APPENDIX I

ESSENTIAL FISH HABITAT ASSESSMENT

Alaska Deep Draft Arctic Port System Study

Preface

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act established the essential fish habitat (EFH) provision to identify and protect important habitats of Federally-managed marine and anadromous fish species. Federal agencies that fund, permit, or undertake activities that may adversely affect EFH are required to consult with National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH, and respond in writing to NMFS recommendations.

EFH is defined as those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity. “Waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate. ”Substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities.

Coastal and marine habitats comprise a variety of broad habitat types for EFH-managed species, including sand bottoms, rocky reefs, and submarine canyons. When rock reefs support kelp stands, they become exceptionally productive. Relative to other habitats, including wetlands, shallow and deep sand bottoms, and rock bottom, giant kelp habitats are substantially more productive in the fish communities they support. The stands provide nurseries, feeding grounds, and/or shelter to a variety of groundfish species and their prey (NOAA 2005).

Non-fishing activities have the potential to adversely affect the quantity or quality of EFH in marine systems. Broad categories of such activities include, but are not limited to, mining, dredging, fill, impoundment, discharge, water diversions, thermal additions, actions that contribute to nonpoint source pollution and sedimentation, introduction of potentially hazardous materials, introduction of exotic species, and the conversion of aquatic habitat that may eliminate, diminish, or disrupt the functions of EFH.

Upon completing EFH-coordination with the NMFS, the Corps’ will incorporate EFH evaluations and findings, and NMFS conservation recommendations (if any), into the project’s integrated Feasibility Report and Environmental Assessment.

Project Purpose

The purpose and need for the proposed project is to enhance the availability of port infrastructure in the region – including deep-draft port facilities currently unavailable north of Unalaska/Dutch

Harbor – to meet the State's goal of encouraging economic development in remote areas; provide local and regional economic development opportunities (resource extraction, tourism, research); decrease Arctic region operating costs; provide protected moorage to support offshore oil and gas endeavors, fishing fleet, and resource extraction vessels; and provide vessel repair and maintenance support. The proposed project would also improve international relationships and increase U.S. exports, optimize the aforementioned benefits while preserving natural resources; raise awareness of U.S. as an Arctic nation; and provide upland support to vessels operating in the region (fuel, water, electricity, food, medical, storage, laydown/staging for resource extraction).

Project Authority

The Rivers and Harbors Act of 1917 (8 August 1917, House Doc. 1932, 64th Congress, 1st Session), as adopted by Public Law (P.L.) No. 37 to complete the improvement to Nome Harbor, provided for an east jetty 335 feet long, a west jetty 460 feet long, a channel 75 feet wide to a depth of -8 feet MLLW from Norton Sound through the Snake River, ending in a basin of the same depth 250 feet wide and 600 feet long near the mouth of Bourbon and Dry Creeks, and revetment along the banks of the river.

The Rivers and Harbors Act of 1935 (30 August 1935, House Doc. 404, 71st Congress, 2nd Session, and the Rivers and Harbors Committee Doc. 38, 73rd Congress, 2nd Session) as adopted, provided for an extension of the east jetty an additional 616 feet, extension of the west jetty another 216 feet, and extension of the basin northward 400 feet.

The Rivers and Harbors Act of 1948 (16 June 1948, P.L. 80-649) as adopted, authorized construction of a rock mound seawall extending easterly from the east jetty along the water front for a distance of 3,350 feet.

Section 101(a)(1) of the Water Resource Development Act of 1999 (P.L. 106-53, 106th Congress), provided for a new entrance to Nome harbor consisting of a 2,986-foot-long breakwater, 230-foot-long causeway spur, and a 3,450-foot-long entrance channel with supporting sediment traps and a causeway bridge. This project was completed in 2006, and resulted in the current configuration of Nome Harbor (Figure 1).

This current study is conducted under authority granted by the House Public Works Committee Resolution for Rivers and Harbors in Alaska, adopted 2 December 1970. The resolution states:

> "*Resolved by the Committee on the Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports of the Chief of Engineers on Rivers and Harbors in Alaska, published as House Document Numbered 414, 83rd Congress, 2nd Session; and other pertinent*

reports, with a view to determining whether any modifications of the recommendations contained herein are advisable at the present time."

Existing Project	Length	Depth	Width
Main Breakwater	2986 ft		
Spur Breakwater	230 ft		
Entrance Channel	3450 ft	-22, -12, -10 ft	Varies
Bridge	118 ft		30 ft

Project Description

This EFH assessment addresses the preferred alternative proposed under the U.S. Army Corps of Engineers Alaska District (Corps) Alaska Deep-Draft Arctic Port System Study; the navigation improvements and harbor expansion activities described are located at Nome Harbor, Alaska.

Proposed in-water construction activities associated with the study's recommended plan includes a 2,150-foot causeway extension, a 450-foot long dock, and dredging to -28 feet MLLW (figure 1). The existing stub breakwater would be demolished, and a 2,150-foot-long extension to the causeway would be constructed, extending the causeway to the -34-foot MLLW isobath. This extension would protect the existing harbor from southeastern waves and provide protection to a new 450-foot-long concrete caisson dock parallel to the new causeway extension. The causeway extension would be constructed to match the current causeway elevation on the sea side of +28 feet MLLW and on the harbor side of +15.5 feet MLLW. The extension would also include a 30-foot-wide driving surface for vehicle access to the new 450-foot-long dock. Table 1 shows the estimated amount of material needed to construct the causeway extension.

Dredging to create the improved navigation channel and harbor area will remove a total of approximately 441,000 cubic yards of material from 120.7 acres of sub-tidal habitat. The approximate average depth of 12 feet in the inner maneuvering area will be dredged to -22 feet MLLW (287,400 cubic yards removed), and the approximate average depths of -25 feet MLLW in the outer maneuvering area will be dredged to -28 feet MLLW (153,600 cubic yards removed)[1]. The outer entrance channel would be flared out to daylight at the existing contours and follow the head radius of the extended causeway. The effective channel width would be 700 feet. A total combined outer entrance channel and maneuvering area of approximately 45 acres would be available to accommodate the new 450-foot caisson dock. The inner channel and maneuvering area would have a combined area of 27.2, compared with the existing 15.4 acres now available.

[1] For comparative purposes, Alternative 1B would require a total of 852,600 yd^3 to be dredged, Alternative 1C would require 1,666,000 yd^3 to be dredged, and Alternative 1D would require 1,673,800 yd^3 to be dredged.

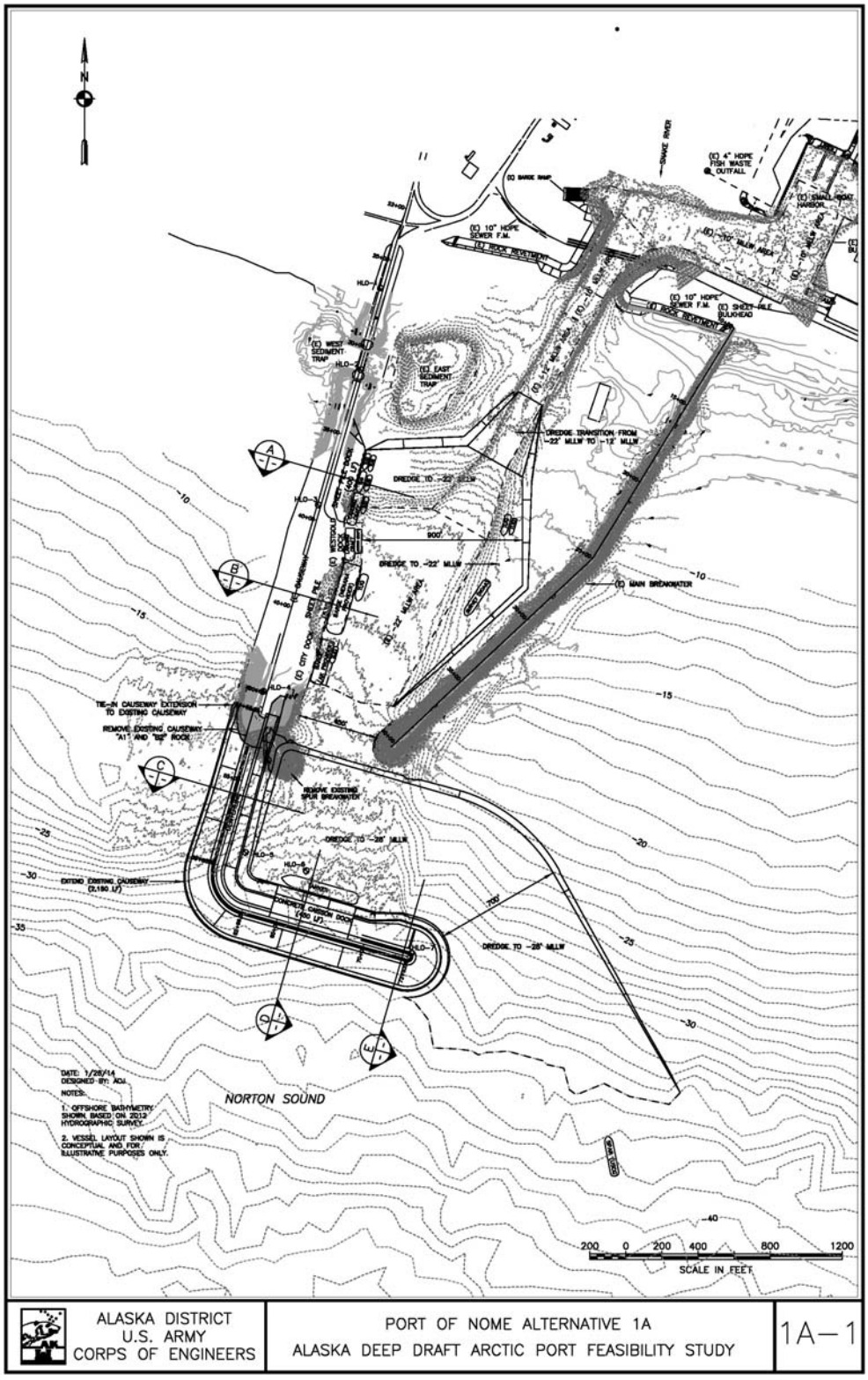

Figure 1: Nome Harbor causeway extension layout and dredging plan

Table 1: Causeway Material Amounts

Item	Amount (cy)
A1 Rock	181,600
A5 Rock	29,100
B2 Rock	100,300
B3 Rock	13,350
C1 Rock	30,700
C2 Rock	9,800
D Filter Material	47,725
F Fill Material	82,075
E Fill Material	367,350
Total	**862,000**

All dredged material will be placed above mean lower low water (MLLW) on the beach immediately east (littoral down-current side) of the harbor breakwater for the beneficial purpose of beach nourishment and shoreline protection, as is the practice with material derived from permitted annual maintenance dredging activities at Nome Harbor.

Figure 2. Aerial oblique view of current Nome Harbor configuration, with construction completed in 2006; view is towards the east-northeast.

Under the recommended plan, the causeway extension will require submerged placement of 862,000 cubic yards of several different grades of rock, ranging from 8-ton-average-weight armor rock to gravel-sized fill material, converting approximately 16.3 acres of soft-bottom subtidal habitat to hard substrate at a depth of approximately -28 to -34 feet MLLW. The concrete caisson dock would likely be assembled from pre-cast 150-foot by 50-foot by 40-foot modules that are fabricated off-site and towed to Nome Harbor. Dredging is expected to require the removal of 153,000 cubic yards of marine sediment from the outer channel, and 287,400 cubic yards from the inner channel and maneuvering area (a total of 441,000 cubic yards). This sediment is expected to consist primarily of uncontaminated sands and gravels, although silts may be encountered in the newly-excavated seabed; knowledge of the physical and chemical composition of the marine sediments to be dredged will be refined upon geotechnical investigation of the project site, but the results are likely to be similar to that associated with dredging during the annual maintenance dredging cycle.

Since 2009, annual maintenance dredging at Nome Harbor has placed between 20,000 to 50,000 cubic yards of dredged material each year within a roughly 600-foot by 300-foot (less than 5 acre) area about 450 yards east of Nome Harbor; the material is placed - for the beneficial purpose of beach nourishment - where littoral transport will redistribute it eastward along the shoreline, widening the beach along the foot of the seawall and providing additional shoreline protection. This placement of dredged material has substantially increases the width of beach along the foot of the rock seawall protecting the city shoreline.

The dredged material would be similarly placed for the beneficial purposes of beach nourishment and shoreline protection. The large amount of material involved would require expansion of the placement area, to perhaps 20 acres. The dredged material would be placed above MLLW and the seaward limit of any beach vegetation to ensure that all material remains within the active littoral transport zone.

Based on previous studies, and the high-energy characteristics of the project area, contaminated sediments are not expected to be encountered. However, sediment analyses (physical and chemical) will be conducted during geotechnical investigations performed in the design phase of the project. Should contaminated sediments be identified, these materials will be segregated from otherwise suitable (nontoxic) dredged material, and disposed in an upland disposal site or within a specifically-constructed confined disposal facility (CDF).

Two ocean dredged material disposal sites (ODMDS) immediately offshore of Nome, authorized by the U.S. Environmental Protection Agency (USEPA) under Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA), have been historically used for the discharge of dredged material. These two disposal areas (0.30 nmi^2 and 0.37 nmi^2 in size

respectively) flank what used to be the former entrance channel and extend several thousand feet seaward, and have been in use since 1923, with no indications that disposal of dredged material over this period of time has materially altered the characteristics of the ODMDS. The USEPA prepared an environmental impact statement (EIS) designating these interim ODMDS as final ODMDS, with the Record of Decision (ROD) signed in 1992 authorizing the continued use of these sites for the disposal of dredged material for a 10-year period (USEPA, 1984). This designation has since expired, so there are no formally-approved ODMDS currently available for this project's use.

A cutter-head suction dredge with a transport pipeline has been used successfully in the maintenance dredging program, and is an likely option for placement of the construction dredged material at the placement site. Alternatively, if the dredged material is too compacted and cannot be hydraulically lifted and transported via pipeline, the dredged material may be transported to a site east of the eastern boundary of the Nome ODMDS, and discharged in shallow waters via a barge or scow.

Project Area Description

The harbor at Nome was built where the Snake River discharges into Norton Sound (figure 2). The harbor site is on an exposed stretch of low-relief sand and gravel coastline. The seabed near the harbor is a largely featureless expanse of sand and gravel that deepens very gradually, only reaching a depth of -40 feet MLLW at a distance of about 3,000 feet offshore. The natural environment includes the continuous migration and redistribution of benthic sediments via littoral transport, as well as frequent disruption from ice scouring and violent storms. Studies of the general biological setting offshore of Nome describe species typical of a high-energy, sandy-gravelly coastal environment dominated by epifaunal and infaunal species such as sea stars, polychaetes, bivalves, and amphipods that are adapted to a loose, shifting substrate.

Essential Fish Habitat

Dredging and filling in navigable waters for the purpose of constructing and operating marinas, harbors, and ports impacts benthic and water-column habitats. Dredging is used to create deepwater navigable channels and to maintain existing channels that periodically fill with sediments. The environmental effects of dredging on EFH can include:

1. Direct removal/burial of organisms;
2. Turbidity/siltation effects, including light attenuation from turbidity;
3. Contaminant release and uptake, including nutrients, metals, and organics;
4. Release of oxygen consuming substances;
5. Entrainment;
6. Noise disturbances; and
7. Alteration to hydrodynamic regimes and physical habitat.

Many EFH species forage on infaunal and bottom-dwelling organisms. Dredging may adversely affect these prey species by directly removing or burying immobile invertebrates such as polychaete worms, crustacean, and other EFH prey types. Similarly, dredging may also force mobile animals such as fish to migrate out of the project area. If suspended sediments loads remain high, fish may suffer reduced feeding ability and be prone to fish gill injury. The contents of the suspended material may react with dissolved oxygen in the water and result in short-term oxygen depletion to aquatic resources. Dredging can also disturb aquatic habitats by resuspending bottom sediments and, thereby, recirculate toxic metals (e.g., lead, zinc, mercury, cadmium, copper etc.), hydrocarbons (e.g., polyaromatics), hydrophobic organics (e.g., dioxins), pesticides, pathogens, and nutrients into the water column. Toxic metals and organics, pathogens, and viruses, absorbed or adsorbed to fine-grained particulates in the material, may become biologically available to organisms either in the water column or through food chain processes. Dredging may also modify current patterns and water circulation of the habitat by changing the direction or velocity of water flow, water circulation, or dimensions of the waterbody traditionally used by fish for food, shelter, or reproductive purposes (NOAA 2005).

NMFS authority to manage EFH is directly related to those species covered under Fishery Management Plans (FMPs) in the United States. The Corps' proposed action is within an area designated as EFH for two FMPs — Bering Sea/Aleutian Island (BSAI) Groundfish and Alaska Stocks of Pacific Salmon. These two FMPs include species or species complexes of groundfish and invertebrate resources and all Pacific salmon species (Table 1). See Appendix I-1 for a description of EFH for Alaska Stocks of Salmon and Appendix I-2 for a description of EFH for Groundfish Resources of the Bering Sea/Aleutian Islands Region. No EFH "habitat areas of particular concern" are present in the proposed project area. The waters off Nome are included in the Northern Bering Sea Research Area.

Assessment of Project Effects on Essential Fish Habitat

Short-term impacts include water quality impacts in the form of increased levels of turbidity, noise from the removal of the existing spur at the end of the causeway, seabed preparation, placement of quarry rock on the substrate, attendant dredging operations in the interior of the harbor, placement of dredged material on the beach east of the breakwater for purposes of beach nourishment and shoreline protection, pollution in the form of fuel or oils spilled from construction and dredging equipment, noise from construction and dredging equipment, and disturbance from the movement of equipment through the area.

Table 1. Fish with designated essential fish habitat in the Bering Sea/Aleutian Islands Groundfish and Alaska Stocks of Pacific Salmon Fishery Management Plan areas.

Bering Sea/Aleutian Island Groundfish	Alaska Stocks of Pacific Salmon
1. Walleye pollock 2. Pacific cod 3. Yellowfin Sole 4. Greenland Turbot 5. Arrowtooth Flounder 6. Rock Sole 7. Alaska Plaice 8. Rex Sole 9. Dover Sole 10. Flathead Sole 11. Sablefish 12. Pacific Ocean Perch 13. Shortraker Rockfish and Rougheye Rockfish 14. Northern Rockfish 15. Thornyhead Rockfish 16. Light Dusky Rockfish 17. Yelloweye Rockfish 18. Atka Mackerel 19. Forage Fish Complex 20. Sculpins 21. Sharks 22. Skates 23. Squid 24. Octopus 25. Red King Crab	1. Chinook salmon 2. Coho salmon 3. Pink salmon 4. Chum salmon 5. Sockeye Salmon

Short-term Impacts

Water Quality. Norton Sound is characteristically quite turbid; the material to be dredged will consist of sand and gravel with relatively little fines. The proposed cutter-head hydraulic pipeline dredge would loft some sediment into the water column near the site of dredging, but much less than other potential methods that require hauling the material up through the water column (clamshell dredge) or dewatering it at the dredge site (hopper dredge). Any increase in ambient turbidity would be minor and temporary. The discharge of the dredged material would temporarily increase the suspended solids along the shoreline of the placement area. The dredging schedule would be coordinated with the Alaska Department of Fish & Game (ADFG).

Based on direction from the ADFG in Fish Habitat Permit FH13-III-0027 (issued 15 January 2013, expiring 31 Dec 2022), dredging could start as soon as the ice goes out, but be completed in the narrow inner channel area by 25 June, and in the rest of the project area by 31 July. This work-window is intended to protect juvenile salmon, which are believed to start out-migration from Snake River in mid-June.

Pollution. The dredge vehicle and any booster pumps for the pipeline use fuel and lubricants and are potential sources of spills into the marine environment. The contractor would be required to prepare a spill prevention and response plan and have appropriate spill response materials at the work site.

Waterborne Noise. The quantitative level of noise generated by the proposed cutter-head hydraulic dredge is not available. However, in principle, the hydraulic pipeline dredge should be much less likely than other technologies to create the type of abrupt, high-intensity noise most harmful to fish and other marine life, as its continuous manner of operation would avoid the underwater impacts caused by other dredging methods (e.g., a clamshell dredge striking the bottom). All dredging will be performed within the confines of the causeway and breakwater or the inner channel, which should limit the area of the local environment affected by dredge-generated sound. Other noise generated by the dredging vessel would be comparable to that created by other vessels in this busy harbor. Adult resident fish should be able to swim out of the vicinity of the slowly moving cutter-head if they are disturbed by the noise. Juvenile salmon should be protected in part by the work-closure window described above.

Construction-Related Vessel Traffic. Another benefit of the pipeline dredge is the much reduced vehicle traffic, compared with the steady movement of scows or hopper barges required for other dredging methods. The dredging will take place within a busy harbor, and its activities will be an incremental increase in the disturbances already created by other boat traffic.

Long-Term Impacts

Loss and Conversion of Marine Habitat. The natural environment along the Norton Sound coast at Nome is a high-energy sand-and-gravel regime that is subject to constant redistribution of substrate through littoral transport, storm surge, and ice scouring. The Nome Harbor entrance channel requires annual dredging because the sea bed is being continuously reformed as new sediments are deposited but trapped by the artificial structures built at the harbor.

The proposed dredging activities would make only a temporary and highly localized alteration in this constantly shifting environment. In fact, the annual dredging and beach nourishment may be thought of a means of partially compensating for the interruption of west-to-east littoral drift created by the causeway and breakwater and returning the sediment to its natural transport systems.

Any species currently using the dredged area as habitat would be already adapted to a high energy environment of loose, continuously redistributed substrate. At the dredged material placement area, fish such as sand lance or capelin that feed or lay eggs in loose shoreline sediments may be affected by the addition of more sand and gravel to the beach environment. However, the discharged sediments would be quickly redistributed by intentional spreading, wave action, and littoral currents.

The Snake River, which discharges directly into and through Nome Harbor, has been identified as important for the spawning, rearing, and/or migration of anadromous fishes, including Chinook, sockeye, chum, coho and pink salmon, Dolly Varden, whitefish and resident fish species (e.g., Arctic grayling). Following coordination with the Alaska Department of Fish and Game's Nome Office, it was agreed that the proposed project would likely generate insignificant impacts consistent with those of the already-permitted 10-year annual maintenance dredging activities, and therefore should similarly have no adverse effect on anadromous fish or their habitat, and should not obstruct the free passage of fish (ADFG 2013), provided the conditions of the existing maintenance dredging permit were adopted.

Water Quality. The proposed dredging project would have no long-term impact on coastal water quality. The great majority of the material removed and relocated by the annual dredging would be newly deposited oceanic material that was in transit along the Nome coastline. The proposed dredging would in effect be returning material trapped by the artificial harbor structures to its natural transport systems.

Mitigation Measures. Planned measures to limit the project's impact on fish habitat include:

1. Consistent with the conditions of Alaska Department of Fish and Game Fish Habitat Permit FH13-III-0027, in-water construction may commence as soon as the ice goes out through June 25th within the harbor and entrance/inner channel, and through July 31st within the breakwater and causeway;

2. Dredging activities will cease if fish are observed in dredged sediments discharged to the beach. Coordination with the Alaska Department of Fish and Game will be initiated to determine if species and/or numbers are of concern before commencing with further dredging;

3. Fish passages constructed in the existing causeway and breakwater will be maintained to facilitate near shore migration of fish;

4. To accelerate recolonization of the causeway extension, all suitable for reuse armor rock removed from the existing breakwaters with sessile or attached adapted marine organisms and marine algae shall be used in constructing the new breakwater segments. If not reused, the rock shall be side cast to the base of the breakwater so that it may continue to provide habitat for marine resources;

5. Breakwater construction shall use core material and B and armor rock clean of organic debris and invasive species;

6. Workers conducting in-water construction will be instructed to watch for marine animals, and cease work if an animal approaches within 50 meters;

7. The selected contractor shall include an Oil Spill Prevention and Control Plan in its Environmental Protection Plan, which is submitted to the Corps for review and approval;

8. To minimize the danger to marine mammals from project-related vessels, speed limits (e.g. less than 8 knots) shall be imposed on vessels moving in and around the project area;

9. Project-related vessels and barges shall not be permitted to ground themselves on the bottom during low tide period unless there is a human safety issue requiring it; and

10. The causeway extension will be constructed prior to dredging. The causeway extension will help contain as much as possible of the turbid water.

Conclusions and Determination of Effect.

The proposed action has the potential to cause short-term effects on EFH for several Bering Sea groundfish species, particularly species such as flatfish and forage fish like capelin, that favor a loose sandy substrate. Short-term avoidance of the dredged area during dredging operations because of noise disturbances, boat traffic, and turbidity may occur.

Discharge of sediment at the dredged material placement area may potentially affect fish (e.g., capelin and sand lance) that lay their eggs in shoreline sand. These effects would occur only in very limited areas of the harbor and adjacent beach that have already been impacted by similar dredging and sediment discharge over many years and are unlikely to represent the loss of valuable habitat.

The movement of juvenile salmon through Snake River and the inner channel should be protected by the dredging work-windows developed by the ADFG. Long-shore movement of

fish should not be significantly hampered by the presence of the relatively-small dredge vessel in the outer channel.

Almost all rock placement, dredging and dredged material discharge activities will occur shallower than -30 feet MLLW, with the exception of the placement of quarry rock for that portion of the causeway extension that runs parallel to shore for about 1,100 feet – the toe of the outside edge of the causeway will extend out to approximately the -34 foot MLLW isobath. Dredging will not occur deeper than -28 feet MLLW.

The proposed dredging activities would create transient and highly localized alterations to a very dynamic environment. Any species using the project area as habitat are adapted to a high-energy environment of constantly redistributed substrate. The annual dredging and beach nourishment arguably helps maintain coastal habitat at Nome in something closer to its natural state by compensating for the interrupted littoral movement of sediments along the coast and limiting the sediment starvation and coastal erosion that would be expected on the down-current side of the causeway and breakwater.

Consequently, the Corps has determined that while the proposed action may adversely but insignificantly affect designated EFH, no long-term effects are expected.

References

NOAA. 2005. Non-Fishing Impacts to Essential Fish Habitat and Recommended Conservation Measures, *In*: Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Region. Juneau, Alaska. April 2005.

APPENDIX I-1
DESCRIPTIONS OF ESSENTIAL FISH HABITAT

Alaska Stocks of Pacific Salmon

1. EFH Description for Chinook Salmon

Freshwater Eggs

EFH for Chinook salmon eggs is the general distribution for this life stage, located in gravel substrates in those waters identified in ADFG's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes*.

Freshwater Larvae and Juveniles

EFH for larval and juvenile Chinook salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and contiguous rearing areas within the boundaries of ordinary high water. Juvenile Chinook salmon out-migrate from freshwater areas in April toward the sea and may spend up to a year in a major tributaries or rivers, such as the Kenai, Yukon, Taku, and Copper Rivers.

Estuarine Juveniles

Estuarine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Chinook salmon smolts and post-smolt juveniles may be present in these estuarine habitats from April through September.

Marine Juveniles

Marine EFH for juvenile Chinook salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the mean higher tide line to the 200-nm limit of the EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean. Juvenile marine Chinook salmon are at this life stage from April until annulus formation in January or February during their first winter at sea.

Marine Immature and Maturing Adults

EFH for immature and maturing adult Chinook salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska and ranging from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic.

Freshwater Adults

EFH for adult Chinook salmon is the general distribution area for this life stage, located in fresh waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* wherever there are spawning substrates consisting of gravels from April through September.

2. EFH Description for Coho Salmon

Freshwater Eggs

EFH for coho salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes*.

Freshwater Larvae and Juveniles

EFH for larval and juvenile coho salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and contiguous rearing areas within the boundaries of ordinary high water. Fry generally migrate to a lake, slough, or estuary and rear in these areas for up to 2 years.

Estuarine Juveniles

Estuarine EFH for juvenile coho salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Juvenile coho salmon require year-round rearing habitat and also migration habitat from April to November to provide access to and from the estuary.

Marine Juveniles

Marine EFH for juvenile coho salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean.

Marine Immature and Maturing Adults

EFH for immature and maturing adult coho salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to 200 m in depth and range from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean.

Freshwater Adults

EFH for coho salmon is the general distribution area for this life stage, located in freshwaters as identified in ADF&G's *Catalogue of Waters Important for the Spawning,*

Rearing, or Migration of Anadromous Fishes and wherever there are spawning substrates consisting mainly of gravel containing less than 15 percent fine sediment (less than 2-mm diameter) from July to December.

3. EFH Description for Pink Salmon

Freshwater Eggs

EFH for pink salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes.*

Freshwater Larvae and Juveniles

EFH for larval and juvenile pink salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and contiguous rearing areas within the boundaries of ordinary high water during the spring, generally migrate in darkness in the upper water column. Fry leave streams in within 15 days and the duration of migration from a stream towards sea may last 2 months.

Estuarine Juveniles

Estuarine EFH for juvenile pink salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters and generally present from late April through June.

Marine Juveniles

Marine EFH for juvenile pink salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska from the mean higher tide line to the 200-nautical mile (nm) limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean.

Marine Immature and Maturing Adults

EFH for immature and maturing adult pink salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to depths of 200 m and range from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean. Mature adult pink salmon frequently spawn in intertidal areas and are known to associate with smaller coastal streams.

Freshwater Adults

EFH for pink salmon is the general distribution area for this life stage, located in freshwaters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and wherever there are spawning substrates consisting of medium to course gravel containing less than 15 percent fine sediment (less than 2-mm diameter), 15 to 50 cm in depth from June through September.

4. EFH Description for Chum Salmon

Freshwater Eggs

EFH for chum salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes*.

Freshwater Larvae and Juveniles

EFH for larval and juvenile chum salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and contiguous rearing areas within the boundaries of ordinary high water and contiguous rearing areas within the boundaries of ordinary high water during the spring, generally migrate in darkness in the upper water column. Fry leave streams in within 15 days and the duration of migration from a stream towards sea may last 2 months.

Estuarine Juveniles

Estuarine EFH for juvenile chum salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters from late April through June.

Marine Juveniles

Marine EFH for juvenile chum salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska to approximately 50 m in depth from the mean higher tide line to the 200-nm limit of the EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean.

Marine Immature and Maturing Adults

EFH for immature and maturing adult chum salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to depths of 200 m and ranging from the mean higher tide line to the 200-nm limit of the EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean.

Freshwater Adults

EFH for chum salmon is the general distribution area for this life stage, located in freshwaters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and wherever there are spawning substrates consisting of medium to course gravel containing less than 15 percent fine sediment (less than 2-mm diameter) and finer substrates can be used in upwelling areas of streams and sloughs from June through January.

5. EFH Description for Sockeye Salmon

Freshwater Eggs

EFH for sockeye salmon eggs is the general distribution area for this life stage, located in gravel substrates in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes*.

Freshwater Larvae and Juveniles

EFH for larval and juvenile sockeye salmon is the general distribution area for this life stage, located in those waters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and contiguous rearing areas within the boundaries of ordinary high water. Juvenile sockeye salmon require year-round rearing habitat. Fry generally migrate downstream to a lake or, in systems lacking a freshwater lake, to estuarine and riverine rearing areas for up to 2 years. Fry out migration occurs from approximately April to November and smolts generally migrate during the spring and summer.

Estuarine Juveniles

Estuarine EFH for juvenile sockeye salmon is the general distribution area for this life stage, located in estuarine areas, as identified by the salinity transition zone (ecotone) and the mean higher tide line, within nearshore waters. Under-yearling, yearling, and older smolts occupy estuaries from March through early August.

Marine Juveniles

Marine EFH for juvenile sockeye salmon is the general distribution area for this life stage, located in all marine waters off the coast of Alaska to depths of 50 m and range from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean from mid-summer until December of their first year at sea.

Marine Immature and Maturing Adults

EFH for immature and maturing adult sockeye salmon is the general distribution area for this life stage, located in marine waters off the coast of Alaska to depths of 200 m and

range from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA, EBS, Chukchi Sea, and Arctic Ocean.

Freshwater Adults

EFH for sockeye salmon is the general distribution area for this life stage, located in freshwaters identified in ADF&G's *Catalogue of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes* and wherever there are spawning substrates consisting of medium to course gravel containing less than 15 percent fine sediment (less than 2-mm diam.) and finer substrates can be used in upwelling areas of streams and sloughs from June through September. Sockeye often spawn in lake substrates, as well as in streams.

APPENDIX I-2
DESCRIPTIONS OF ESSENTIAL FISH HABITAT

Groundfish Resources of the Bering Sea/Aleutian Islands Region[2]

1. EFH Description for BSAI Walleye Pollock

Eggs
EFH for walleye pollock eggs is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) throughout the BSAI.

Larvae
EFH for larval walleye pollock is the general distribution area for this life stage, located in epipelagic waters along the entire shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile walleye pollock is the general distribution area for this life stage, located in the lower and middle portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI. No known preference for substrates exist.

Adults
EFH for adult walleye pollock is the general distribution area for this life stage, located in the lower and middle portion of the water column along the entire shelf (0 to 200 m) and slope (200 to 1,000 m) throughout the BSAI. No known preference for substrates exist.

2. EFH Description for BSAI Pacific Cod

Eggs—No EFH Description Determined
Scientific information notes the rare occurrence of Pacific cod eggs in the BSAI.

Larvae

[2] http://sharpfin.nmfs.noaa.gov/website/efh_mapper/newinv/efh_inventory.html

EFH for larval Pacific cod is the general distribution area for this life stage, located in epipelagic waters along the entire shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, and muddy sand.

Adults
EFH for adult Pacific cod is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting of sand, mud, sandy mud, muddy sand, and gravel.

3. EFH Description for BSAI Yellowfin Sole

Eggs—No EFH Description Determined
Scientific information notes the rare occurrence of yellowfin sole eggs in the BSAI.

Larvae—No EFH Description Determined
Scientific information notes the rare occurrence of larval yellowfin sole in the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile yellowfin sole is the general distribution area for this life stage, located in the lower portion of the water column within nearshore bays and along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting mainly of sand.

Adults
EFH for adult yellowfin sole is the general distribution area for this life stage, located in the lower portion of the water column within nearshore bays and along the inner (0 to 50

m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are soft substrates consisting mainly of sand.

4. EFH Description for BSAI Greenland Turbot

Eggs

EFH for Greenland turbot eggs is the general distribution area for this life stage, located principally in benthypelagic waters along the outer shelf (100 to 200 m) and slope (200 to 3,000 m) throughout the BSAI in the fall.

Larvae

EFH for larval Greenland turbot is the general distribution area for this life stage, located principally in benthypelagic waters along the outer shelf (100 to 200 m) and slope (200 to 3,000 m) throughout the BSAI and seasonally abundant in the spring.

Early Juveniles—No EFH Description Determined

Insufficient information is available.

Late Juveniles

EFH for late juvenile Greenland turbot is the general distribution area for this life stage, located in the lower and middle portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the BSAI wherever there are softer substrates consisting of mud and sandy mud.

Adults

EFH for late adult Greenland turbot is the general distribution area for this life stage, located in the lower and middle portion of the water column along the outer shelf (100 to 200 m), upper slope (200 to 500 m), and lower slope (500 to 1,000 m) throughout the BSAI wherever there are softer substrates consisting of mud and sandy mud.

5. EFH Description for BSAI Arrowtooth Flounder

Eggs—No EFH Description Determined

Insufficient information is available.

Larvae—No EFH Description Determined

Scientific information notes the rare occurrence of larval arrowtooth flounder in the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile arrowtooth flounder is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the BSAI wherever there are softer substrates consisting of gravel, sand, and mud.

Adults
EFH for adult arrowtooth flounder is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50), middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the BSAI wherever there are softer substrates consisting of gravel, sand, and mud.

6. EFH Description for BSAI Rock Sole

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae
EFH for larval rock sole is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and upper slope (200 to 1,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile rock sole is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand, gravel, and cobble.

Adults
EFH for adult rock sole is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand, gravel, and cobble.

7. EFH Description for BSAI Alaska Plaice

Eggs
EFH for Alaska plaice eggs is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and upper slope (200 to 500 m) throughout the BSAI in the spring.

Larvae—No EFH Description Determined
Scientific information notes the rare occurrence of larval Alaska plaice in the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Alaska plaice is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand and mud.

Adults
EFH for adult Alaska plaice is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand and mud.

8. EFH Description for BSAI Rex Sole

Eggs—No EFH Description Determined
Scientific information notes the rare occurrence of rex sole eggs in the BSAI.

Larvae—No EFH Description Determined
Scientific information notes the rare occurrence of larval rex sole in the BSAI.

Late Juveniles

EFH for juvenile rex sole is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are substrates consisting of gravel, sand, and mud.

Adults
EFH for adult rex sole is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are substrates consisting of gravel, sand, and mud.

9. EFH Description for BSAI Dover Sole

Eggs—No EFH Description Determined
Scientific information notes the rare occurrence of dover sole eggs in the BSAI.

Larvae—No EFH Description Determined
Scientific information notes the rare occurrence of larval Dover sole in the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Dover sole is the general distribution area for this life stage, located in the lower portion of the water column along the middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the BSAI wherever there are substrates consisting of sand and mud**.**

Adults
EFH for adult Dover sole is the general distribution area for this life stage, located in the lower portion of the water column along the middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the BSAI wherever there are substrates consisting of sand and mud.

10. EFH Description BSAI Flathead Sole

Eggs
EFH for flathead sole eggs is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI in the spring.

Larvae
EFH for larval flathead sole is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for juvenile flathead sole is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand and mud.

Adults
EFH for adult flathead sole is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI wherever there are softer substrates consisting of sand and mud.

11. EFH Description for BSAI Sablefish

Eggs—No EFH Description Determined
Scientific information notes the rare occurrence of sablefish eggs in the BSAI.

Larvae
EFH for larval sablefish is the general distribution area for this life stage, located in epipelagic waters along the middle shelf (50 to 100 m), outer shelf (100 to 200 m), and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile sablefish is the general distribution area for this life stage, located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulleys along the slope (200 to 1,000 m) throughout the BSAI.

Adults

EFH for adult sablefish is the general distribution area for this life stage, located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulleys along the slope (200 to 1,000 m) throughout the BSAI.

12. EFH Description for BSAI Pacific Ocean Perch

Eggs—No EFH Description Determined

Insufficient information is available.

Larvae

EFH for larval Pacific ocean perch is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined

Insufficient information is available.

Late Juveniles

EFH for late juvenile Pacific ocean perch is the general distribution area for this life stage, located in the middle to lower portion of the water column along the inner shelf (1 to 50 m), middle shelf (50 to 100 m), outer shelf (100 to 200 m), and upper slope (200 to 500 m) throughout the BSAI wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand.

Adults

EFH for adult Pacific ocean perch is the general distribution area for this life stage, located in the lower portion of the water column along the outer shelf (100 to 200 m) and upper slope (200 to 500 m) throughout the BSAI wherever there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand.

13. EFH Descriptions for BSAI Shortraker and Rougheye Rockfish

Eggs—No EFH Description Determined

Insufficient information is available.

Larvae

EFH for larval shortraker and rougheye rockfish is the general distribution area for this life stage, located in epipelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles—No EFH Description Determined
Insufficient information is available.

Adults
EFH for adult shortraker and rougheye rockfish is the general distribution area for this life stage, located in the lower portion of the water column along the outer shelf (100 to 200 m) and upper slope (200 to 500 m) regions throughout the BSAI wherever there are substrates consisting of mud, sand, sandy mud, muddy sand, rock, cobble, and gravel.

14. EFH Description for BSAI Northern Rockfish

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae
EFH for larval northern rockfish is the general distribution area for this life stage, located in pelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles—No EFH Description Determined
Insufficient information is available.

Adults
EFH for adult northern rockfish is the general distribution area for this life stage, located in the middle and lower portions of the water column along the outer slope (100 to 200 m) and upper slope (200 to 500 m) throughout the BSAI wherever there are substrates of cobble and rock.

15. EFH Description for BSAI Thornyhead Rockfish

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae
EFH for larval thornyhead rockfish is the general distribution area for this life stage, located in epipelagic waters along the outer shelf (100 to 200 m) and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Thornyhead rockfish is the general distribution area for this life stage, located in the lower portion of the water column along the middle and outer shelf (50 to 200 m) and upper to lower slope (200 to 1,000 m) throughout the BSAI wherever there are substrates of mud, sand, rock, sandy mud, muddy sand, cobble, and gravel.

Adults
EFH for adult Thornyhead rockfish is the general distribution area for this life stage, located in the lower portion of the water column along the middle and outer shelf (50 to 200 m) and upper to lower slope (200 to 1,000 m) throughout the BSAI wherever there are substrates of mud, sand, rock, sandy mud, muddy sand, cobble, and gravel.

16. EFH Description for BSAI Yelloweye Rockfish

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae
EFH for larval yelloweye rockfish is the general distribution area for this life stage, located in the epipelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile yelloweye rockfish is the general distribution area for this life stage, located in the lower portion of the water column within bays and island passages and along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates of rock and in areas of vertical relief, such as crevices, overhangs, vertical walls, coral, and larger sponges.

Adults
EFH for adult yelloweye rockfish is the general distribution area for this life stage, located in the lower portion of the water column within bays and island passages and along the inner shelf (0 to 50 m), outer shelf (100 to 100 m), and upper slope (200 to 500 m) throughout the BSAI wherever there are substrates of rock and in vegetated areas of vertical relief, such as crevices, overhangs, vertical walls, coral, and larger sponges.

17. EFH Description for BSAI Dusky Rockfish

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae
EFH for larval dusky rockfish is the general distribution area for this life stage, located in the pelagic waters along the entire shelf (0 to 200 m) and slope (200 to 3,000 m) throughout the BSAI.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles—No EFH Description Determined
Insufficient information is available.

Adults
EFH for adult dusky rockfish is the general distribution area for this life stage, located in the middle and lower portions of the water column along the outer shelf (100 to 200 m) and upper slope (200 to 500 m) throughout the BSAI wherever there are substrates of cobble, rock, and gravel.

18. EFH Description for BSAI Atka Mackerel

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae
EFH for larval atka mackerel is the general distribution area for this life stage, located in epipelagic waters along the shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) throughout the BSAI.

Early Juveniles —No EFH Description Determined

Insufficient information is available.

Late Juveniles—No EFH Description Determined
Insufficient information is available.

Adults
EFH for adult Atka mackerel is the general distribution area for this life stage, located in the entire water column, from sea surface to the sea floor, along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates of gravel and rock and in vegetated areas of kelp.

19. EFH Description for BSAI Forage Fish Complex—Eulachon, Capelin, Sand Lance, Sand Fish, Euphausiids, Myctophids, Pholids, Gonostomatids, etc.

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles—No EFH Description Determined
Insufficient information is available.

Adults—No EFH Description Determined
Insufficient information is available.

20. EFH Description for BSAI Sculpins

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Juveniles
EFH for juvenile sculpins is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m),

outer shelf (100 to 200 m) and portions of the upper slope (200 to 500 m) throughout the BSAI wherever there are substrates of rock, sand, mud, cobble, and sandy mud.

Adults
EFH for adult sculpins is the general distribution area for this life stage, located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m, outer shelf (100 to 200 m) and portions of the upper slope (200 to 500 m) throughout the BSAI wherever there are substrates of rock, sand, mud, cobble, and sandy mud.

21. EFH Description for BSAI Sharks

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles—No EFH Description Determined
Insufficient information is available.

Adults—No EFH Description Determined
Insufficient information is available.

22. EFH Description for BSAI Skates

Eggs—No EFH Description Determined
Insufficient information is available.

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Adults
EFH for adult skates is the general distribution area for this life stage, located in the lower portion of the water column on the shelf (0 to 200 m) and the upper slope (200 to

500 m) throughout the BSAI wherever there are of substrates of mud, sand, gravel, and rock

23. EFH Description for BSAI Squid

Eggs—No EFH Description Determined

Insufficient information is available.

Young Juveniles—No EFH Description Determined

Insufficient information is available.

Late Juveniles

EFH for older juvenile squid is the general distribution area for this life stage, located in the entire water column, from the sea surface to sea floor, along the inner (0 to 50 m), middle (50 to 100 m), and outer (200 to 500 m) shelf and the entire slope (500 to 1,000 m) throughout the BSAI.

Adults

EFH for adult squid is the general distribution area for this life stage, located in the entire water column, from the sea surface to sea floor, along the inner (0 to 50 m), middle (50 to 100 m), and outer (200 to 500 m) shelf and the entire slope (500 to 1,000 m) throughout the BSAI.

24. EFH Description for BSAI Octopus

Eggs—No EFH Description Determined

Insufficient information is available.

Young Juveniles—No EFH Description Determined

Insufficient information is available.

Late Juveniles—No EFH Description Determined

Insufficient information is available.

Adults—No EFH Description Determined

Insufficient information is available.

25. EFH Description for BSAI Red King Crab

Eggs

Essential fish habitat of the red king crab eggs is inferred from the general distribution of egg-bearing female crab (see also Adults).

Larvae—No EFH Description Determined
Insufficient information is available.

Early Juveniles—No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile red king crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of rock, cobble, and gravel and biogenic structures such as boltenia, bryozoans, ascidians, and shell hash.

Adults
EFH for adult red king crab is the general distribution area for this life stage, located in bottom habitats along the nearshore (spawning aggregations) and the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of sand, mud, cobble, and gravel.