US Army Corps of Engineers
Alaska District

Environmental Resources Section

Public Notice

Alaska District
U.S. Army Corps of Engineers

Date 30 September 2020 Identification No.ER-PN-20-004
Please refer to the identification number when replying.

The U.S. Army Corps of Engineers (USACE) has prepared an environmental assessment (EA) and Draft Finding of No Significant Impact (FONSI) for the following project:

Maintenance Dredging
Nome Harbor
Nome, Alaska

These documents describe the proposed continuation of annual maintenance dredging at Nome Harbor and assess the potential environmental impacts. The EA also describes related activities intended to improve sediment management at Nome Harbor: the clearance of accumulated sediment from the causeway breach, and the excavation of a new shoreline sediment trap west of the causeway. Dredged material from the existing Federal project will be deposited for beach nourishment at the established dredged material placement site east of the harbor. Material excavated from the causeway breach, and the new sediment trap will be placed for potential beneficial use on the beach just inland from the new sediment trap location.

The enclosed EA and Draft FONSI are available for public review and comment for **30** days from the date of this notice. It may also be viewed on the Alaska District's website at www.poa.usace.army.mil. Click on the Reports and Studies button, look under Documents Available for Public Review, and then click on the Operations and Maintenance link.

To obtain a printed copy, please send a request via email to Christopher.B.Floyd@usace.army.mil or send a request to the address below. The FONSI will be signed upon review of comments received and resolution of significant concerns. Please submit comments regarding the proposed action to the above email or the following address:

U.S. Army Corps of Engineers, Alaska District
ATTN: CEPOA-PM-C-ER
P.O. Box 6898
Joint Base Elmendorf-Richardson, Alaska 99506-0898

For information on the proposed project, please contact Chris Floyd of the Environmental Resources Section at the above email or the USACE postal address.

STATE OF ALASKA WATER QUALITY CERTIFICATION

Notice is hereby given that the USACE will be applying for State Water Quality certification from the Alaska Department of Environmental Conservation (ADEC). ADEC may certify there is a reasonable assurance this proposed action and any discharge that might result will comply with the Clean Water Act, Alaska Water Quality Standards, and other applicable State laws. ADEC's certification may authorize a mixing zone and/or a short-term variance under 18 AAC 70, Water Quality Standards, amended as of April 6, 2018. ADEC may also deny or waive certification. Any person desiring to comment on the project with respect to Water Quality Certification may submit written comments to the address below or the email address dec-401cert@alaska.gov within **30** days of the date of this Public Notice. Mailed comments must be postmarked on or before the last day of the public comment period.

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WDAP/401 CERTIFICATION
555 CORDOVA STREET
ANCHORAGE, AK 99501-2617
PHONE: (907) 269-2711 | EMAIL: dec-401cert@alaska.gov

Sincerely,

Michael R. Salyer

Michael R. Salyer
Chief, Environmental Resources Section

US Army Corps
of Engineers®
Alaska District

Environmental Assessment and Finding of No Significant Impact

Maintenance Dredging
Nome Harbor
Nome, Alaska

September 2020

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FINDING OF NO SIGNIFICANT IMPACT

Maintenance Dredging
Nome Harbor
Nome, Alaska

I. In accordance with the National Environmental Policy Act, I have reviewed and evaluated the documents concerning planned continued maintenance dredging at Nome Harbor, Nome, Alaska:

As part of my evaluation, I have considered:

a. Existing resources and the No Action Alternative.

b. Impacts to existing resources from the Preferred Alternative.

II. The possible consequences of these alternatives have been studied for physical, environmental, cultural, and social effects. My evaluation of significant factors has contributed to my finding:

a. No significant impacts to federally listed endangered or threatened species are anticipated.

b. No significant impacts are anticipated to natural resources, including fish and wildlife. The proposed work would have no adverse effect on historic properties or archaeological resources. There would be no appreciable degradation to the physical environment (e.g., water quality and air quality) as a result of the proposed activities. The proposed activity will not require compensatory mitigation; the Environmental Assessment details avoidance and minimization practices that will be followed to ensure impacts to protected species, migratory fish, and water quality are less than significant.

c. The No Action Alternative was evaluated and determined to be unacceptable, as the U.S. Army Corps of Engineers is responsible for maintaining the Federal project depths at Nome Harbor in order to provide safe, reliable, efficient, and environmentally sustainable waterborne transportation systems for the movement of commerce, national security needs, and recreation.

III. Based on the evaluation and disclosure of impacts contained within the Environmental Assessment, I find no significant impacts to the human environment are likely to occur as a result of the proposed action. Therefore, an Environmental Impact Statement will not be prepared prior to proceeding with the proposed maintenance dredging at Nome Harbor in Nome, Alaska.

_____ _____

DAMON A. DELAROSA Date
COL, EN
Commander, Alaska District
U.S. Army Corps of Engineers

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APPENDIX A: 404(B)(1) EVALUATION

1.0 PURPOSE AND NEED

1.1 Introduction

The U.S. Army Corps of Engineers, Alaska District (USACE) prepared this Environmental Assessment (EA) to describe the proposed continued maintenance dredging and placement of dredged material at Nome, Alaska (Figure 1). This EA also describes modifications proposed to allow more effective maintenance of the causeway breach.

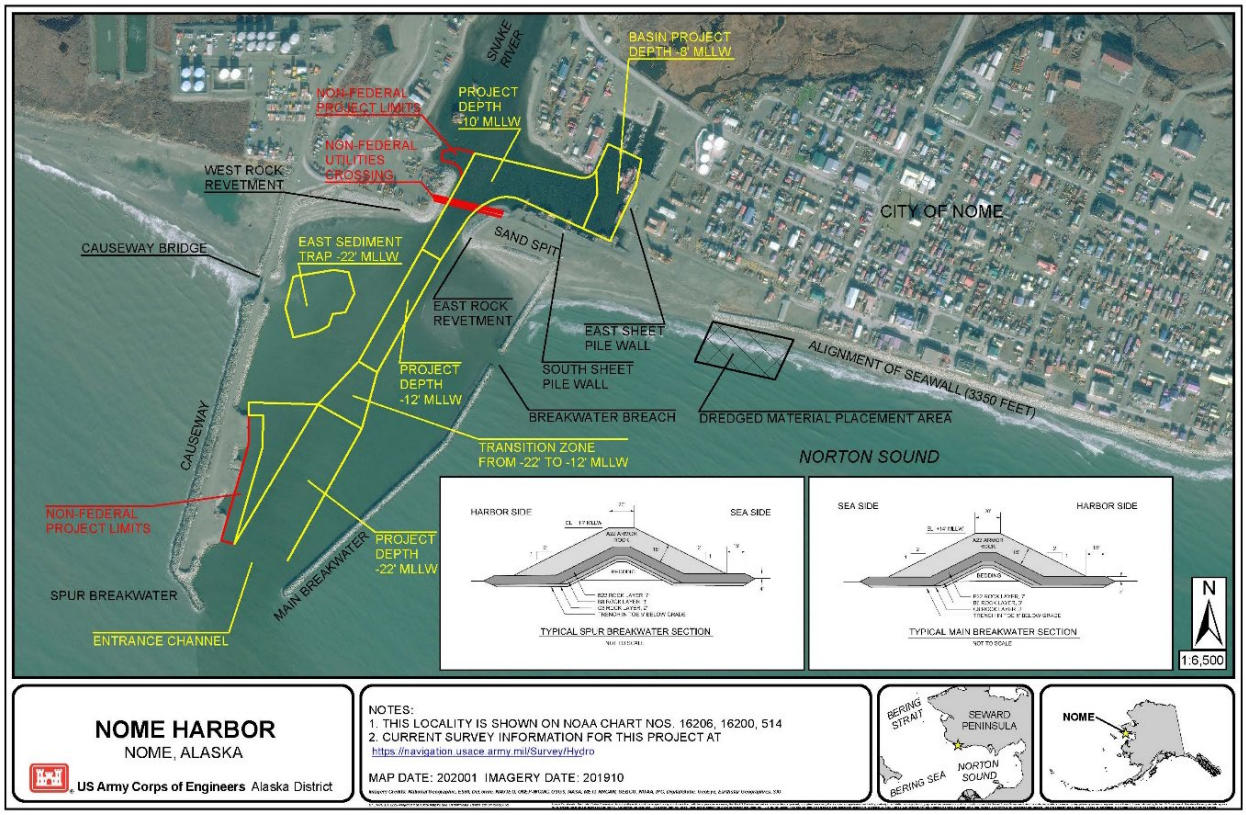


Figure 1. Location and vicinity of the Federal project at Nome Harbor (USACE 2019).

1.2 Federal Project Authorities and Histories

The original improvements to Nome Harbor were approved via the Rivers and Harbors Act of 8 August 1917, Public Law (P.L.) 37. Subsequent authorizations modified the original authorization to produce the current project configuration completed in 2006:

- Rivers and Harbors Act, 30 August 1935
- Section 101 (a)(1), P.L. 106-53, Water Resources Development Act of 1999

Construction on the original project at Nome began in 1919 and was completed in 1923. Annual maintenance dredging began in 1924, removing an average of 6,500 cubic

yards each year. Conversion of the harbor and entrance channel to its current configuration (Figure 1) began in 2004 and was completed in 2007 (USACE 2019).

1.3 Project Need and Objectives

Nome serves as a center of transportation, supply, and cargo distribution for the Seward Peninsula and much of northwest Alaska. The Federal project at Nome Harbor includes approximately 4,075 linear feet (ft) of channel that must be dredged to maintain authorized project depths ranging from -22 feet below mean lower low water (MLLW) to -8 feet MLLW. Littoral transport and storms deposit large quantities of marine sediment, primarily sand, within the channel, and the Federal project must be dredged annually to maintain safe access to the harbor. The transport of sediment along the shoreline at Nome is predominantly from west to east, with sediment entering the harbor through multiple pathways (Figure 1 and Figure 2)

This EA is intended to cover maintenance dredging of the existing Nome Harbor Federal channels and basin, beginning in 2021 and extending until such a time that there are significant changes in the scope of maintenance dredging or the resources affected. The proposed objectives include:

1.3.1 Continued maintenance of the Federal channels, basin, and east sediment trap.

Routine annual maintenance dredging at Nome Harbor typically removes roughly:

- 24,000 cubic yards from the inner harbor basin and inner entrance channel, where required depths vary from -10 feet MLLW to -22 feet MLLW;
- 25,000 cubic yards from the east sediment trap, to a required depth of -22 feet MLLW;
- 20,000 cubic yards from the outer entrance channel, to a required depth of -22 feet MLLW.

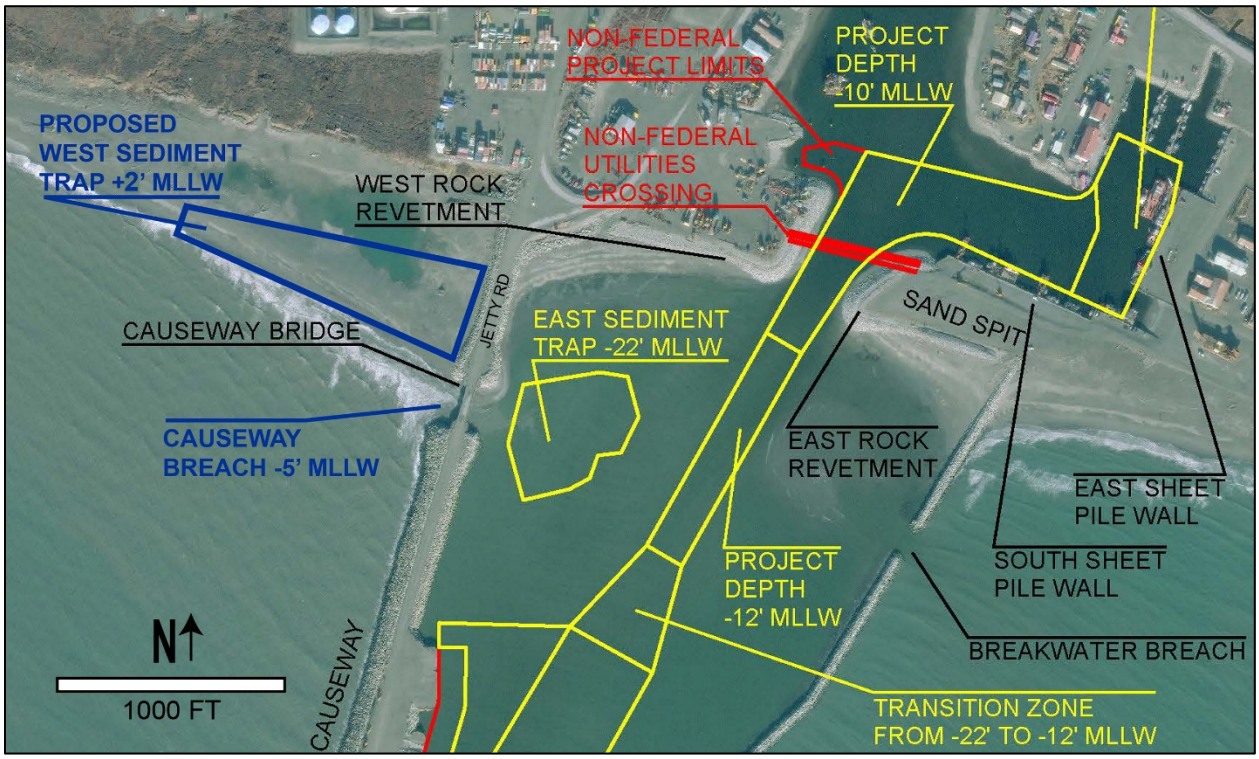


Figure 2. Location detail of the causeway breach and proposed west sediment trap (annotated from USACE 2019).

This estimated annual total of 69,000 cubic yards has historically varied considerably from one year to the next, depending on variable shoaling rates, weather and sea conditions, and funding levels (Table 1). Annual maintenance dredging typically starts in early June and extends into July or August.

Table 1. Annual Maintenance Dredging Quantities at Nome Harbor (USACE 2019).

Year	Volume Dredged (cubic yards)	Dredging Time (days)
2014	54,238	38
2015	116,505	56
2016	67,543	27
2017	82,520	21
2018	65,716	19
2019	34,941	13

1.3.2 Clearance of the causeway breach.

The breach in the causeway has shown an increasing tendency to fill in with sediment. This prevents sediment from reaching the eastern sediment trap and shuts down the littoral sediment by-pass mechanism that the current Nome Harbor layout was designed to implement. About 7,000 cubic yards of existing sediment would need to be removed from the causeway breach to deepen it to a required depth of -5 feet MLLW (-6 feet MLLW maximum pay depth; Figure 2 and Figure 3). The breach may need to be cleared more than once during the 2021-2023 contract period; however, the frequency of maintenance required for the causeway breach should decrease once the proposed west sediment trap (described below) is constructed and in operation. The causeway breach will most likely be cleared using an excavator or other heavy equipment during low tide, with the excavated material placed at the same location as the material from the proposed west sediment trap (Figure 3).

1.3.3 Construction of a new west sediment trap.

The Federal project originally included a subsurface sediment trap immediately west of the causeway breach, similar to the east sediment trap (Figure 1 and Figure 2). The west sediment trap proved very difficult to access and dredge, with nearly immediate infill of longshore transport and has not been maintained as a result.

The USACE proposes constructing a new shoreline sediment trap on the beach immediately west of the causeway (Figure 2 and Figure 3). A roughly triangular depression would be excavated in the beach, about 1,000 feet long and 370 feet wide at the causeway end, to a design depth of +2 feet MLLW (plus an over-dredge to +1 foot MLLW). The approximately 43,000 cubic yards of excavated beach material would be stockpiled on the beach north of the excavation for potential beneficial use by others. The intent is that the new west sediment trap will intercept sediment being transported west-to-east before the sediment enters the harbor. Its shoreline location will allow it to be accessed and maintained by construction equipment, potentially during the fall and winter, when the usual suction dredging equipment cannot operate.

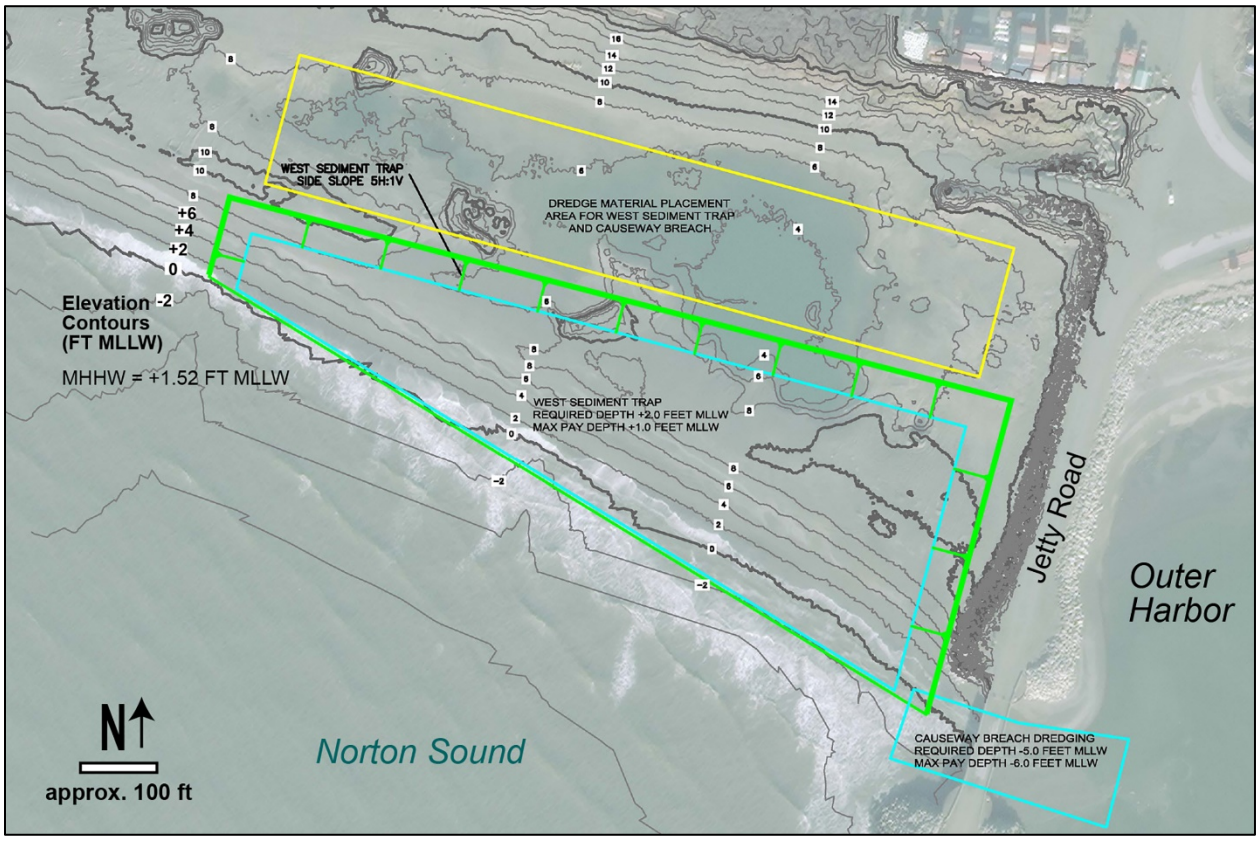


Figure 3. Proposed west sediment trap and adjacent excavated material placement area.

2.0 ALTERNATIVES AND PROPOSED ACTION

2.1 No Action Alternative

The No Action alternative would result in no annual maintenance dredging of the Nome Harbor entrance channel. This alternative would avoid the potential environmental impacts and port access issues described in later sections. However, it would also allow the continued accumulation of sediments that would rapidly restrict safe access by ships and barges to the harbor at Nome.

2.2 Dredging and Sediment Transport Alternatives

Any dredging action requires a dredging method, a location to place the dredged material, and the means of transporting the dredged material to the disposal/placement site(s). The basic choices of dredge types are mechanical (e.g., clamshell) versus hydraulic (suction) with transport via a barge/scow, hopper dredge, or pipeline.

2.2.1 Mechanical Dredge

A clamshell dredge deployed by a barge-mounted crane is often used for dredging in areas around harbor floats and other infrastructure where maneuvering space is limited. Where the area to be dredged is in shallow waters, a large, long-armed excavator can also be used. The dredged sediment is typically deposited onto a barge or in a scow and loses much of its entrained water as it is transferred to or held in this equipment. The dredged material is partially dewatered before being placed at the disposal or stockpiling location. In comparison to other dredging methods, mechanical dredging can result in less lofting of sediment into the water column.

2.2.2 Hopper Dredge

A hopper dredge operates by using suction “drag heads” that extend from the hull of the floating plant down into the substrate to be dredged. Materials are suctioned up into the open hull of the dredge until the hopper is full, and materials can then be moved to a dredged material placement site. The suction of material brings in significant volumes of water and sediment; the excess water is allowed to overflow the hopper and flow back into the water body. The overflow water can increase turbidity and cause water quality issues.

2.2.3 Pipeline Dredge

A pipeline dredge, like the hopper dredge, uses a suction head to bring up sediment from the bottom of the harbor and/or channel. The suction head is often fitted with a rotating cutter to loosen the substrate during the dredging process. However, a pipeline

dredge does not have a hopper to contain the material. Instead, the material is moved through a floating or submerged, metal, or high-density plastic, pipe directly to the placement site. As with a hopper dredge, water is removed with the sediment. The excess water helps to keep the sediment “fluid” so that it can be pumped to the dredged material disposal/placement facility. The pipeline dredge must have a placement or dewatering location within the pumping range of the dredge; otherwise, booster pumps may be necessary to transport the dredged slurry further distance.

A cutter head suction-pipeline dredge has been used for the annual maintenance dredging at Nome Harbor since at least 2003. Past dredging contractors believe this equipment arrived in Nome to conduct the maintenance activities, perhaps as early as 1989.

2.3 Dredged Material Placement or Disposal Alternatives

The typical alternatives for the placement of dredged material include:

- onshore (upland) placement or disposal;
- near-shore placement as fill for construction or environmental-enhancement purposes; and
- off-shore disposal.

2.3.1 Onshore Placement or Disposal

The dredged material, if shown to meet State of Alaska standards for “non-polluted” soil, may be used onshore (upland) for fill, cover, or other purposes such as beneficial use. This requires enough upland space to dewater and stockpile the dredged material, and also the identification of a party willing to take responsibility for the material and put it to legitimate use. Under some conditions, contaminated dredged material may be useable for cover at a nearby landfill but must meet the policies of the State of Alaska Solid Waste Division.

2.3.2 Near-Shore Placement

The USACE and the U.S. Environmental Protection Agency (EPA) have policies encouraging the use of dredged material for construction or environmental enhancement. Such use requires identifying a coinciding construction project, or a legitimate environmental restoration or enhancement project, that can receive the dredged material. Contaminated dredged material can be placed within specially designed confined disposal facilities (CDFs).

The USACE currently places the dredged material from annual maintenance dredging at a shoreline location east of the harbor breakwater (Figure 1). Natural wave action and

littoral transport are allowed to carry the material to the east, where it has beneficially broadened the beach along the toe of the Nome City seawall.

2.3.3 Off-Shore Disposal

Norton Sound immediately offshore of Nome is part of the "territorial sea;" disposal of material below mean low water within the territorial sea is subject to regulation under the Marine Protection, Research, and Sanctuaries Act (MPRSA). Under Section 103 of the MPRSA, the U.S. Army Corps of Engineers has the authority to issue or deny permits for the disposal of dredged material in the territorial sea. While the Corps does not issue itself permits, a Corps action to discharge dredged material into the territorial sea must follow the substantive requirements and criteria of the MPRSA and is subject to U.S. Environmental Protection Agency (EPA) review and concurrence. There are no active MPRSA ocean disposal sites near Nome, and the process to designate and permit one is complex and can take several years. An ocean disposal permit issued under Section 103 is valid for only three years, with the possibility of renewal for another three years.

Previously, two in-water disposal sites authorized under Section 102 of the Marine Protection, Research, and Sanctuaries Act (MPRSA) have been used for disposal. These two disposal areas flanked the former entrance channel and extended several thousand feet seaward. The EPA prepared an environmental impact statement to assess the impacts of using these disposal sites, and a Record of Decision was signed in 1992, authorizing the use of these sites for the disposal of dredged material for a 10-year period. However, the USACE management plan was never approved by the EPA. The realignment of the harbor in 2004-2007 made one of the disposal areas unusable, and the USACE stopped using the remaining disposal site in 2007, switching to the placement of annual dredged material at the current shoreline placement area in 2008 (USACE 2012).

2.4 Preferred Alternative

2.4.1 Maintenance Dredging – Pipeline Dredge

While the contractors bidding on the contract may propose alternate methods of dredging and disposal, it is anticipated that a cutter head suction dredge would continue to be used for maintenance dredging at Nome.

The new west sediment trap and the causeway breach will likely be excavated using upland construction equipment (i.e., bulldozer, excavator, etc.) working on the beach and intertidal zone during low tide, or perhaps from the sea ice during the winter.

2.4.2 Dredged Material Placement for Beneficial Use

The near-shore placement area is at the shoreline at the western end of the rock seawall (Figure 1). This roughly 600-foot by 300-foot (less than 5 acres) area receives sediment dredged from the harbor basin, inner and outer channels, and east sediment trap. This placement site has been used successfully since 2008, and its use has contributed to the widening of the beach in front of the Nome seawall. The dredged material would be placed at the waterline within this area and periodically spread with a grader or bulldozer to match the surrounding beach profile. The dredged material discharged in this area would serve as beach nourishment as it is naturally redistributed eastward along the foot of the seawall. The coordinates of the corners of the onshore placement area are:

- 64° 29 52.76’ N, 165° 25 00.00’ W;
- 64° 29 51.46’ N, 165° 24 47.15’ W;
- 64° 29 48.73’ N, 165° 24 50.13’ W;
- 64° 29 50.03’ N; 165° 25 03.00’ W.

The material excavated to create the new west sediment trap would be stockpiled on the beach to the north and inland of the excavation, as shown in Figure 3. The stockpiled material would be available for beneficial use by other entities. The material removed from the causeway breach may also be transported via the hydraulic pipeline to the near-shore placement area located east of the harbor; however, there is a greater probability the material will be placed in the same stockpile location north of the new west sediment trap to minimize the transport distance.

2.5 Sediment Quality Considerations

Previous sampling and chemical analysis of harbor sediments at Nome has shown little indication of significant human-caused chemical contamination. However, notably high concentrations (up to 200 mg/kg) of arsenic have been reported regularly in sediment samples from the inner harbor area. The State of Alaska has not established marine sediment standards. The dredged material management guidelines (RSET 2018) currently used by the USACE Alaska District have established a marine sediment screening level of 57 mg/kg total arsenic, based on published Lowest Apparent Effects Thresholds (LAETs). This screening level presumes, however, that the arsenic present is due to human-made contamination, rather than naturally occurring minerals.

Arsenic concentrations of surface sediment samples collected in 2016 and 2017 from Snake River, Nome Harbor, and along the outer shoreline are shown in Figure 4. The high variability of arsenic concentrations reported may be due to “nugget effects,” in which a small fraction of high-arsenic particles may skew the analytical results for that

sample; localized selective sorting of high-arsenic particles by density or grain-size may also play a role.

The surface sediment samples collected along the Norton Sound shoreline and within the outer harbor had generally much lower concentrations of arsenic than those collected from the Snake River and inner harbor (Figure 4), suggesting that the Snake River is the source of arsenic-rich sediment found in Nome Harbor. The relatively low variability of arsenic concentrations in shoreline sediment samples taken east of the Outer Basin may be due to a homogenizing effect by the annual suction-dredging of sediments before they are discharged at the beach nourishment placement site.

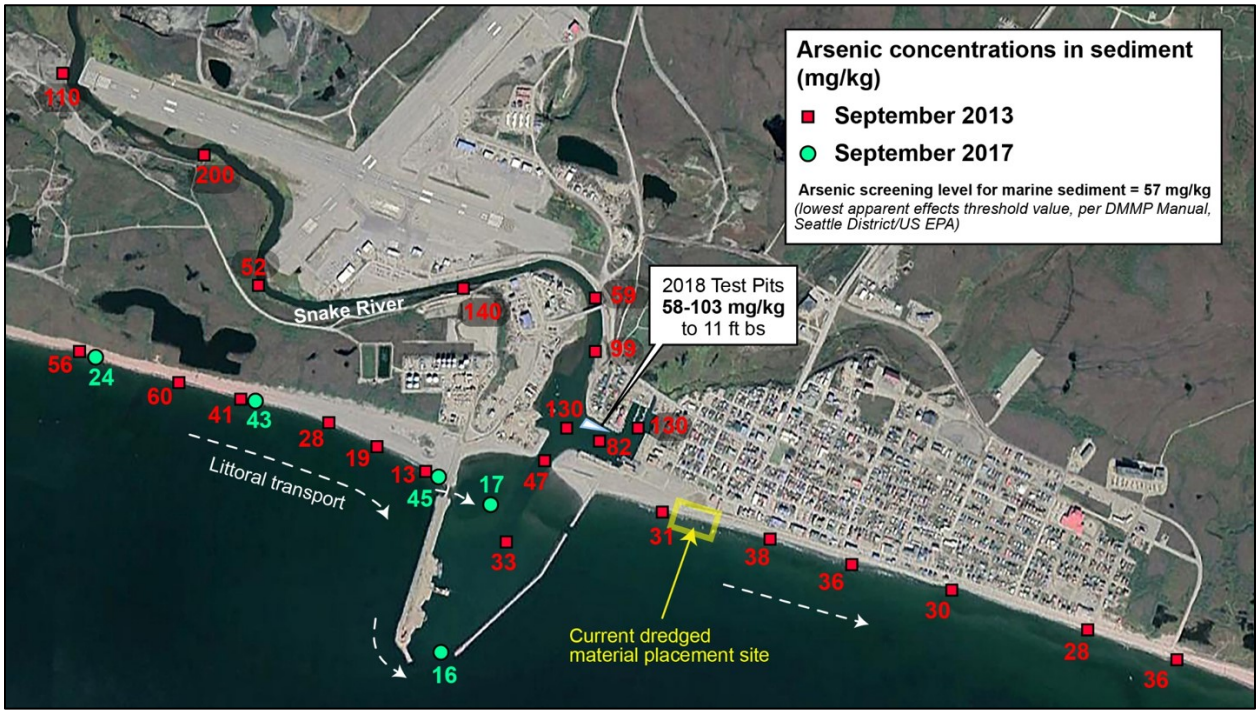


Figure 4. Arsenic concentrations in samples of surface sediment.

2.6 Minimization of Environmental Impacts

No compensatory mitigation is required for the proposed project. The following avoidance and minimization practices will be followed to reduce the risk of environmental impacts during the proposed activities.

2.6.1 Prevention of Contaminant Discharge

The dredging contractor will be required to prepare an Oil Spill Prevention and Control Plan. Reasonable precautions and controls would be used to prevent incidental and accidental discharge of petroleum products or other hazardous substances. Fuel storage and handling activities for equipment would be sited and conducted to prevent

petroleum contamination of the ground, surface runoff, or water bodies. Equipment would be inspected daily for leaks. In case of leaks, equipment would not be used and pulled from service until the leak is repaired. During construction, spill response equipment and supplies such as sorbent pads shall be available and used immediately to contain and clean up oil, fuel, hydraulic fluid, antifreeze, or other pollutant spills. Any spill amount must be reported in accordance with Discharge Notification and Reporting Requirements (AS 46.03.755 and 18 AAC 75 Article 3).

2.6.2 Timing of Construction Activities

The annual maintenance dredging at Nome is currently performed under a Fish Habitat Permit (FHP) issued by the State of Alaska Department of Fish and Game (ADFG). The current FHP (FH13-III-0027, expires 31 December 2023) protects migrating fish by applying the following restrictions:

- Dredging will commence annually as soon as practicable after the ice goes out (typically early June). Dredging of the inner harbor and inner channel shall be completed by 30 June each dredge season and shall be conducted in a manner that will either allow for continuous free passage of fish or dredging for only a 12 hour period per 24 hours. There is no closed period for dredging seaward of the sand spit within the closed portion of the causeway and breakwater.

- If fish are observed entrained within the discharged sediment, the USACE will cease dredging and contact the ADFG.

2.6.3 Minimization of Impacts to Protected Species

The USACE and the National Marine Fisheries Service (NMFS) have developed the following avoidance and minimization measures (NMFS 2020a) to reduce project impacts on pinnipeds (e.g., seals and sea lions) and cetaceans (e.g., porpoises, dolphins, and whales):

1. Prior to dredging, an exclusion zone radius of 525 feet (160 meters) around the dredging equipment will be established.

2. Protected species observers (PSOs) will scan the exclusion zone for 15 minutes before any dredging activities occur. If any listed species are present within the exclusion zone, dredging will not begin until the animal(s) is observed exiting the exclusion zone of their own accord. If not visually observed leaving the exclusion zone, then dredging activities may begin 15 minutes after the animal(s) last observation in the exclusion zone.

3. Throughout all dredging activity, PSOs will continuously scan the exclusion zone to ensure that listed species do not enter it.

4. If any listed species enter, or appear likely to enter, the exclusion zone during dredging, all activity will cease immediately. Dredging may resume when the animal(s) has been observed leaving the area on its own accord. If the animal(s) is not observed leaving the area, dredging may begin 15 minutes after the animal is last observed in the exclusion zone. If a listed species is first observed within the exclusion zone during dredging, take is considered to have occurred, and all in-water work must cease pending re-initiation of consultation (see measure 8).

5. PSOs will:

a. demonstrate proficiency in spotting and identifying Alaska marine mammals at a distance, either through reliable training or existing local experience.

b. have no other primary duties assigned during the time they are conducting marine mammal observations.

c. have the following equipment, or the equivalent, to aid in determining the location of observed listed species, to take action if listed species enter the exclusion zone, and to record these events:

- Binoculars
- Range finder
- GPS
- Compass
- Two-way radio communication with dredge operator
- A logbook of all activities which will be made available to NMFS upon request.

PSOs must have the ability to communicate in real-time with equipment operators either directly or through voice communication tools and will have the authority to delay or cease operations if necessary, to avoid take of marine mammals.

6. PSOs will use NMFS-approved Observation Records. Observation Records will be used to record the following:

a. Date and time that monitored activity begins or ends;

b. Construction activities occurring during each observation period;

c. Weather parameters (e.g., percent cover, visibility);

d. Water conditions (e.g., sea state, tide state);

e. Species, numbers, and, if possible, sex and age class of marine mammals;

f. Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from dredging activity;

g. Distance from dredging activities to marine mammals and distance from the marine mammals to the observation point;

h. Locations of all marine mammal observations;

i. Detailed information about any implementation of any mitigation triggered (e.g., shutdowns and delays), a description of specific actions that ensued, and resulting behavior of the animal, if any;

j. Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take, such as the ability to track groups or individuals;

k. An extrapolation of the estimated takes by Level B harassment based on the number of observed exposures within the Level B harassment zone and the percentage of the Level B harassment zone that was not visible; and

l. Other human activity in the area.

7. Monthly PSO reports will be provided to NMFS. The reporting period for each monthly PSO report will be the entire calendar month. Reports will be submitted by close of business on the fifth day of the month following the end of the reporting period.

8. Though take is not authorized, if a listed species is taken (i.e., a listed species is observed entering the shutdown zone before dredging operations can be shut down), that take must be reported to NMFS within one business day (contact listed below). PSO records for listed species taken by project activities must include:

a. Number of listed species taken.

b. The date and time of each take.

c. The cause of the take (e.g., impact hammer operating at maximum energy).

d. The time the listed species entered the exclusion zone, and, if known, the time it exited the zone.

e. Mitigation measures implemented prior to and after the listed species entered the exclusion zone.

9. Monthly reports in spreadsheet format and reports of take will be submitted to the NMFS Protected Resources Division, Anchorage Office: 907-271-5006.

10. To reduce the risk of collisions with protected species, project vessels will be limited to a speed of 8 knots or the slowest speed above 8 knots consistent with safe navigation.

3.0 AFFECTED ENVIRONMENT

3.1 Community and People

Nome is a community of 3,662 people (2018 estimate; ADCRA 2020) on the south coast of the Seward Peninsula in northwestern Alaska (Figure 1). It serves as a major hub of transportation, commerce, education, and government services for much of northwest Alaska. Nome cannot be reached by road from Anchorage or other population centers of Alaska, but a network of minor roads across the Seward Peninsula connects Nome to villages such as Council and Teller, and to numerous mines and other resource development sites. Thus, the port facilities at Nome provide direct economic support to a region much larger than Nome itself (USACE 2020).

3.2 Climate

Nome is within a transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers (ADCRA 2020).

The Bering Sea at Nome is frozen each winter. Sea ice formation typically occurs in early November; spring break-up usually occurs in late May. Fast ice (i.e., sea ice attached to the shoreline) typically extends out from shore from 0.5 miles to approximately 7 miles depending on seasonal conditions (USACE 2020).

3.4 Soils and Geology

Marine, glacial sand and gravel underline the surface sediments of the Nome coastal plain and adjacent offshore areas. At least six distinct deposits are recognized onshore, relic “beaches,” marking six different coastline elevations during the geologic past. In turn, these deposits are underlain by schist and limestone bedrock, which is exposed at higher elevations north of the coast. The marine and glacial deposits of sand and gravel extended offshore and intermixed with marine silt and clay (Tagg & Greene 1974; MMS 1991).

Near-shore subsurface sediments at Nome consist of four strata consisting of recently deposited sediment underlain by three identifiable older deposits:

a. Silty sand with a trace amount of gravel (recent deposition) to depths -5 to -37 feet MLLW
b. Gravelly silty sand (glacial till) to depths of approximately -15 to -47 feet MLLW
c. Silty fine sand (older marine deposits) to depths of approximately -35 to -71 feet MLLW
d. Sandy gravel rubble to depths of approximately -45 to -72 feet MLLW.

3.5 Tides, Currents, and Sediment Transport

The tidal influence at Nome is relatively small, and the tides are primarily diurnal. Much larger water surface elevation fluctuations occur at Nome due to storm surges. The mean tide level (arithmetic average of the Mean High Water and the Mean Low Water) is 0.82 feet, and the mean tide range (the difference between Mean High Water and Mean Low Water) is 1.03 feet (Table 2).

Table 2. Published Tidal Data for Nome Alaska

Description	Tide Level (ft)
Highest Observed Water Level (19 October 2004)	+9.83
Mean Higher High Water (MHHW)	+1.52
Mean High Water (MHW).	+1.33
Mean Sea Level (MSL)	+0.82
Mean Tide Level	+ 0.81
Mean Low Water (MLW)	+0.30
Mean Lower Low Water (MLLW).	0.00 (datum)
Lowest Observed Water Level (11 November 2005)	-6.69

Source: NOAA NOS, Tidal Epoch 1983-2001, published 10/06/2011.

The USACE conducted a 3-D physical model study for the Nome Navigation Improvements project in 1999. As part of the study, wave-induced currents were evaluated using scaled measurements of current velocities in the model. Various wave heights, periods, wave directions, and still water levels were tested. Generally, current velocities were measured in the range of 0.4 to 1.3 feet per second at the entrance between the spur and main breakwaters. The highest measured current velocity of 4.4 feet per second was recorded in the model.

The movement of littoral drift is dependent primarily on the wave climate and the incident wave angle to the beach. Because waves are approaching the harbor site from the southwest the majority of the time, net sediment transport at Nome is from west to east (Figure 1). This is evidenced by the large accumulation of sediment on the west side of the harbor causeway (visible at the extreme left side of Figure 3), which tends to act as a littoral barrier. The gross annual sediment transport rate is estimated to be 180,500 cubic yards, while the net transport towards the east is an estimated 60,170 cubic yards each year.

Under normal flow conditions, the Snake River discharges only about 400 cubic yards of sediment a year. This river is a stable, low-velocity stream that drains the relatively flat tundra coastal plain surrounding Nome (USACE 1998).

3.6 Water Quality

Water quality studies have not been carried out specifically at the Nome Harbor site. A study of general water quality in northern Norton Sound (Hood & Burrell 1974) found uniformly high dissolved oxygen concentrations, including in bottom waters, due to the mixing effects of storms. Concentrations of nutrients such as phosphorus and nitrogen were extremely high due to the influx of sediment and dissolved matter from the Yukon River into Norton Sound. Measurements of pH were within the slightly-basic norm (7.7-8.1) for coastal marine waters.

The waters of Norton Sound are characteristically turbid due to an enormous load of sediment discharged by the Yukon River to the south and carried throughout the Sound by a counterclockwise gyre (Cacchione and Drake 1979). These sediments, once deposited on the sea floor, can be readily resuspended by severe storms, especially given the shallow depths found through much of Norton Sound.

Because of the history of mining in the Nome area, the presence of metals in the marine environment has been the subject of several studies (Hood & Burrell 1974; MMS 1990). Some early sampling efforts reported high metals levels, but in later studies, ambient concentrations of dissolved or suspended metals such as lead, copper, and zinc have not been found to be elevated in the marine waters off Nome compared with other coastal areas (MMS 1990). A study of metal concentrations in the plume of a gold dredge working offshore of Nome found that samples of the water column containing resuspended sediment contained elevated concentrations of metals. Those same samples, when filtered, showed similar concentrations to samples collected outside the plume, suggesting that the resuspension of sediment by the dredge was not driving significant amounts of metals into the dissolved phase (MMS 1990).

3.7 Air Quality

Nome presumably enjoys good air quality because of the persistent winds off the ocean and a relatively low number of air pollutant sources. There is no established ambient air quality monitoring program at Nome, and no current existing data to compare with the National Ambient Air Quality Standards (NAAQS) established under the Clean Air Act (CAA). These air quality standards include concentration limits on the “criteria pollutants” carbon monoxide (CO), ozone (O_3), sulfur dioxide (SO_2), nitrogen oxides (NO_x), lead (Pb), and particulate matter (PM_{10}, $PM_{2.5}$).

Particulate matter, in the form of dust lofted from unpaved roads and trails, is a major air quality concern in Alaskan rural and smaller communities (ADEC 2018a). The Alaska Department of Environmental Conservation (ADEC) Air Quality Division has conducted repeated rural dust surveys, and Nome was one of the numerous communities reporting

people “highly affected by dust.” Most of Nome’s major streets and roads are paved, except for the area around the port; there are many unpaved roads and working areas.

Aggregate air emissions from vessels at Nome Harbor are unmonitored, but are expected to be highly seasonal (e.g., negligible during November through April), and highly variable depending on the number, type, and activity of vessels operating within and around the harbor at any time during the ice-free season. Vessel operations in the inner harbor are limited primarily to gasoline-fueled and smaller diesel-fueled vessels; larger vessels moor at docks along the causeway (the nearest distance from a causeway dock to a residential building is roughly 0.6 mile) or wait offshore.

3.8 Noise

Nome Harbor is currently a seasonally busy seaport. Sources of noise during the ice-free season include vessel engines and gear, as well as land-based sources such as vehicles, construction machinery, and the movement of cargo and equipment. The number of noise sources diminishes during the winter, although there is still activity in the industrial areas connected with the port. Most noise-generating activity at the port is at least several hundred yards from the nearest residences. Although housing, particularly in the Belmont Street area between Snake River and the inner harbor, is immediately adjacent to the existing port-related industry.

3.9 Biological Resources

3.9.1 Habitat and Wildlife

3.9.1.1 Shoreline Habitat

The Norton Sound shoreline at Nome and for 10 to 13 miles on either side consists primarily of exposed sandy beaches. The beaches adjacent to Nome Harbor are largely devoid of vegetation due to strong storm surges and extensive surf run-up, and due to human disturbance. The shoreline and beaches adjacent to and within the harbor are shown in Figure 5 and Figure 6. The beach to the west of the harbor (where the proposed west sediment trap would be located) has been modified by sand extraction and construction vehicle traffic (Figure 5). The beach to the east of the harbor is the site of the existing dredged material placement area (Figure 6); it is otherwise frequently used by the public for walking, picnics, and beach-combing.

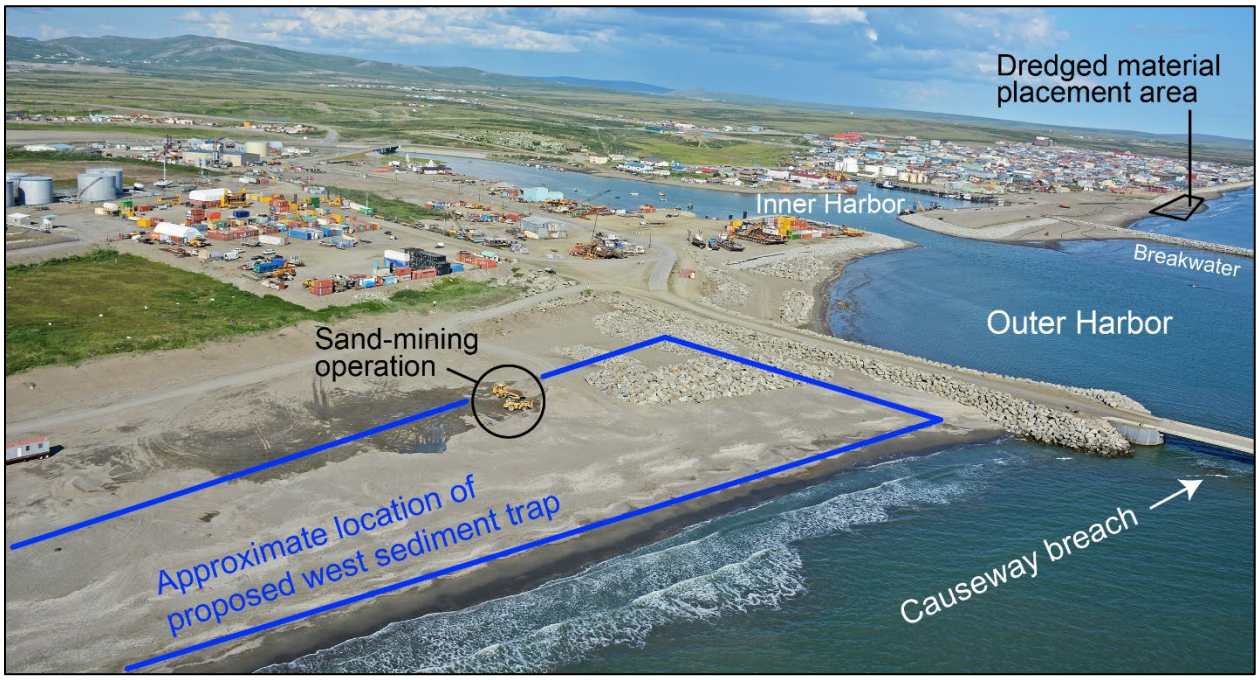


Figure 5. Annotated aerial photo of the beach west of the harbor (photo dated July 2015, ShoreZone 2020).

Figure 6. Annotated aerial photograph of the beach east of the harbor (photo dated July 2015, ShoreZone 2020).

3.9.1.2 Near Shore Benthic Habitat

The near shore benthic environment near Nome deepens very gradually (Figure 7) and is highly dynamic, subject to frequent disruption from currents, storms, ice, and gold-dredging. Littoral transport moves such volumes of fine sediment along the shoreline that Nome Harbor must be dredged annually. During ice-free months, frequent storms can cause a substantial redistribution of bottom sediments and disruption of benthic habitat at depths of 60 feet or greater (Jewett 2013). Shore-fast ice extends to the seabed within the 8- to 10-feet depth contour, and the movement of this near shore ice during spring break up scours bottom sediments out to roughly the 20-foot depth contour (USACE 2020). The recurring disruption of benthic sediments in this zone limits its use primarily to organisms adapted to loose, mobile substrates, such as polychaetes and amphipods. The frequency and severity of benthic disruption decrease farther offshore with increasing water depth. Beginning at approximately the 30-foot depth contour, littoral transport of fine sediments tapers off, and the seafloor becomes a mosaic of sand and cobble habitats, periodically re-arranged by stronger storm surges.

Organisms living under the surface of marine sediment of western Norton Sound include polychaete worms, sand dollars, and mollusks such as clams and cockles. These mollusks are important prey for sea stars and walrus, as well as crab and flatfish (Fukuyama and Oliver 1985, RJW 2013).

Red king crab is an essential Norton Sound benthic invertebrate for human use. The Norton Sound red king crab stock appears to be isolated from other Bering Sea stocks of this species; it lives in relatively shallow water and is confined under sea ice for five to six months each year. Adult and sub-adult crabs migrate into coastal waters near Nome in late fall and winter, then return to deeper waters when near shore ice breaks up in spring, and coastal water temperatures rise, and salinities decrease (RJW 2013).

Six species of demersal (bottom-dwelling) fish have made up the bulk of fishes caught in Norton Sound benthic trawl studies: saffron cod, Arctic cod, starry flounder, yellowfin sole, Alaska plaice, and plain sculpin. Saffron cod is a vital subsistence resource, harvested mainly in winter, and also a major prey species for marine mammals. Arctic cod tend to be distributed farther offshore than saffron cod, but do inhabit shallower nearshore waters in winter. Yellowfin sole display a seasonal distribution opposite of the cod species, moving into inshore waters to spawn during spring and summer, and returning to deeper offshore waters in the fall and winter. Juvenile yellowfin sole remains in shallow, nearshore areas for several years (RJW 2013).

The USACE performed a video survey in August 2018, using a drop-camera at 43 locations (Figure 7). Most points within and to the immediate east and west of the Outer Harbor showed waves of fine sand. Areas of coarser sand, sometimes with pebbles and cobbles, were noted to the east of the breakwater, and is a known scour area off the end of the causeway, but not west of the causeway. Given the general west-to-east

littoral transport along the coastline at Nome, these coarse deposits may result from changes to sediment transport caused by the causeway and breakwater structures.

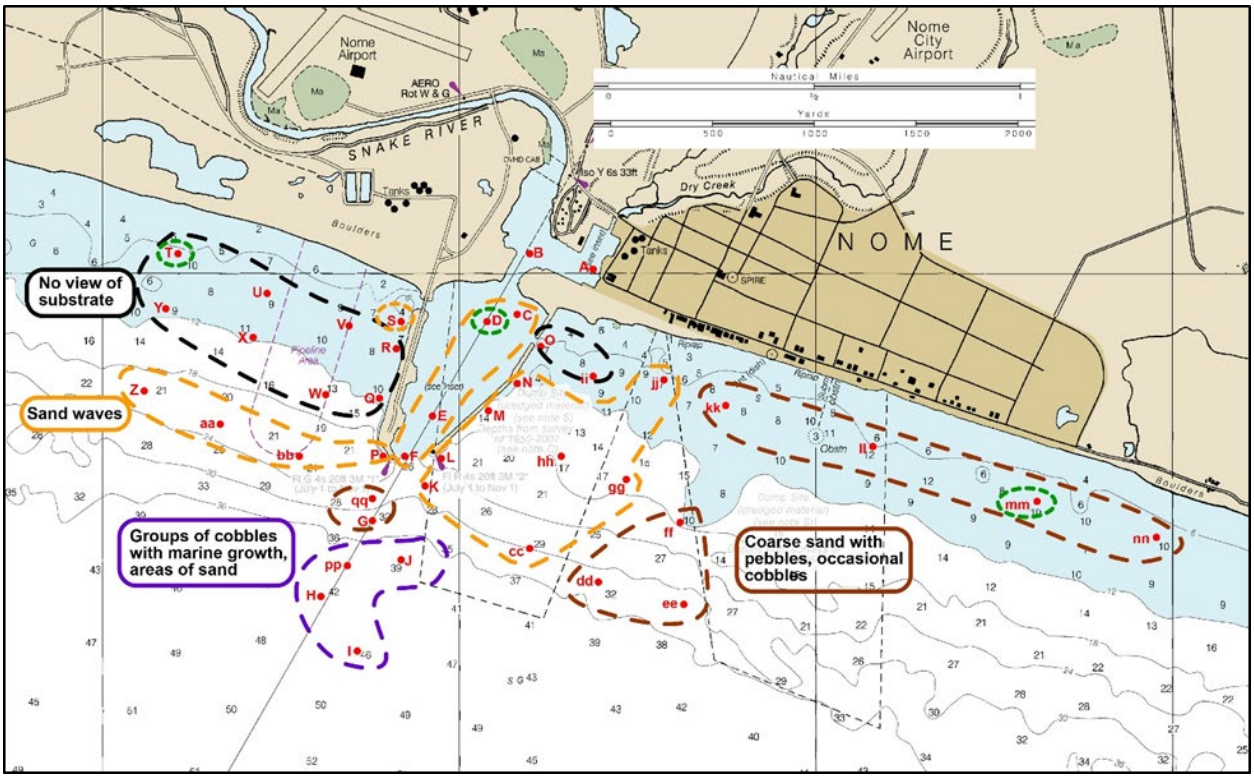


Figure 7. Conceptual groupings of substrate types observed using a drop-camera 7-8 August 2018. The red dots with alphabetical designations indicate the 43 individual observation points (base image is adapted from NOAA Chart 16206; soundings are in feet).

Reduced visibility at most locations was due to suspended material and a massive green cast from phytoplankton. At many locations, material in the water column appeared to be planktonic or free-swimming organisms, judging by the size and movement of the particles. Incidental sightings of larger marine organisms noted on the drop-camera videos included several fish, probably saffron cod, several possible small squids; a sea jelly (probably *Aurelia* sp.); unidentified 5-limbed sea stars; and a possible marine worm casting on the sand surface. At three widely-spaced points, the drop-camera encountered large clumps of unidentified marine plants (points D, T, and mm in Figure 7). The orientation and motion of the plants in the videos suggested that they were rooted in the substrate, but this could not be confirmed.

The existing rubble mound causeway and breakwater at Nome represent another type of substrate within the project area that is uncommon in the Nome area: vertical rocky surfaces. Annual scouring by sea ice and a minimal tidal range presumably severely limits the extent to which intertidal marine organisms can exploit the rock surfaces. Still,

the growth of several marine algae species, including *Fucus* (a.k.a., rockweed), can be seen at numerous locations on armor stone awash or just under the water surface. Herring are known to spawn on these patches of *Fucus*. Small barnacles are also widespread on the rock surfaces. Mussels grow at depth on the rock; their shells are abundant on the beach to the east of the causeway. Drop-camera videos taken on 31 May 2019 along the causeway and breakwater showed diverse communities of marine algae, invertebrates, and fish occupying the riprap at depth, especially along the seaward sides (USACE 2020).

3.9.1.3 Pelagic fish

Major non-benthic marine species include ocean-run Pacific salmon, of which all five species are present in Norton Sound. Chum salmon and pink salmon are the most abundant species in this area, while coho, chinook, and sockeye are much less common or widespread (USACE 2020).

Pacific herring appear along the Bering Sea coast immediately after ice breakup in mid-May to early June, with peak spawning occurring during the first half of June. Spawning is primarily in intertidal and shallow subtidal areas, with rockweed (*Fucus* sp.), eelgrass, or bare rock serving as the substrate. The major herring spawning areas are in the eastern and southern parts of Norton Sound, where suitable spawning substrate is more available. Still, herring can be seen spawning along the stone causeway and breakwater at Nome in early June. Pacific herring migrate back to deeper waters in mid-September (ADFG 2012; RJW 2013).

Capelin, sand lance, and smelt are abundant, widespread forage fishes that play a crucial role in Bering Sea food webs. They serve as prey species for larger fish, birds, and marine mammals. Capelin and sand lance spawn in sandy intertidal habitats, while smelt prefers aquatic plants and rocky substrates (RJW 2013; Smith et al. 2017); capelin in the Nome area spawn in mid-June (ADFG 2012).

3.9.1.4 Coastal Birds

The industrial setting surrounding the port and the adjacent well-traveled beaches offer limited habitat for birds. Glaucous-winged gulls, mew gulls, and common ravens forage along the beaches and roost on harbor infrastructure. Seabirds such as black-legged kittiwakes, horned puffins, tufted puffins, common murres, thick-billed murres, and pelagic cormorants' nest on coastal bluffs to the east and west of Nome but may be seen feeding offshore of Nome Harbor (ADFG 2012).

3.9.1.5 Pinnipeds and Cetaceans

Several species of seals, walrus, and whales make notable use of Norton Sound for at least a portion of the year, their seasonal distribution tied to the advance and retreat of sea ice. Ringed, bearded, spotted, and ribbon seals are collectively known as "ice

seals" due to their associations with sea ice. Ringed seals are the most widespread and numerous of the ice seals. They are primarily associated with shore-fast ice, whereas the other ice seals generally prefer moving ice. Ringed seals can create and maintain breathing holes in thick winter ice and may build a den in the snow; pupping occurs in late winter or early spring. Near Nome, ringed seals are often seen using open water offshore from Cape Nome and Safety Sound in winter and spring. Some ringed seals follow the ice pack north as it retreats, but others remain in Norton Sound all summer, feeding on salmon and other fish at the mouths of rivers like the Cripple, Penny, and Nome Rivers. Juvenile seals are often seen resting on beaches (Oceana & Kawerak 2014).

Bearded seals prefer moving ice and open water over relatively shallow seafloors. They feed primarily at or near the seabed, on benthic invertebrates and demersal fish. Like the ringed seals, bearded seals congregate at the open water found near Cape Nome and Sledge Island in winter and spring. Juvenile bearded seals may remain in open water during the summer, feeding in lagoons and rivers, but older individuals migrate north with the retreating pack ice. Bearded seals are a particularly important subsistence species (Oceana & Kawerak 2014).

Spotted seals are regularly seen within Nome Harbor, especially before or after the busy summer season, sometimes hauled out on the beach or breakwater. Seals and other marine mammals tend to congregate in the outer harbor, especially in the autumn (Kawerak 2017).

Near Nome, walrus typically stay well offshore during migration; Nome-area hunters may have to travel up to 50 miles from shore to find walrus (Oceana & Kawerak 2014). Individual walrus, however, have been spotted near Nome Harbor, sometimes hauled out onto the breakwater. Walruses are an important subsistence species throughout the Bering Strait region.

Beluga whales concentrating in Norton Sound belong to the eastern Bering Sea stock, one of five stocks found in Alaskan waters. Belugas are small, toothed whales that feed in shallow coastal waters and at the mouths of rivers, and are generally found in herds that range in size from a handful of individuals to hundreds. Beluga whales use Norton Sound during the entire open-water season, but not typically in the winter, due to the extensive ice cover. During the spring and summer, beluga whales in Norton Sound tend to concentrate in the eastern half of the Sound (Oceana & Kawerak 2014), but the whales may be seen migrating in large numbers close to the shoreline near Nome in late autumn (ADFG 2012). Beluga whales have been occasionally spotted in the outer harbor of Nome during the fall migration (Lean 2019).

Gray whales may be seen feeding in Norton Sound, including offshore of Nome, in the spring and summer, but do not appear to concentrate in the Sound (ADFG 2012).

According to Ms. Gay Sheffield, a long-time Nome resident and marine biologist affiliated with the University of Alaska and the Alaska Sea Grant Marine Advisory Program, Steller sea lions forage in Norton Sound and farther north. Sea lions haul out in small numbers at Sledge Island, about 22 miles west of Nome (Oceana and Kawerak 2014).

3.9.2 Protected Species

3.9.2.1 Endangered Species Act

Jurisdiction under the Endangered Species Act (ESA) of 1973 is divided by species between the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). Through informal consultation with the USFWS and the NMFS, the USACE has identified the ESA-listed species that may be present in the project area (Table 3).

Table 3. ESA-Listed Species Potentially Affected by the Proposed Action

Species	Listed Population	Agency Jurisdiction	ESA Status	Critical Habitat in Area?
Ringed seal, *Pusa hisipida*	Arctic DPS	NMFS	Threatened	Proposed
Bearded seal, *Erignathus barbatus*	Beringia DPS	NMFS	Threatened	No
Steller sea lion, *Eumetopias jubatus*	Western DPS	NMFS	Endangered	No
Bowhead whale, *Balaena mysticetus*	All	NMFS	Endangered	No
Humpback whale, *Megaptera novaeangliae*	W. Pacific DPS	NMFS	Endangered	No
	Mexico DPS	NMFS	Threatened	
N. Pacific right whale, *Eubalaena japonica*	All	NMFS	Endangered	No
Gray whale, *Eschrichtius robustus*	Western North Pacific DPS	NMFS	Endangered	No
Polar bear, *Ursus maritimus*	All	USFWS	Threatened	Yes
Spectacled eider, *Somateria fischeri*	All	USFWS	Threatened	No
Steller's eider, *Polysticta stelleri*	AK breeding population	USFWS	Threatened	No

DPS: Distinct population segment.

Arctic Ringed Seal

Ringed seals are the most abundant marine mammal in the Beaufort, Chukchi, and Bering seas. They are circumpolar in distribution, with the Arctic subspecies present year-round in the Bering, Chukchi, and Beaufort seas off the coast of western and northern Alaska (NMFS 2020a).

In the Beaufort, Chukchi, and Bering seas, ringed seals prefer large ice floes, moving seasonally with the melting and retreating ice pack. Like the other ice seals, ringed seals are closely associated with sea ice during breeding, pupping, and molting.

During the open water season, ringed seals are widely dispersed as single animals or in small groups, and they are known to move into coastal areas. Satellite tagging data revealed that ringed seals cover large distances between foraging areas and haulout sites during the open water season. The time that ringed seals spend on haulout sites is much shorter than the time they spend foraging in open water. For example, in July, ringed seals spent 70 percent (%) of the time in open water, increasing to greater than 90 percent in August. In winter and spring, the highest densities of ringed seals are found on stable land fast ice (NMFS 2020a).

Ringed seals produce underwater vocalizations, which range from approximately 0.1 to 1.0 kHz in association with territorial and mating behaviors. Underwater audiograms for ringed seals indicate that their hearing is most sensitive at 49 dB re 1 µPa (12.8 kHz) in water, and -12 dB re 20 µPa (4.5 kHz) in the air. Underwater audiograms for phocids suggest that they have very little hearing sensitivity below 1 kHz, though they can hear underwater sounds at frequencies up to 60 kHz and make calls between 90 Hz and 16 kHz. NMFS defines the functional hearing range for phocids (seals) as 50 Hz to 86 kHz (NMFS 2020a).

Bearded Seal

Bearded seals are circumpolar throughout the Arctic. They can be found in continental shelf waters of the Bering, Chukchi, and Beaufort seas. They are closely associated with sea ice, and specifically with pack ice during their breeding, whelping, nursing, molting, and resting periods. Seasonal movements and distribution of bearded seals are linked to seasonal changes in ice conditions. Bearded seals are generally associated with pack ice and only rarely use shore fast ice. Bearded seals generally move north in late spring and summer as the ice edge retreats; seals then move south in the fall as sea ice forms and continue to remain associated with sea ice (NMFS 2020a).

The summer distribution is quite broad, with bearded seals rarely hauled out on land. However, some seals, mostly juveniles, have been observed hauled out on land along lagoons and rivers in some areas of Alaska, such as in Norton Bay and near Wainwright and on sandy islands near Barrow (NMFS 2020a).

Results from satellite tracking by the Alaska Department of Fish and Game indicate that bearded seals are present in Norton Sound year-round, including the ice-covered months. Additionally, bearded seals are observed swimming in and around the Nome Harbor during the spring, summer, and fall (NMFS 2020a).

Underwater audiograms for ice seals suggest that they have very little hearing sensitivity below 1 kHz; but hear underwater sounds at frequencies up to 60 kHz, and

make calls between 90 Hz and 16 kHz. NMFS defines the functional hearing range for phocids as 50 Hz to 86 kHz (NMFS 2018).

Steller Sea Lion

The Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 (55 FR 49204). In 1997, NMFS reclassified Steller sea lions into two distinct population segments (DPSs) based on genetic studies and other information (62 FR 24345); at that time, the eastern DPS was listed as threatened, and the western DPS was listed as endangered. On November 4, 2013, the eastern DPS was removed from the threatened and endangered species list (78 FR 66139).

Steller sea lions prefer the colder temperate to subarctic waters of the North Pacific Ocean. Haul outs and rookeries usually consist of beaches (gravel, rocky or sand), ledges, and rocky reefs. In the Bering Sea and Okhotsk Sea, sea lions may also haul out on sea ice, but this is considered atypical behavior. The critical habitat for Steller sea lions was designated in 1993 and is described in 50 CFR §226.202. Critical habitat in Alaska west of 144°W longitude consists of:

a. Aquatic zones that extend 20 nautical miles (nm), or 37 kilometers (km), seaward of each major haul out, and major rookery.
b. Terrestrial zones that extend 3,000 ft (0.9 km) landward from each major haul out and major rookery.
c. Air zones that extend 3,000 ft (0.9 km) above the terrestrial zone of each major haul out and major rookery in Alaska.
d. Three aquatic foraging areas: the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area, as specified at 50 CFR §226.202(c).

The nearest Steller sea lion CH to Nome is on the east shore of St. Lawrence Island, about 140 miles to the southwest. However, Steller sea lions, especially juveniles and non-breeding males, can range through waters far beyond their primary use areas. Observations suggest that Steller sea lions are becoming common in the northern Bering Sea. Their change in range is perhaps attributed to climate change-driven movement of pelagic fish prey species, such as Pacific cod, northward.

The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. NMFS categorizes Steller sea lions in the otariid pinniped functional hearing group, with an applied frequency range between 60 Hz and 39 kHz in water (NMFS 2018).

Bowhead Whale

Four distinct populations of bowheads are recognized worldwide; the only population found in U.S. waters is the Western Arctic stock, also known as the Bering-Chukchi-Beaufort stock. The United States listed all bowhead whales as endangered under the ESA in 1973 (NOAA 2018).

Western Arctic bowheads winter in the Bering Sea along the southern edge of pack ice or within polynyas. In March and April, most bowheads are thought to migrate along leads in the ice through the Chukchi Sea to summering areas in the Beaufort Sea. From August to October, they migrate back west to Point Barrow and pass through the Bering Strait by November (ADFG 2008a). Norton Sound is at the outer limit of their typical range (Oceana & Kawerak 2014; Smith et al. 2017), but a bowhead whale would most likely be found in the vicinity of Nome during the winter, as sea ice extends into Norton Sound. Bowhead whales are unlikely to be present near Nome during the ice-free dredging season. No CH has been established for this species.

Humpback Whale

Humpback whales were listed on the ESA in 1973. Guidance from the NMFS on humpback whales occurring in Alaskan waters (NMFS 2016) discusses three DPS:

- Western North Pacific DPS (ESA endangered);
- Mexico DPS (ESA threatened); and
- Hawaii DPS (not listed under the ESA).

Whales from the Western North Pacific, Mexico, and Hawaii DPSs overlap to some extent in feeding grounds off Alaska. An individual humpback whale encountered in the Bering Sea has an 86.5% probability of being from the unlisted Hawaii DPS, an 11.3% chance of being from the threatened Mexico DPS, and a 4.4% chance of being from the endangered Western North Pacific DPS.

The humpback whale is seasonally migratory, mating and calving in tropical and subtropical waters in winter, but spending summers feeding in temperate and subpolar seas. In Alaskan waters, humpbacks concentrate in southeast Alaska, Prince William Sound, lower Cook Inlet, and along the Aleutian Islands in the summer. Some humpback whales summer in the Bering Sea, even venturing into the Chukchi Sea. In 2007, humpbacks were spotted in the Beaufort Sea east of Utqiaġvik, suggesting a northward expansion of their summer feeding range (ADFG 2018a). Humpback whales are most likely to be in the vicinity of Nome during the summer and fall.

Humpback whales produce a variety of vocalizations ranging from 20 Hz to 10 kHz (NMFS 2020a). NMFS categorizes humpback whales in the low-frequency cetacean

functional hearing group, with an applied frequency range between 7 Hz and 35 kHz (NMFS 2018).

North Pacific Right Whale

The North Pacific right whale was listed on the former Endangered Species Conservation Act and continued to be listed as endangered following the passage of the ESA in 1973. The listing was later divided into two separate endangered species: North Pacific right whales and North Atlantic right whales. The two areas of CHs designated in 2008 (73 FR 19000) are in the Gulf of Alaska and the Bering Sea, well south of Nome. North Pacific right whales are found from Baja California to the Bering Sea with the highest concentrations in the Bering Sea, Gulf of Alaska, Okhotsk Sea, Kuril Islands, and Kamchatka area. They are primarily found in coastal or shelf waters. The seasonal distribution of this species is poorly understood (NMFS 2013). However, recent studies of long-term acoustic monitoring suggest they may venture farther into the northern Bering Sea than previously thought (Wright et al. 2019). In the spring through the fall, their movements are believed to follow the distribution of prey, primarily high densities of zooplankton. In the winter, pregnant females move to shallow waters in low latitudes to calve; the winter habitat of the rest of the population is unknown. This species would most likely be present in the vicinity of Nome in the summer (NMFS 2013).

A study of right whale ear anatomy indicates a total possible hearing range of 10 Hz to 22 kHz (NMFS 2020a). NMFS categorizes right whales in the low-frequency cetacean functional hearing group, with an applied frequency range between 7 Hz and 35 kHz (NMFS 2018).

Western North Pacific Gray Whale

The gray whale was listed as an endangered species under the ESCA on June 2, 1970 (35 FR 8491), and continued to be listed as endangered following the passage of the ESA. There are two extant populations in the eastern and western North Pacific. The eastern population was delisted in 1994 (59 FR 31094). The western population remains very low, around 200 individuals, and is listed as endangered under the ESA. Critical habitat has not been designated for the gray whale. A small number of endangered Western North Pacific DPS of gray whales make their way to the coastal waters of North America during the summer and autumn feeding season, mixing with the unlisted Eastern Pacific population. The probability of encountering a western north Pacific gray whale in the Bering Sea is unknown. No CH is designated for this species (NMFS 2020a).

Gray whales produce a variety of vocalizations, which have been reported to range from 20 Hz to 10 kHz (NMFS 2020a). While there is no direct data on hearing in low-

frequency cetaceans, the applied frequency is anticipated to range from 7 Hz to 35 kHz (NMFS 2018).

Polar Bear

The polar bear is a maritime carnivore dependent on arctic sea ice and the associated assemblage of sea mammals. It is listed as a threatened species under the ESA throughout its range (73 FR 28212), due to observed and anticipated changes to its sea ice habitat; the polar bear is also protected under the Marine Mammal Protection Act (MMPA). Polar bears are widely distributed throughout the arctic, with a worldwide population estimated at 20,000 to 25,000. Sea ice provides polar bears with a platform for hunting and feeding, breeding, and denning. The most productive hunting for ice seals, the polar bear's primary prey, is along ice edges and open leads, so polar bears tend to migrate seasonally with the sea ice edge as it advances in the autumn and retreats in spring (USFWS 2016).

The CH unit for polar bears was designated by the USFWS under the ESA in 2010 (75 FR 76086, USFWS 2010) and includes three habitat units: barrier islands, sea ice, and terrestrial denning habitat. The only CH unit appearing in Nome is 'sea ice.' The nearest 'barrier island' CH exists at Safety Sound, roughly 17 miles southeast of Nome, and at Sledge Island, about 23 miles west of Nome. No terrestrial denning habitat has been identified along the Norton Sound coast.

While polar bears may be present near Nome, population studies suggest that typical polar bear winter foraging and denning ranges do not extend far into Norton Sound and that Nome is near the margin of those ranges (Smith et al. 2017). The likelihood of a polar bear appearing near Nome would be highest when dense sea ice is present in Norton Sound, roughly November through May, and minimal when sea ice is absent. Rarely, a polar bear may be stranded on the Norton Sound coast when the sea ice retreats in the spring (ADFG 2012).

Spectacled Eider

Spectacled eiders are large sea ducks that spend most of their life cycle in the arctic environment. They were listed as a threatened species throughout their range in 1993 based on indications of steep declines in the Alaska-breeding populations.

From November through March or April, spectacled eiders remain in the open sea, polynyas, or open leads in the sea ice of the northern Bering Sea; the availability of sea ice as a resting platform is believed to be important for energy conservation. As open water becomes available in spring, breeding pairs move to nesting areas on wet coastal tundra along the Arctic Ocean coast, or along the Bering Sea coast of the Yukon-Kuskokwim Delta. Spectacled eiders molt in several discrete areas of shallow coastal

water (Figure 8) during late summer and fall. Spectacled eiders generally depart all molting sites in late October to early November, migrating offshore in the Chukchi and Bering Seas to a single wintering area in openings in the pack ice of the central Bering Sea south/southwest of St. Lawrence Island.

CH designated for spectacled eiders consists of a wintering habitat in the Bering Sea south of St. Lawrence Island, nesting habitat along the coast of the Yukon-Kuskokwim Delta, and molting areas in eastern Norton Sound, and Ledyard Bay on the Chukchi Sea coast (Figure 8).

None of the identified spectacled eider concentration areas or CH is in the vicinity of Nome or within the project area; the closest CH unit, the Eastern Norton Sound Unit, is roughly 80 miles to the east. Spectacled eiders found near Nome would most likely be transients migrating between breeding, molting, and wintering areas.

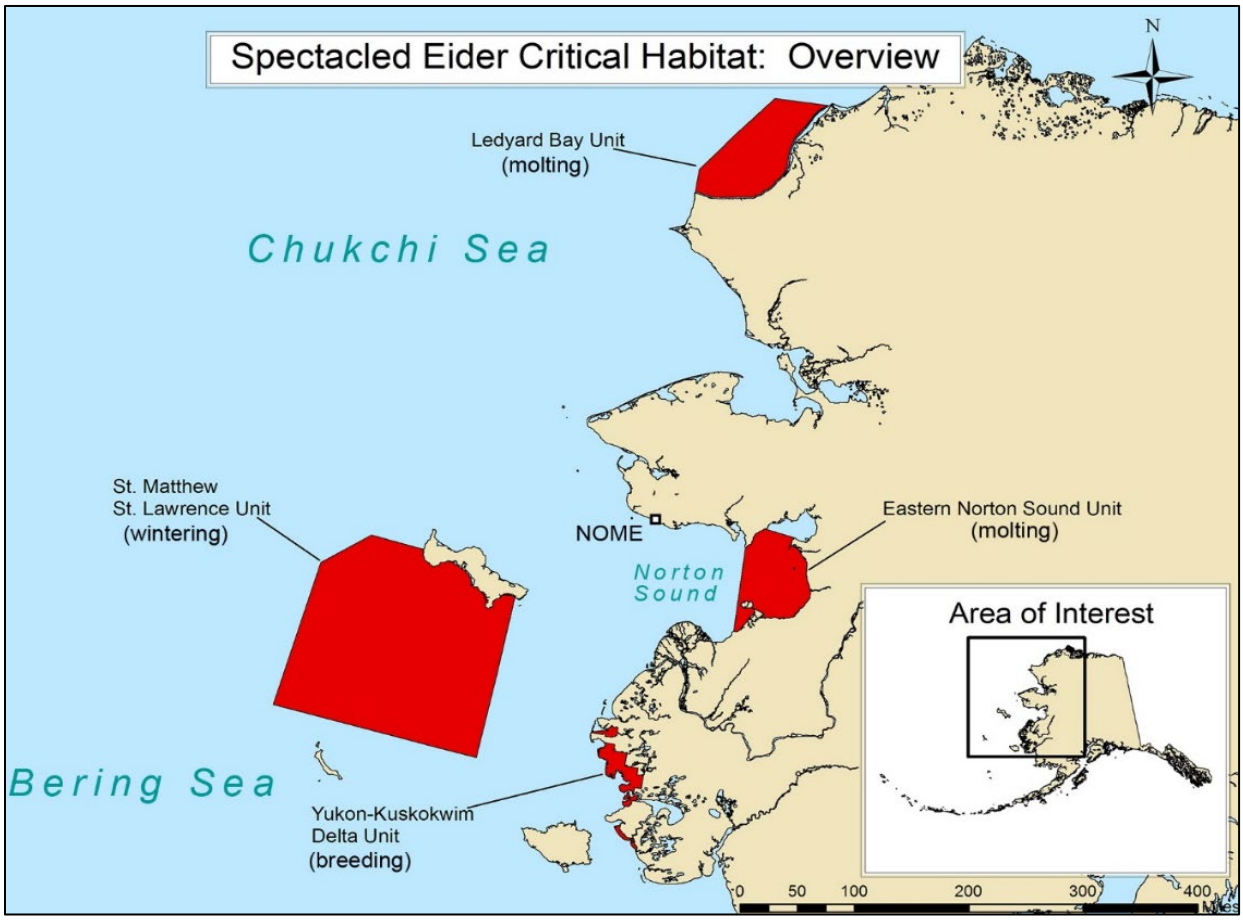


Figure 8. Spectacled eider critical habitat (adapted from USFWS 2013).

Steller's Eider

The Steller's eider is a sea duck that has both Atlantic and Pacific populations. The Pacific population consists of both a Russia-breeding population (which nests along the Russian eastern arctic coastal plain) and an Alaska-breeding population. The Alaska-breeding population of the Steller's eider was listed as threatened in July 1997 based on a substantial contraction of the species' breeding range in Alaska, overall reduced numbers breeding in Alaska, and vulnerability of the Alaska-breeding population to extinction (USFWS 2015).

Most of the Pacific population winters in the Aleutian Islands and along the Alaska Peninsula then migrates along the Bristol Bay coast towards arctic nesting grounds in the spring. Steller's eiders arrive in small flocks of breeding pairs on the Alaskan arctic coastal plain (ACP) in early June and similar habitat along the arctic coast of Russia. Nesting on the ACP is concentrated in tundra wetlands near Utqiaġvik and occurs at lower densities elsewhere on the ACP. Hatching occurs from mid-July through early August. After rearing is complete, both the Russia- and Alaska-breeding populations depart for molting areas in southwest Alaska (such as Izembek Lagoon), where they remain for about three weeks. Following the molt, the Pacific-wintering Steller's eiders disperse throughout the Aleutian Islands, the Alaska Peninsula, and the western Gulf of Alaska (USFWS 2015).

As with spectacled eiders, no identified concentration areas or CH for Steller's eiders are in the vicinity of the project area; any Steller's eiders near Nome would likely be transients migrating between breeding, molting, and wintering areas.

3.9.2.2 Marine Mammals Protection Act

The Marine Mammal Protection Act (MMPA) of 1972 protects all whales, dolphins, porpoises, seals, sea lions, and sea otters, regardless of a species' listing under the ESA. All of the ESA species in Table 2 are also protected under the MMPA, excluding the eiders. Marine mammals not currently listed under the ESA, but protected under the MMPA that may be present in the project area include:

- Pacific walrus (*Odobenus rosmarus*)
- Spotted seal (*Phoca larga*)
- Ribbon seal (*Histriophoca fasciata)*
- Harbor porpoise (*Phocoena phocoena*)
- Killer whale (*Orca orca*)
- Beluga whale, other than Cook Inlet DPS (*Delphinapterus leucas*)
- Stejneger's beaked whale (*Mesoplodon sejnegeri*)
- Sei whale (*Balaenoptera borealis*)
- Minke whale (*Balaenoptera acutorostrata*)
- Gray whale, other than Western North Pacific DPS (*Eschrichtius robustus*)

3.9.2.3 Migratory Bird Treaty Act

Except for the state-managed ptarmigan and grouse species, all native birds in Alaska (including active nests, eggs, and nestlings) are protected under the Federal Migratory Bird Treaty Act (MBTA; USFWS 2009).

3.9.3 Essential Fish Habitat and Anadromous Streams

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 assess the potential effects of their actions on EFH, consult with National Marine Fisheries Service (NMFS) regarding any potential adverse effects on EFH, and respond in writing to NMFS recommendations.

The USACE has identified marine EFH in the Nome area for all five species of Pacific salmon and eight species of Bering Sea groundfish (Table 4).

Habitat areas of particular concern (HAPCs) are specific sites within marine EFH that are of particular ecological importance to the long-term sustainability of managed species, are of a rare type, or are especially susceptible to degradation or development. The North Pacific Fisheries Management Council may designate specific sites as HAPCs and may develop management measures to protect habitat features within HAPCs. There are no HAPCs designated within Norton Sound or near the project area.

Table 4. EHF identified within the Nome Project Area

Species	Life-Stage	Seasons	Fishery Management Plan
Pink salmon	Juvenile, mature	Spring, summer	Salmon[1]
Chum salmon	Juvenile, mature	Spring, summer, fall	Salmon[1]
Sockeye salmon	Juvenile, mature	Spring, summer	Salmon[1]
Coho salmon	Juvenile, immature, mature	Spring, summer, fall	Salmon[1]
King salmon	Juvenile	Spring, summer	Salmon[1]
Pacific cod	Adult	Spring, summer	BSAI groundfish[2]
Yellowfin sole	Egg, larvae, juvenile, adult	Summer	BSAI groundfish[2]
Arrowtooth flounder	Juvenile, adult	Summer	BSAI groundfish[2]
Northern rock sole	Adult	Spring, summer	BSAI groundfish[2]
Southern rock sole	Adult	Spring	BSAI groundfish[2]
Alaska plaice	Adult	Summer	BSAI groundfish[2]
Flathead sole	Juvenile, adult	Summer	BSAI groundfish[2]
Octopus	Adult	Spring	BSAI groundfish[2]

1. Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska (NPFMC 2018a).
2. Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (NPFMC 2018b).
3. Fishery Management Plan for the Bering Sea/Aleutian Islands King and Tanner Crabs (NPFMC 2011).

EFH for Pacific salmon includes freshwater habitat and extends to all streams, lakes, wetlands, and other water bodies currently, or historically assessable to salmon. The State of Alaska manages these waters and their salmon fisheries. The location of many freshwater water bodies used by salmon are contained in documents organized and maintained by the Alaska Department of Fish and Game (ADFG). ADFG is required to specify the various streams that are important for spawning, rearing, or migration of anadromous fishes, and this is accomplished through the *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes* and the *Atlas to the Catalog of Waters Important for Spawning, Returning or Migration of Anadromous Fishes* (NPFMC 2018a).

Snake River and Dry Creek discharge directly into Nome Harbor, and portions of the inner harbor presumably serve as an estuarine transition area for juvenile salmon acclimating to saltwater. Salmon fry and smolt leave the Snake River freshwater habitat in the second and third weeks of June. Mature chum and pink salmon return to Snake River between 4 and 25 July, sockeyes from about 20 July to 10 August. Adult coho in-

migrations are variable but generally happen in three weeks between 5 August and 10 September (Lean 2019).

3.10 Special Aquatic Sites

Special aquatic sites, identified as part of the Clean Water Act, are waters of the U.S. possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. These areas are generally recognized as significantly influencing or positively contributing to the general environmental health or vitality of the entire ecosystem of a region. The following ecosystems are considered to be special aquatic sites:

- Wetlands
- Coral reefs
- Sanctuaries and refuges
- Mudflats
- Vegetated shallows
- Riffle and pool complexes (in freshwater streams)

None of these categories are known to exist in the areas affected by the planned activities.

3.11 Subsistence

Fishes and shellfish are harvested from marine and freshwater year-round and make up a large portion of the subsistence diet in Norton Sound communities. Salmon fishing occurs from June into late September or early October. Finfish are also harvested through the nearshore ice, with jigging for tomcod being especially popular from November to February. Some residents use the outer harbor at Nome for ice-fishing. The notable winter subsistence fishery for Norton Sound red king crab takes advantage of the migration of adult crab into nearshore waters in the late fall and winter. The crab fishery generally occurs from 1 December to 31 May, through holes cut in the shorefast ice or along the shorefast ice active edge; a summer subsistence crab season lasts from late June until early September (Menard 2018).

Between 2010 and 2013, Kawerak, Inc. conducted a subsistence mapping project that included interviewing local experts in Nome as part of their regional Ice Seal and Walrus Project. The experts reported:

> In Nome, walrus hunting only occurs in the springtime. Currently, walruses do not usually pass close to Nome and hunters will often travel 20-50 or more miles to reach ice with walruses. Seals, including bearded seals, are most commonly hunted in spring and fall. There are seals present in summer, especially juveniles

(ringed and bearded seals) as well as adult spotted seals, but few people harvest them. There is usually open water accessible in winter, and some hunters will hunt seals and bearded seals at that time (Kawerak 2013).

Spring harvest areas for walrus, seal, and bearded seal were identified at Nome, as were fall harvest areas for seal and bearded seal. Winter seal and bearded seal harvest areas were identified near Nome (Kawerak 2013). Seals tend to congregate around Nome Harbor in the fall, and the Outer Basin is a popular place for subsistence hunters to take animals (Kawerak 2017). Nome residents hunt beluga whales between Cape Nome and Sledge Island in the spring and fall. Belugas occasionally enter Nome Harbor in the autumn and can be harvested from the beach near Nome (Oceana & Kawerak 2014).

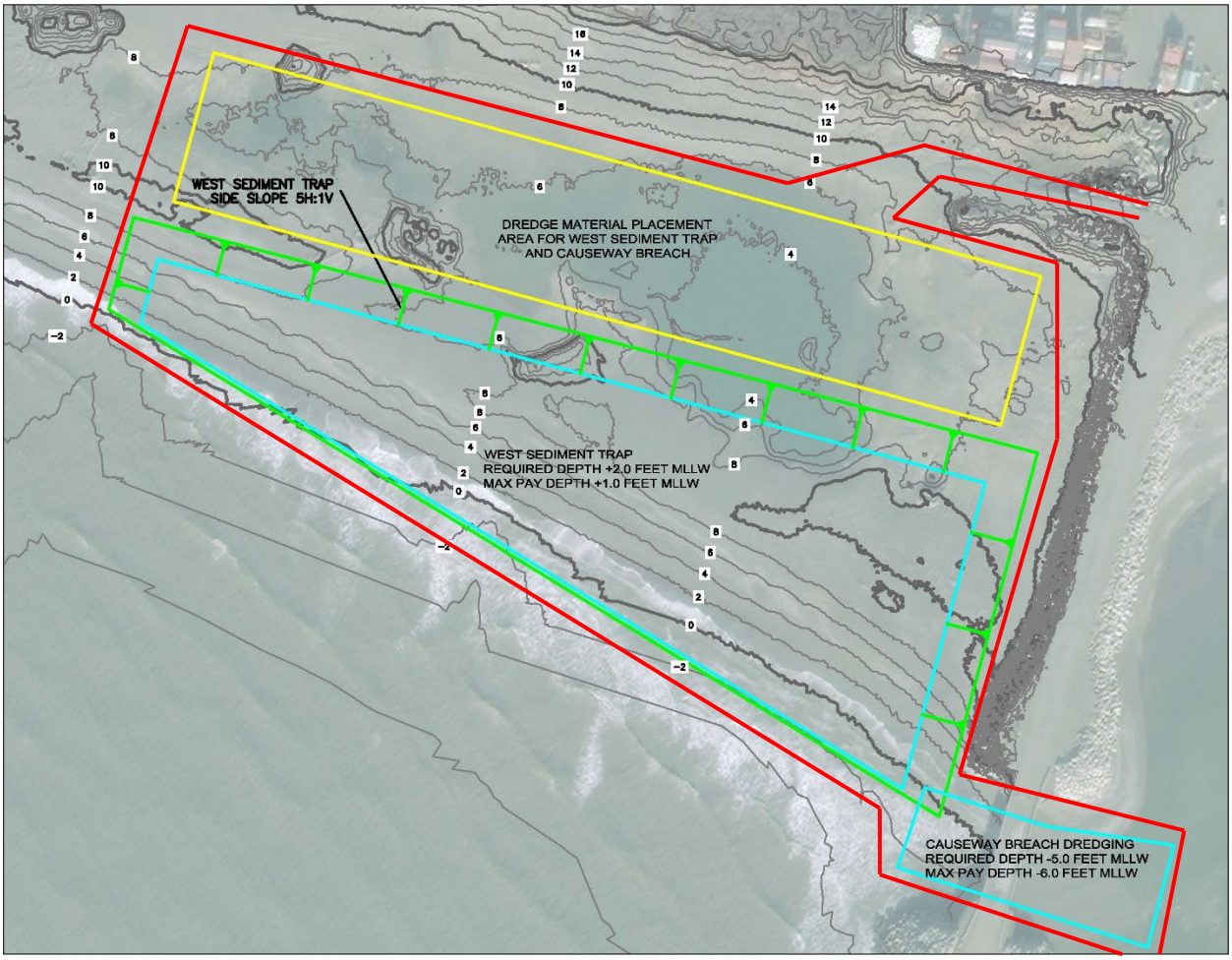
3.12 Cultural and Historic Resources

Norton Sound is the geographic break between two Indigenous peoples: the Iñupiaq to the north and the Yup'ik to the south. The Seward Peninsula has been occupied for more than 12,000 years. The mouth of the Snake River at Nome was the site of a permanent village, now known as the Snake River Sandspit Site. Excavated features of the site were radiocarbon-dated to approximately 200 years old (Eldridge 2014). Outsiders began impacting the Norton Sound region in the nineteenth century, with the establishment of the Saint Michael Redoubt in 1833. Gold discoveries just a few miles from the current location of Nome resulted in a major influx of wealth seekers to the area, and in 1900 the population had increased from approximately 12,000 to 20,000 residents in less than six months. This early mining settlement was known as Anvil City; the name of the community was changed to Nome in 1899. The City of Nome was officially incorporated in April 1901. In 1904, a private company was granted permission to dredge the mouth of the Snake River out to the open beach and to protect the resulting channel with jetties; however, after a year's preliminary work, the project was dropped. In 1915 and 1916, the USACE examined the community's navigation problem. This study resulted in dredging a small harbor and the construction of two jetties at the mouth of the Snake River in 1923; maintenance dredging of the harbor has occurred on an annual basis since 1924 (USACE 1976; Eldridge 2020).

The proposed project's Area of Potential Effect (APE) upon cultural resources includes the established areas of annual maintenance dredging (Figure 1) and the proposed new areas of dredging shown in Figure 9 (Eldridge 2020). Within the APE are also the proposed dredged material placement areas and access routes associated with the original maintenance dredging locations and new dredging locations. The access route for the new dredging locations will be the same unimproved trail between the Nome

Harbor causeway and the western beach that is used by the community for beach access.

There are 21 known cultural resources cataloged by the Alaska Heritage Resources Survey (AHRS) in the vicinity of the proposed project's APE. One of these resources, the Nome Subsurface Historic District (AHRS identifier NOM-00158), may partially fall within the proposed APE (the boundaries of this resource have not been verified). The second-closest known cultural resource is the Sitnasuaŋmiut Quŋuwit Cemetery (NOM-00264), which lies entirely outside the APE (Eldridge 2020).



9. Proposed new dredging and disposal area along the west beach, Nome Harbor. Project APE in red, dredging area in green and blue, disposal area in yellow.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 No Action Alternative

The No Action alternative would avoid the direct and indirect environmental impacts described in Section 4.2, but would not accomplish the objective of returning Nome Harbor to its authorized design depths or improving the management of littoral sediment transport. Without annual maintenance dredging and effective sediment management, commercial and subsistence use of Nome Harbor would become increasingly difficult and potentially hazardous as shoals form within the navigation channels.

4.2 Action Alternative

As described in Section 2, the USACE has identified hydraulic dredging of harbor sediments, placement of the dredged material for beneficial use, clearance of the causeway breach, and construction of a west sediment trap as the preferred alternative for the proposed activities.

Within each resource category, the magnitude of the effects upon that resource are evaluated using these criteria (where relevant) and best professional judgment, and tiered as follows (Doub 2014):

- Minor: effects are not detectable or are so minor that they would neither destabilize nor noticeably alter any important attribute of the resource.
- Moderate: effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.
- Major: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

4.2.1 Effects on Community and People

The intent of the proposed maintenance dredging is to benefit commerce, subsistence, and recreation by ensuring local and transient vessels have safe, reliable, and efficient access to the harbor mooring areas. While the presence of the dredge and support vessels within the confines of the channel may cause a temporary obstruction and restricted access to moorage, these effects can be adequately minimized by close coordination with the harbormaster and other stakeholders and will be scheduled to the least disruptive time periods to the extent possible.

The USACE determines that there may be moderate but temporary and short-term impacts to economic, subsistence, or recreational activities in the limited area affected by the action alternative.

4.2.3 Climate

The USACE determines that the action alternative will have a minor (not discernable) effect on climate. The placement of dredged material for beach nourishment is intended to temporarily improve the climate resilience of the City of Nome infrastructure.

4.2.4 Effects on Soils and Geology

The maintenance dredging would remove recently shoaled, unconsolidated sediment from within the Federal project limits, which will gradually infill with new sediment between dredge seasons. The existing beach material within the footprint of the proposed west sediment trap and causeway breach appears to consist of cobbles and gravel as well as sand; as the sediment trap collects sand transported along the shoreline, and the sediment trap is emptied, the beach material within the sediment trap and the sediment trap placement area will become sandier.

The USACE determines that the action alternative will have minor to moderate, and highly localized impacts on soils and geology.

4.2.5 Effects on Tides, Currents, and Sediment Transport

The removal of sediment from the Federal channel will return the project contours to their original design; this may have a small effect on water movement through the harbor versus pre-dredging conditions. The placement of dredged material for beach nourishment will temporarily displace wave energy offshore at the placement location and add to the material moved by the natural sediment transport process. The proposed annual dredging and beach nourishment may be thought of as 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.

Clearance of the causeway breach and construction of the west sediment trap is intended to restore and maintain water flow and some of the original sediment transport through the causeway breach. The sediment that will collect in the west sediment trap is material that has been largely lost to the sediment by-pass system anyway, as it has overwhelmed the causeway breach and accumulated on the west side of the causeway, out of the reach of annual maintenance suction dredging.

The USACE determines that the action alternative will have minor impacts to tides and currents, and moderate (but largely beneficial) impacts to sediment transport.

4.2.6 Effects on Water Quality

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). The dredged material is expected to be primarily sand, which would settle out of the water column quickly. Discharge of the dredged material would temporarily increase the suspended solids along the shoreline of the placement area. On the other hand, to the extent that the discharge water percolates down into the sand of the beach, the beach itself may serve to filter and trap some percentage of fines. The waters of Norton Sound are typically turbid with silt discharged from major river systems and stirred up from its shallow bottom by storms. The discharge of fines in the dredged material would cause a temporary, incremental increase in suspended solids at the discharge site, which may have little effect on primary producers and aquatic filter feeders already adapted to a turbid environment.

Excavation of sediment from the causeway breach and the west sediment trap would occur during low tide; construction machinery will avoid working in the water to the extent possible. As the excavated sediment is deposited in the placement area (Figure 9), any water entrained in the sediment is expected to drain quickly down through the coarse beach material within the placement area, with minimal surface runoff.

The USACE determines that the action alternative will have minor impacts on water quality.

4.2.7 Effects on Air Quality

The operation of construction equipment and vessels during the agency's preferred alternative would, in the short term, add incrementally to the air pollutant emissions ordinarily generated by vessels and machinery at Nome Harbor. The dredging equipment and construction machinery likely to be used during the project would be primarily diesel-powered and comparable to existing mobile emission sources at Nome. Direct, short term project-related impacts to air quality in the greater Nome area would be highly variable and transitory, where noticeable at all. The planned activities will not create any new stationary source of air emissions.

The USACE determines that the action alternative will have minor impacts on air quality.

4.2.8 Effects on Noise

The operation of equipment and vessels during project construction would, in the short term, add incrementally to the noise ordinarily generated by vessels and machinery at Nome Harbor. Most project-related noise would be low-frequency, low-amplitude sound generated by diesel machinery. The effects of project noise would be highly seasonal, variable, and transient.

The USACE determines that the action alternative will have minor, seasonal impacts on air-transmitted noise in the port area.

4.2.9 Effects on Habitat and Wildlife

The areas to be dredged have been dredged annually since 2006, so it is unlikely that substantial populations of benthic invertebrates have had a chance to establish themselves there. Likewise, the onshore placement area located east of the harbor has been in use since 2008, and continued use of this area to deposit sand and gravel from the dredged areas is unlikely to further degrade the beach environment. Existing populations of organisms in the near shore benthic environment, adapted to maneuvering and burrowing through loose, shifting sediment, would most likely not suffer significant adverse effects from the addition of several inches of new material to their environment.

Maintenance dredging would have little direct effect on mature fish inhabiting the project area, as their mobility allows them to avoid construction activities (e.g., dredging, generated turbidity, vessel movements, and underwater construction noise). Long-shore movements of juvenile fish may be disrupted for a matter of hours. However, given the small scale of the dredge and its cutter-head and the fact that the dredge will spend a very limited portion of its time within the zone, juvenile fish would use to move along the shore, and through the breakwaters, the disruption of long-shore migration should be minimal. Juvenile fish moving into or out of the harbor and Snake River may encounter a moderately greater level of disturbance and delay depending on how much dredging is being done at the mouth of or in the harbor.

Based on direction from ADFG through its amendments to Fish Habitat Permit FH13-III-0027, dredging would start as soon as the ice goes out but be completed in the inner harbor and inner channel area by 30 June. This work-window is intended to protect juvenile salmon, which are believed to start out-migration from Snake River in mid-June.

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. Similarly, the

shoreline excavation of the west sediment trap is intended and expected to infill rapidly with sand carried by littoral transport. Excavation of the sediment trap during the egg-laying season may disrupt the feeding or reproductive habitat of sand lance and capelin within the immediate shoreline portion of the excavation, but overall should not have a detectable impact on that resource.

The proposed dredging activities would affect a relatively small area of coastal habitat already partly degraded by human use and previous dredging. The dredging and discharge locations, to include the west sediment trap excavation and stockpile areas, are not known to be a unique or valuable habitat for birds. Vessels moving through the area to access the entrance channel and harbor could displace waterfowl and sea ducks within their intended course. Vessel lights have the potential to become an attractive nuisance causing bird collisions and subsequent injury or death; however, given the length of daylight and twilight hours in the Nome area between June and August, there is little likelihood that collisions would occur.

The greater potential for environmental impacts associated with vessels would be the effects of spills of fuels or other hazardous materials. The effects of fuel spills on bird populations are well documented, as direct contact and mortality are caused by ingestion during preening as well as hypothermia from matted feathers. The displacement of local bird populations from the project area during construction would be short term. Overall, the USACE believes that dredging would not have a long-term effect on local bird populations. No significant adverse impacts are expected. The placement area east of the harbor can be expected to attract shore birds that prey on marine organisms as the dredged material pumped onto the shoreline will expose intertidal and sub-tidal organisms normally preyed upon when storm events wash them onto the beach.

Maintenance dredging would temporarily and indirectly disturb any marine mammals in proximity to the site due to construction noise, construction vessel traffic, and construction-generated turbidity. Airborne noise would be generated by the operation of heavy equipment, and waterborne noise would be generated by work boats, dredge slurry pump(s), and the cutter-head dredge. The primary reaction of marine mammals is likely to be movement away from the work area during the construction period. Similarly, the noise generated by barges and tugs in transit to or from the work area from other locations in Alaska would be similar to that generated by routine small vessel traffic through the entrance channel and harbor. Low to moderate levels of turbidity would be generated by dredging and hydraulic placement of the dredged material, potentially causing marine mammals to temporarily avoid the area until such time that the construction-generated plume dissipates to background levels.

The USACE determines that the action alternative will have moderate short-term impacts and minor long-term impacts on habitat and wildlife in the project vicinity.

4.2.9 Effects on Protected Species

4.2.9.1 Effects on Endangered and Threatened Species

The potential effects of the proposed action on ESA-listed pinnipeds and cetaceans and critical habitat include:

- Acoustic disturbance;
- Vessel strike;
- Habitat alteration,
- contaminants (NMFS 2020a).

For purposes of the ESA, “effects of the action” means all consequences to listed species or critical habitat that are caused by the proposed action. The applicable standard to find that a proposed action is “not likely to adversely affect” listed species or critical habitat is that all of the effects of the action are expected to be insignificant, extremely unlikely to occur, or completely beneficial. “Insignificant effects” relate to the size of the impact and are those that one would not be able to meaningfully measure, detect, or evaluate; insignificant effects should never reach the scale where take occurs. Beneficial effects are contemporaneous positive effects without any adverse effects to the species (NMFS 2020a).

Acoustic Disturbance
The NMFS uses the following thresholds for underwater sounds that cause injury, referred to as Level A harassment under section 3(18)(A)(i) of the MMPA. These acoustic thresholds are presented using dual metrics of cumulative sound exposure level (LE) and peak sound level (PK) for impulsive sounds and LE for non-impulsive sounds (Table 5).

Table 5. Marine Mammal Hearing Groups and Level A Acoustic Thresholds.

Hearing Group	Relevant Species	Generalized Hearing Range	PTS Onset Acoustic (Level A) Thresholds	
			Impulsive	Non-Impulsive
Low-Frequency Cetaceans (LF)	Humpback whale NP right whale NWP gray whale	0.007 to 35 kHz	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB
Mid-Frequency Cetaceans (MF)	Sperm whale Beluga whale	0.15 to 160 kHz	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency Cetaceans (HF)	Porpoises	0.275 to 160 kHz	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,MF,24h}$: 173 dB
Phocid Pinnipeds (PW)	Ringed seal Bearded seal Spotted seal	0.05 to 86 kHz	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW)	Steller sea lion	0.06 to 39 kHz	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB

PTS: Permanent Threshold Shift: a permanent reduction in the ability to hear.
kHz: kilohertz (sound frequency)
dB: Decibels, unweighted (sound intensity)
L_{pk}: Peak sound level; "flat" = unweighted within the generalized hearing range.
L_E: Cumulative sound level; "24h" = 24-hour cumulative period.
LF, MF, HF, PW, OW: defined in "Hearing Group" column
(Adapted from NMFS 2018)

NMFS currently uses the following conservative thresholds of underwater sound pressure levels (measured in micropascals, or µPa), expressed in root mean square (rms), from broadband sounds that cause a behavioral disturbance, and referred to as Level B harassment under section 3(18)(A)(ii) of the MMPA.

- impulsive sound: 160 dB re 1 μPa_{rms}
- continuous sound: 120 dB re 1μPa_{rms}

For air-transmitted sound, the NMFS has developed the following Level B thresholds:

- 100 dB re 20μPa_{rms} for non-harbor seal pinnipeds
- 90 dB re 20μPa_{rms} for harbor seals

The underwater noise generated by a hydraulic dredge is essentially continuous. USACE researchers studied the underwater sounds produced by several hydraulic dredges operating in California (Reine & Dickerson 2014). The smallest of the dredges in the study, the *Veracious,* was similar in size and engine power to the dredge *Alaskan Hawk,* the hydraulic dredge typically used at Nome. The 100-foot-long *Veracious* was estimated to have a source level of 152.9 dB rms re 1µPa at 1 meter, and the sound was expected to attenuate to 120 dB in 156 meters. Most of the sound measured from the *Veracious* was at frequencies below 1000 Hz and most commonly in a band between 350 and 100 Hz; this is within the lower part of the hearing range of many listed species. These frequencies overlap most with the hearing ranges of low-

frequency cetaceans (NMFS 2018). However, these large whales are unlikely to be in the Nome Harbor or within 156 meters of the entrance to the harbor (NMFS 2020a).

The *Alaskan Hawk* has no propulsion plant, although it is pulled along the seafloor by the action of the dredging equipment. A small tender vessel is used intermittently to maneuver the dredge and also to monitor and reposition the hydraulic pipeline. The tender vessel has a 220 hp diesel engine. A recent study of noise levels from small powerboats suggests peak sound source levels of 145-150 dB at 1 meter. Using a sound source of 150 dB and log 15, sound from the tender vessel is expected to attenuate to 120 dB within 100 meters (NMFS 2020a).

The breakwater surrounding Nome Harbor is expected to block the noise from propagating to its full extent through the marine environment. A pre-dredging scan will last for 15 minutes rather than the usual 30 minutes, where whales are of concern because whales are not expected within the harbor where sound will exceed Level B take thresholds. With the implementation of the other mitigation measures, including PSOs monitoring appropriate shutdown zones for dredging, it is extremely unlikely that listed species will be exposed to non-impulsive sound levels ≥ 120 dB re 1µParms. Given these factors, the probability that listed species will be exposed to project-related sound in excess of harassment thresholds is very small, and thus adverse effects to listed marine mammals are extremely unlikely to occur (NMFS 2020a).

Vessel Strikes

The potential for strikes from proposed project vessels would be a very small incremental increase over the potential strike effects from the many similar vessels that operate within Nome Harbor every year. The probability of strike events depends on the frequency, speed, and route of marine vessels, as well as the distribution of marine mammals in the area. An analysis of ship strikes in Alaskan waters (Neilson et al. 2012) found that whale mortalities are more likely when large vessels travel at speeds greater than 12 knots. Another study (Vanderlaan and Taggart 2007) used observations to develop a model of the probability of lethal injury based upon vessel speed, projecting that the chance of lethal injury to a whale struck by a vessel is approximately 80 percent at vessel speeds over 15 knots, but approximately 20 percent at 8.6 knots. The very low speed of the *Alaskan Hawk* and tender, together with its blunt prow and shallow draft, make it far less likely to strike and inflict injury upon a marine mammal than larger, faster ocean-going vessels such as cruise ships and cargo ships. The exclusion zone of 160 m, PSOs monitoring the exclusion zone, and the vessels' low speed makes it extremely unlikely vessel strikes will occur (NMFS 2020a).

Habitat Alteration

The dredging and dredged material placement have the potential to alter the habitat in the immediate project area. Sediment will be disturbed and will temporarily impact water quality during these activities. This will occur in the area immediately surrounding these activities, within the confines of the Nome Harbor. However, suspended sediments are expected to settle within a few hours to a point where their concentration in the water column is not detectably different from surrounding waters within the harbor. For this reason, this project is not anticipated to affect water quality to any measurable degree during dredging, nor is it likely to cause future impacts that are measurably different from the existing environmental baseline (NMFS 2020a). The exposed beach to the west of the causeway is not known to provide important feeding or resting habitat for marine mammals. Excavation of the causeway breach and west sediment trap would not cause a detectable impact on important marine mammal habitat.

Contaminants

Vessel activity during the project could result in an increased risk of accidental leaks and improper discharge of fuel or other pollutants. Onshore discharges from dredging equipment could potentially also contaminate marine waters. The contractor will be required to follow the USACE approved oil spill prevention and response plan for Nome Harbor. Therefore, effects to listed species from the discharge of contaminants associated with this project are extremely unlikely to occur (NMFS 2020a).

USFWS Species

Polar bears, Steller's eiders, and spectacled eiders are unlikely to be in the project area during the maintenance dredging season, which typically extends from June into August. If maintenance of the west sediment trap were to occur in the winter months, the project personnel would be prepared to follow the standard Polar Bear Interaction Guidelines provided by the USFWS (USFWS 2020).

The USACE determines that the action alternative may have moderate short-term impacts on individuals of ESA-listed species, but only minor long-term impacts. The proposed action will have no effect on any critical habitat, as none exists within the project area.

The USACE determinations of effect under the ESA are summarized in Table 6. Mitigatory measures are detailed in Section 2.6.

4.2.10 Effects on Marine Mammals

The anticipated effects on cetaceans or pinnipeds not listed under the ESA (Section 3.9.2.2) are expected to be the same as described above for the ESA-listed marine mammals. The same avoidance and minimization measures, as described in Section 2.6.3, would apply for any whales, porpoises, dolphins, sea lions, or seals.

Table 6. USACE Determinations of Effect for ESA Species

Species	Listed Population	Agency Jurisdiction	USACE Effects Determination
Ringed seal, *Pusa hisipida*	Arctic DPS	NMFS	May affect, but not likely to adversely affect
Bearded seal, *Erignathus barbatus*	Beringia DPS	NMFS	May affect, but not likely to adversely affect
Steller sea lion, *Eumetopias jubatus*	Western DPS	NMFS	May affect, but not likely to adversely affect
Bowhead whale, *Balaena mysticetus*	All	NMFS	May affect, but not likely to adversely affect
Humpback whale, *Megaptera novaeangliae*	W. Pacific DPS	NMFS	May affect, but not likely to adversely affect
	Mexico DPS	NMFS	
N. Pacific right whale, *Eubalaena japonica*	All	NMFS	May affect, but not likely to adversely affect
Gray whale, *Eschrichtius robustus*	Western North Pacific DPS	NMFS	May affect, but not likely to adversely affect
Polar bear, *Ursus maritimus*	All	USFWS	No effect
Spectacled eider, *Somateria fischeri*	All	USFWS	No effect
Steller's eider, *Polysticta stelleri*	AK breeding population	USFWS	No effect

The USACE determines that the action alternative may have moderate short-term impacts on individual marine mammals, but only minor long-term impacts.

4.2.11 Effects on Migratory Birds

The USACE determines that the action alternative will have minor impacts on birds (as described in Section 4.2.9) and that the proposed action is unlikely to result in the killing of a migratory bird or destruction of an active nest.

4.2.12 Effects on Essential Fish Habitat and Anadromous Streams

The USACE determines that the agency's preferred alternative has minor impacts upon and will not adversely affect marine or freshwater EFH, with the adoption of the mitigatory measures detailed in Sections 2.6.1 and 2.6.2.

4.2.13 Effects on Cultural and Historic Resources

The location of the dredged materials placement area for the west sediment trap may coincide with the Nome Subsurface Historic District (NOM-00158). However, as the project action in this area consists of adding local materials (e.g., sands, gravels) to the beach surface, which has been disturbed in recent years by other sand/gravel excavation activities, it is unlikely to have any adverse effect on any potential subsurface historical materials associated with the historic district.

The USACE has determined that the proposed actions will have no adverse effect on historic properties and received concurrence Alaska State Historic Preservation Officer (SHPO) in an email dated 10 August 2020. Coordination with other cultural resource stakeholders in the project area is continuing.

4.2.15 Effects on Environmental Justice and Protection of Children

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, was issued in 1994. The purpose of the order is to avoid disproportionate adverse environmental, economic, social, or health effects from Federal activities on minority and low-income populations.

The lands surrounding Nome Harbor are mostly zoned as “industrial,” “commercial,” or “open space/recreation.” A few residential apartments are located at the north end of the inner harbor. The USACE anticipates no disproportionate adverse effects on minority or low-income populations as a result of the agency’s preferred alternative.

On April 21, 1997, Executive Order 13045, Protection of Children from Environmental Health and Safety Risks, was issued to identify and assess environmental health and safety risks that may disproportionately affect children.

There are no schools in the project area. The USACE anticipates no disproportionate health or safety risks to children as a result of the agency’s preferred alternative.

4.2.15 Cumulative Effects

Federal law (40 CFR 651.16) requires that NEPA documents assess cumulative effects, which are the impact on the environment resulting from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.

By their nature, the planned annual maintenance activities are intended to return the Federal project to its designed configuration. The dredging of Nome Harbor will be

coordinated with the City of Nome and the US Coast Guard to minimize disruption of activities at the harbor. No direct or indirect, cumulative effects are anticipated.

5.0 REGULATORY COMPLIANCE AND AGENCY COORDINATION

5.1 Compliance with Laws and Regulations

National Environmental Policy Act (NEPA). This EA and unsigned Finding of No Significant Impact (FONSI) were prepared using information gathered during iterations of this project, and the most recent correspondence with state and federal resource agencies. Per the NEPA process and USACE regulations and guidance, the EA and unsigned FONSI are subject to a public review period. If requested, a public meeting may be held to discuss project alternatives and ask for public views and opinions.

Clean Water Act. The dredged material placed at the beach nourishment will be placed initially above Mean Higher High Water (MHHW), but with the intent that it enters waters of the U.S. and be distributed by the littoral transport system. This dredged material placement constitutes a discharge for beneficial purposes under the Clean Water Act (CWA). The USACE does not issue Section 404 permits for its own actions. A Section 404(b)(1) evaluation has been prepared by the USACE and appended to this EA (Appendix A). The USACE has requested a CWA Section 401 water quality certification from the State of Alaska.

Endangered Species Act. The USACE has engaged in informal consultation under the ESA with the NMFS. The USACE submitted a letter dated 28 May 2020 to the NMFS, requesting concurrence with the determination that the planned activities “may affect but not likely to adversely affect” ESA-listed species under NMFS jurisdiction. The NMFS concurred in a letter dated 26 June 2020 (NMFS 2020a). The USACE determined the project would have “no effect” on ESA-listed species under USFWS jurisdiction, and no further coordination is required; however, the USFWS will have an opportunity to review this EA.

Magnuson-Stevens Fisheries Conservation and Management Act. The USACE has reviewed information on EFH in the project area and has made the determination that the planned activities would have no adverse effect on EFH. No further coordination is required, but NMFS Habitat Division will have the opportunity to review this EA.

National Historic Preservation Act. Coordination with Section 106 of the NHPA has been completed, with the SHPO’s concurrence with the USACE determination of “no historic properties adversely affected.”

Executive Order 13175, Consultation and Coordination with Indian Tribal Governments. Letters inviting Government-to-Government coordination were sent to one tribe and

three Native corporations on 24 July 2020. No responses were received from these entities. The USACE plans to follow up on these letters as the EA is released for public review.

Fish and Wildlife Coordination Act. Maintenance dredging projects that return established navigation projects to their design parameters and use upland or established in-water disposal sites are generally regarded by the USACE, in the absence of unusual impacts or circumstances, to not be subject to the Fish and Wildlife Coordination Act (FWCA). The USFWS was asked to review the planned placement of dredged material for beach nourishment; no comments were received.

Alaska withdrew from the voluntary National Coastal Zone Management Program on July 1, 2011. Within the State of Alaska, the Federal consistency requirements under the Coastal Zone Management Act do not apply to federal agencies, those seeking forms of federal authorization, and state and local government entities applying for federal assistance.

Federal and state agencies with whom this project has been coordinated include:

- Protected Resources Division, National Marine Fisheries Service.
- U.S. Environmental Protection Agency.
- Division of Water, Department of Environmental Conservation, State of Alaska.
- Office of History and Archaeology, Department of Natural Resources, State of Alaska.
- Department of Fish and Game, State of Alaska.

6.0 CONCLUSION

The completed Environmental Assessment supports the conclusion that the proposed maintenance dredging does not constitute a major federal action significantly affecting the quality of the human and natural environment. An environmental impact statement (EIS) is therefore not necessary for the agency's preferred alternative, and the prepared Finding of No Significant Impact (FONSI) may be signed.

7.0 DOCUMENT PREPARATION

This Environmental Assessment was prepared by Chris Floyd (Biologist), Kelly Eldridge (Archaeologist), and Janice Scott (Editor) of the Environmental Resources Section, Alaska District, U.S Army Corps of Engineers. The Corps of Engineers Project Manager is Michael Tencza.

A checklist of project compliance with relevant Federal, state, and local statutes and regulations is shown in Table 7.

Table 7. Environmental Compliance Checklist

FEDERAL	Compliance
Archeological & Historical Preservation Act of 1974*	FC
Clean Air Act	FC
Clean Water Act	FC
Coastal Zone Management Act of 1972	NA
Endangered Species Act of 1973	FC
Estuary Protection Act	FC
Federal Water Project Recreation Act	FC
Fish and Wildlife Coordination Act	NA
National Environmental Policy Act	PC*
Land and Water Conservation Fund Act	FC
Marine Protection, Research & Sanctuaries Act of 1972	NA
National Historic Preservation Act of 1972	FC
River and Harbors Act of 1899	FC
Magnuson-Stevens Fishery Conservation & Management Act	FC
Marine Mammal Protection Act	FC
Bald Eagle Protection Act	FC
Watershed Protection and Flood Preservation Act	FC
Wild & Scenic Rivers Act	NA
Executive Order 11593, Protection of Cultural Environment	FC
Executive Order 11988, Flood Plain Management	FC
Executive Order 11990, Protection of Wetlands	FC
Executive Order 12898, Environmental Justice	FC
Executive Order 13045, Protection of Children	FC
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments	FC
STATE AND LOCAL	
State Water Quality Certification	FC
Alaska Statute 16.20.500 Critical Habitat Areas	FC
Alaska Coastal Management Program	NA

PC = Partial compliance, FC = Full compliance
*Full compliance will be attained upon the signing of the FONSI.

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APPENDIX A

EVALUATION UNDER
SECTION 404(b)(1) CLEAN WATER ACT 40 CFR PART 230

EVALUATION UNDER
SECTION 404(b)(1) CLEAN WATER ACT 40 CFR PART 230
MAINTENANCE DREDGING
NOME HARBOR
NOME, ALASKA

I. Project Description

The Federal project at Nome Harbor includes approximately 4,075 linear feet of channel that must be dredged to maintain authorized project depths ranging from -22 feet below mean lower low water (MLLW) to -8 feet MLLW. Littoral transport and storms deposit large quantities of marine sediment, primarily sand, within the channel, and the Federal project must be dredged annually to maintain safe access to the harbor. The transport of sediment along the shoreline at Nome is predominantly from west to east, with sediment entering the harbor through multiple pathways (Figure 1).

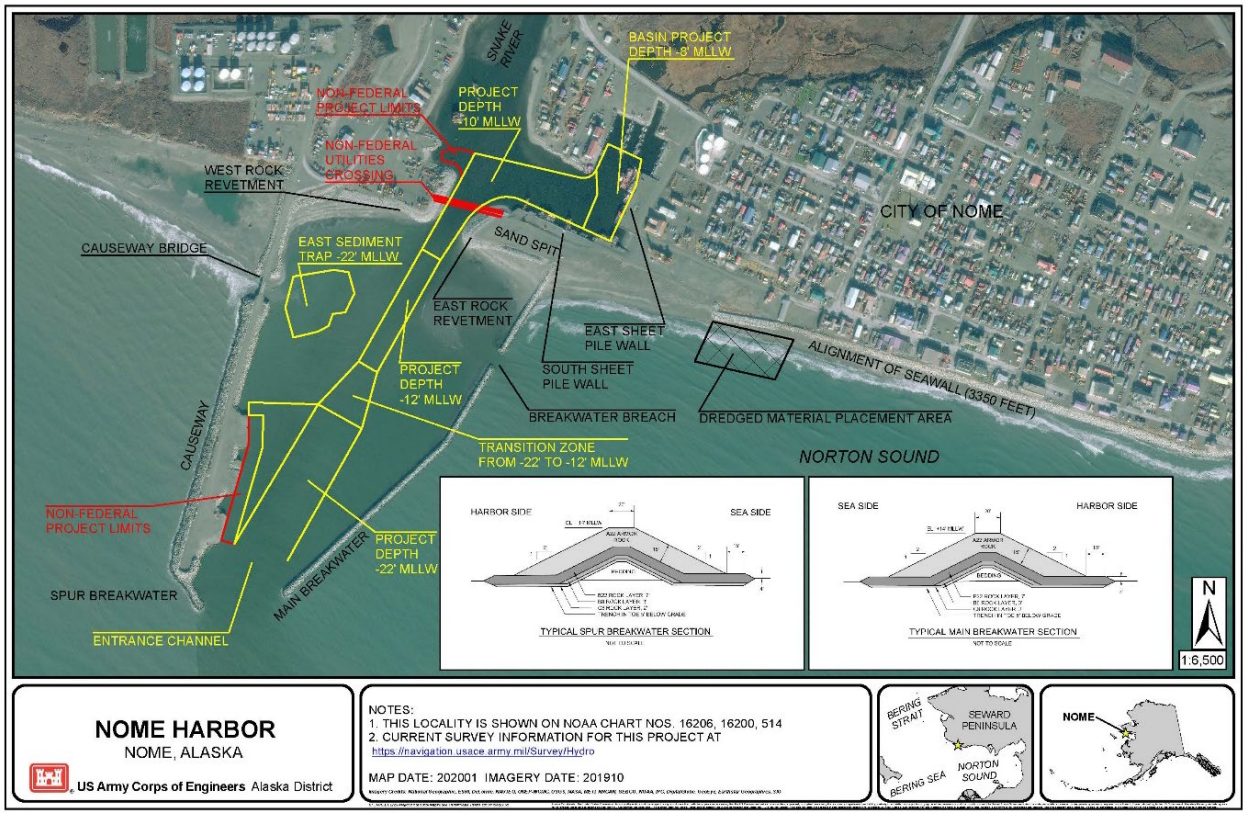

Figure 1. Location and vicinity of the Federal project at Nome Harbor (USACE 2019).

Routine annual maintenance dredging at Nome Harbor typically removes roughly:

- 24,000 cubic yards from the inner harbor basin and inner entrance channel, where required depths vary from -10 feet MLLW to -22 feet MLLW;
- 25,000 cubic yards from the east sediment trap, to a required depth of -22 feet MLLW;
- 20,000 cubic yards from the outer entrance channel, to a required depth of -22 feet MLLW.

This estimated annual total of 69,000 cubic yards has historically varied considerably from one year to the next, depending on variable shoaling rates, weather and sea conditions, and funding levels. Annual maintenance dredging typically starts in early June and extends into July or August. The material dredged from the Federal limits is deposited within the dredged material placement area on the beach adjacent to the west end of the Nome seawall (Figure 1). The expected method of dredging is a small cutter-head suction dredge, with the dredged material transported via a hydraulic pipeline to the placement area.

This Section 404(b)(1) evaluation is intended to cover maintenance dredging of the existing Nome Harbor Federal channels and basin, beginning in 2021 and extending until such a time that there are significant changes in the scope of maintenance dredging or the resources affected. Other maintenance tasks to be performed during this period include clearing sediment from the causeway breach and excavating a new shoreline sediment trap just west of the causeway (Figure 2). However, the sediment removed from the causeway breach and west shoreline will be placed upland, not discharged to waters of the United States (U.S.), and therefore will not be subject to Section 404 of the Clean Water Act.

II. Factual Determinations

A. Physical Substrate Determinations

The material dredged annually from the Federal project is newly deposited silty sand with a trace amount of gravel and cobbles carried by littoral transport in a predominantly west-to-east direction. The gross annual sediment transport rate is estimated to be 180,500 cubic yards, while the net transport towards the east is an estimated 60,170 cubic yards each year. Under normal flow conditions, the Snake River (which empties into the Nome inner harbor) discharges only about 400 cubic yards of sediment a year. The dredged material discharge site has received annually dredged sediment from Nome Harbor every year since 2008; the sediment at the placement site should be very similar in character to the maintenance dredged material to be placed there in the future.

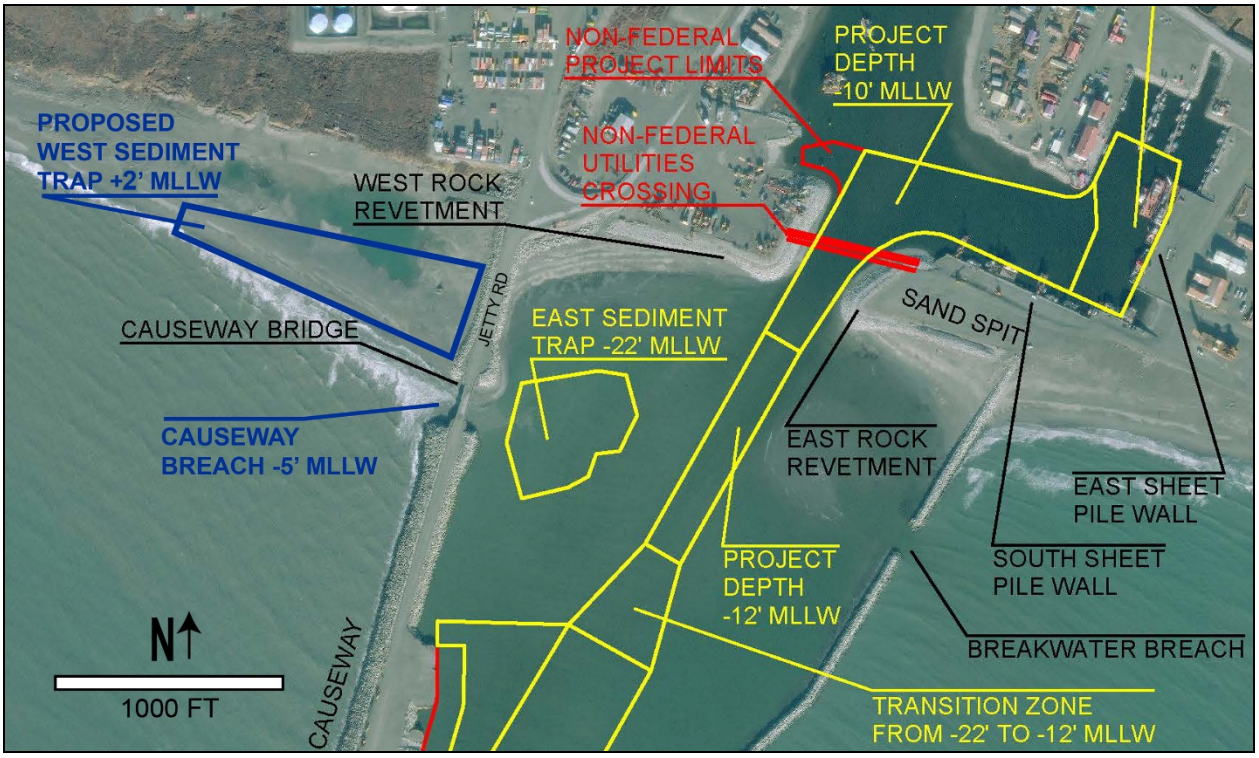

Figure 2. Location detail of the causeway breach and proposed west sediment trap (annotated from USACE 2019).

B. Water Circulation, Fluctuations, and Salinity Determinations

The tidal influence at Nome is relatively small, and the tides are primarily diurnal. Much larger water surface elevation fluctuations occur at Nome due to storm surges. The mean tide level (arithmetic average of the Mean High Water and the Mean Low Water) is 0.82 ft, and the mean tide range (the difference between Mean High Water and Mean Low Water) is 1.03 ft.

The United States Army Corps of Engineers (USACE) conducted a 3-D physical model study for the Nome Navigation Improvements project in 1999. As part of the study, wave-induced currents were evaluated using scaled measurements of current velocities in the model. Various wave heights, periods, wave directions, and still water levels were tested. Generally, current velocities were measured in the range of 0.4 to 1.3 feet per second at the entrance between the spur and main breakwaters. The highest measured current velocity of 4.4 feet per second was recorded in the model.

Salinity in Norton Sound is seasonally variable, especially in nearshore waters. Summer surface water salinities can be less than 20 practical salinity units (PSUs; equivalent to the concentration of sodium and chloride ions expressed in parts-per-thousand; the average salinity of oceanic seawater is 35.5 PSUs) due to the influx of freshwater from

streams and subsurface seeps. Water column salinity increases to a maximum of 34 PSUs in winter, as freshwater sources freeze, and sea ice formation concentrates dissolved ions in the unfrozen seawater. The formation of sea ice also leads to salinity stratification, as the water column is isolated from the mixing effect of wind. A layer of less-dense freshwater from Snake River pools on top of seawater within the Nome Outer Basin as it freezes over, and the water column within the Inner Basin becomes entirely fresh throughout the winter. The stratification contributes to the estuarine character of the Outer Basin, creating an earlier freeze and attracting saffron cod and their predators (Charlie Lean, personal communication, 2019).

C. Suspended Particulate/Turbidity Determinations

Water quality studies have not been carried out specifically at the Nome Harbor site. A study of general water quality in northern Norton Sound (Hood & Burrell 1974) found uniformly high dissolved oxygen concentrations, including in bottom waters, due to the mixing effects of storms. Concentrations of nutrients such as phosphorus and nitrogen were extremely high due to the influx of sediment and dissolved matter from the Yukon River into Norton Sound. Measurements of pH were within the slightly basic norm (7.7-8.1) for coastal marine waters.

The waters of Norton Sound are characteristically turbid due to an enormous load of sediment discharged by the Yukon River to the south and carried throughout the Sound by a counterclockwise gyre (Cacchione and Drake 1979). These sediments, once deposited on the seafloor, can be readily resuspended by severe storms, especially given the shallow depths found through much of Norton Sound.

Because of the history of mining in the Nome area, the presence of metals in the marine environment has been the subject of several studies (Hood & Burrell 1974; MMS 1990). Some early sampling efforts reported high metals levels. Still, in later studies, ambient concentrations of dissolved or suspended metals such as lead, copper, and zinc have not been found to be elevated in the marine waters off Nome compared with other coastal areas (MMS 1990). A study of metal concentrations in the plume of a gold dredge working offshore of Nome found that samples of the water column containing resuspended sediment contained elevated concentrations of metals. Those same samples, when filtered, showed similar concentrations to samples collected outside the plume, suggesting that the resuspension of sediment by the dredge was not driving significant amounts of metals into the dissolved phase (MMS 1990).

Excavation of sediment from the causeway breach and the west sediment trap would occur during low tide; construction machinery will avoid working in the water to the extent possible. As the excavated sediment is deposited in the placement area, any

water entrained in the sediment is expected to drain quickly down through the coarse beach material within the placement area, with minimal surface runoff.

D. Contaminant Determinations

Previous sampling and chemical analysis of harbor sediments at Nome has shown little indication of significant human-caused chemical contamination. However, notably high concentrations (up to 200 mg/kg) of arsenic have been reported regularly in sediment samples from the inner harbor area. The State of Alaska has not established marine sediment standards. The dredged material management guidelines (RSET 2018) currently used by the USACE Alaska District have established a marine sediment screening level of 57 mg/kg total arsenic, based on published Lowest Apparent Effects Thresholds (LAETs). This screening level presumes, however, that the arsenic present is due to human-made contamination, rather than naturally occurring minerals. Arsenic concentrations of surface sediment samples collected in 2016 and 2017 from Snake River, Nome Harbor, and along the outer shoreline are shown in Figure 3. The high variability of arsenic concentrations reported may be due to "nugget effects," in which a small fraction of high-arsenic particles may skew the analytical results for that sample; localized selective sorting of high-arsenic particles by density or grain-size may also play a role.

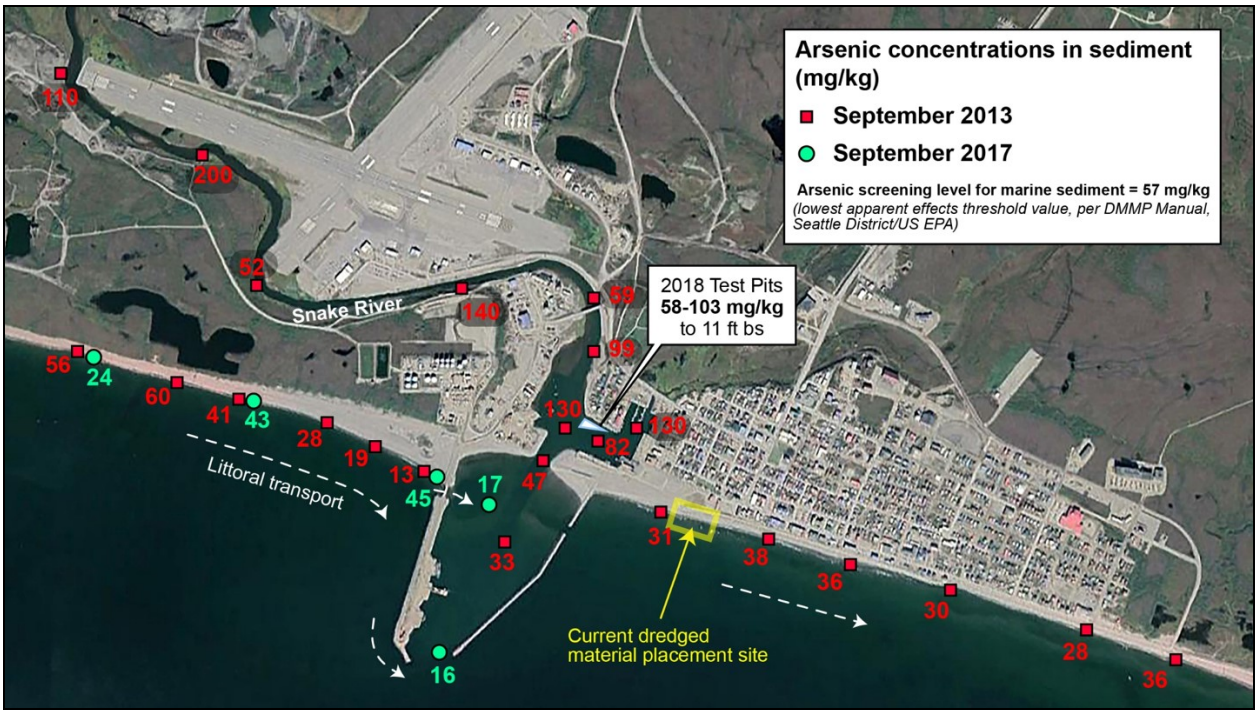

Figure 3. Arsenic concentrations in samples of surface sediment.

The surface sediment samples collected along the Norton Sound shoreline and within the outer harbor had generally much lower concentrations of arsenic than those collected from the Snake River and inner harbor (Figure 3), suggesting that the Snake River is the source of arsenic-rich sediment found in Nome Harbor. The relatively low variability of arsenic concentrations in shoreline sediment samples taken east of the Outer Basin may be due to a homogenizing effect by the annual suction-dredging of sediments before they are discharged at the beach nourishment placement site.

E. Aquatic Ecosystems and Organism Determinations

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. The natural environment includes the continuous migration and redistribution of benthic sediments and frequent disruption from ice scouring and violent storms. The dredged material to be discharged is similar to the existing benthic sediments in the discharge area; existing populations of organisms, adapted to maneuvering and burrowing through loose sediment, would most likely not suffer significant adverse effects from the addition of several inches of new material to their environment.

F. Proposed Material Placement Site Determinations

The shoreline dredged material placement site has been used annually since 2008. The material existing at and near the placement site is expected to consist of dredged material placed there in previous years. The maintenance dredging material placed there will therefore be very similar in composition to existing sediment at the placement site.

G. Determination of Cumulative and Secondary Effects on the Aquatic Ecosystem

The onshore placement area has been in use since 2008, and continued use of this area to deposit silty sand and gravel from the dredged areas is unlikely to degrade the beach environment further. Existing populations of organisms in the nearshore benthic environment, adapted to maneuvering and burrowing through loose, shifting sediment, would most likely not suffer significant adverse effects from the addition of several inches of new material to their environment. The USACE has observed that wave action rapidly redistributes the dredged material discharged at the placement site, such that little sign of the discharge is visible within a few months of the end of the dredging season.

III. Findings of Compliance with the Restrictions on Discharge

A. Adaptation of Section 404 (b)(1) Guidelines to this Evaluation

The preceding evaluation was prepared by using "U.S. Army Corps of Engineers ER 1105-2-100 Planning Guidance Notebook, Appendix C, Environmental Compliance, Exhibit C-1, Recommended Outline for Section 404(b)(1) Evaluation without making any significant adaptations to Section 404(b)(1) guidelines (40 CFR 230).

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem

The USACE has determined that placement of the maintenance dredging material to the west of the Nome seawall is a beneficial use that has widened the beach and reduced wave energy along a portion of the seawall. The annual placement of dredged material for beach nourishment may be thought of as 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. No practicable upland placement or disposal site for the dredged material has been identified, and managing and transporting the dredged material upland would cause its own environmental impacts. The USACE considers the placement of annually dredged material for beach nourishment to be the least environmentally damaging practicable alternative (LEDPA).

C. Compliance with Applicable State Water Quality Standards

The proposed project would not be expected to have an appreciable adverse effect on water supplies, recreation, growth, and propagation of fish, shellfish, and other aquatic life, or wildlife. It would not be expected to introduce petroleum hydrocarbons, radioactive materials, residues, or other pollutants into the waters of Norton Sound. Overall, the project would comply with the State of Alaska Water Quality Standards (18 AAC 070).

D. Compliance with Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act

No toxic effluents that would affect water quality parameters are associated with the proposed project. Therefore, the project complies with toxic effluent standards of Section 307 of the Clean Water Act.

E. Compliance with Endangered Species Act (ESA) of 1973

The USACE has engaged in informal consultation under the ESA with the National Marine Fisheries Service (NMFS). The USACE submitted a letter dated 28 May 2020 to the NMFS, requesting concurrence with the determination that the planned activities "may affect but not likely to adversely affect" ESA-listed species under NMFS

jurisdiction. The species involved and mitigatory measures are detailed in the attached environmental assessment. The NMFS concurred in a letter dated 26 June 2020 (NMFS 2020a). The USACE determined the project would have “no effect” on ESA-listed species under the United States Fish and Wildlife Service (USFWS) jurisdiction, and no further coordination is required.

F. Evaluation of Extent of Degradation of the Waters of the United States

There are no municipal or private water supplies in the area that could be negatively affected by the proposed project. Recreational, commercial, and coastal storm resilience would benefit from maintenance actions. There would be no significant adverse impacts to plankton, fish, shellfish, wildlife, and/or special aquatic sites.

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