 in the FEIS, JNU presented as its Proposed Action Alternative FW/RW-2 to develop the following facilities for general aviation through the year 2015. FAA has identified Alternative FW/RW-2 as its preferred aviation facilities development alternative. This alternative includes the following development:

- 12 based and transient aircraft tiedowns in the northeast portion of the Airport.
- 11 based and transient tiedowns in the northwest portion of the Airport.
- 38 new executive/T- hangars in the northwest portion of the Airport.
- 7 large hangars in the northeast portion of the Airport
- 2 new fixed-base helicopter operations in the northeast portion of the Airport.
- 15 helicopter tiedowns in the northeast portion of the Airport.

Figure 2-34 in the FEIS illustrates a proposed layout concept for currently undeveloped property in the northeast portion of the Airport. Figure 2-36 in the FEIS provides a layout concept for undeveloped area in the northwest portion of the Airport.

I.1.2.4 Implement a Revised Wildlife Hazard Management Plan (WHMP)

JNU has completed a new WHMP for the Airport that recommends a number of proposed actions to address the specific wildlife hazards identified in Section 1.4.4.3 of the FEIS. JNU's Proposed Actions and FAA's preferred WHMP alternative comprise a combination of activities from each of the three wildlife hazard management action alternatives that are presented in the FEIS. These activities would include:

- Fill of the wetlands located near the mouth of Duck Creek on Airport property.
- Selective fill of the wetlands on the Refuge, west of Runway 08 and extending north past the mouth of Duck Creek.
- Relocation of the mouth of Duck Creek to the north.

- Removal of swales and areas which pond water along the edges of the runway and parallel taxiway.
- Removal of vegetation from the Float Plane Pond.
- Removal of the dam at the mouth of Jordan Creek.
- Periodic removal of corvid nests in and installation of a deer fence around the Float Plane Pond Woodland accompanied by increased hazing in this area, as needed.

Figure 2-20 in the FEIS illustrates the on- and off-Airport locations that would be affected by the proposed wildlife hazard control actions.

I.2 Essential Fish Habitat (EFH) Assessment

I.2.1 Affected Environment[1]

Fish species in the Juneau area for which the NMFS has identified EFH include chinook salmon (*Oncorhynchus tshawytscha*), chum salmon (*O. keta*), coho salmon (*O. kisutch*), pink salmon (*O. gorbuscha*), and sockeye salmon (*O. nerka*) in fresh and estuarine waters; and staghorn sculpin (*Leptocottus armatus*), sablefish (*Anoplopoma fimbria*), Pacific Ocean perch (*Sebastes alutus)*, yelloweye rockfish (*S. ruberrimus*), shortraker rockfish (*S. borea*), rougheye rockfish (*S. aleutianus*), dusky rockfish (*S. ciliatus*), Pacific cod (*Gadus macrocephalus*), starry flounder (*Platichthys stellatus*), yellowfin sole (*Pleuronectes asper*), rock sole (*P. bilineatus*), and various "forage fish" in marine waters (Table 1).

Of these, chum, coho salmon, pink, and sockeye salmon are known to use the freshwater rivers and estuarine low marsh habitats on and adjacent to Airport property; and sculpins are routinely observed in the fresh and brackish waters on and adjacent to Airport property. Of the sculpins, staghorn sculpins are most often found in the brackish waters (sloughs, low marsh, and intertidal portions of streams), while coastrange sculpin and prickly sculpin (*Cottus asper*) are found upstream from tidal influence. Gerke et al. (1999) also captured yellowfin sole and rock sole from mudflat habitats in the Mendenhall Wetlands, south of the Mendenhall Peninsula approximately 1.5 miles from the Airport.

"Forage fish" including capelin (Mallotus villosus), Pacific herring (*Clupea palasi*), eulachon (*Thaleichthys pacificus*), and sandlance (*Ammodytes hexapterus*) are known to occur in and around the project area. The local Lynn Canal stock of Pacific herring was a commercially important stock until it declined in the early 1980s for unknown reasons. Since then, Pacific herring abundance has increased but has not exceeded the target threshold of 5,000 tons of spawning fish established as a criterion for renewing a commercial fishery. These Pacific herring spawn primarily in Berner's and Auke bays during May and June, and deposit spawn on eelgrass, pilings, and other substrate along the water's edge at tides of up to +2 ft MLLW (Craig Farrington, ADF&G, pers. comm. April 2002). Eulachon have been observed spawning in the Mendenhall River and

1. The following information is summarized from Section 3.9 of the FEIS and various reference sources.

Table I-1. Seasonal Use of Aquatic Habitats within and adjacent to the EIS Project Area, by Fish Species for which Essential Fish Habitat (EFH) Has Been Designated

Species, Lifestage	Duck Creek	Jordan Creek	Mendenhall River	Tidal Sloughs, Low Marsh	High Marsh	Relative Abundance, Other Notes
Coho salmon						Common in Duck, abundant in Jordan
Adult migration (in)	F	F	F	F		
Spawning	F	F	F			
Incubation	F, W	F, W	F, W			Tends to fail in Duck Creek
Juvenile rearing	F, W, Sp, Su	F, W, Sp, Su	F, W, Sp	Sp, Su, F	Sp, Su, F	
Juvenile migrations (in+out)	F, Sp	F, Sp	Sp			Downstream in spring, upstream in fall
Chum and pink salmon						Chum abundant, pink common
Adult migration (in)	Su	Su	Su	Su		
Spawning	Su	Su	Su?			
Incubation	Su, F, W	Su, F, W	Su, F, W?			Tends to fail in Duck Creek
Juvenile rearing				Sp	Sp	Largely hatchery fish from DIPAC
Juvenile migration (out)	Sp	Sp	Sp			
Sockeye salmon						Common
Adult migration (in)			Su			
Juvenile migration (out)			Sp			
Eulachon						Sporadically abundant
Spawning			Sp			

Table I-1. Seasonal Use of Aquatic Habitats within and adjacent to the EIS Project Area, by Fish Species for which Essential Fish Habitat (EFH) Has Been Designated, continued

Species, Lifestage	Duck Creek	Jordan Creek	Mendenhall River	Tidal Sloughs, Low Marsh	High Marsh	Relative Abundance, Other Notes
Capelin						Common
Adults				Sp, Su	Sp, Su	
Spawning						Spawns on beaches
Juveniles				Sp, Su	Sp, Su	
Pacific herring						Abundant
Adults				Sp, Su	Sp, Su	
Larvae				Sp, Su	Sp, Su	
Juveniles				Su	Su	
Sandlance						Common
Adults + juveniles				Sp, Su, F, W		
Staghorn sculpin						Abundant
All stages	Sp, Su, F	Sp, Su, F		Sp, Su, F	Sp, Su, F	
Starry flounder						Abundant
Juveniles	Sp, Su, F	Sp, Su, F		Sp, Su, F	Sp, Su, F	
Yellowfin sole				Su, F		Observed in Mendenhall Wetlands; not adjacent to Airport
Rock sole				Sp, Su		

[1] Species include those for which NMFS has designated Essential Fish Habitat in and adjacent to the project area. Codes: Sp=Spring, Su=Summer, F=Fall, W=Winter. Bold indicates seasonal use confirmed during various studies (note: little is known about winter use of the tidal sloughs and salt marsh).

capelin and sandlance have been observed in estuarine waters near the Airport but make up a minor portion of the forage fish community in the project area. Other EFH species, including chinook salmon, sablefish, Pacific Ocean perch, yelloweye rockfish, shortraker rockfish, rougheye rockfish, dusky rockfish, and Pacific cod, are not regularly associated with the project area.

Thus, all aquatic habitats within and adjacent to the Airport, aside from the Float Plane Pond, constitute EFH for the salmon, sculpins, and forage fish listed above. The water quality and hydrology of the tidal wetlands, sloughs, and freshwater streams and rivers associated with this area are also considered important factors in maintaining EFH.

I.2.2 Impacts Analysis of the Preferred Alternatives on Essential Fish Habitat (EFH)

Impacts to wetland habitat by acreage and percentage are detailed in the Vegetation and Wetlands sections, Sections 4.3.7, 4.4.7, 4.5.7, 4.6.7, 4.7.7, 4.8.7 and 4.3.8, 4.4.8, 4.5.8, 4.6.8, 4.7.8, and 4.8.8, respectively, of the FEIS. Those analyses were used to evaluate impacts to EFH within and adjacent to the project area. Because fish within the project area tend to use virtually all aquatic and estuarine habitats during various seasons and tides, the impacts described in the following sections are presumed to affect all fish species associated with the project area (resident and anadromous salmonids, sculpins, sticklebacks, starry flounders, and marine forage fish) unless otherwise specified.

FAA's preferred alternatives would directly impact a total of 55.8 acres of EFH in the Mendenhall estuarine wetland system (Table I-2). This would result in a reduction of approximately 1.6 percent of the estuarine wetlands in the Mendenhall area. Extending the RSA would also likely disrupt tidal flows to estuarine wetlands on the east side of the project area. This could potentially result in indirect impacts to estuarine wetlands in this area of the Mendenhall wetlands.

Table I-2. Total Impacts to EFH

EFH Type	Acres Lost	Percent of Landscape Area*
Open water	0.9	<0.1%
Slough	13.0	1.7%
Low marsh	9.0	1.1%
High marsh	32.9	3.5%
Total EFH Lost	55.8	1.6%

*Percent of like habitat available within the Mendenhall estuarine wetland system.
+ Identifies net gain of EFH; - identifies net loss of EFH.

The reduction of EFH as a result of the preferred alternatives would have direct, adverse affects on the fish populations in the Mendenhall estuarine wetland system including chum salmon, coho salmon, and Pacific herring. However, the preferred alternatives would impact a relatively small proportion of available habitat in the landscape area (as defined in the FEIS), which comprises approximately 3,531 acres of EFH in the form of marine, estuarine, and riverine wetlands and waters of the U.S. If the conservation measures identified in Section 2.4, below, are implemented the direct and indirect impacts to fish populations resulting from these actions would likely be negligible.

I.2.2.1 RUNWAY SAFETY AREA (RSA): ALTERNATIVE RSA-5E

The primary impacts to EFH caused by Alternative RSA-5E stem from the filling and disruption of access to EFH. The majority of the direct habitat losses would occur south and east of the runway. Following construction, EFH would be permanently and adversely reduced by approximately 39.8 acres (Table I-3), though this includes areas disturbed in the reconstruction of the eastern runway slough, which would off-set adverse impacts to EFH resulting from construction of the RSA. Most of the direct loss would be high marsh habitat, but loss of tidal slough and low marsh habitat would be somewhat offset with the active reconstruction of the tidal slough around the east end of the runway.

Table I-3. Direct Effects of EFH: Alternative RSA-5E

EFH Type	Acres*	Percent of Landscape Area**
Open water	0.5	<0.1%
Slough	11.9	1.8%
Low marsh	8.9	1.3%
High marsh	18.5	2.0%
Total EFH Lost	39.8	1.0%

**Includes acreage for reconstruction of eastern runway sloughs, which would ultimately serve to maintain the hydrologic connection between the tidal sloughs located north and south of the Runway 26 end and minimize impacts to vegetation, hydrology, and wetlands communities that comprise EFH.

*Percent of like habitat available within the Mendenhall estuarine wetland system.

The preferred RSA alternative would also affect fish passage into Jordan Creek, another major impact of concern. Construction activities associated with extending the Jordan Creek culvert would have short-term impacts on fish passage and aquatic habitat quality resulting from enclosure of the existing open channel and temporary increases in turbidity. Long-term impacts to fish passage resulting from the culvert extension are possible but largely unknown. While fish passage has been studied extensively in roadway culverts less than 300 feet long, there are relatively few analogs to the situation at JNU from which to make predictions concerning impacts to fish passage, especially considering the magnitude of Juneau's tidal fluctuations and the fish species of concern.

When high tides inundate the Jordan Creek culvert, fish access through the culvert is facilitated, as downstream velocities slow and often reverse such that the tides may push fish upstream. When the culvert is not inundated by tides, fish access is dependent on the physical streamflow conditions and the behavior of fish within and immediately outside the culvert. Swimming performance curves suggest that, at temperatures from 8° to 12° C, coho salmon juveniles (5-inches long) could pass a 770-foot-long distance against a water velocity of 1.6 feet/second (Jin 1986). Passage success of salmon fry and juveniles is profoundly influenced by velocity profiles and turbulence within a culvert (Powers 1997). If the existing culverts are joined, access would be further complicated due to the slope break and the metal bottom within the culvert that is mostly free of gravels or other bed material.

The length of a modified culvert raises two other concerns. First, darkness within the culvert would likely cause fish to pause at the culvert entrance, abort initial passage attempts, or otherwise resist passage. Second, maintenance of the culvert to clear debris jams and correct defects would be more difficult due to the slope break preventing a clear sight line through the passage and more limited access to the center of the culvert. Both of these concerns are greatest if the existing culverts are joined. Since the two existing culverts are set at different angles, there would be no "through light" visible from either end, and the narrow, relatively rough sides of the corrugated metal pipe (CMP) culverts are more likely to catch debris than the smooth sides of a wider concrete arch culvert. As noted previously, surface grates would be installed at practicable intervals along the length of the culvert to allow in visible light and help reduce the impact of darkness. Additionally, the existing CMP would ultimately be replaced with a bottomless arch culvert, either to coincide with runway construction, or substantive repair activities or and the end of the useful life of the existing culvert pipes. The smoother sides of the bottomless arch culvert would have less potential to catch debris.

Relative to current conditions, fish passage into Jordan Creek would be inhibited by joining the existing culverts. The existing open reach between the runway and taxiway may be benefiting fish passage by providing light between the already long culverts; however, such benefits would be reduced by construction of the lateral RSA. Table I-4 describes the culvert treatment incorporated into the RSA alternative and the drawbacks of the action.

Table I-4. Proposed Culvert Treatment for Alternative RSA-5E at the Jordan Creek Crossing

Parameter	Description
Treatment	Join existing culverts
Bottom Condition	Bare CMP (partial), slope break, gravel (partial at first, then full length)
Minimum Culvert Width	8 feet for existing CMPs 10 feet after replacement of existing CMPs
Relative Water Velocity	Moderate
Visible Light	Limited (surface grates)
Maintenance	Difficult
Overall Fish Passage	Inhibited

EFH and fish access to EFH may also be affected indirectly, as the area hydrology adapts to the new fills placed for the RSA south and east of the runway. The tidal flow patterns resulting from this alternative are likely to differ from existing conditions, with the long eastward RSA extension blocking flows and fish access between the north and south sides of the east runway fill. The East Runway Slough channel would be actively reconstructed around the end of the east end of the runway under this alternative, thereby re-establishing the majority of existing tidal flow through this area after construction of the RSA. A slight reduction in tidal flows on the south side of the runway is still possible even with the reconstruction of the slough channel and may reduce channel size of the sloughs into which Jordan Creek flows. Consequently, fish access to Jordan Creek may change downstream from the runway.

On the north side of the runway, slightly reduced tidal flow to estuarine habitats near the Miller-Honsinger Slough would result in limited reduction of fish access to high marsh habitats on every tidal cycle. Reduced tidal inundation would cause the loss of additional EFH along the tidal perimeter of the Miller-Honsinger Slough area. The area of high and low marsh habitats indirectly affected by the eastern RSA fill is unknown at this time due to the lack of detailed topographic data. When CBJ's LIDAR data becomes available to the public, this area could be calculated using hydrologic modeling and GIS.

I.2.2.2 Navigational Improvements

When considered independently of the RSA improvements, construction of the medium-intensity approach lighting system with runway alignment indicator lights (MALSR) is assumed to have no substantial short-term impact to EFH. Installation of the access road and light towers and pads in sloughs and low marsh would primarily occur during low tide and best management practices would be employed to minimize sediment losses throughout the construction process.

The magnitude of EFH permanently lost by MALSR installation under RSA-5E would be 0.9 acres and would consist entirely of high marsh habitat. Table I-5 quantifies the habitat types lost due to MALSR installation for the RSA-5E alternative. The long-term losses in EFH would result primarily from the at-grade access road and the MALSR light towers and pads. Tidal flows would be preserved under the bottomless concrete arch culverts or a bridge used to support the road over the reconstructed tidal slough at the end of Runway 26. Exclusionary devices would discourage fish-eating birds from perching on the MALSR towers and minimize any indirect potential for increased predation on fish.

I.2.2.3 Snow Removal Equipment and Maintenance Facility (SREF)

Most of the land changes required to accommodate Alternative SREF-3B1 are described and evaluated within other alternatives (e.g., Aviation Facility Development Alternative FW/RW-2). The SREF development would affect 1.6 acres of high marsh habitat (0.2% of high marsh available within the landscape area) that is only accessible to fish on extreme high tides. Construction of the SREF would have no direct impact on fish resources. However, development of the SREF site would reduce infiltration and cause an increase in peak flows and concentration of contaminants in Zig-Zag and Miller-Honsinger Sloughs during precipitation events, thereby indirectly increasing the potential to harm fish or otherwise degrade fish habitat.

Table I-5. Direct Loss of EFH: Navigational Alignment Alternative RSA-5E

EFH Type	Acres	Percent of Landscape Area*
Open water	0.0	0.0%
Slough	0.0	0.0%
Low marsh	0.0	0.0%
High marsh	0.9	<0.1%
Total EFH Lost	0.9	<0.1%

*Percent of like habitat available within the Mendenhall estuarine wetland system.

I.2.2.4 Fuel Farm Access

The primary direct impact of improving fuel farm access under Alternative FF-1 relates to construction of a new crossing of Duck Creek in the northwest Airport area. EFH in this reach is limited to the active stream channel, which would only be reduced by a small amount to accommodate the stream crossing needed for a new access road. The primary, indirect impact to fisheries relates to the risk of a fuel spill due to vehicular accident on or immediately adjacent to the Duck Creek crossing.

Construction of the bottomless concrete arch culvert for the new stream crossing could disrupt fish movement in Duck Creek. However, these effects would be short-term in duration, lasting only during the construction phase. Approximately 60 linear feet of riparian habitat on Duck Creek would be lost along both banks of stream corridor and replaced with the concrete arch culvert. This loss would be considered a minor, adverse impact since the primary goal for this reach is to facilitate fish migration, not encourage rearing or spawning. The new culvert would simulate stream conditions and ensure fish passage at all flows.

There may be a beneficial, indirect impact of this alternative (relative to the No Action) consisting of a slight reduction in the risk of catastrophic fish kills due to accident-related fuel spills in or near Duck Creek, since the fuel delivery route would be shorter and more secure than the existing route along Cessna Drive.

I.2.2.5 Aviation Facility Development

There is potential for substantial effects to fish, both adverse and beneficial, from aviation facility development as outlined in Alternative FW/RW-2. Most of these impacts would occur in the northwest Airport area, especially around Duck Creek and its associated estuarine habitat. Although pink and chum salmon have been observed spawning in this portion of Duck Creek, success is typically limited due to the high sedimentation of the streambed and low dissolved oxygen levels. Additionally, the goal for this reach is to facilitate upstream and downstream fish movement and not to encourage fish to spawn within the reach for safety purposes relating to wildlife hazard management (Koski and Lorenz 1999, USDA 2001).

Under JNU's Proposed Action and FAA's preferred alternative, direct impacts to fish in the northeast Airport area would be limited to a small amount of slough (i.e., open water) and low marsh habitat and a larger amount of high marsh habitat in and near Zig-Zag Slough. There is no fish habitat on Engineer's Cut, the proposed site for the relocation of the remote communications outlet (RCO) relocation (a connected action, since the existing RCO would be displaced by new aviation facilities), but the automated surface observation system (ASOS) BRL relocation site and access road would affect high marsh and slough habitat. Table I-6 summarizes direct loss of EFH associated with aviation facility development and does not account for the 0.4 acre of high marsh habitat impacted by relocation of the ASOS.

Table I-6. Direct Loss of EFH: Aviation Facility Development Alternative FW/RW-2

EFH Type	Acres	Percent of Landscape Area*
Open water	0.0	0.0%
Slough	+0.2	+<0.1%
Low marsh	+0.7	+<0.1%
High marsh	-13.3	-1.9%
Total EFH Lost	-12.4	-0.3%

*Percent of like habitat available within the Mendenhall estuarine wetland system.
+ Identifies net gain of EFH; - identifies net loss of EFH.

Development of the large areas of impervious surface in the northeast and northwest Airport areas would also cause a reduction of storm water infiltration, an increase in storm water runoff, and concentration of contaminants near Duck Creek and the Miller-Honsinger Slough areas during precipitation events. These changes could indirectly increase the potential for harm to fish or degradation of EFH.

I.2.2.6 Wildlife Hazard Management Plan (WHMP)

The actions proposed by JNU for wildlife hazard management, and identified as the FAA's preferred WHMP alternative, comprise a combination of different activities that would occur under the various wildlife hazard alternatives described Section 2.9 in the FEIS. Specifically, JNU proposes to implement the following actions:

- WH-3a: Alter vegetation management practices to attract fewer wildlife and increase hazing activities, as needed.
- WH-1b: Fill on-Airport wetlands to elevation of proposed Northwest Development Area.
- WH-2c: Selectively dredge and fill wetlands west of the airport to eliminate swales, ponds, and ditches and create a free-draining surface to the Mendenhall River.
- WH-1d: Relocate lower Duck Creek (between Cessna Drive and the Mendenhall River) to a newly created channel along the north Airport boundary.

- WH-4e: No action (no change to existing surface water conveyances).
- WH-1f: Remove swales and areas along pavement edges that collect water.
- WH-1g: Mechanically remove vegetation from Float Plane Pond and pond fingers using dredging equipment.
- WH-1h: Remove dam at mouth of Jordan Creek.
- WH-2i: Periodically remove corvid nests and install deer fence; increase hazing in Float Plane Pond woodland, as needed.

Of the above actions, the ones that would affect EFH are WH-1b, WH-2c, WH-1d, and WH-1h. The other actions will not be discussed further in this document. With the exception of WH-1h, these actions would result in direct losses of estuarine EFH. Action WH-1h could enhance EFH by eliminating a possible impediment to fish passage immediately downstream of the Jordan Creek runway culvert outfall.

Table I-7 summarizes direct loss of EFH associated with implementation of the above wildlife hazard management activities.

Table I-7. Direct Effects to EFH: Proposed Wildlife Hazard Management Activities (acres)

EFH Type	WH-1b	WH-2c	WH-1d	TOTAL	Percent of Landscape Area*
Open water	0.0	-0.6	+0.2	-0.4	<0.1%
Slough	- 0.2	-1.7	+0.6	-1.3	0.2%
Low marsh	- 0.7	-1.0	+0.9	-0.8	0.1%
High marsh	-1.3	0.0	+1.1	-0.2	<0.1%
Total EFH Lost	-2.2	-3.3	+2.8	-2.7	<0.1%

*Percent of like habitat available within the Mendenhall estuarine wetland system.

Long-term adverse impacts associated with wildlife hazard management would include a 2.7-acre reduction of EFH (mostly slough habitat) along and within the Mendenhall River. Fish movement in Duck Creek may be temporarily disrupted during channel relocation and establishment of a new confluence to the Mendenhall River. However, there would be a net gain in EFH associated with the relocation of Duck Creek under WH-1d. Fish movement in the Mendenhall River may be disrupted during wetland fill activities associated with WH-1b and WH-2c.

Removal of the rock dam near the mouth of Jordan Creek under WH-1h would be accompanied by maintenance and improvement of semi-natural cobble/boulder steps at the culvert entrance. Removal of the dam would ease fish access and allow fish to move more swiftly through the culverts. This action would also reduce wildlife hazards by limiting a food source at this location.

Dredging the Float Plane Pond fingers would disrupt habitat for resident fish populations (three-spine sticklebacks, staghorn and coastrange sculpins, and starry flounder). However, the Float Plane Pond is designed for aviation uses and not considered EFH for these fish species. Thus, potential impacts to fisheries associated with dredging the Float Plane Pond were not included in this assessment.

I.2.3 CUMULATIVE EFFECTS

I.2.3.1 PAST AND CURRENT ACTIONS

The construction of JNU and its facilities permanently disturbed approximately 345 acres of wetlands from baseline conditions to present-day. Table 5-1 in the FEIS presents a summary of activities permitted by the U.S. Army Corps of Engineers since 1982. The bulk of these projects affected estuarine wetland types such as high marsh, low marsh, and intertidal sloughs.

The construction of the golf course, west of the Mendenhall River, resulted in the loss of approximately 120 acres of high marsh habitat. Additionally, the golf course caused the high marsh boundary to shift to the south, thereby decreasing low marsh habitat west of the Mendenhall River.

The development of Miller-Honsinger Pond converted 28 acres of estuarine high marsh to lacustrine wetlands. Indirectly, this action contributed to loss of tidal influence near Egan Drive, resulting in the conversion of high marsh to palustrine wetlands. This action resulted in the loss of wetland functions such as ground water discharge and lateral flow, fish habitat, regional ecological diversity, and riparian support, and the gain of functions such as sediment and toxicant retention and surface hydrologic control.

Dredging of the Gastineau Channel to connect commercial boat traffic to Auke Bay occurred around 1959, causing a loss of 53 acres of estuarine wetlands and the formation of upland habitat. (Some of these dredge-spoil islands have developed stands of spruce.) Wetland functions lost are similar to those lost due to Airport development and construction. As mentioned earlier, the dredge-spoil islands likely have had an effect on tide dynamics that actively maintained intertidal sloughs and adjacent low marsh habitat. With the local reduction of tidal forces, in conjunction with isostatic rebound, more rapid uplandification could occur at the landscape level.

The net accumulation of past and current development on and near the Airport, particularly along Duck and Jordan creeks, has resulted in substantial loss of freshwater and estuarine EFH, reduction in fish habitat quality, increased risk of fish injury and death due to contamination, and impediments to fish movement. The natural process of isostatic rebound may also contribute to further loss of estuarine EFH and may exacerbate fish access problems in lower Duck Creek. In addition, recent DIPAC operations include annual releases of millions of juvenile hatchery salmon that compete with wild salmon, at least during a few weeks annually, for limited estuarine rearing habitats. Hatchery adults may also compete with wild adults for holding space, spawning habitat, and mates – especially in small streams like Duck and Jordan creeks. However, because DIPAC fish originate from local stocks, their overall influence may be minor, but they remain products of human, rather than natural, genetic selection. Finally, although difficult to assess independent of natural variability, management and harvest may have contributed to reductions in abundance of some fish populations.

I.2.3.2 Reasonably Foreseeable Future Actions

Present and foreseeable future actions that may have adverse cumulative effects on EFH include continued releases and returns of DIPAC hatchery fish, and most human development along the estuary and within the drainage basins of the Mendenhall River, Duck Creek, and Jordan Creek. One exception includes actions related to the upper Duck Creek watershed enhancements that will tend to improve habitat quality and access for salmon within Duck Creek (Koski and Lorenz 1999). These improvements should increase the number of fish using Duck Creek, but may be offset or overshadowed by habitat and access losses related to other development in the basin. Actions proposed at the Airport are mostly consistent with the Duck Creek Watershed Management Plan, in that they tend to discourage salmon from lingering near the mouth of Duck Creek and encourage them to move through this reach more efficiently. While DIPAC has discontinued their pink salmon stocking program as of 2002, releases of chum, coho, and chinook salmon into Gastineau Channel are likely to continue into the foreseeable future (Rick Focht, DIPAC, pers. comm. November 2002).

The Douglas Island crossing would be likely to permanently disturb high and low marsh habitat and subtidal and intertidal sloughs. This would result in the loss of EFH acreage and function similar to those lost due to Airport development.

Overall, restoration efforts and application of improved management practices (e.g., stream-simulation culverts and stream buffers) would improve fish habitat and access into the streams. It is reasonable to assume that the Refuge will continue to protect estuarine EFH. However, increased development, combined with glacial uplift, will cause a long-term reduction in estuarine EFH and increase the risk of fish injury due to contaminants.

I.2.4 Proposed Conservation Measures

A conceptual wetland mitigation plan, which will include mitigation for losses to estuarine wetlands and thus EFH, is currently under development by FAA and CBJ, in consultation with cooperating agencies and other relevant local, state, and federal entities. In addition to this compensatory mitigation plan, there are a variety of potential conservation measures that, if implemented, would avoid or minimize impacts to EFH. These measures are described in detail in Section 2.11 of the FEIS and include:

- The construction of a large con-span or bridge for the fuel farm road that would span the estuarine zone along lower Duck Creek to minimize impacts to EFH in this area,
- Use of steeper slopes (i.e., 1:1) or a vertical retaining wall, connecting the eastern and western RSA edges to ground surface to minimize fill volumes and direct habitat loss, and
- Use of gabions and mechanically stabilized earth walls constructed at a steep slope (0.6:1) along the south edge of the lateral safety area to minimize fill volumes and direct habitat loss.

I.2.5 CONCLUSIONS

The Airport's Proposed Actions and FAA's preferred alternative incorporate measures to minimize overall harm to EFH in both acreage and function. Implementation of the above conservation measures would not result in substantial reductions to the acreage of EFH impacted by the proposed actions/FAA's preferred alternative. These measures would, however, result in reduced impacts to EFH function. Without implementation of any additional conservation measures, the Proposed Actions would result in a direct loss of 55.8 acres of EFH, or approximately 1.6% of all EFH in the landscape area on and surrounding the Airport. However, a portion of these impacted acres are those disturbed as a result of reconstructing the East Runway Slough channel around the end of Runway 26, which would help to offset potential adverse impacts to EFH from loss of hydrologic connectivity between Miller-Honsinger Slough, Zig-Zag Slough, and Gastineau Channel resulting from construction of the RSA. Slough construction would not in itself impact EFH but it would convert existing high marsh habitat to low marsh and slough habitats which are more frequently accessible, and therefore of higher quality, to fish.

I.3 BIOLOGICAL ASSESSMENT

This biological assessment (BA) analyzes the potential effects of JNU's Proposed Actions and FAA's preferred alternatives on the federally listed threatened and endangered species that have the potential to occur within and adjacent to the JNU Landscape Area (as defined in the FEIS) and could be affected by these actions. In addition to federally listed species, a BA typically evaluates impacts to species proposed for listing under the Endangered Species Act. Presently, there are no proposed species known to occur within the vicinity of the Airport. Consequently, there will be no further discussion of proposed species in this BA.

Threatened and endangered species include those species federally listed under the Endangered Species Act (ESA) of 1973 (as amended). The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) is responsible for protecting most marine species including those that are listed as threatened or endangered under the ESA. The U.S. Fish and Wildlife Service is responsible for protecting all freshwater aquatic and terrestrial species that are listed as threatened and endangered under the ESA, as well as some marine mammals such as the walrus, polar bear, and northern sea otter. The only two federally listed species known to occur in the vicinity of JNU are the threatened Steller sea lion (*Eumetopias jubatus*) and the endangered humpback whale (*Megaptera novaeangliae*). Both of these species are under the regulatory jurisdiction of NMFS. This biological assessment is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C. 1536 (c)), and follows the standards established in the FAA's NEPA and ESA guidance.

I.3.1 CONSULTATION TO DATE

On October 20, 2001, Spencer Martin of SWCA Environmental Consultants sent a letter to NMFS on behalf of the FAA requesting a list of threatened and endangered species with potential to be affected by the Airport project and initiating informal Section 7 consultation. NMFS responded on July 22, 2004 with a letter describing NMFS responsibilities for administration of the ESA as it applies to certain cetaceans, pinnipeds, and marine fish. It identified the Steller sea lion and humpback whale as federally listed species with potential to occur in the vicinity of JNU. The letter also identified NMFS role in enforcing the Marine Mammal Protection Act and the essential fish habitat provisions of the Magnuson-Stevens Fishery Conservation and Management Act.

I.3.2 SPECIES ACCOUNTS

The following sections describe the conservation status and natural history of, and habitat use by Steller sea lions and humpback whales in the project and landscape areas and provide a determination of project effects on these species.

I.3.2.1 STELLER SEA LION

The Steller sea lion is distributed across the North Pacific from northern Japan, through the Kuril Islands and Okhotsk Sea of Russia, to the Aleutian Islands, central Bering Sea, southern coast of Alaska, southward through the Pacific Northwest coast to the Channel Islands off the coast of California. The world population is divided into two stocks divided at 144° W Longitude (i.e., Cape Suckling, Alaska) based on differences in mitochondrial DNA and differing population trends in the two regions (NMFS 2004a). The western stock has been experiencing substantial population declines and is listed as endangered under the ESA. While the reasons for this decline are not currently known, hypotheses include competition with commercial fisheries; effects of environmental change on prey abundance/availability; increased predation by killer whales and sharks; anthropogenic impacts including incidental and direct mortality, commercial and subsistence harvesting, and harassment; disease; contaminants; or some combination of the above factors (NMFS 2004b). The eastern stock, including Steller sea lions found in the Juneau area, has had a stable or slightly increasing population over the last 10 years (NMFS 2002) and is listed as threatened under the ESA.

Steller sea lions are opportunistic predators and feed on a variety of fishes and cephalopods. Prey species tend to vary seasonally and geographically. Preferred prey species include walleye pollock (*Theragra chalcogramma*), Atka mackerel (*Pleurogrammus monopterygius*), Pacific herring (*Clupea harengus*), Capelin (*Mallotus villosus*), Pacific sand lance (*Ammodytes hexapterus*), Eulachon (*Thaleichthys pacificus*), Pacific cod (*Gadus macrocephalus*), salmon (*Onchorhynchus* spp.), and cephalopods such as squid and octopus (NMFS 2004a). Several of these species are produced within the estuarine habitats of the study and landscape areas (see EFHA Section 2.1, above). Steller sea lions have also been known to prey on other pinnipeds such as the harbor seal, fur seal, ringed seal, and possibly sea lion pups, but these prey are considered to be a minor, supplemental component to their diet (NMFS 2004a).

Steller sea lions gather on well-defined, traditionally used haul-outs and rookeries to rest and breed, respectively. The nearest major haul-out to the project area is Benjamin Island, approximately 20 miles to the northwest of the project area (see Map Section 6.0). This haul-out has been designated under the Endangered Species Act as critical habitat for the Steller sea lion. Steller sea lions use Benjamin Island from September through May with peak usage in the spring and fall (Womble 2003). Womble (2003) found that Benjamin Island is located close to seasonal aggregations of herring and eulachon and that herring was one of the most frequent prey items in the scat of sea lions at Benjamin Island, comprising 86% to 98% of their diet. The seasonality of sea lion use of Benjamin Island coincides with the abundance of Pacific herring in nearby spawning and overwintering areas. During the summer months when herring typically move to feeding areas along the outer coast, sea lion use of Benjamin Island declines to zero (Womble 2003). Fall increases of sea lion use of the Benjamin Island haul-out also coincides with the large salmon runs in the area (particularly those associated with the Chilkat River) and Womble (2003) noted that the occurrence of salmon in Steller sea lion diet was greatest during the fall and winter.

NMFS has developed protection measures for haul-outs used by the endangered western stock in the Gulf of Alaska, Aleutian Islands and Bering Sea. However, there are no protection measures in place for haul-outs in southeastern Alaska (such as Benjamin Island) that are used by the western stock of Steller sea lions. The closest sea lion rookery to JNU is Graves Rock off of Cape Spencer, approximately 80 air-miles southwest of JNU.

I.3.2.2 Humpback Whale

The humpback whale (*Megaptera novaeangliae)* is federally listed as endangered throughout its range. It is distributed seasonally throughout the world's oceans, from the Arctic to the Antarctic, with distinct populations located in virtually every sea. The North Pacific Population occupies coastal and inland waters around the Pacific Rim from Point Conception, California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka peninsula and the Sea of Okhotsk (various authors cited in NMFS 2001). The central North Pacific Stock of humpback whales spend winter and spring in the Hawaii Islands and migrate to northern British Columbia, Southeast Alaska, and Prince William Sound west to Kodiak in the summer and fall (NMFS 2001). The minimum population size estimated for this stock is approximately 3,700 whales (NMFS 2001). The central North Pacific Stock is further divided into three separate feeding aggregations: southeastern Alaska, Prince William Sound, and Kodiak. Humpback whales in the vicinity of JNU are of the southeastern Alaska aggregation, which has been estimated at 404 individuals (NMFS 2001). In a study of humpback whale response to whale-watching boats near Juneau, Peterson (2001) tracked 18 individuals in areas around southwest Shelter Island, North Pass, and Young Bay (see Map Section 6.0). Although data indicate that the central North Pacific stock increased in abundance between the early 1980s and early 1990s, there is not sufficient data to assess the rate of this increase (NMFS 2001).

Entanglement in fishing gear (e.g., drift gillnets, crab pots, etc.), ship strikes, eutrophication (excessive nutrient loading, oxygen depletion, and commonly algae development) and pollution (most notably polychlorinated biphenyls) are currently the most common threats to humpback whale populations (NMFS 2001, Gardner 1993). Studies examining the effects of whale watching boats and anthropogenic noise on humpback whales have so far indicated only subtle responses to these factors on the part of the whales (Peterson 2001, NMFS 2001). To minimize potential disturbance to humpbacks from whale watching, NMFS had promulgated regulations prohibiting vessels within 200 nautical miles of Alaska (with some exceptions) from approaching within 100 yards of humpback whales.

In southeastern Alaska, humpbacks feed on zooplankton and small schooling fishes such as Pacific herring, eulachon, Pacific sand lance, capelin, Atka mackerel, walleye pollock, and haddock (Bryant et al. 1981; Dolphin 1987a: Dolphin 1987b). The Lynn Canal stock of Pacific herring has undergone substantial population declines in recent decades. The tidal sloughs within the study and landscape areas are considered an important source of herring larva for Auke Bay (Mattes 2003). Although the population of herring in Auke Bay is generally believed to be on the rise, it is still considered a weak population and the continued health of the sloughs may be an important factor in the recovery of herring, and potentially humpback whales, throughout these areas.

I.3.3 Status of the Species in the Action Area

I.3.3.1 Steller Sea Lion

Steller sea lions are commonly sighted north and west of the project area around Portland and Shelter Islands and Fritz Cove. Within the JNU EIS landscape area, they have been occasionally observed in Gastineau Channel (Jensen 2004). While there are no known records of occurrence for Steller sea lions within the project area, because eulachon spawn in the Mendenhall River and harbor seals are know to frequent the lower portion of the river, sea lions could may occasionally use this area to hunt. Thus, there is potential for Steller sea lions to occur intermittently in the western portion of the project area.

I.3.3.2 Humpback Whale

Humpback whales are occasionally sighted in the southern portion of Gastineau Channel but are unlikely to use the northern portion near the project area due to shallow water depths (Jensen 2004). While humpback whales do not use the project area, they are known to frequent waters around Portland and Shelter Islands and Fritz Cove, located about 1¼ miles west of JNU at the western edge of the landscape area.

I.3.4 Effects

I.3.4.1 Steller Sea Lion

Given that Steller sea lions are only likely to occur in the western portion of the project area (Mendenhall River) on an ephemeral basis and in the landscape area occasionally, implementation of the proposed actions/FAA's preferred alternative is unlikely to have any direct impacts on this species. However, indirect impacts could result from decreased production and/or survival of forage fish associated with impacts to EFH.

Under the Proposed Actions/FAA's preferred alternative, 55.8 acres of EFH would be permanently lost from the Mendenhall wetlands. This impact comprises a 1.6% loss of EFH within the landscape area. Most of these impacts would occur to estuarine high marsh habitat, which would be reduced by 32.9 acres or 3.5% in the landscape area. Losses to estuarine EFH could result in incremental reduction in juvenile survivorship of Steller sea lion prey resources such as Pacific herring, coho salmon, capelin, sand lance, and flounder. Minor impacts to the Mendenhall River would not be expected to have a substantive effect on eulachon spawning success. Given the relatively small area affected, it is unlikely that these impacts, when aggregated over the Lynn Canal/ Stephens Passage area within which Steller sea lions feed, would exceed the natural range of variation in production and survivorship for forage fish in the region. Consequently, implementation of the proposed actions/ FAA's preferred alternative would be unlikely to have a substantive impact on Steller sea lions in the vicinity of the project and landscape areas.

I.3.4.2 Humpback Whale

Because humpbacks only occur in the western portion of the JNU landscape area (Fritz Cove), implementation of the Proposed Actions/FAA's preferred alternative would have no direct effects on this endangered species.

Salmon are not a food source for humpback whales, thus potential impacts to salmon production or juvenile survivorship would have no effect on this species. Otherwise, indirect effects to humpback whales would be very similar to those described for the Steller sea lion. While implementation of the proposed actions may result in incremental reductions in forage fish production or survivorship in the Mendenhall wetlands, when aggregated over the Lynn Canal/Stephens Passage area within which local whale aggregations feed, these impacts would be unlikely to exceed the natural range of spatial and temporal variation for forage fish populations. Thus, the proposed actions/FAA's preferred alternative would be unlikely to have a measurable effect on the humpback whales that make sporadic use of Fritz Cove and other areas in the vicinity of JNU.

I.3.5 Cumulative Effects

Cumulative impacts to Steller sea lion and humpback whale prey resources would be identical to those described for EFH in Section 2.3, above.

I.3.6 Conclusion and Determination

I.3.6.1 Steller Sea Lion

Steller sea lions occur on only an occasional basis in the landscape area and, while they have potential to use the portion of the project area that extends into the Mendenhall River, they have never been documented in this area. Consequently, the Proposed Actions only have the potential to impact sea lions indirectly through potential reductions in the production and/or survivorship of prey resources. These reductions would not affect the Pacific herring spawning and overwintering areas near Benjamin Island nor the euchalon spawning grounds in that area and they would not affect the large salmon runs associated with the Chilkat River and other major salmon streams off of Lynn Canal. Thus, potential project-related reductions in forage fish are not anticipated to exceed the natural range of variation in Steller sea lion prey production or survivorship in the Juneau area. Consequently, implementation of the Proposed Actions/FAA's preferred alternative is unlikely to adversely affect the Steller sea lion.

I.3.6.2 Humpback Whale

Humpback whales occur on only an occasional basis in Fritz Cove, located on the western edge of the JNU landscape area. Consequently, the Proposed Actions only have the potential to impact humpbacks indirectly through potential reductions in the production and/or survivorship of prey resources. Potential project-related reductions in Pacific herring, eulachon, and other forage fish are not anticipated to exceed the natural range of variation in humpback whale prey production or survivorship in the Juneau area. Consequently, implementation of the Proposed Actions/FAA's preferred alternative is unlikely to adversely affect the humpback whale.

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I.5 List of Preparers

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I.6 Map

[Map of Juneau area showing location of Benjamin Island, Shelter and Portland Islands, Fritz Cove, and Landscape and Project Areas]

Figure I-1. Location of Benjamin Island, Shelter and Portlands Islands, Fritz Cove, and landscape and project areas.