Safer Seward Highway Project
Seward Highway MP 98.5 to 118,
Bird Flats to Rabbit Creek

Project No.: Z566310000/0A31034

Environmental Assessment

Appendix M: Section 7 Biological Assessment and Consultation

DRAFT

December 2025

Prepared for:

Alaska Department of Transportation and Public Facilities

Prepared by:

HDR, Inc.
582 E. 36th Avenue, Suite 500
Anchorage, AK 99503-4169
907-644-2000 Phone | 907-644-2022 Fax

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated April 13, 2023, and executed by FHWA and DOT&PF.

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802-1668

March 24, 2025

Col. Jeff Palazzini
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-0898

Brian Elliot
Regional Environmental Manager
Alaska Department of Transportation and Public Facilities
P.O. Box 112500
Juneau, Alaska 99811-2500

Re: Safer Seward Highway Project Seward Highway MP 98.5 to 118, Bird Flats to Rabbit Creek, Anchorage, Alaska, AKRO-2024-03047

Dear Col. Palazzini and Mr. Elliot:

This letter responds to your request for concurrence from the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the proposal to realign and construct safety improvements to the Seward Highway between Mileposts (MPs) 98.5 and 118, in the Municipality of Anchorage, Alaska, and proposed issuance of all U.S. Army Corps of Engineers (Corps) permits associated with the project. NMFS received an initial request for informal consultation on October 3, 2024; however, extensive early coordination via a stakeholder working group that convened regularly beginning March 15, 2023, providing NMFS the opportunity to provide technical assistance throughout project design development. After discussion via email and video call in November and December 2024 regarding updates to the proposed action and new information on occurrence of Steller sea lions in the action area, the Alaska Department of Transportation and Public Facilities (DOT&PF) submitted a revised request for expedited informal consultation on January 2, 2025. Your request qualified for our expedited review and concurrence because it met our screening criteria and contained all required information on your proposed action, mitigation measures, and its potential effects to listed species and designated critical habitat. Expedited consultation for this proposed action commenced on January 2, 2025.

We reviewed your consultation request document and related materials. Our analysis of this project's effects on listed species and critical habitats relied upon the project description you provided, including all of the proposed mitigation measures (see Attachment A). Failure to implement any of these mitigation measures may require reinitiation of consultation as per reinitiation trigger number 3, below (50 CFR 402.16(a)(3)).

Based on our knowledge, expertise, and the materials you provided, we concur with your conclusions that the proposed action is not likely to adversely affect the federally endangered

western distinct population segment (DPS) of Steller sea lion (*Eumetopias jubatus*), the federally endangered Cook Inlet DPS of beluga whale (*Delphinapterus leucas*) or Cook Inlet beluga whale critical habitat. A complete administrative record of this consultation is on file at our office.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 FR 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to NMFS' existing practice in implementing section 7(a)(2) of the ESA (84 FR at 45015; 89 FR at 24268). We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this letter of concurrence would not have been any different under the 2019 regulations or pre-2019 regulations.

Reinitiation of consultation is required where discretionary federal involvement or control over the action has been retained or is authorized by law, and if: (1) take of listed species occurs; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or (4) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16).

Please direct any questions regarding this letter to Jill Seymour at Jill.Seymour@noaa.gov or (323) 372-3328.

Sincerely,

Anne Marie Eich

Anne Marie Eich, Ph.D.
Assistant Regional Administrator
for Protected Resources

Attachments:
Project Mitigation Measures
Consultation Request Letter

cc:
Douglas Kolwaite, douglas.kolwaite@alaska.gov
Matthew Dietrick, matthew.dietrick@alaska.gov
Frederick Land, Frederick.J.Land@usace.army.mil
Kerri Hancock, Kerri.C.Hancock@usace.army.mil
Heather Markway, Heather.N.Markway@usace.army.mil

Project Mitigation Measures: **Safer Seward Highway Project Seward Highway MP 98.5 to 118, Bird Flats to Rabbit Creek (AKRO-2024-03047)**

The DOT&PF will ensure that following mitigation measures, developed specifically to avoid and minimize potential impacts to Steller sea lions, Cook Inlet beluga whales, and Cook Inlet beluga whale critical habitat, are implemented for the proposed project:

1. The filled areas have been reduced from 200 to 105 acres based on the revised design, reducing potential impacts on fish and marine mammals.
2. In-water fill placement will not occur from April 1 through July 15.
3. Fill placement and onshore blasting will only occur during daylight hours.
4. Blasting will not occur in or below the intertidal zone.
5. All fill activities will occur from shore, with seaward expansion from atop previous fill. Barges and other vessels will not be used for fill activities and dredging will not be required.
6. In-water work will be conducted at the lowest points of the tidal cycle when feasible.
    a. If piles need to be removed or installed for railroad or highway bridge replacement, pile installation and removal will occur around low tide when the creeks have no tidal influence.
7. One or more Protected Species Observers (PSOs) will be on site to accurately identify beluga whales and other ESA-listed marine mammals beyond the shutdown zone distances identified for the 160 and 120 decibel (dB) isopleths (Table 1).

Table 1. Shutdown zone radii for impulsive (160 dB) and continuous (120 dB) activities associated with the proposed action

Activity	Threshold dB rms re 1 µPa SPL	Shutdown Zone
Upland Blasting	160	1.5 km (4,921 ft)
In-water Fill Placement	120	300 m (984 ft)

8. PSOs will be positioned such that collectively they will be able to monitor the entirety of each activity's shutdown zone.
9. PSOs will scan the relevant shutdown zone for beluga whales and other ESA-listed marine mammals for 30 minutes (mins) before commencing blasting or in-water fill.
10. If one or more beluga whales or other ESA-listed marine mammals are present within the applicable shutdown zone during this 30-min observation period, blasting and in-water fill placement will not begin until all listed marine mammals vacate the shutdown zone of their own accord, or until no ESA-listed marine mammals have been observed in the shutdown zone for 30 mins.
11. The PSO will continuously monitor the applicable shutdown zones to prevent takes of any ESA-listed marine mammals.
12. Should blasting or in-water fill placement cease for more than 60 mins, PSOs will monitor the applicable shutdown zones for beluga whales and other ESA-listed marine mammals for 30 mins before again commencing work.

13. Blasting will only occur when all marine waters within 0.9 mi (1.5 km) of the blasting site are visible to the PSO.
14. At least one PSO will have either prior experience as a PSO in Alaska, or will have taken a NMFS-approved PSO or marine mammal observer training course.
15. PSO training will include:
    a. field identification of marine mammals and marine mammal behavior;
    b. ecological information on marine mammals and specifics on the ecology and management concerns of those marine mammals;
    c. ESA and Marine Mammal Protection Act (MMPA) regulations;
    d. proper equipment use;
    e. methodologies in marine mammal observation and data recording and property reporting protocols; and
    f. an overview of PSO roles and responsibilities.
16. PSOs will be individuals independent from the project proponent and must have no other assigned tasks during monitoring periods.
17. The action agency or its designated non-federal representative will provide resumes or qualifications of PSO candidates to consultation biologist and akr.prd.records@noaa.gov approval at least one week prior to in-water work. NMFS will provide a brief explanation of lack of approval in instances where an individual is not approved.
18. PSOs will have the appropriate gear, such as binoculars, spotting scopes, charts, compass, rangefinder, or digital mapping tool such as an iPad or Global Positioning System device (or equivalent), and have the ability to use these instruments to plot the position of all observed ESA-listed marine mammals accurately. PSOs will keep a record of all ESA-listed marine mammal sightings and associated data.
19. PSOs have the following responsibilities for data collection:
    a. PSOs will record observations on data forms or into electronic data sheets.
    b. The project proponent will ensure that PSO data will be submitted electronically in a format that can be queried such as a spreadsheet or database (i.e., digital images of data sheets are not sufficient).
    c. PSOs will record the following:
        i. Project name, date, shift start time, shift stop time, and PSO identifier;
        ii. date and time of each reportable event (e.g., a listed marine mammal observation, operation shutdown, reason for operation shutdown, change in weather conditions);
        iii. weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state where the Beaufort Wind Force Scale will be used to determine sea state (https://www.weather.gov/mfl/beaufort);
        iv. species, numbers, and, if possible, sex and age class of observed listed marine mammal;
        v. the predominant anthropogenic sound-producing activities occurring during each listed marine mammal observation;
        vi. observations of listed marine mammal behaviors and reactions to anthropogenic sounds and presence;

vii. geographic coordinates of initial, closest, and last location of listed species, including distance from observer to the listed species, and minimum distance from the predominant sound-producing activity to listed species;
viii. whether the presence of a listed species necessitated the implementation of mitigation measures to avoid acoustic impact (i.e., shutdown), and the duration of time that normal operations were affected by the presence of listed species.

20. PSOs will have the authority and means (direct communication) to shut down or stop blasting and in-water fill placement capable of harassing an ESA-listed marine mammal when a marine mammal(s) is detected within or is about to enter the applicable shutdown zone.
21. PSOs will not work for more than 4 hours without a break, and will not work more than 12 hours during a 24-hour period.
22. PSOs will advise DOT&PF to stop blasting or placing in-water fill immediately if one or more beluga whales or other ESA-listed marine mammals enter, or are about to enter, the applicable shutdown zone.
23. Monthly monitoring reports will be submitted to the NMFS Alaska Regional Office (AKRO) within 14 days after the end of each calendar month. Reports will be submitted by emailing them to akr.prd.records@noaa.gov and the consulting biologist.
24. A draft annual report on activities and results of the monitoring and mitigation program will be submitted to the AKRO within 90 days after the end of the calendar year or 90 days after the end of the in-water construction season.
    a. The annual report will summarize all in-water activities associated with the proposed action, and results of PSO monitoring conducted during the in-water activities.
    b. The report for projects will include:
        i. summaries of monitoring efforts, including dates and times of construction, dates and times of monitoring, dates and times and duration of shutdowns due to listed marine mammal presence;
        ii. dates and times of listed marine mammal observations, geographic coordinates of listed marine mammals at their closest approach to the project site, including date, water depth, species, age/size/gender (if determinable), and group sizes.
        iii. number of listed marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);
        iv. observed listed marine mammal behaviors and movement types versus project activity at the time of observation;
        v. numbers of marine mammal observations/individuals seen versus project activity at time of observation;
        vi. any photos or videos taken of marine mammals;

vii. digital, queryable documents containing PSO observations and records, and digital, queryable reports.

c. A final annual monitoring report will be produced within 30 days of receiving NMFS AKRO's comments on the draft annual report.

25. Staging areas will be located within upland areas adjacent to the proposed Project Area, within the already established DOT&PF right-of-way. DOT&PF will develop and implement a Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasure (SPCC) Plan.
26. Trash will be disposed of in accordance with State law. All closed loops (e.g., packing straps, rings, bands) will be cut prior to disposal. Additionally, all ropes, nets, and other marine mammal entanglement hazards will be secured so they do not enter marine waters.

Reporting

Unauthorized Take

27. If a listed marine mammal is determined by the PSO to have been disturbed, harassed, harmed, injured, or killed (e.g., a listed marine mammal is observed entering a shutdown zone before operations can be shut down, or is injured or killed as a direct or indirect result of the action), the PSO will report the incident to NMFS within one business day, with information submitted to akr.prd.records@noaa.gov. These PSO records will include:
    a. digital, queryable documents containing PSO observations and records, and digital, queryable reports.
    b. the date, time, and location of each event (provide geographic coordinates);
    c. description of the event;
    d. number of individuals of each listed marine mammal species affected;
    e. the time the animal(s) was first observed or entered the shutdown zone, and, if known, the time the animal was last seen or exited the zone, and the fate of the animal;
    f. mitigation measures implemented prior to and after the animal was taken;
    g. if a vessel struck a listed marine mammal, the contact information for the PSO on duty on the vessel or the contact information for the individual piloting the vessel; and
    h. photographs or video footage of the animal(s), if available.

Stranded, Injured, Sick or Dead Listed Species (not associated with the project)

28. If the PSO observes an injured, sick, or dead marine mammals (i.e., stranded), they will notify the Alaska Marine Mammal Stranding Hotline at 877-925-7773. The PSOs will submit photos and available data to aid NMFS in determining how to respond to the stranded animal. If possible, data submitted to NMFS in response to stranded marine mammals will include date/time, location of stranded marine mammal, species and number of stranded individuals, description of the stranded marine mammal's condition,

event type (e.g., entanglement, dead, floating), and behavior of live-stranded marine mammals.

Illegal Activities

29. If the PSO observes listed marine mammals or other marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS Alaska Region Office of Law Enforcement (Table 2; 1-800-853-1964).
30. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.

Extralimital Sightings

31. All observations of ESA-listed marine mammal species not considered in this consultation will be reported to NMFS within 24 hours. Photographs and/or video should be taken if possible to aid in Photo ID of individual animals. Reports will include all applicable information that would be included in a final report.

Table 2. Summary of Agency Contact Information

Reason for Contact	**Contact Information**
Consultation Questions & Unauthorized Take	akr.prd.section7@noaa.gov Consulting biologist: Jill Seymour 323-372-3328, jill.seymour@noaa.gov
Reports & Data Submittal	akr.prd.records@noaa.gov Consulting biologist: Jill Seymour 323-372-3328, jill.seymour@noaa.gov
Stranded, Injured, or Dead Marine Mammals	Stranding Hotline (24/7 coverage) 1-877-925-7773
Oil Spill & Hazardous Materials Response	U.S. Coast Guard National Response Center: 1-800-424-8802 and AKRNMFSSpillResponse@noaa.gov

Illegal Activities *(not related to project activities; e.g., feeding, unauthorized harassment, or disturbance to marine mammals)*	NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964
In the event that this contact information becomes obsolete	NMFS Anchorage Main Office: 907-271-5006 or NMFS Juneau Main Office: 907-586-7236

In addition to the mitigation measures above, DOT&PF will implement the following voluntary measures for avoidance, minimization, or mitigation of potential adverse effects to anadromous fish streams that produce forage fish for the beluga whale and to designated critical habitat for the Cook Inlet beluga whale. These measures are associated with other permitting and/or authorization processes, such as memorandums of agreement between DOT&PF and Alaska Department of Fish and Game (ADF&G), as well as requirements as part of the USACE Section 404 permit and relevant requirements of the Clean Water Act (CWA).

32. For all project-related crossings of fish-bearing waters that incorporate bridges or culverts, DOT&PF will design, construct, and maintain the conveyance structures in accordance with the Memorandum of Agreement that DOT&PF has with ADF&G to ensure that appropriate stream crossing culverts are designed to provide efficient fish passage for all fish life stages following American Association of State Highway and Transportation Officials fish passage design guidelines.
33. DOT&PF will avoid and minimize impacts to waters of the U.S., including wetlands, to the extent practicable. DOT&PF has proposed compensatory mitigation for unavoidable impacts to wetlands as part of the USACE Section 404 permit, to the extent practicable, in accordance with the requirements of the CWA.
34. DOT&PF will organize project-related construction in anadromous streams to minimize adverse effects to salmon during critical life stages, when practicable. DOT&PF will incorporate timing windows as specified by the ADF&G Division of Habitat into construction contract specifications for in-stream work. DOT&PF will design and construct stream crossings so as to not impede fish passage or impair the hydrologic functioning of the waterbody.
35. DOT&PF will implement Essential Fish Habitat (EFH) conservation measures as agreed upon with NMFS during the EFH consultation process for this project.
36. Based on preliminary engineering done to date, the newly built and replaced bridge crossings will be designed to minimize impacts to EFH by placing as few piles as feasible within or below ordinary high water. Designs will be continually evaluated to minimize impacts on EFH.

37. DOT&PF will obtain federal permits required by Section 404 of the CWA and Section 10 of the Rivers and Harbors act from the USACE prior to initiation of project-related construction activities in wetlands and waterbodies. DOT&PF will also obtain necessary state permits and authorizations as required, and will incorporate stipulations into construction contract specifications.
38. No vehicles or equipment will be fueled or serviced within 100 ft (30.48 m) of wetlands, fish-bearing streams, or marine waters with the exception of "low-mobility" equipment used for pile-driving, drilled shaft construction, or other bridge construction. An appropriate plan will be developed detailing the fueling process for this equipment, with materials to immediately contain and clean-up spilled petroleum products. Fuel will be stored a minimum of 100 ft (30.48 m) from any waterbody or wetland.
39. Spill response supplies adequate in type and quantity for the equipment being used on the property will be on site and readily accessible at all times.
40. The project will incorporate best management practices and compliance with applicable Alaska Department of Environmental Conservation (ADEC), U.S. Environmental Protection Agency (USEPA), and U.S. Coast Guard requirements on contaminants and spill response to minimize the potential for fuel spills and contamination.
41. An appropriate SWPPP and SPCC Plan will be developed for the project prior to construction. The plans will include detailed fueling instructions and spill response protocols. NMFS will review the SPCC Plan prior to the start of construction.
42. Contaminant-free embankment and surface materials will be used in construction.
43. Stream banks where culverts and bridges will be replaced will be re-contoured and re-vegetated with native vegetation to minimize erosion and provide fish habitat.
44. DOT&PF will be subject to USEPA and ADEC jurisdiction under the Alaska Pollutant Discharge Elimination System for stormwater discharges resulting from project-related construction activities.
45. Consistent with measures #7 through 22, above, to minimize impacts of construction noise on belugas whales and other ESA-listed marine mammals, in-water fill placement and uplands blasting will be conducted while PSOs are on site, and PSOs will be authorized to halt the activity if a beluga whale or other ESA-listed marine mammal is observed approaching or within the harassment isopleth for that activity. In-water fill placement or uplands blasting will not commence until the ESA-listed marine mammal has left the area.
46. Expanding on measure #6, above, in-water fill placement and demolition will occur within 3 hours on either side of low tide, as feasible, to minimize noise impacts on beluga whales and other ESA-listed marine mammals.

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Transportation and Public Facilities

OFFICE OF THE COMMISSIONER

P.O. Box 112500
3132 Channel Drive
Juneau, AK 99811-2500
Main: 907-465-3900
TTY: 711 or 1-800-770-8973
dot.alaska.gov

September 27, 2024

Jon Kurland
Regional Administrator
NOAA Fisheries, National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802

Re: Seward Highway MP 98.5 to 118, Bird Flats to Rabbit Creek, Safer Seward Highway Project
Z566310000/0A31034
Section 7 Endangered Species Act Informal Consultation Request

Dear Mr. Kurland:

The Alaska Department of Transportation and Public Facilities (DOT&PF) is submitting the enclosed Biological Assessment (BA; in accordance with 50 Code of Federal Regulations 402.13(c)) to initiate informal consultation with the National Marine Fisheries Service (NMFS) for the for the Seward Highway Milepost (MP) 98.5 to 118, Bird Flats to Rabbit Creek Project No. Z566310000/0A31034, Safer Seward Highway Project (Project).

DOT&PF is proposing to construct the Project between MPs 98.5 through 118 of the Seward Highway in order to: 1) reduce crash rates and crash severity; 2) improve mobility and reliability; and 3) safely accommodate mixed uses in the corridor. Construction operations are expected to begin as early as 2026 and last through 2035, using a phased construction approach. Phase 1 would occur from roughly MP 106 through 112 of the Seward Highway along Turnagain Arm.

The proposed Project is located along Turnagain Arm in Upper Cook Inlet, which provides habitat for the federally endangered distinct population segment (DPS) of Cook Inlet beluga whales (*Delphinapterus leucas*), and nearly all of Turnagain Arm is designated as critical habitat for this DPS. The federally endangered western DPS of Steller sea lions (*Eumetopias jubatus*) may also occur in Turnagain Arm. The federally endangered Western North Pacific DPS and federally threatened Mexico DPS of humpback whales (*Megaptera novaeangliae*) also occur in Cook Inlet, although it is unlikely they would occur within the Project vicinity. The proposed threatened sunflower sea star (*Pycnopodia helianthoides*) is not expected to occur within the Project vicinity.

Proposed activities during Project construction with the potential to affect species listed under the Endangered Species Act (ESA) and their critical habitat include continuous and intermittent noise from fill placement as well as impulsive noise from uplands blasting associated with the highway and Alaska Railroad Corporation track realignment.

The attached BA is specifically intended to address potential impacts to ESA species under your jurisdiction.

We look forward to your written acknowledgement of this Section 7 consultation request, along with consultation assistance. DOT&PF also requests an advance copy of the Draft Letter of Concurrence for review prior to finalizing your Letter of Concurrence, should NMFS agree with our findings. We look forward to your feedback, and to working with you and your staff toward successful consultation under Section 7 of the ESA.

Please feel free to contact me at (907) 269-0539 or via email at brian.elliott@alaska.gov. You may also contact our environmental consultant for the Project, Brett Carrothers, HDR, Inc., at (907) 644-2121 or via email at brett.carrothers@hdrinc.com.

Sincerely,

Brian Elliott

Brian Elliott
Regional Environmental Manager
DOT&PF

Enclosure:
Attachment 1: Biological Assessment

cc:
Matt Dietrick, NEPA Program Manager, DOT&PF
Jill Seymour, Protected Resources Division, NOAA Fisheries, National Marine Fisheries Service
Sierra Franks, Protected Resources Division, NOAA Fisheries, National Marine Fisheries Service

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Safer Seward Highway Project
Seward Highway MP 98.5 to 118,
Bird Flats to Rabbit Creek

Project No.: Z566310000/0A31034

Biological Assessment

REV 1

January 2025

Prepared for:

Alaska Department of Transportation and Public Facilities

Prepared by:

HDR, Inc.
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Anchorage, AK 99503-4169
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The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by DOT&PF pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated April 13, 2023, and executed by FHWA and DOT&PF.

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Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

2D	two-dimensional
3D	three-dimensional
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AKRO	Alaska Regional Office
ANFO	ammonia nitrate and fuel oil
ARRC	Alaska Railroad Corporation
AWC	Anadromous Waters Catalog
BA	Biological Assessment
BOP	Beginning of Project
CFR	Code of Federal Regulations
CWA	Clean Water Act
dB	decibel(s)
dBA	A-weighted decibel(s)
dB_{rms} re 1 µPa	decibel root mean square referenced to a pressure of 1 microPascal
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	distinct population segment
EA	environmental assessment
EFH	Essential Fish Habitat
EOP	End of Project
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FR	*Federal Register*
Hz	hertz
kHz	kilohertz
km	kilometer(s)
L_E	cumulative sound exposure level
L_{pk}	peak sound level
mi	mile(s)
MLLW	mean low lower water

MMPA	Marine Mammal Protection Act
MP	Milepost
MS	materials site
NES1	North Extension Stabilization Step 1
NMFS	National Marine Fisheries Service
PBF	physical and biological feature
PCE	Essential Features or primary constituent element
Port of Alaska	Don Young Port of Alaska
Project	Safer Seward Highway Project
PSO	Protected Species Observer
PTS	permanent threshold shift
rms	root mean square
SPCC	Spill Prevention Control and Countermeasure Plan
SPL	sound pressure level
SWPPP	Stormwater Pollution Prevention
TEK	traditional ecological knowledge
TTS	temporary threshold shift
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Fish and Wildlife Service
WSDOT	Washington State Department of Transportation

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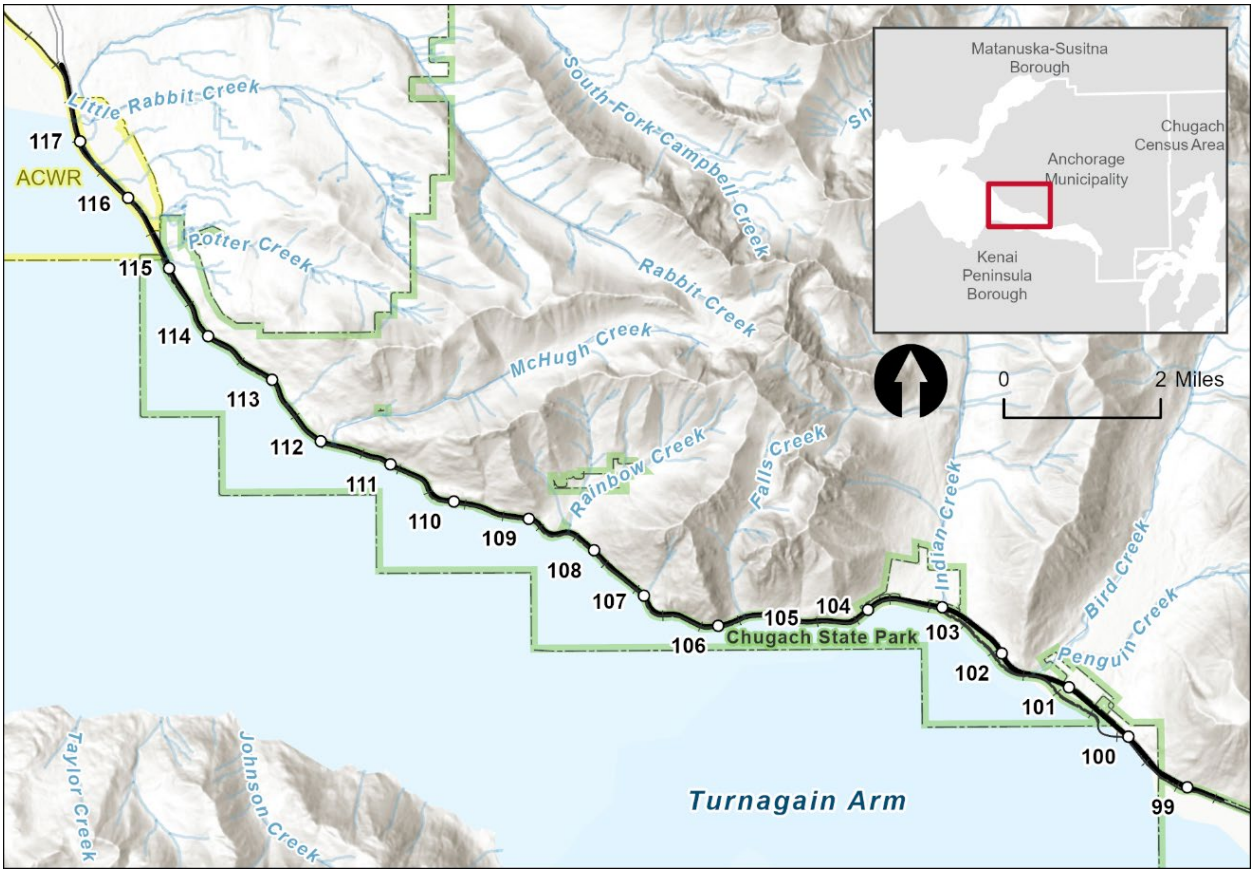
1 Introduction

1.1 Background and Project Summary

The Alaska Department of Transportation and Public Facilities (DOT&PF) is proposing to realign and construct safety improvements to the Seward Highway between Mileposts (MPs) 98.5 and 118, known as the Safer Seward Highway Project (Project). The Project purpose is to reconstruct this segment of highway to meet current design standards for a component of the Interstate Highway System and eliminate the current designation as a Highway Safety Corridor.

This Project would realign the highway and Alaska Railroad Corporation (ARRC) tracks along a 31.38-kilometer (km; 19.5-mile [mi]) segment of the Seward Highway between the vicinities of Bird Flats (MP 98.5) and Potter Marsh (MP 118) on the shores of Turnagain Arm in Upper Cook Inlet (Figure 1-1).

Figure 1-1. Proposed Safer Seward Highway Project corridor.



Turnagain Arm provides habitat for the federally endangered distinct population segment (DPS) of Cook Inlet beluga whales (*Delphinapterus leucas*), and nearly all of Turnagain Arm is designated as critical habitat for this DPS. The federally endangered western DPS of Steller sea lions (*Eumetopias jubatus*) may also occur in Turnagain Arm. The federally endangered Western North Pacific DPS and federally threatened Mexico DPS of humpback whales (*Megaptera novaeangliae*) also occur in Cook Inlet, although it is unlikely they would occur in

the Project vicinity. On March 16, 2023, the National Marine Fisheries Service (NMFS) proposed listing the sunflower sea star (*Pycnopodia helianthoides*) as threatened under the Endangered Species Act (ESA). Upper Cook Inlet, where this Project is proposed, is considered outside the range of the proposed sunflower sea star (NMFS 2024). Proposed activities during Project construction with the potential to affect species listed under the ESA and their critical habitat include continuous and intermittent noise from fill placement as well as impulsive noise from uplands blasting associated with the highway and ARRC track realignment.

Section 7 of the ESA requires that federal agencies ensure that any action they authorize, fund, or carry out does not jeopardize the continued existence of any federally endangered or threatened species and does not adversely modify designated critical habitat of such species. When a federal action agency authorizes, funds, or carries out an action, it must consult with NMFS and/or the U.S. Fish and Wildlife Service (USFWS) if the agency determines that the action may affect ESA-listed species. For the actions described in this Biological Assessment (BA), two federal action agencies must authorize the Project: the U.S. Army Corps of Engineers (USACE) and NMFS. The USACE would authorize the Project through Section 10 permit issuance and Section 408 permission under the Rivers and Harbors Act of 1899, and Clean Water Act (CWA) Section 404 discharge authorization. This BA describes the Project and is intended to fulfill the requirements for informal consultation under Section 7 of the ESA. This BA provides an analysis of potential effects of the Project on the ESA-listed western DPS of Steller sea lions, Cook Inlet beluga whales, Mexico DPS humpback whales, proposed threatened sunflower sea stars, and designated critical habitat for these ESA-listed entities (as applicable) and recommends determinations of effect.

Recognized for its scenic, natural, historic, and recreational values, the Seward Highway is considered an All-American Road and a National Scenic Byway by the Federal Highway Administration (FHWA); an Alaska State Scenic Byway by DOT&PF; and a National Forest Byway by the U.S. Department of Agriculture, Forest Service (USFS). The Seward Highway is functionally classified as a Rural Principal Arterial Interstate in the Project vicinity.

Turnagain Arm is characterized by extensive mud flats, large tides, strong winds, and heavy precipitation. The physical landscape consists of high-relief coastal and mountainous terrain rising from sea level to nearly 1,219.2 meters (4,000 feet) in elevation. Glaciers have carved wide, flat valleys in the area, and large glaciers still exist in the upper portions of those watersheds (USFS 2004).

Development of the Project began during the early 2000s. A Categorical Exclusion prepared for Project Z566310000 (Seward Highway Safety Improvements, Indian to Potter Marsh, MP 105–115) was approved in 2004 and re-evaluated as part of the smaller Seward Highway MP 105 to 107 Windy Corner project, which commenced in 2013. As a result of public feedback and consultation with FHWA, the Class of Action was revised to an environmental assessment (EA) in 2017. The *Seward Highway Route Development Plan Reconnaissance Study* was completed in 2017, which evaluates potential long-term improvements to the corridor and their associated costs, to assist with project planning and programming. To produce the draft EA, DOT&PF conducted agency scoping and public involvement in compliance with National Environmental Policy Act requirements. The draft Seward Highway: MP 105 to 107, Windy Corner EA was made available to the public in March 2020.

After reviewing public comments received on the draft Windy Corner EA, DOT&PF extended the project limits 2.5 miles northward, to between Windy Corner and Rainbow Point. Due to the expanded corridor and passage of time, DOT&PF decided rescoping the project was warranted. In spring 2021, public and agency scoping to cover the changed conditions commenced for the renamed project: Seward Highway MP 105–109.5, Windy Corner to Rainbow Point.

Following the 2021 scoping, DOT&PF expanded the project corridor to its current extent and renamed the project: Seward Highway Reconstruction MP 98.5 to 118, Bird Flats to Rabbit Creek, also known as the Safer Seward Highway Project. On January 24, 2023, DOT&PF published a Notice of Intent to Begin Engineering and Environmental Studies and Floodplain Encroachment for this Project in several newspapers of record. The current Project builds upon the prior work efforts and stakeholder feedback received on the draft Windy Corner EA and Seward Highway MP 105–109.5, Windy Corner to Rainbow Point scoping.

1.2 Project Purpose and Need

The purpose of the Project is to reconstruct the MP 98.5 to 118 segment of the Seward Highway to meet current design standards for a component of the Interstate Highway System and eliminate the current designation as a Highway Safety Corridor. The Project purpose can be achieved by improving safety for all users, updating the roadway to current standards, and reducing roadway congestion.

1.2.1 Project Objectives

This Project intends to address three needs:

- **Need 1: Reduce Crash Rates and Crash Severity.** In 2006, this stretch of the Seward Highway was designated as the state's first Highway Safety Corridor. Despite additional enforcement presence, community education, improved signage and safety improvement projects, high crash rates and crash severity, issues remain. Crashes are caused by limited passing opportunities, curvy and constrained road geometry, poor access management, and inadequate and incomplete pedestrian and non-motorized facilities. Extreme driving conditions—including atmospheric (e.g., high winds, rain, snow, dark conditions) and road surface (e.g., wet, ice, snow; changes that occur at the freeze-thaw line)—increase the risk of drivers losing control and sliding off the road or into oncoming traffic. Due to heavy summer seasonal traffic volumes, drivers spend considerable time following vehicles without safe passing opportunities, which results in frustrated drivers making high-risk passing maneuvers and increasing the risk of head-on collisions.
- **Need 2: Improve mobility and reliability.** Mobility within the Seward Highway corridor begins to fail during summer weekend peaks. Summer traffic volumes can result in long platoons (lines) of vehicles. When vehicles slow to turn or pull over for scenic or wildlife viewing, these actions pulse back through the lines, causing variable speeds. Mobility is also degraded by high truck and recreational vehicle volumes; uncontrolled access to and from scenic turnouts and trailheads, driveways, and intersections; and difficult weather and road conditions. Crashes, engine trouble, and poor weather or road conditions can cause unexpected delays, which reduce reliability. Emergency lane or

road closures following collisions, rockfall, or avalanches cause miles-long, hours-long backups since no alternative road crosses the Project area. Access to an emergency location is limited by the two-lane facility, slowing the response times of emergency services.

- **Need 3: Safely Accommodate Mixed Uses within the Corridor.** The Project corridor's multitude of scenic, natural, and recreational attractions contribute to the highway's designation as a National Scenic Byway, All-American Road, and Alaska Scenic Byway. However, the popularity of the attractions alongside, and including, the road exacerbates the safety, mobility, and reliability issues. A need exists to maintain the corridor's scenic qualities while safely accommodating the needs of all users, including recreators and tourists accessing attractions, local residents accessing their homes and communities, commercial and through-travelers making long-distance trips, and bicyclists and pedestrians. Numerous access points to pullouts and private driveways mean that vehicles are making many turning movements throughout the corridor. Vehicles pulled onto the highway shoulders create safety hazards. Gaps in non-motorized pathways result in people biking and walking along or across the highway to access attractions, creating safety and mobility issues.

1.3 Consultation History

At least two Section 7 ESA consultations have been completed for construction-related activities for improvements to the Seward Highway within the Project area:

- 2015 Letter of Concurrence (NMFS 2015) that informally consulted on the effects of improvements to the Seward Highway for the Windy Corner MP 105–107 project on Cook Inlet beluga whales and their designated habitat.
- 2021 Seward Highway Rockfall Mitigation between MPs 90 and 114.5 (AKRO-2021-00435)

2 Project Description

2.1 General Description

The Project proposes to realign and construct safety improvements to the Seward Highway between MPs 98.5 and 118 to meet current design standards for a component of the Interstate Highway System and eliminate the current designation as a Highway Safety Corridor.

The highway corridor would be widened and realigned to reduce sharp corners, increase visibility, and allow for more room for passing lanes, dedicated vehicle turnoffs, and pedestrian access (Figure 1-1). The proposed Project would start at MP 98.5 (near Bird Flats); follow Turnagain Arm northward; and end north of Potter Marsh, at the intersection/overpass to Rabbit Creek Road at MP 118 (Figure 1-1). The Project area includes Windy Corner, Beluga Point, McHugh Creek Trailhead, and Turnagain Arm Trailhead. The Seward Highway parallels the coastline of upper Turnagain Arm and crosses Rabbit, Potter, McHugh, Indian, and Bird Creeks as well as many other unnamed and named anadromous waterbodies between MPs 98.5 and 118 (Appendix A Project Plans and Map Set).

Because of the challenging topography, including the Chugach Mountains north of the corridor and Turnagain Arm along the southern side of the corridor, extensive cut-and-fill would be required to realign the highway. Fill in marine waters would primarily occur irregularly from MP 103 to 118, whereas blasting from rock cuts may occur intermittently from MP 98.5 to 115. Additional Project activities would include the construction of a pedestrian path along the entirety of the Project length; a parking lot and pedestrian pathway across the ARRC tracks at Beluga Point (MP 110); a trailhead parking lot at Rainbow Creek (MP 108.5); a parking lot, pedestrian pathway across the ARRC tracks, and emergency rescue craft ramp at Windy Corner (MP 106.5); a new intersection at Indian Valley (MP 103); a highway bridge at Bird Creek (MP 101.5); and a new intersection at Bird Creek (MP 101). The ARRC tracks that parallels the Seward Highway would be realigned when the highway is forced more in-water due to topography or environmental constraints, but would generally be limited to the areas near Potter Marsh, McHugh Creek, Beluga Point, Windy Corner, and the communities of Rainbow and Indian. Railroad and highway bridges may be replaced or widened at certain crossings, such as Bird and Indian Creeks. However, if piles need to be replaced within the stream crossings, pile installation and removal would occur at low tide, when the creeks have no tidal influence and no underwater sound propagation would occur into Turnagain Arm. See Appendix A Project Plans and Map Set for further information.

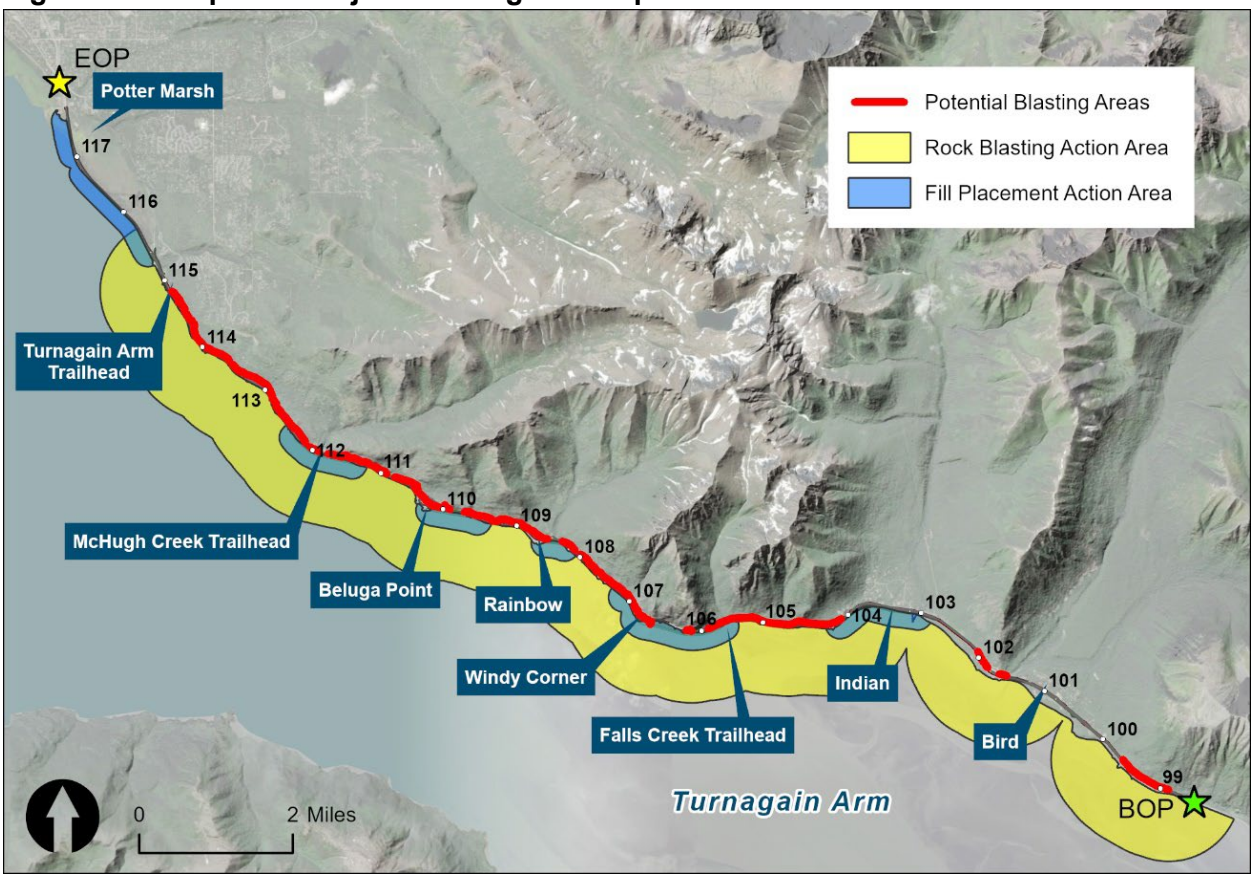
2.1.1 Project Activities

2.1.1.1 UPLAND BLASTING

Rock blasting would occur along the majority of the Project boundaries to create space for the road and ARRC track realignment. Additionally, rock blasting may occur at dedicated material sites to create fill material for this Project, although the necessity of material sites would be reduced by careful usage of fill from areas where the highway is realigned more inland, and using the fill generated from those cuts for areas where the highway and ARRC track are moved toward the water. The extent and duration of blasting is not known at this time; however, it is

assumed to occur during all phases and at nearly all locations along the corridor based on preliminary Project designs and standard construction practices. No more than one blast would occur per day (although one blast may be composed of hundreds of small charges triggered nearly instantaneously), and no more than one site would be blasted on any given day. The sound generated by blasting would extend along the Project action area nearly 1.5 km (0.9 mi) into Turnagain Arm (Figure 2-1) based on in-air acoustic calculations. Blasting may occur year-round, although blasting during ice-free months may be more consistent.

Figure 2-1. Proposed Project blasting and fill placement action areas.

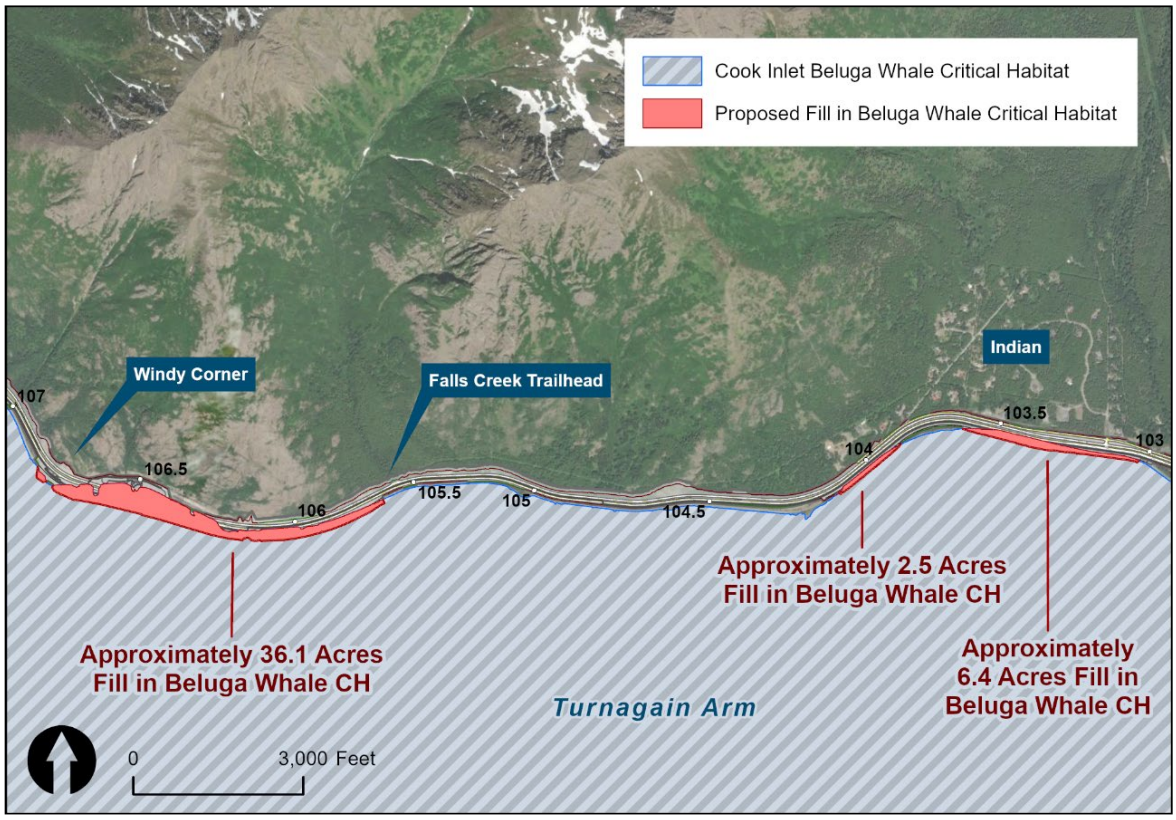


Note: BOP =Beginning of Project, EOP = End of Project

2.1.1.2 FILL PLACEMENT

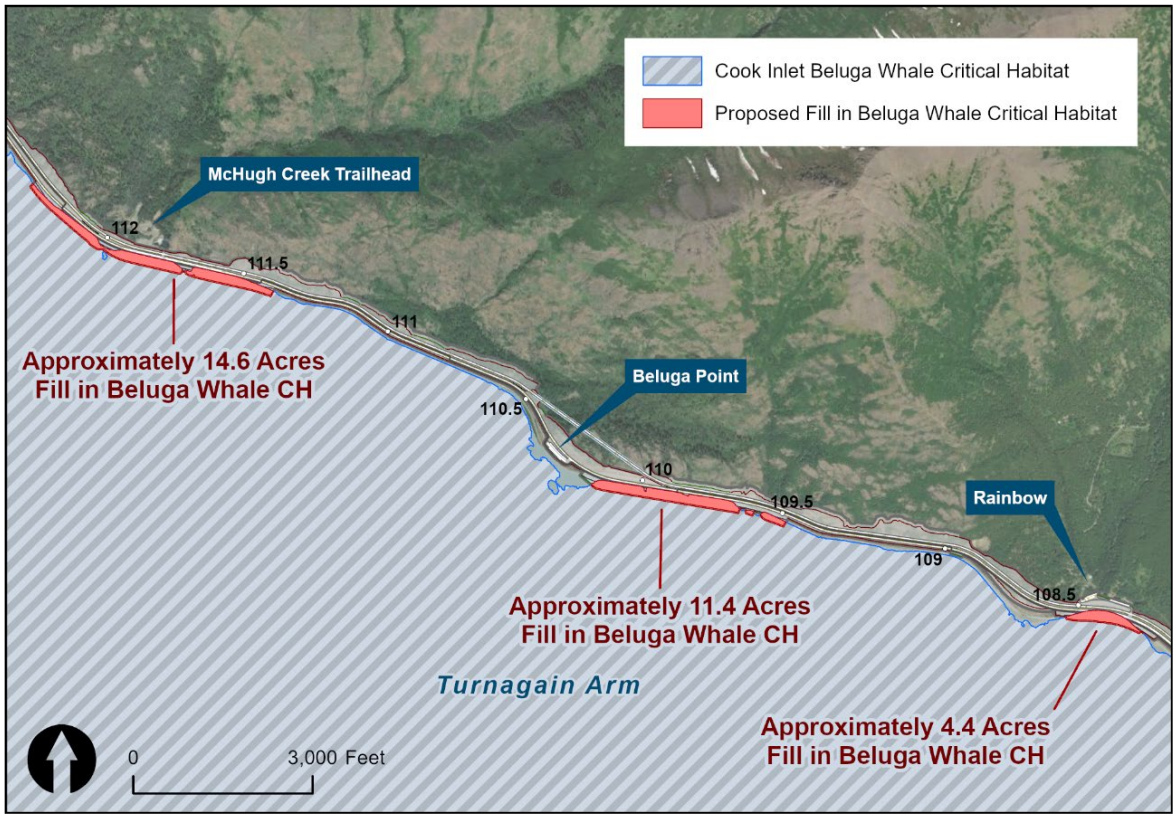
In order to realign the highway and ARRC tracks along the Project corridor, approximately 105 acres of fill, reduced from 200 acres in preliminary design, would be placed in the Turnagain Arm mudflats along approximately 16.1 km (10 mi) of the corridor (Figure 2-2; Figure 2-3), typically during the ice-free season (April through October). Throughout spring (April 1 through June 15), fill placement will only occur onto intertidal mudflats while the tide is out and the area is largely void of standing water.

Figure 2-2. Proposed fill areas from MP 103 to 107.



Note: Approximate fill acreages may differ from total

Figure 2-3. Proposed fill areas from MP 108.5 to 112.



Note: Approximate fill acreages may differ from total

Measures will be in place to avoid direct impacts on ESA-listed marine mammals, including beluga whales, as well as migrating fish:

- Up to 105 acres of fill placement below the high tide line may be needed. Fill will primarily come from cuts within the Project area and will consist of clean rock with varying grades or grain sizes.
- Trucks or the ARRC will haul fill from Project cuts to the new alignment to be dumped.
- Prior to new fill being placed adjacent to the existing ARRC track, the coastal armament (armor stone, riprap) along the existing track will be removed.
- Should fill or coastal armament need to be stored, it will be stored in sites along the right-of-way and will not require new material sites.
- Rock fill will be placed onto mudflats at low tide when the mudflats are exposed. In some cases, rock fill will be placed in or near a low-tide channel, where rock must be placed in water, during the lowest tides feasible.
- All fill activities will occur from shore, with seaward expansion occurring from atop previous fill. Barges and other vessels will not be used for fill activities, and dredging is not required.

2.2 Project Construction Schedule and Considerations

During all construction years, in-water fill placement will not occur from April 1 through June 15 in order to minimize potential Project impacts on beluga whales as well as migrating eulachon (*Thaleichthys pacificus*) and salmon. Blasting, fill placement, removal of coastal armament (armor stone, riprap) along the existing ARRC track, and other activities that occur in the dry or in the intertidal zone at low water levels in a dewatered state will occur from April 1 through June 15.

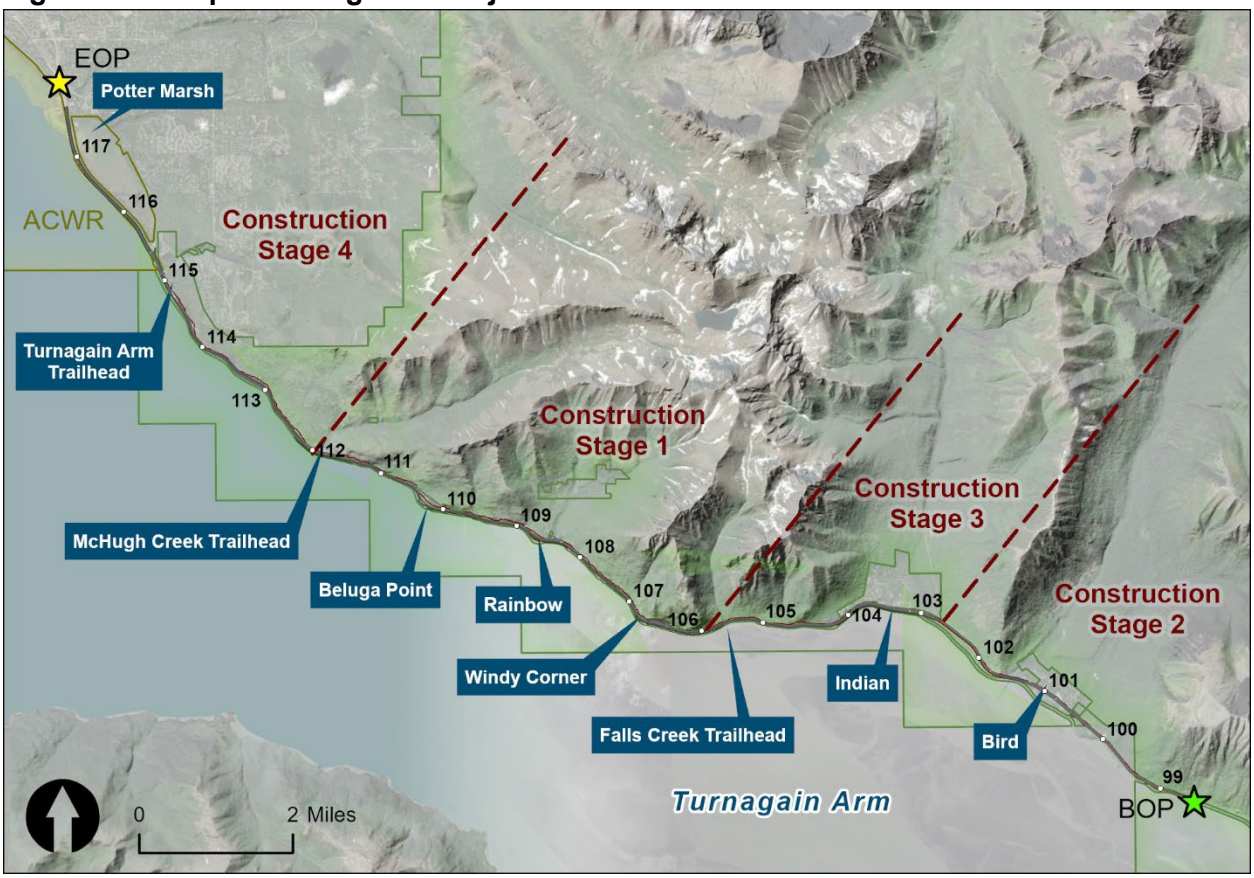
2.2.1 Dates and Durations

The Project would occur through four phases over the span of 10 years, anticipated to last from 2026 through 2035. Some out-of-water discrete tasks with no effect on listed species that may improve safety along the corridor might occur as early as fall 2024, but the vast majority of work is not expected to begin until summer 2025 and beyond, as funding is received and permits are approved. Figure 2-4 shows the proposed Project construction stages.

DOT&PF would phase construction to minimize impacts on motorists and ARRC during the busy summer season as well as for anadromous fish and Cook Inlet beluga timing windows. Construction is anticipated to occur year-round, as weather and ice permit. In-water work windows will avoid the period from May 15 to July 15 based on the Alaska Department of Fish and Game (ADF&G) fish permit requirements.

Given the harsh winter environmental conditions, significant risk to personnel and equipment, and the potential cost impacts and delays, it is likely that construction activities would be minimized from December through March. This applies particularly to proposed in-water work. However, the contractor may adjust the Project scheduling (with approval from NMFS) to further minimize potential impacts on Cook Inlet beluga.

Figure 2-4. Proposed stages of Project construction.



Note: BOP =Beginning of Project, EOP = End of Project

2.2.2 Best Available Information

The Project construction contractor has not yet been identified; therefore, certain schedule details, construction means and methods, and design specifics presented herein may differ in limited degree from the work that would eventually be presented in the contractor's Construction Work Plans. The Project team made estimates of blasting and fill placement quantities based on prior experience with similar construction projects. Actual durations or quantities may change depending upon many variables associated with construction and the environment. The sequencing of events is unknown at this time, and flexibility would be required to accommodate the myriad unavoidable contractor logistical and operational challenges as well as avoid disruption to critical day-to-day usage of the ARRC tracks and Seward Highway. Descriptions of design and construction herein are as accurate as possible at this stage of the Project but may vary slightly as design and construction advance. It is anticipated that the actual methods, including types of equipment as well as numbers of hours and days of each activity, would be determined based on the engineering specifications for the Project as determined by the construction contractor and/or designer The Project description in Section 2.1 consists of conservative predictions and estimates based on the best available information at this time. It is not anticipated that the Project would change such that potential impacts on marine mammals would substantially change from those described below. If substantial changes occur, DOT&PF will coordinate with NMFS.

2.3 Avoidance and Minimization of Project Impacts

In order to avoid and minimize potential Project impacts on Cook Inlet beluga whales and fish, DOT&PF proposes the following measures:

2.3.1 The filled areas have been reduced from 200 to 105 acres based on the revised design, reducing potential impacts on fish and marine mammals.

2.3.2 In-water fill placement will not occur from April 1 through July 15.

2.3.3 Fill placement and onshore blasting will only occur during daylight hours.

2.3.4 Blasting will not occur in or below the intertidal zone.

2.3.5 In-water work will be conducted at the lowest points of the tidal cycle when feasible.

a. If piles need to be removed or installed for railroad or highway bridge replacement, pile installation and removal will occur around low tide when the creeks have no tidal influence.

2.3.6 One or more Protected Species Observers (PSOs) will be on site to accurately identify beluga whales and other ESA-listed marine mammals beyond the shutdown zone distances identified for the 160 and 120 decibel (dB) isopleths (Table 2-1).

Table 2-1. The proposed impulsive (160 dB) and continuous noise (120 dB) activities within Turnagain Arm and the required shutdown zones.

Activity	Threshold dB rms re 1 µPa SPL	Shutdown Zone
Upland Blasting	160	1.5 km (4,921 feet)
In-water Fill Placement	120	300 meters (984 feet)

Notes: dB_{rms} re 1 µPa = decibel root mean square referenced to a pressure of 1 microPascal; SPL = sound pressure level

2.3.7 PSOs will be positioned such that collectively they will be able to monitor the entirety of each activity's shutdown zone.

2.3.8 PSOs will scan the relevant shutdown zone for beluga whales and other ESA-listed marine mammals for 30 minutes before commencing blasting or in-water fill placement.

2.3.9 If one or more beluga whales or other ESA-listed marine mammals are present within the applicable shutdown zone during this 30-minute observation period, blasting and in-water fill placement will not begin until all listed marine mammals vacate the shutdown zone of their own accord, or until no ESA-listed marine mammals have been observed in the shutdown zone for 30 minutes.

2.3.10 The PSO will continuously monitor the applicable shutdown zones to prevent takes of any ESA-listed marine mammals.

2.3.11 Should blasting or in-water fill placement cease for more than 60 minutes, PSOs will monitor the applicable shutdown zones for beluga whales and other ESA-listed marine mammals for 30 minutes before again commencing work.

2.3.12 Blasting will only occur when all marine waters within 1.5 km (0.9 mi) of the blasting site are visible to the PSO.

2.3.13 PSOs will have the appropriate gear, such as binoculars, spotting scopes, charts, compass, rangefinder, or digital mapping tool such as an iPad or Global Positioning System device (or equivalent), and have the ability to use these instruments to plot

the position of all observed ESA-listed marine mammals accurately. PSOs will keep a record of all ESA-listed marine mammal sightings and associated data.

2.3.14 PSOs will have the authority and means (direct communication) to shut down or stop blasting and in-water fill placement capable of harassing an ESA-listed marine mammal when a marine mammal(s) is detected within or is about to enter the applicable shutdown zone.

2.3.15 PSOs will not work for more than 4 hours without a break, and will not work more than 12 hours during a 24-hour period.

2.3.16 PSOs will advise DOT&PF to stop blasting or in-water fill placement immediately if one or more beluga whales or other ESA-listed marine mammals enter, or are about to enter, the applicable shutdown zone.

2.3.17 Monthly monitoring reports will be submitted within 14 days after the end of each calendar month.

2.3.18 A draft annual report on activities and results of the monitoring and mitigation program will be submitted to the NMFS Alaska Regional Office (AKRO) within 90 days after the end of the year or 90 days after the end of the in-water construction season.

a. The report will provide summaries of the dates and locations for construction operations and a copy of the completed marine mammal observation spreadsheet.
b. A final monitoring report will be produced within 30 days of receiving NMFS AKRO's comments on the draft report.

2.3.19 Staging areas will be located within upland areas adjacent to the proposed Project area, within the already established DOT&PF right-of-way. DOT&PF will develop and implement a Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasure (SPCC) Plan.

2.3.20 Trash will be disposed in accordance with state law. All closed loops (e.g., packing straps, rings, bands) will be cut prior to disposal. Additionally, all ropes, nets, and other marine mammal entanglement hazards will be secured so they do not enter marine waters.

3 Action Area

The action area is defined as the area to be affected directly or indirectly by a federal action (50 Code of Federal Regulations [CFR] 402.02) and is not merely the immediate area involved in the action. The action area is determined by the geographic extent of the effects of the action on the environment. It extends to a point at which no measurable effects from the Project are expected to occur. For the proposed Project, the basis for defining the action area considers the in-air and underwater construction-related noise associated with uplands blasting and in-water fill placement.

3.1 Underwater Portion of the Action Area

The action area for the proposed Project includes Turnagain Arm marine waters along the majority of the corridor (Figure 2-1). DOT&PF anticipates that uplands blasting using ammonium nitrate and fuel oil (ANFO) would produce the loudest in-air noise of all construction activities and would propagate into adjacent marine waters. Therefore, the underwater portion of the action area is defined by the acoustic effects related to uplands blasting.

NMFS uses the following thresholds of underwater sound pressure levels (SPLs), expressed in root mean square (rms), from broadband sounds that have the potential to cause behavioral disturbance, which is referred to as Level B harassment under the Marine Mammal Protection Act (MMPA):

- Impulsive sound Level B (e.g., blasting): 160 decibel root mean square referenced to a pressure of 1 microPascal (dB_{rms} re 1 µPa)
- Continuous or intermittent sound Level B (e.g., placement of fill): 120 dB_{rms} re 1 µPa

During a recent NMFS consultation on the Seward Highway Rockfall Mitigation Project from MP 90 to 114.5 (AKRO-2021-00435), the blasting consultant calculated a behavioral 160 dB sound threshold at 149 meters (489 feet; Attachment 4 of the Seward Highway Rockfall Mitigation consultation request). This was based on a 45.46-kilogram (100-pound) charge weight detonated approximately 40 meters (131 feet) from the water with an SPL at the waterline of 217.6 dB_{rms} re 1 µPa. However, a more conservative action area with a 1.5-km (0.9-mi) isopleth from the blast location will be used based on the Windy Corner consultation (AKRO-2015-9420).

During the Windy Corner consultation, it was estimated that the distance to the 180 dB_{rms} re 1 µPa threshold (prior auditory injury for whales threshold) due to ANFO blasting would be 358 meters (1,175 feet), and the behavioral threshold distance would be 1,471 meters (4,826 feet), based on a conservative model assuming blasting occurred within the water. Therefore, a highly conservative 1.5 km (0.9-mi) will be used as the action area for this Project.

3.2 In-Air Portion of the Action Area

DOT&PF anticipates that blasting, using ANFO, would produce the highest SPLs of all construction activities. Therefore, the in-air portion of the action area is defined by the acoustic effects related to uplands blasting.

The spherical spreading model with sound transmission loss of 20.0, which is a 6.0 dB per doubling distance for a hard surface ($D = D_o \times 10^{[(\text{Construction Noise} - \text{Ambient Sound Level in dBA}/\alpha]}$; WSDOT 2020), was used to estimate sound threshold distances from the mean source levels. In the model:

$$D = D_o \times 10^{((\text{Construction Noise} - \text{Ambient Sound Level})/\alpha)}$$

- D = the distance from the noise source
- D_o = the reference measurement distance (15.24 meters [50 feet] in this case)
- Construction Noise = assumed to be 119 A-weighted decibels (dBA; Section 6.1.1)
- Ambient Sound Level = assumed to be 65 dBA
- α = 20 for hard ground or water, which assumes a 6 dBA reduction per doubling distance
- α = 25 for soft ground, which assumes a 7.5 dBA reduction per doubling distance

Based on estimated in-air ambient noise levels of 65 dBA (WSDOT 2020), the spherical spreading loss model indicates that noise from uplands blasting would attenuate to ambient noise levels between approximately 2,203 meters (7,228 feet) using soft ground, to 7,639 meters (25,061 feet) using hard ground from the blasting area. While this would describe the in-air action area for the Project, no habitat for ESA-listed terrestrial species or haulouts for ESA-listed pinnipeds is within the in-air portion of the action area (Section 4). Therefore, the analysis herein focuses solely on impacts on the aquatic portion of the action area resulting from uplands blasting and in-water fill placement (Figure 2-1), based on distances described in Section 3.1.

4 Federally Listed Species and Designated Critical Habitat in Action Area

Federally listed marine species most likely to be observed in Upper Cook Inlet include Steller sea lions, Cook Inlet beluga whales, and humpback whales.

The Cook Inlet beluga whale is the most abundant marine mammal in Upper Cook Inlet, and sightings of beluga whales are common in Knik Arm and Turnagain Arm. Steller sea lions are not commonly observed in Upper Cook Inlet, but sightings in Knik Arm do occur with some regularity (61N Environmental 2020, 2021, 2022a, 2022b, 2022c).

Humpback and gray whales are rarely observed in Upper Cook Inlet. They are occasionally sighted in Knik Arm, but observations of these species in Turnagain Arm are more likely to be stranded animals or carcasses, possibly due to the decreased depth in Turnagain Arm compared to Knik Arm. Turnagain Arm shoals to a shallow tidal flat cut by tidal channels within its first 16.1 km (10 mi), compared to Knik Arm that maintains an average depth of 15.2 meters (50 feet) for approximately 27.4 km (17 mi) before shoaling into a tidal flat (USACE 2023). Gray whales are not discussed in this BA, as gray whales in Cook Inlet are assumed to be members of the Eastern North Pacific DPS and not the Western North Pacific DPS. Because of the unlikely event that humpback whales would enter Turnagain Arm, including the action area, a **no effect** determination is appropriate for this species, and they are not discussed further.

NMFS proposed listing the sunflower sea star as threatened on March 16, 2023 (88 *Federal Register* [FR] 16212). They are not known to occur within the action area; therefore, a **no effect** determination is appropriate. Sunflower sea stars are not further discussed or analyzed in this BA.

4.1 Steller Sea Lion

4.1.1 Status and Distribution

Steller sea lions inhabit coasts along the North Pacific Ocean rim, spanning from Hokkaido, Japan, through the Kuril Islands, Sea of Okhotsk, Bering Sea, Aleutian Islands, Gulf of Alaska, and south to central California (Loughlin 1997). Steller sea lions were listed as threatened under the ESA throughout their range in 1990, prior to the development of DPSs for this species (55 FR 12645, 55 FR 13488, 55 FR 49204, and 55 FR 50005). Two DPSs are found in Alaska: the western DPS and the eastern DPS. The western DPS includes Steller sea lions born at and west of Cape Suckling (Longitude 144° West), and the eastern DPS includes Steller sea lions born east of Cape Suckling (Loughlin 1997). The Western DPS of Steller sea lions, which includes Steller sea lions found in the Project area, is listed as endangered under the ESA (62 FR 24345).

The most recent abundance estimate of the Western DPS is 49,320 individuals (Sweeney et al. 2023). Pups totaled 11,987 individuals, and the population has increased at a rate of 0.50 percent between 2007 and 2022. Non-pups (adults) totaled 37,333 individuals and changed at a rate of 1.05 percent during the same timeframe (Sweeney et al. 2023).

4.1.2 Foraging Ecology

Steller sea lions are generalist predators (Merrick et al. 1997; Sinclair and Zeppelin 2002) that opportunistically forage on seasonally available prey (Thompson et al. 1991; Tollit et al. 1997). Steller sea lion diets tend to be less diverse during summer and more diverse during winter, possibly due to the availability of preferred prey species (Womble et al. 2009; Fritz et al. 2019). They often target schooling or spawning aggregations of fish such as eulachon, walleye pollock (*Theragra chalcogramma*), capelin (*Mallotus villosus*), mackerel, Pacific salmon, Pacific cod (*Gadus macrocephalus*), flatfishes, rockfishes (*Sebastes* spp.), Pacific herring (*Clupea pallasii*), sand lance (*Ammodytes hexapterus*), skates (*Raja sp.*), and cephalopods (Womble and Sigler 2006; Womble et al. 2009). Due to their energetic density, capelin are an especially important winter prey species (Perez 1994; Maniscalco 2023).

4.1.3 Distribution in Cook Inlet

Steller sea lions are commonly found in Lower Cook Inlet but are rarely sighted in Upper Cook Inlet. The closest Steller sea lion haul-out site is approximately 241.4 km (150 mi) from the Project site, near Cook Inlet's southern terminus west of Nanwalek, Alaska. The closest Steller sea lion rookery is located farther south of the haul-out site in the Barren Islands (AEP et al. 2016).

4.1.4 Presence in Action Area

Steller sea lions are not commonly seen in Upper Cook Inlet; however, sightings of Steller sea lions have increased over the past decade, possibly due to increased observation effort or increased presence. Beluga whale aerial surveys occurred annually in June between 1994 to 2012 and 2014 (Shelden et al. 2013, 2015a, 2017; Sheldon and Wade 2019). The aerial surveys did not observe Steller sea lions in Upper Cook Inlet during that time. However, marine mammal monitoring at the Don Young Port of Alaska (Port of Alaska) on Knik Arm recorded observations of Steller sea lions during 2009, 2016, and 2019 to 2022 (ICRC 2010; Cornick and Seagars 2016; 61N Environmental 2020, 2021, 2022a, 2022b, 2022c). No documented observations of Steller sea lions in Turnagain Arm are known, however, potential observations have been reported to NMFS as far up Turnagain Arm as Twentymile River, which is 25 kilometers (15 miles) beyond the Project area (J. Seymour, Pers. Coms). Table 3-1 summarizes documented Steller sea lion sightings within nearby Knik Arm in Upper Cook Inlet.

Table 3-1. Steller sea lion sightings in Upper Cook Inlet.

Year	Total Sightings of Steller Sea Lions	Source
2009	3	ICRC 2010
2016	5	Cornick and Seagers 2016
2019	1	61N Environmental 2020
2020	6	61N Environmental 2021
2021	9	61N Environmental 2022a
2022	6	61N Environmental 2022b, 2022c

4.1.5 Critical Habitat

Critical habitat for the Western DPS Steller sea lion is defined as all land and air within 915 meters (3,000 feet) of a designated major haulout or rookery, and all marine waters within 20

nautical miles of a designated major haulout (58 FR 45269). The closest haulout to the Project area is near Nanwalek, Alaska, approximately 241.4 km (150 mi) away. No designated critical habitat for the Western DPS of Steller sea lions is within the action area, and the Project would not affect critical habitat.

4.2 Beluga Whale

4.2.1 Status and Distribution

Five stocks of beluga whale occur in Alaskan waters: Cook Inlet; Bristol Bay; Eastern Bering Sea; Eastern Chukchi Sea; and Beaufort Sea (Allen and Angliss 2013). The Cook Inlet stock is the only stock found in the action area. The Cook Inlet stock is an isolated population confined to Cook Inlet throughout the year (Rugh et al. 2000; Markowitz 2005; Hobbs et al. 2006, 2008; Hobbs and Shelden 2008; NMFS 2008a).

Historically, Cook Inlet beluga whales may have numbered several thousand animals, but no systematic population estimates exist prior to 1994. The best estimate of historical Cook Inlet beluga whale abundance and most complete survey prior to 1994 was conducted in 1979 by ADF&G. This survey did not include all of Upper Cook Inlet, a highly used summer area for belugas; however, a correction factor was incorporated to account for whales missed during the survey (Calkins 1989). The 1979 ADF&G survey estimated 1,293 beluga whales (as cited in Calkins 1984). For management purposes, NMFS used this number to establish a carrying capacity of 1,300 whales (65 FR 34590).

NMFS began comprehensive, systematic aerial surveys of beluga whales in Cook Inlet in 1994, including the upper, middle, and lower inlet. During this time, the abundance of Cook Inlet beluga whales decreased from an estimated 653 to 347 whales, a decline of nearly 50 percent (Rugh et al. 2000). In response to this decline, NMFS initiated a status review of Cook Inlet beluga whale stock pursuant to the MMPA and ESA in 1998 (63 FR 64228). The Cook Inlet beluga whale was designated as a depleted and strategic stock under the MMPA in 2000 (Young et al. 2023) and listed as an endangered species under the ESA on October 17, 2008 (NMFS 2008a; 73 FR 62919). The Proposed Rule for Critical Habitat Designation for the Cook Inlet beluga whale was published on December 2, 2009 (74 FR 63080). On April 11, 2011, the Final Rule for Critical Habitat Designation was published (76 FR 20180).

From 1999 through 2012, annual abundance surveys occurred each June. No survey data exists for 2013 because the survey switched to a biennial schedule that started in 2014 (Hobbs 2013). Since 2014, surveys have occurred every other year except for 2020 due to the Covid-19 pandemic. In its place, a 2021 survey was conducted; however, abundance estimates were not released for this year due to the timing of the survey resulting in unfavorable survey conditions. Survey conditions during 2022 were comparable to previous years and produced an annual median index estimate that was within the range of normal for the survey (Shelden et al. 2022).

The population continued to decline at a rate of 0.4 percent according to an analysis of 1999 to 2016 survey data (Shelden et al. 2015a, 2017). However, a new modeling approach was introduced in 2019 that was used to analyze time-series abundance data from 2010 to 2018 (Shelden and Wade 2019; Boyd et al. 2019). This new methodology was used on the most

recent survey data and produced an estimate of 331 Cook Inlet beluga whales with a probability range of 290 to 386 whales (Goetz et al. 2023). Based on this new methodology, an analysis of survey data between 2012 and 2022 estimated an annual increase in Cook Inlet beluga whale abundance of nearly 0.9 percent (Goetz et al. 2023).

4.2.2 Foraging Ecology

Cook Inlet beluga whale diet varies throughout the year, includes a wide variety of prey species, and often depends on what is seasonally abundant. Eulachon and Chinook salmon (*Oncorhynchus tshawytscha*), both energetically dense fish (Perez 1994), are the first fish to spawn in Cook Inlet rivers during the spring and are especially important to the energetics of Cook Inlet beluga whales (Burek-Huntington et al. 2022; NMFS 2016). In a study that sampled Cook Inlet beluga whale stomachs during late spring and early summer, Pacific salmon (*Oncorhynchus* spp.) represented the highest occurrence of prey species. All five species of Pacific salmon (Chinook, sockeye [*O. nerka*], coho [*O. kisutch*], pink [*O. gorbuscha*], and chum [*O. keta*]) spawn in rivers that feed into Cook Inlet (Moulton 1997; Moore et al. 2000). Other fish and invertebrate species found in Cook Inlet beluga whales' stomachs include porifera, polychaetes, mysids, amphipods, shrimp, crabs, and marine worms; however, some of these are likely from secondary ingestion (Quakenbush et al. 2015).

As anadromous fish runs begin to decline during fall, beluga whales return to nearshore bays and estuaries to consume fish species such as cod (family Gadidae) and flatfish (order Pleuronectiformes). No studies have sampled Cook Inlet beluga whale stomachs for winter months (December through March); however, dive data from beluga whales tagged with satellite transmitters is available. This data shows that beluga whales dive in deeper waters during winter (Hobbs et al. 2005), suggesting they could be feeding on species such as flatfish, cod, sculpin (Cottoidea), and pollock (Pollachius).

4.2.3 Distribution in Cook Inlet

Beluga whale distribution in Cook Inlet is influenced by prey availability, predator avoidance, sea-ice cover, water level and tide stage, and other environmental factors. Additionally, reproduction, sex and age class, and human activities play an important role in the seasonal distribution of beluga whales within Cook Inlet (Rugh et al. 2000; NMFS 2008a). Cook Inlet beluga whales are concentrated in Upper Cook Inlet, generally near river deltas and bays during summer and fall, and disperse offshore into mid-inlet waters during winter (Allen and Angliss 2013). Aerial surveys beginning in 1993 have consistently documented high use of Knik Arm, Turnagain Arm, Chickaloon Bay, and the Susitna River delta areas of the upper inlet (NMFS 2008a, Shelden et al. 2015b, Goetz et al. 2023). Satellite tagging data further support the high use of these areas by beluga whales (Hobbs et al. 2005).

4.2.3.1 SPRING AND SUMMER DISTRIBUTION

Alaska Native hunter traditional ecological knowledge and NMFS aerial survey data indicate a historical contraction of the summer range of the Cook Inlet beluga whale to the upper inlet (NMFS 2008a; Rugh et al. 2010). This range contraction is likely a function of a reduced population size seeking the highest quality habitat offering the most abundant prey; most favorable feeding topography; best calving areas; and best protection from predation (Rugh et

al. 2010). An expanding population might result in an extension of the species' range back into the lower inlet (NMFS 2008a; Rugh et al. 2010).

Cook Inlet beluga whale summer distribution and habitat have been well documented from annual aerial surveys, the Cook Inlet beluga whale photo-identification project, and beluga whale monitoring projects (Hobbs et al. 2000, 2011, 2012; Rugh et al. 2003, 2004a, 2004b, 2005a, 2005b, 2005c, 2006a, 2006b, 2007; Hobbs and Shelden 2008; Allen and Angliss 2010, 2011; Shelden et al. 2013, 2015a, 2017; Shelden and Wade 2019; Boyd et al. 2019; 61 North Environmental 2021, 2022a, 2022b, 2022c; Easley-Appleyard and Leonard 2022; Goetz et al. 2023). Cook Inlet beluga whales display site fidelity to distinct summer concentration areas and are reliably found each year within these areas (Seaman et al. 1985), typically near river mouths and associated shallow, warm, and low-salinity waters (Moore et al. 2000). Seasonal movement and density patterns as well as site fidelity appear to be closely linked to prey availability, coinciding with seasonal salmon and eulachon concentrations (Moore at al. 2000; Goetz et al. 2012). Cook Inlet beluga whales forage intensely during summer, when prey availability is high and locally concentrated near river mouths (Huntington 2000; Moore et al. 2000). This seasonal feeding is presumably important in providing energy storage and reserves for winter. The patterns and timing of eulachon and salmon runs have a strong influence on beluga whale feeding behavior and their movements during spring and summer (Nemeth et al. 2007; NMFS 2008a).

During summer, Cook Inlet belugas are sighted most often in the upper portion of the inlet, north of Kalgin Island (NMFS 2008a). The areas of known eulachon and salmon runs and, thus, primary beluga feeding "hotspots," are the Susitna River Delta, Chickaloon Bay, Knik Arm, and along the western side of Upper Cook Inlet. Aerial surveys conducted during late April and early May documented beluga whales in Upper Cook Inlet as eulachon runs reached the Susitna and Twentymile Rivers (NMFS 2008a). Cook Inlet beluga whales are frequently observed along the Susitna Flats, gathering at the Susitna and Little Susitna Rivers and other small streams on the western side of Cook Inlet, following runs of eulachon, Chinook salmon (), and coho salmon (Hobbs and Shelden 2008; NMFS 2008a; Allen and Angliss 2013). Goetz et al. (2012) identified essential summer habitat for the Cook Inlet beluga whale and determined that there is a greater probability of beluga whales being present closer to rivers with Chinook salmon runs, rivers with medium flow accumulation, tidal flats, and areas with sandy coastlines. Conversely, the models concluded that the presence of beluga whales decreases closer to rivers with chum salmon, rivers with high flow accumulation, communities, oil development, and coastal areas with rocky substrate (Goetz et al. 2012).

4.2.3.2 FALL AND WINTER DISTRIBUTION

During late summer and fall, Cook Inlet beluga whales aggregate near stream mouths on the western side of the inlet, south from Susitna Flats to Chinitna Bay (NMFS 2008a). Beluga whales are often seen near coastal mud flats and river mouths in Cook Inlet from spring through fall (Goetz et al. 2007; NMFS 2008a). Beluga whales have been observed moving into the upper shallow arms of Upper Cook Inlet, including Knik Arm, during high tides and departing during ebb tides (Hobbs et al. 2005; Ezer et al. 2008).

Little is known about the winter distribution of the Cook Inlet beluga whale; however, based on satellite tag data, evidence indicates some beluga whales remain in northern Cook Inlet year-round (Hansen and Hubbard 1999; Rugh et al. 2004b; Hobbs et al. 2005). Hobbs et al. (2005) provides the first evidence that beluga whales remain in Cook Inlet throughout the year and tend to disperse offshore into the deeper waters of the inlet during winter. Using satellite telemetry, Hobbs et al. (2005) tracked 14 beluga whales from late September 2000 through March 2003 in Upper Cook Inlet. Satellite tagging data showed that individuals moved between Redoubt Bay, Kalgin Island, and East Foreland, north to Knik and Turnagain Arms during the winter study (Hobbs et al. 2005). Beluga whales may vary their movements seasonally in relation to sea ice concentration; however, Moore et al. (2000) suggest that sea ice may not be a limiting factor to their distribution. Beluga whales are more widely dispersed in Cook Inlet during winter than the rest of the year, possibly because of the dispersed nature of their prey species during winter (NMFS 2008a).

4.2.4 Presence in Action Area

Aerial surveys and tagging data have documented that Turnagain Arm is regularly used by the Cook Inlet beluga whale (Rugh et al. 2004b; Markowitz et al. 2005; Hobbs et al. 2005, 2012; NMFS 2008a; Sims et al. 2012). Aerial surveys conducted during late April and early May reported that beluga whales were seen in the upper inlet as eulachon runs reached the Twentymile River (NMFS 2008a). Data from NMFS aerial surveys, opportunistic sightings, baseline studies of beluga whale occurrence in Turnagain Arm conducted in preparation for Seward Highway improvements, and satellite-tagged beluga whales confirm that beluga whales are concentrated along the rivers and near-shore areas of Turnagain Arm from May through October (Rugh et al. 2004b; Markowitz et al. 2005; Sims et al. 2012; Hobbs et al. 2012). Using satellite telemetry, Hobbs et al. (2005) tracked 14 beluga whales from late September 2000 through March 2003 in Upper Cook Inlet. These tagging data showed that individuals moved between Redoubt Bay, Kalgin Island, and East Foreland, north to Knik and Turnagain Arms during winter. Beluga whales have been seen in areas of up to 60 percent ice cover in northern Cook Inlet (Hansen and Hubbard 1999) and move through more than 90 percent ice cover in Knik and Turnagain Arms (Hobbs et al. 2005).

NMFS has conducted annual or semi-annual aerial surveys of the beluga population in northern Cook Inlet since 1993 (NMFS 2008a). The surveys cover all coastal areas in Upper Cook Inlet, north of the Kenai River and West Foreland. Surveys were typically conducted during July and August but have occasionally occurred during June and September. Cook Inlet beluga whale groups were frequently observed in near-shore channels as well as river and stream mouths. The August 2012 aerial surveys documented one beluga whale group moving from Bird Point to Rainbow Creek, with a median count of 33 beluga whales in the group (Hobbs et al. 2012; Sims et al. 2012).

Markowitz et al. (2005) documented habitat use and behavior of beluga whales along the Seward Highway in Turnagain Arm from May through November 2006. This study was focused around the high tides, when whales regularly traverse the nearshore channels to the river and stream mouths, where they feed on fish. Most of the observations of whales occurred between the end of August and the end of October. No beluga whales were sighted in the study area during May, June, or July. Most beluga whale observations were in upper Turnagain Arm, east

of Bird Creek. Most beluga whale movements were with the tide: eastward into upper Turnagain Arm on the rising tide and westward out of Turnagain Arm on the falling tide. The few observations of beluga whales in lower Turnagain Arm were close to the mid-tide, indicating that beluga whales may use these areas closer to the low tide rather than the high tide pattern observed in upper Turnagain Arm.

Cook Inlet beluga whales often travel adjacent to the rock armor when transiting near-shore areas, and were most often sighted immediately along the rock-armored shoreline between Bird Point and Girdwood (Markowitz et al. 2005). One-third of groups seen during September and two-thirds of groups seen during October 2006 (the months with the most sightings) were observed within approximately 46 meters (150 feet) of the armored shoreline (Markowitz et al. 2005). Several Cook Inlet beluga whale groups were also seen as they traveled near shore from Bird Point to Girdwood (McGuire et al. 2008; McGuire and Kaplan 2009). Cook Inlet beluga whales were occasionally observed feeding near rock armoring approximately 500 meters (1,640 feet) east of Bird Point, as they traveled eastward and upstream in Turnagain Arm (McGuire et al. 2008). In addition to these observations, Cook Inlet beluga whale groups have also been seen adjacent to bridges in Turnagain Arm at the mouth of Ingram Creek, Portage Creek, and within approximately 500 meters (1,640 feet) of the bridge spanning the Twentymile River (Hobbs et al. 2005; Markowitz et al. 2005).

In 2019, the Alaska Beluga Monitoring Program, a shore-based citizen science project, began collecting beluga presence data at sites around Cook Inlet during spring and fall, including near the Project area at Seward Highway MP 95.3. Belugas are consistently sighted at MP 95.3 during the fall surveys, which last from mid-August until November, and are sighted less frequently during the spring surveys, lasting from mid-March through the end of May (AKBMP 2024).

4.2.5 Critical Habitat

The designation of critical habitat for the Cook Inlet beluga whale population was published on April 11, 2011 (76 FR 20180). Critical habitat was defined as two areas: Critical Habitat Area 1 and Critical Habitat Area 2, which in total encompass 7,800 square km (3,013 square mi) of marine and estuarine habitat in Cook Inlet.

Critical Habitat Area 1

Critical Habitat Area 1 consists of approximately 1,909 square km (738 square mi) of Cook Inlet, located north of Threemile Creek and Point Possession (76 FR 20180). The area consists of mudflats, shallow tidal flats, river and stream mouths, and estuarine areas that are important for beluga whale foraging, calving, molting, and predator avoidance. High concentrations of beluga whales are often observed in these areas from spring through fall. Additionally, anthropogenic threats have the greatest potential to adversely impact beluga whales in Critical Habitat Area 1 (76 FR 20180). The Project action area occurs entirely within Critical Habitat Area 1.

Critical Habitat Area 2

Critical Habitat Area 2 consists of 5,891 square km (2,275 square mi) south of Critical Habitat Area 1 and includes nearshore areas along western Cook Inlet and Kachemak Bay. Critical

Habitat Area 2 is known for fall and winter foraging and transit habitat for beluga whales as well as spring and summer habitat for smaller concentrations of beluga whales (76 FR 20180).

NMFS determined there are five PCEs, or Essential Features, important to the Cook Inlet beluga whale population. PCEs are defined as "physical and biological features that are essential to the conservation of a given species and that may require special management considerations or protection" (76 FR 20180). Features can include habitat area for individual and population growth, nutritional and physiological necessities, shelter, or important mating and breeding habitat (50 CFR 424.12; 76 FR 20180). NMFS has determined that the following PCEs are essential to the conservation of beluga whales and may require special consideration:

1. Intertidal and subtidal water of Cook Inlet with depths less than 9.14 meters (30 feet), mean lower low water (MLLW), and within 8 km (5 mi) of high- and medium-flow accumulation anadromous fish streams
2. Primary prey species consisting of four species of Pacific salmon (Chinook, sockeye, chum, and coho), eulachon, Pacific cod, walleye pollock, saffron cod (*Eleginus gracilis*), and yellow fin sole (*Limanda aspera*)
3. The absence of toxins or other agents of a type or amount harmful to beluga whales
4. Unrestricted passage within or between the critical habitat areas
5. Absence of in-water noise at levels resulting in the abandonment of habitat by the Cook Inlet beluga whale

4.2.6 Life History

The beluga whale is a small, toothed whale in the family Monodontidae. Beluga calves generally are born dark- to brownish-gray and lighten to white or yellow-white with age. Adult beluga whales are typically all white; however, recent research has shown that adults, including mothers, can be gray in color (Blees et al. 2009; McGuire et al. 2008). The adult Cook Inlet beluga whale averages between 3.66 and 4.27 meters (12 and 14 feet) in length, although individuals as long as 6.1 meters (20 feet) have been reported through Alaska Native hunter traditional ecological knowledge (TEK) (Huntington 2000). Males may weigh up to 3,300 pounds, while females are typically smaller, weighing up to 3,000 pounds (Nowak 2003). Female beluga whales attain sexual maturity between 8 and 9 years of age, and males mature slightly later (NMFS 2008a). Beluga whales have a life span of up to 60 years (Suydam 2009).

Beluga whales are highly social animals, found in small groups of a dozen to large herds of thousands, but can also occur individually (Hobbs et al. 2000). Cook Inlet beluga whale group composition generally consists of small (2–5 individuals) and large (20–50 individuals) mixed groups (Markowitz and McGuire 2007; Cornick and Saxon-Kendall 2008, 2009, 2010), and they are commonly observed in herds (100–200 individuals) near river mouths during spring and summer, when they are likely foraging (Huntington 2000; Rugh et al. 2000).

In Cook Inlet, breeding occurs between late winter and early spring, with most calving occurring from mid-May to mid-July (NMFS 2008a; Braham 1984; Kleinenberg et al. 1964; Calkins 1983). Cook Inlet Native hunter TEK indicates that the range of calving dates can extend from April through August (Huntington 2000). TEK has described calving areas in the lower inlet (the southern portion of Cook Inlet) along the northern side of Kachemak Bay during April and May;

in the northwestern portion of the upper inlet near the Beluga and Susitna Rivers during May; and in Chickaloon Bay and Turnagain Arm during summer (Huntington 2000). The gestation period is approximately 14 months, and females may produce a calf approximately every 3 years (NMFS 2008a; Braham 1984; Kleinenberg et al. 1964; Calkins 1983).

The shallower waters of Turnagain Arm may be important habitat for predator avoidance from killer whales (*Orcinus orca*; Shelden et al. 2003; 76 FR 20180). The killer whale is the only known non-human Cook Inlet beluga whale predator (NMFS 2008a). Killer whales are occasionally observed throughout Cook Inlet, although they are more commonly found in lower Cook Inlet and the Gulf of Alaska (Shelden et al. 2003; NMFS 2008a). Killer whales have been reported in Turnagain and Knik Arms, between Fire Island and Tyonek, and near the Susitna River mouth (Shelden et al. 2003; NMFS 2008a). Killer whales are known to pursue beluga whales in Cook Inlet, and some patterns of beluga movement can be attributed to predator avoidance (NMFS 2008a). To avoid predation by killer whales, beluga whales strand, either purposely or accidentally (NMFS 2008a). Mass strandings associated with evasion of killer whales have been observed in Turnagain Arm (Hobbs et al. 2006). Approximately 2 hours prior to the stranding of approximately 60 beluga whales at Bird Point in August 1999, at least three killer whales were seen pursuing beluga whales in Turnagain Arm (NMFS unpublished data cited in Moore et al. 2000).

Beluga whale stranding events are fairly common within Cook Inlet, with reports of more than 700 stranded beluga whales in upper Cook Inlet, mostly in Turnagain Arm, between 1988 and 2008 (NMFS 2008a). Most mass strandings coincide with spring tides, when beluga whales may be beached for more than 10 hours (NMFS 2008b). Although most whales survive these stranding events, at least 179 mortalities have been associated with stranding since 1988. Stress, hyperthermia, and damage to internal organs were often the causes of death (NMFS 2008a).

Killer whale predation is a documented, though apparently uncommon, cause of mortality for the Cook Inlet beluga whale (Huntington 2000; NMFS 2008b). Beluga whales occasionally strand in tidal areas, apparently to avoid killer whale predation (Huntington 2000). From 1985 to 2002, a mean of more than one beluga whale per year died from killer whale predation or stranding to avoid killer whales (Moore et al. 2000, Shelden et al. 2003).

Other known causes of mortality are not a significant threat for the Cook Inlet beluga whale. They are not generally prone to entrapment in sea ice, a common cause of mortality in arctic beluga populations (Moore et al. 2000). Direct mortality due to vessel strikes and fishing net entanglements rarely occur in Cook Inlet and do not currently appear to be a significant threat to the Cook Inlet beluga whale (Moore et al. 2000; NMFS 2008b).

5 Environmental Setting

This discussion of environmental setting of the action area includes general habitat features used by ESA-listed species in the action area as well as a past and present federal, state, or private actions that have affected the status of listed species and the functional condition of PCEs (or physical or biological features [PBFs]) in critical habitats. The following discussion considers existing environmental conditions as well as past and present activities that could influence, or have influenced, the action area over time.

5.1 Past and Present Disturbances in Cook Inlet

The exact mechanisms hampering the recovery of Cook Inlet beluga whale abundance and range are unknown, but recovery could be affected by both anthropogenic and natural factors. The Recovery Plan for Cook Inlet beluga whales outlined 10 potential threats that could be hindering the recovery of their population (NMFS 2016). These potential threats and their associated level of concern are: catastrophic events (relative concern: high), cumulative effects of multiple stressors (relative concern: high), noise (relative concern: high), disease agents (relative concern: medium), habitat loss or degradation (relative concern: medium), reduction in prey (relative concern: medium), unauthorized take (relative concern: medium), pollution (relative concern: low), predation (relative concern: low), and subsistence hunting (relative concern: low) (NMFS 2016). Recovery of the Cook Inlet beluga whale population could be influenced by each potential threat or by cumulative impacts of multiple anthropogenic and natural factors (NMFS 2008a).

This section describes past and present anthropogenic activities that may have or would affect the Cook Inlet beluga whale population. The majority of these anthropogenic activities occur outside the action area.

5.1.1 Recent Biological Opinions near the Action Area

Recent biological opinions within the action area vicinity include:

- Port of Alaska North Extension Stabilization Step 1 (NES1; AKRO-2022-03630), Port of Alaska, December 2023
- Hilcorp Cook Inlet Tugs Towing a Jack-up Rig (AKRO-2021-03484), September 2022
- Port of Alaska South Floating Dock (AKRO-2021-01051), Port of Alaska, August 2021
- Port of Alaska Petroleum and Cement Terminal (AKRO-2018-01332), Port of Alaska, March 2020
- Alaska Liquefied Natural Gas Project (AKRO-2018-01319), Alaska Gasoline Development Corporation, June 2020
- 2019 U.S. Environmental Protection Agency's (USEPA's) Proposed Approval of the State of Alaska's Mixing Zone Regulation Section of the State of Alaska's Water Quality Standards (AKRO-2018-00362), USEPA, July 2019
- Hilcorp Alaska and Harvest Alaska Oil and Gas Activities (AKRO-2018-00381), Hilcorp Alaska and Harvest Alaska, June 2019

5.1.2 Coastal Zone Development

Degradation or loss of habitat is listed as a threat of medium relative concern for Cook Inlet beluga whales due to the limited understanding of how this habitat would be altered by various activities and its overall resiliency (NMFS 2016, 2022). Anthropogenic modification to critical habitat tends to occur seasonally and is concentrated in coastal areas. The majority of Upper Cook Inlet is undeveloped, and most beluga habitat remains intact (NMFS 2008a); however, Turnagain Arm has experienced extensive shoreline development through activities such as rip rap placement, railroad construction, and highway expansion and modification.

In addition to the activities occurring along Turnagain Arm, municipalities, port facilities, airports, wastewater treatment facilities, roads, mixing zones, and railroads occur along or close to the shoreline within nearby Cook Inlet beluga whale habitat. Cook Inlet beluga whales and Steller sea lions both use nearshore environments to rest, feed, give birth, and breed. Because belugas frequently use nearshore habitats (Perrin 1999), they could be affected by coastal development activities.

5.1.3 Highway Projects

DOT&PF conducted prior improvements to the Seward Highway in 2015. The stretch of highway along Turnagain Arm from MP 75 to 107 experienced a range of activities, including geophysical and geotechnical testing, onshore blasting, pile removal and installation at stream crossings, and fill placement in Turnagain Arm.

The Seward Highway MP 75 to 90 project included resurfacing 15 miles of roadway, straightening curves, creating new passing lanes and parking areas, and replacing 8 existing bridges. Three of the bridges were completed during Phase 1 of the project, which concluded by the end of 2019. Phase 2 began in 2021 and includes bridge work at Portage Creek #1, the Placer River, and the Twenty Mile River. This area is heavily used by beluga whales, especially during the early spring eulachon run.

5.1.4 Port Facilities

Cook Inlet is home to port facilities in Anchorage, Port MacKenzie, Nikiski, Kenai, Homer, Seldovia, and Port Graham, with the closest ports to the Project being Port of Alaska and Port MacKenzie.

The Port of Alaska, located in Anchorage on Knik Arm within Upper Cook Inlet, is Alaska's largest seaport and provides critical infrastructure for 90 percent of Alaskans. At least nine Section 7 ESA consultations have been completed for construction-related activities at the Port of Alaska, with the most recently completed consultation being a 2023 Biological Opinion (NMFS 2023) that consulted on the effects of the NES1 project on Cook Inlet beluga whales, Mexico DPS humpback whales, Western North Pacific DPS humpback whales, and Western DPS Steller sea lions and their designated or proposed critical habitat.

5.1.5 Oil and Gas Development

No oil and gas developments are currently occurring within Turnagain Arm. The area total of 200 active oil and gas lease sale areas are within Cook Inlet, with approximately 322,801 acres located offshore and 71,601 acres onshore (ADNR 2024). It is anticipated that the oil and gas industry would continue to develop in Cook Inlet (87 FR 62364), resulting in a potential increase in threats of high relative concern to beluga whales. The primary threats related to oil and gas development are noise and potential catastrophic events (NMFS 2016).

Noise can result from exploration activities such as seismic surveys, drilling, high-power active transducers (e.g., multibeam echosounders, sub-bottom profilers), or from exploitation activities such as platform noise (e.g., in-air noise radiated into the water, drilling noise in water and/or bottom substrate) and air/water vessels during operations (NMFS 2016). Catastrophic events can affect beluga whales directly or indirectly through reduction in prey. Events that qualify as catastrophic include oil spills, leaks, and natural gas blowouts (NMFS 2016).

Drilling platforms in Cook Inlet are located mainly in deep, offshore water. Construction and operation of drilling platforms temporarily or permanently create areas of habitat loss. Noise associated with construction and operation (including vessel traffic) could cause temporary habitat loss through beluga whale avoidance of the area. The footprint of the platform is the area of permanent habitat loss. The oil and gas industry uses tanker vessels to transport oil, refined petroleum products, and liquid gas across the Inlet. Increased vessel traffic has the potential to impact beluga whales.

Seismic surveys detect oil and gas substrates below the seafloor by using air guns to emit high-energy, low-frequency sound pulses (Richardson et al. 1995). Underwater noise produced by seismic activity is identified as one of the loudest sound sources that could potentially impact marine mammals (NMFS 2008a). Past and ongoing seismic surveys in Cook Inlet include the Apache Alaska Corporation Cook Inlet 3D (three-dimensional) Seismic Program (2016–2021), Chevron/UOCC (Union Oil Company of California) Granite Point Onshore/Offshore 3D Seismic Survey (2007), SAExploration Upper Cook Inlet Seismic Program (2014–2015), ConocoPhillips Beluga River 3D Seismic Project (2014), Hilcorp 3D seismic survey over eight Outer Continental Shelf lease blocks in Lower Cook Inlet (2019), and Hilcorp 2D (two-dimensional) seismic survey planned for between Anchor Point and Nikiski for the 2024 open water season.

5.1.6 Tidal Energy

The National Renewable Energy Lab identified Cook Inlet as a prime location for tidal energy development. Cook Inlet possesses 36 percent of the nation's tidal energy potential, with the capacity to produce 160 terrawatt-hours per year (Kilcher et al. 2021). Ocean Renewable Power Company filed a preliminary permit application with Federal Energy Regulatory Commission (FERC) in May 2021 to place a tidal generator in the East Forelands, near Nikiski (86 FR 25855). Turnagain Arm Tidal Energy Corp filed a preliminary permit application with FERC to study the proposed Turnagain Arm Tidal Electric Generation Project to be located within Turnagain Arm (86 FR 23711), which would include six 0.8-km (0.5-mi)-long, 91.4-meter (300-foot)-wide tidal power stations and 47.97 km (29.81 mi) of undersea transmission lines.

Potential effects of tidal energy on the marine environment include changes in oceanographic systems, electromagnetic fields, underwater noise, collision risk, and displacement of marine animals (Buenau et al. 2022). The type of potential effect, degree to which it occurs, and likelihood of the effect occurring depend largely on the type of marine energy device installed and the surrounding environment. Of these potential effects, underwater noise, collision risk, and displacement are the most likely to directly affect marine mammals. Underwater noise modeling for marine energy devices is limited. Generally, noise generated from marine energy devices is not thought to exceed the threshold that would cause injury or hearing loss in marine mammals (Copping and Hemery 2020). Collision risk and the severity of injury is largely tied to the velocity blades for underwater turbines. Onoufriou et al. (2019) conducted a study on the effects of seals colliding with tidal turbine blades and determined mortality was unlikely when collision speeds were less than 5.1 meters per second (17 feet per second). Displacement of marine mammals can be avoided or minimized by avoiding areas that are biologically important, such as foraging or breeding habitats.

5.1.7 Fisheries Interactions

Subsistence, personal, recreational, and commercial fishing are common activities in Cook Inlet. No subsistence or commercial fisheries for salmon exist in the action area. However, a personal use and small commercial fishery for eulachon, also known as hooligan and smelt, occur near the Project area, specifically concentrated near the Twentymile River mouth (Spangler et al. 2003). A valid Resident Sport Fishing License is required for personal use fishing but not required for subsistence harvest. Harvest counts for eulachon may be underreported due to the lack of a recording system for subsistence harvests as well as residents' confusion about the difference between personal use and subsistence fisheries (NMFS 2008a). Operation of fishing vessels near streams and in shallow waters have the greatest potential impact on Cook Inlet beluga whales through harassment, competition for prey species, vessel strikes, and displacement from critical habitat areas. No documentation exists of beluga whale injury or mortality from subsistence, personal, or recreational fishing (NMFS 2008a).

Commercial fishing occurs throughout Cook Inlet, requiring federal permits. No commercial fishing occurs within the action area; however, migratory fish species that travel into Turnagain Arm may be affected by commercial fishing within Cook Inlet. Sockeye salmon are the most important contributor to the Upper Cook Inlet harvest and account for 91 percent of the ex-vessel value. Other species commercially harvested in upper Cook Inlet include the other four species of Pacific salmon, as well as eulachon, Pacific herring, and razor clams (Marston and Frothingham 2022). In 2022, approximately 1.7 million salmon were harvested in Upper Cook Inlet, which is approximately 42 percent less than the 2011 to 2020 average annual harvest and 57 percent less than the 1970 to 2020 average annual harvest (Marston and Frothingham 2022).

Cook Inlet beluga whales could be affected by commercial fishing from gear entanglement, vessel strikes, displacement from critical habitat, competition for prey, and harassment. A low probability of beluga whale mortality exists as a direct result of commercial fishing (NMFS 2008a); however, the reduction of prey is listed as a threat of medium relative concern for Cook Inlet beluga whales. In particular, the population reduction of Chinook salmon is of particular concern due to its nutritional quality. The energy content of a Chinook salmon is four

times greater than that of a coho salmon, suggesting the decline of Chinook salmon could create a nutritional void in the diet of beluga whales that cannot be replaced by other prey species in terms of quality or quantity (Norman et al. 2019, 2022).

A 2021 review of photographic records taken between 2005 and 2017 of 106 individual belugas indicated 14 cases of confirmed or possible entanglement and 12 cases of confirmed or possible vessel strike (McGuire et al. 2021). Entanglement in fishing gear is the most common cause of anthropogenic mortality in small cetaceans worldwide (Brownell et al. 2019); however, direct mortality from fishing gear is uncommon for Cook Inlet beluga whales (Moore et al. 2000; McGuire et al. 2021). Little evidence exists of what fishing gear is involved in most entanglements, but potential sources include set nets along shore, drift nets in deeper water, recreational fishing from shore or from small vessels, derelict gear, and debris (McGuire et al. 2021).

5.1.8 Research

Research activities also have the potential to impact the Cook Inlet beluga whale through harassment, displacement, injury, or mortality. Past and ongoing research includes land- and boat-based observational surveys, passive acoustic monitoring, aerial surveys, and satellite tagging. These research projects have begun to improve the knowledge of the Cook Inlet beluga whale biologically and ecologically and have contributed to a better understanding of the impacts of anthropogenic activities on the population (NMFS 2008a).

NMFS has established abundance estimates and distribution of the Cook Inlet beluga whale population through aerial surveys conducted since 1993. Noise associated with the small, fix-winged aircraft traveling at an altitude of 244 meters (800 feet; Sims et al. 2012) could affect beluga whale behavior or physiological conditions. Further information has been gathered on distribution through a NMFS satellite tagging study from 1999 to 2002. Several pieces of evidence indicated that mortality of one to three beluga whales was likely caused by the satellite tagging within 24 to 54 hours after the tagging occurred (NMFS 2008a; Hobbs et al. 2005). A later study indicated that of the 18 beluga whales tagged between 1999 and 2002, 3 were confirmed dead and 5 were presumed to have died (McGuire et al. 2021).

Land- and boat-based observational surveys and monitoring programs corresponding with government, industry, and nonprofit organizations have been conducted within Cook Inlet. Observational studies could potentially disturb groups of whales through vessel presence and increased noise. The deployment of passive acoustic monitoring equipment requires the use of a boat and could also temporarily disturb beluga whales. Acoustic monitoring equipment is either suspended in the water column or anchored to the seafloor, where it records environmental sounds. Once the equipment is deployed, recording devices are noninvasive and unlikely to affect beluga whales.

Research on the Cook Inlet beluga whale population is expected to increase, and efforts would continue to minimize potential effects of research activities on beluga whales. The information gained from research would continue to increase the knowledge and understanding of the population and anthropogenic impacts (NMFS 2008a).

5.2 Physical Environment

Cook Inlet, located in Southcentral Alaska, is a semi-enclosed tidal estuary approximately 370 km (230 mi) long, 20,000 square km (7,722 square mi) in area, with 1,350 km (approximately 839 mi) of coastline (Rugh et al. 2000). Cook Inlet has the second highest tidal variation in the world (Mulherin et al. 2001), with tides that fluctuate as much as 12 meters (39 feet) between high and low tide (Sharma and Burrell 1970). Tides in Cook Inlet occur twice daily (tidal day = 24 hours, 50 minutes), and produce strong currents and tidal bores. Streams and rivers substantially contribute to the influx of freshwater and glacial outflow, including sediment, into Cook Inlet, with the volume of water and sediment dependent on the time of year (Muench et al.1978).

Upper Cook Inlet is defined as the inlet section north of the East and West Forelands constriction. At its northern reaches, Upper Cook inlet splits into two branches: Knik Arm and Turnagain Arm. Upper Cook Inlet is generally shallow, with a mean depth of 60 meters (200 feet) deep (Muench et al. 1978). Strong tidal fluctuations in Cook Inlet make some shallow habitats available to beluga whales only during periods with higher water levels. Associated with these large tidal fluctuations are significant changes in shoreline location and tidal currents capable of 6.2 meters (20 feet) per second (Moore et al. 2000), creating highly turbid and low visibility waters (NMFS 2008a). While the strong currents and highly fluctuating tides of Cook Inlet result in a well-mixed, turbid water column, they also prevent the deposition of clay and silt-sized sediments in Upper Cook Inlet, resulting in a sea floor of primarily cobble, pebbles, and sand (Sharma and Burrell 1970; Karlstrom 1964).

Turnagain Arm is characterized by large tidal ranges, strong currents, massive inputs of glacial and coastal sediment, and severe seasonal ice scour. Turnagain Arm is a large tidal flat cut by many channels. It flows from the southeast and shoals within the first 16.1 km (10 mi). Extensive sections of Turnagain Arm shoreline have been developed with riprap and large boulders to protect the ARRC tracks and Seward Highway. Recreational opportunities for whale viewing, eulachon and salmon fishing, and surfing are prevalent in Turnagain Arm. Ice formation in Turnagain Arm is driven by the air temperature. Between October and December, rivers begin to freeze, and ice forms and melts between March and April, varying depending on the year (Moore et al. 2000; NMFS 2008a).

Turnagain Arm lies in a steep-walled, glacially carved valley with the near-contiguous mountains of the Chugach Range reaching in excess of 1,067 meters (3,500 feet) on either side of Turnagain Arm. The topography of the area consists of broad outwash plains bounded by steep, rocky, glaciated side slopes. A major portion of the outwash plains consists of wetlands. The dominant vegetation types in the alpine and mountain side slopes are dwarf scrub and herbaceous vegetation types. The remainder of the side slopes and the valley bottoms are covered with a mixed broadleaf forest (USFS 2004).

5.3 Acoustic Environment

The underwater acoustic environment, or soundscape, is composed of biotic, abiotic, and anthropogenic sounds. Biotic sounds are those that stem from marine biological origin, and include sounds from marine mammals and fish. Abiotic sounds are composed of all environmental noise, including ice, tides, and rain. Anthropogenic sounds stem from human-related activities and include construction sounds, shipping, and resource extraction (Eickmeier and Vallarta 2022). The effects of introduced sound (e.g., construction activities), or the audibility of introduced sounds in a given environment, are determined by comparing the introduced sound to the ambient or background sound of the environment. In this case, ambient sound refers to sound from the natural environment without anthropogenic-generated sound; whereas, background sound includes all sound in the soundscape, including anthropogenic-generated sound.

Very few sound studies have been conducted in Turnagain Arm that attempt to record ambient or background sound levels. A study published in 2002 attempted to characterize ambient sound levels in Upper Cook Inlet, with the closest recording event near Turnagain Arm occurring north of Point Possession (Blackwell and Greene 2002). Using computed broadband levels in a 10-hertz (Hz) to 20-kilohertz (kHz) band, broadband levels at this location reached a maximum of 124 dB re 1µPa with a mean of 120 dB, the highest ambient noise levels recorded for this study.

In 2014, DOT&PF commissioned LGL Alaska Research Associates. Inc. and its subcontractor Greeneridge Sciences, Inc., to measure ambient sound levels in Turnagain Arm near Windy Corner (Burgess 2014). The measurements showed ambient SPLs at high and low tide to be 74 and 81 dB re 1µPa, respectively, with broadband levels between 40 Hz and 9.3kHz. The Burgess (2014) study recomputed the sound levels from the Blackwell and Greene (2002) study with the 40 Hz and 9.3kHz broadband levels. This reprocessing caused the Point Possession mean value to drop from 120 to 104 dB re 1µPa.

While few sound studies have been conducted in Turnagain Arm in which ambient or background sound levels were recorded, several studies have been conducted in Knik Arm, primarily near the Port of Alaska (Blackwell and Greene 2002; Blackwell 2005; URS 2007; Scientific Fishery Systems, Inc. 2009; Austin et al. 2016). The most recent background sound levels recorded at the Port of Alaska occurred in 2016 during the Test Pile Program (Austin et al. 2016). This study measured sound levels at two locations, one immediately offshore from the Port of Alaska and the second approximately 1 km (0.6 mi) offshore. The median background noise levels recorded were 117 and 122.2 dB re 1µPa, respectively. NMFS accepted 122.2 dB re 1µPa as the background noise level for the following Port of Alaska projects: Phases 1 and 2 of the Petroleum and Cement Terminal Project (85 FR 19294), South Floating Dock Project (86 FR 50057), and NES1 Project (89 FR 2832).

5.4 Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act defines Essential Fish Habitat (EFH) as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Act notes that:

> …for the purpose of interpreting the definition of EFH, "waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities, "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species full life cycle.

A provision of the Magnuson-Stevens Fishery Conservation and Management Act requires that Fisheries Management Councils identify and protect EFH for every species managed by a Fishery Management Plan (U.S. Code [USC] 1853 (a)(7)). Managed species with EFH in Turnagain Arm are listed in Table 5-1.

Table 5-1. EFH within Turnagain Arm waters.

Species	Latin Name	Life Stage
Alaska plaice	*Pleuronectes quadrituberculatus*	Egg and larvae in summer
Dover sole	*Microstomus pacificus*	Larvae in summer
Flathead sole	*Hippoglossoides elassodon*	Larvae in summer
Northern rock sole	*Lepidopsetta polyxystra*	Larvae in summer
Pacific cod	*Gadus macrocephalus*	Larvae in summer
Southern rock sole	*L. bilineata*	Larvae in summer
Yellowfin sole	*Limanda aspera*	Egg in summer
Rex sole	*Glyptocephalus zachirus*	Larvae in summer
Chinook salmon	*Oncorhynchus tshawytscha*	Juvenile and mature
Chum salmon	*O. keta*	Juvenile and mature
Coho salmon	*O. kisutch*	Juvenile and mature
Pink salmon	*O. gorbuscha*	Juvenile
Sockeye salmon	*O. nerka*	Juvenile and mature

A study of fish presence in Turnagain Arm found juvenile salmonids to be the most abundant fish found in nearshore areas during June and July (Pentec 2007). Young salmonids use the shoreline to forage and shelter before dispersing to the open ocean. EFH for juveniles and adults includes marine waters off the coast of Alaska to depths of 200 meters (656 feet) from the mean higher high tide line to the 200-nautical mile limit of the U.S. Exclusive Economic Zone (NPFMC 2024).

Alaska Statute 16.05.870 requires ADF&G to identify waterbodies important for spawning, rearing, or migration of anadromous fish. ADF&G does this by selecting waterbodies for the Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes (AWC) and the Atlas to the Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes. Waterbodies documented by ADF&G used by anadromous fish are listed in the AWC. The atlas shows the locations of these waterbodies and identifies the life stage of anadromous fish that use them. The Project alignment intersects EFH supporting salmon that have been identified in the AWC; Table 5-2 lists AWC waterbodies and species present.

Table 5-2. AWC waterbodies near the action area.

AWC Code	Waterbody Name	Species Present[a]	Nearest Seward Highway MP[b]
247-60-10272	Unnamed stream	COr	98.5
247-60-10272-2009[c]	Unnamed stream	COr	100.5
247-60-10272-2009-0010	Unnamed lake	COr	100.5
247-60-10278	Birdhouse Creek	COr	100.5
247-60-10280[c]	Bird Creek	CHs, COp, Ksr, Ps	101.5
247-60-10290	Indian Creek	COpr, Kp, Pps	103
247-60-10292	Unnamed stream	COr	103.5
247-60-10292	Unnamed stream	COr	103
247-60-10300	McHugh Creek	COr	112
247-60-10300-0010	McHugh Pond	COr	112
247-60-10310	Potter Creek	COr, Pp	115
247-60-10310-2004	South Fork Potter Creek	COr	115
247-60-10320-2012[c]	Little Survival Creek	COr, Kr	117

[a] CO: coho salmon; CH: chum salmon; DV: Dolly Varden; K: Chinook salmon; P: pink salmon; p: present r: rearing; s: spawning;
[b] Waterbody may be in close proximity to more than one highway MP
[c] This waterbody connects at least one additional AWC waterbody not listed in this table upstream to Turnagain Arm

On September 28 and 29, 2023, HDR conducted field efforts to identify potential waterbodies not listed in the AWC that provide habitat for anadromous fish. Ten locations not listed in the AWC that intersect the Project alignment were successful at capturing anadromous fish. These locations are listed in Table 5-3. All locations have been submitted to ADF&G to be added into the AWC and are pending approval.

Table 5-3. HDR-sampled waterbodies submitted for AWC nominations.

Site ID	Coordinates	Fish Present
001B	61.050530, -149.794211	CO
004	60.955482, -149.421810	CO, DV
006	60.951913, -149.411095	CO
007	60.953134, -149.415021	CO
008B	60.951518, -149.407299	CO
009B	60.951079, -149.399964	CO

Note: CO: coho salmon; DV: Dolly Varden; ID = Identifier; all nominations are pending approval and are not currently listed in the AWC

5.5 Prey Fish

Primary prey species for Cook Inlet beluga whales in the study area include Chinook, sockeye, chum, and coho salmon; eulachon; Pacific cod; walleye pollock; saffron cod; and yellow fin sole (NMFS 2016). Cook Inlet beluga whale predation fluctuates seasonally depending on which prey species are available. Sampling of marine fish in the area have shown which prey species are important to belugas at which times of the year (Houghton et al. 2005). Sampling efforts used seines in the nearshore environment, while tow-nets were used mid-channel.

Eulachon, an energetically dense fish (Perez 1994) and vital spring food source (Norman 2019), migrate in spring to rivers in Upper Cook Inlet and are followed by beluga whales, starting the main period of yearly beluga whale presence. In Cook Inlet, three primary runs of eulachon occur, including the Kenai River, Twentymile River, and Susitna River runs. Additional runs have not been recently documented in other rivers entering Knik Arm, but portions of Knik and Turnagain Arms have been listed as EFH for eulachon (ADF&G 2022). Historic accounts of eulachon in other streams, such as the Placer River, predate the 1964 Good Friday Earthquake, when dramatic changes to the landscape occurred. Subsequent and more recent surveys were not able to confirm these historic runs (Spangler et al. 2003).

Eulachon spawn primarily over small and coarse gravel substrate, and the widespread influx of small glacial sediment may be a determining factor in presence within rivers entering Cook Inlet (Moody 2010). The only commercial fishery for eulachon in the Upper Cook Inlet Management Area targets the Susitna River eulachon run. Outside of the Susitna River, runs are poorly studied, and the total biomass of returning fish and other spawning areas are not well understood; however, anecdotal information regarding the Twentymile River run indicates that it is composed of many ‘pulses’ during May and June.

Prey fish selection after the eulachon run during April and May becomes more focused on the return of salmon to the area. Chinook salmon returning during May and June are a valuable food source (Norman et al. 2019, 2022), followed by the arrival of pink, chum, sockeye, and coho salmon in July. Coho salmon presence and subsequent predation persists throughout August. Other species, particularly saffron cod, are found at lower levels of abundance than salmon throughout the year, forming a supplemental prey base to the annual salmon runs. Out-migrating juvenile salmon were also present during spring, an existing but less important source of prey than their adult forms.

6 Effects of the Action

For purposes of the ESA, “effects of the action” means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). To concur that an action may affect, but is not likely to adversely affect, listed species, NMFS must find that all direct and indirect effects of the proposed action are expected to be insignificant, discountable, or entirely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where a take would occur. Discountable effects are those that are extremely unlikely to occur. Based on best judgment, one would not: 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur. Beneficial effects are contemporaneous and positive, with no adverse effects to listed species.

Potential effects on beluga whales and Steller sea lions due to the proposed action include:

- Acoustic disturbance from blasting and fill placement
- Habitat loss or modification
- Effects on prey species

6.1 Direct Effects

6.1.1 Acoustic Disturbance from Blasting and In-water Fill Placement

The Project would introduce noise into the action area during uplands blasting and in-water fill placement. It is anticipated that uplands blasting and in-water fill placement would occur intermittently for the Project’s duration, until its completion. While potential exists for behavioral disturbance from noise to occur, the overall likelihood is discountable due to the effects of the activities discussed below and the avoidance, minimization, and mitigation measures discussed in Section 2.3.

6.1.1.1 EFFECTS OF NOISE ON MARINE MAMMALS

The ability to hear and transmit sound are vital to the survival of marine mammals. Marine mammals use sound to gather information about their environment, communicate, detect prey, and detect predators.

These survival functions could be disrupted through the introduction of anthropogenic noise into their ecosystem. The level of effect can vary between individuals and groups depending on species, age, sex, context of sound (e.g., sound is similar to a predator), current behavior, physiological status, and environmental conditions.

Marine mammals can be affected by anthropogenic noise, and these effects fall within one or more of the following categories: 1) tolerance of noise; 2) noise can mask vital life functioning sounds; 3) noise can cause a behavioral disturbance; and 4) noise can temporarily or permanently cause hearing impairment, or non-auditory physical effects such as stress, neurological effects, bubble formation, resonance effect or tissue and organ damage (Richardson et al. 1995; Southall et al. 2007). Temporary hearing impairment, also known as temporary threshold shift (TTS), can be induced by reduced residual middle-ear muscular

activity, sensitivity of sensory hair cells in the inner ear, changes in the chemical environment in the sensory cells, increased blood flow, displacement of inner ear membranes, and post-stimulatory reduction in efferent and sensory neural output (Kryter 1994; Ward 1997). A literature review on marine mammal hearing and responses to noise, including initiation of TTS, was completed by Southall et al. (2007). Permanent threshold shift (PTS) occurs when the level of hearing threshold is met, causing permanent hearing loss (Yost 2000). No severe effects from noise, such as permanent hearing impairment, are expected as a result of this Project.

6.1.1.2 NOISE EXPOSURE CRITERIA

The ESA does not define "harass"; however, NMFS issued guidance interpreting the term "harass" under the ESA as to: "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." Typically, harassment of beluga whales, whether Level A or Level B under the MMPA, is considered a "take" under the ESA (Title 16 USC 1532). No harassment under the MMPA is anticipated for the Project; therefore, take under the ESA would be avoided.

Level B Harassment: Harassment by impulse noise (e.g., blasting) is set at 160 dB_{rms} re 1 µPa for pinnipeds and cetaceans.

Level B Harassment: Harassment by intermittent and continuous noise (e.g., fill placement) is set at 120 dB_{rms} re 1 µPa (70 FR 1871–75) for pinnipeds and cetaceans.

NMFS has established acoustic thresholds for exposure of beluga whales and other marine mammals to in-water noise that is considered likely to cause injury to marine mammals through onset of permanent and temporary thresholds shifts (PTS and TTS) (83 FR 28824; June 21, 2018). Under the PTS/TTS Technical Guidance, NMFS uses the following thresholds (Table 6-1) for underwater sounds that cause injury, referred to as Level A harassment under Section 3(18)(A)(i) of the MMPA (16 USC 1362(18)(A)(i)) (NMFS 2018). New guidance for Level A has been proposed as of September 2024 (89 FR 36762) and has been incorporated below. Cumulative sound exposure level (L_E) and peak sound level (L_{pk}) for impulsive sounds and L_E for non-impulsive sounds were used to determine auditory thresholds. Table 6-2 defines generalized hearing ranges of different marine mammal groups.

Table 6-1. PTS onset acoustic threshold for Level A harassment.

Hearing Group	PTS Onset Acoustic Thresholds[a] (Received Level; 2018 Guidance)		PTS Onset Acoustic Thresholds[a] (Received Level; 2024 Guidance)	
	Impulsive	Non-impulsive	Impulsive	Non-impulsive
Low-frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB	$L_{pk,flat}$: 222 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 197 dB
Mid-frequency (MF) Cetaceans (2018) *High-frequency (HF) Cetaceans (2024)*	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 193 dB	$L_{E,MF,24h}$: 201 dB
High-frequency (HF) Cetaceans (2018) *Very High-frequency (VHF) Cetaceans (2024)*	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 159 dB	$L_{E,HF,24h}$: 181 dB
Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	L_{E}, PW, 24h: 201 dB	$L_{pk,flat}$: 223 dB $L_{E,PW,24h}$: 183 dB	$L_{E,PW,24h}$: 195 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	L_{E}, OW, 24h: 219 dB	$L_{pk,flat}$: 230 dB $L_{E,OW,24h}$: 185 dB	$L_{E,OW,24h}$: 199 dB

Source: NMFS 2018, 2024

[a] Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak SPL thresholds associated with impulsive sounds, these thresholds should also be considered. Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. The subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds would be exceeded.

Table 6-2 Underwater marine mammal hearing groups (NMFS 2018, 2024).

Hearing Group	ESA-listed Marine Mammals within the Project Area	Generalized Hearing Range[a] (2018)	Generalized Hearing Range[a] (2014)
Low-frequency (LF) Cetaceans *(Baleen whales)*	None	7 Hz to 35 kHz	7 Hz to 36 kHz
Mid-frequency (MF) Cetaceans (2018) *High-frequency (HF) Cetaceans (2024) (dolphins, toothed whales, beaked whales)*	Cook Inlet beluga whales	150 Hz to 160 kHz	150 Hz to 160 kHz
High-frequency (HF) Cetaceans *(true porpoises) Very High-frequency (VHF) Cetaceans (2024)*	None	275 Hz to 160 kHz	200 Hz to 165 kHz
Phocid Pinnipeds (PW) *(true seals)*	None	50 Hz to 86 kHz	40 Hz to 90 kHz
Otariid Pinnipeds (OW) *(sea lions and fur seals)*	Western DPS Steller sea lions	60 Hz to 39 kHz	60 Hz to 68 kHz

[a] Represents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on approximately 65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall et al. 2007) and PW pinnipeds (approximation).

In-Air Acoustic Thresholds

No in-air acoustic exposure threshold has been established by NMFS under the ESA for Level A harassment of marine mammals. In-air acoustic exposure thresholds for Level B harassment have been established by NMFS under the MMPA but not the ESA for harbor seals and other pinnipeds (90 and 100 dB_{rms} re 1 µPa, respectively). NMFS has not established an in-air acoustic exposure threshold for Level B harassment of cetaceans because it is assumed that cetaceans would experience any exposure to elevated sound levels in the water, not in the air.

6.1.1.3 POTENTIAL ELEVATED NOISE EFFECTS OF UPLANDS BLASTING

While most upland actions associated with the proposed Project are far enough from shore that they are extremely unlikely to be perceived acoustically in the marine environment, it is possible that proposed uplands blasting along the corridor (see Section 3.1) could be perceived by marine mammals if present in nearshore habitats adjacent to the blast event. Though no in-water blasting would occur, sound pressure waves associated with uplands blasting could move into waters adjacent to the blast sites, and potentially expose beluga whales and Steller sea lions to elevated sound levels.

While in-air peak noise estimates are available for rock blasting, underwater noise estimates for uplands blasting are not readily available. During rock blasting along Interstate 90 in the State of Washington, the Washington State Department of Transportation (WSDOT) measured peak in-air sound levels of 119 dBA at 50 feet (15 m) from the blast source (Magnoni 2006). Blasting for the Project would be located in uplands areas away from the shoreline, which would further reduce the anticipated underwater sound level at the shore.

Using the spherical spreading formula, and considering the distance of the estimated nearest blast site from the shoreline (175 feet [53 meters]), the anticipated in-air sound level at the shoreline would be approximately 108 dBA:

$$D = Do \times 10^{((\text{Construction Noise} - \text{Sound Level in dB})/\alpha)}$$

or

Sound Level at 175 feet = 119 dBA at 50 feet – 20*log (175/50)

In this formula:

- Do = the distance of measured blast sound from the source (50 feet);
- Construction (blast) Noise = 119 dBA; and
- α =20 for sound that propagates over a hard surface.
- To determine the in-air sound level at the shoreline, the distance of the nearest blast to the shoreline (175 feet) is substituted for D.

It is unknown how much of the in-air sound levels of approximately 108 dBA at the shoreline would penetrate marine waters, and how any transmitted sound would be perceived by marine mammals. Acoustic specialists have stated that no quantitatively robust method exists to convert in-air noise levels to in-water noise levels (Stadler, personal communication 2009) because many variables (e.g., densities, sound speeds, measured frequencies) exists that are not directly comparable. In-air sound levels are generally measured in units of dBA, which are A-weighted decibels, a weighting system that was developed to account for the relative loudness of sounds in air as perceived by the human ear. However, acoustic disturbance thresholds for marine mammals are defined as unweighted “root mean square” (rms) values and are not A-weighted. No direct conversion exists of A-weighted sound levels to unweighted levels. However, HDR has previously consulted with WSDOT rock blasting and acoustic specialists who provided recommendations for converting blast sounds reported as dBA to rms values, as discussed below.

As previously stated, the predicted in-air SPLs at the shoreline attributed to upland blasting at least 175 feet (53 meters) away would be approximately 108 dBA or less, as the distance between the blasting site and the shoreline increases. Considering noise levels reported for rock blasting using a 90-pound blast of explosives (119 dBA at 50 feet [15.2 meters]), and based on a report by Dubbink Associates (2010), WSDOT recommended adding 35 dB to convert A-weighted levels to unweighted levels, and it found, from experience, that it is appropriate to convert a peak level to an rms by subtracting 15 dB. The in-air noise level at the shoreline of 108 dBA, therefore, can be converted to approximately 128 dB_{rms}. For impulse sounds, like blasting, the acoustic disturbance threshold for marine mammals in-water is 160 dB_{rms}, and it is highly unlikely that an in-air sound level of approximately 128 dB_{rms} could enter the water and exceed the marine mammal underwater disturbance level for impulse sound of 160 dB_{rms}. Therefore, although belugas may perceive blasting noise if they are present along the shoreline, predicted sound levels would not exceed disturbance thresholds. For this reason, adverse effects to beluga whales are not anticipated during blast events at 175 feet (53 meters) from the shoreline or greater. It is anticipated that all blasting events would occur at 175 feet (53 meters)

from the shoreline or greater, avoiding potential impacts on beluga whales and other ESA-listed marine mammals. Even if blasting occurs closer to the shore than the anticipated 175 feet (53 meters), because of the conservative application of a 1.5-km (0.9-mi) preclearance zone based on blasting occurring at the shore (described in Section 3.1), no additional impacts would be anticipated.

No known Steller sea lion haulouts occur along the shoreline near the action area. Therefore, adverse effects to Steller sea lions are not anticipated during blasting events. Any beluga whales that might be near the Project area would be underwater; as discussed above, adverse effects to beluga whales are not anticipated during blasting events, which would occur at 175 feet (53 meters) from the shoreline or greater. Additionally, no blasting would occur if beluga whales or other ESA-listed marine mammals are within 1.5 km (0.9-mi) of the blasting site following Mitigation Measures 2.3.6 and 2.3.9. Based on the location of the blasting events and proposed mitigation measures, it is anticipated that impacts from uplands blasting would be discountable for all ESA-listed species.

6.1.1.4 POTENTIAL ELEVATED NOISE EFFECTS AND DISTURBANCE FROM FILL PLACEMENT

Fill would be placed in intertidal areas along some sections of the Project (Figure 2-2; Figure 2-3). In-air noise from heavy equipment used onshore to place fill into intertidal areas, as well as the placement of materials into the water, could temporarily increase noise levels during construction. Construction noise would automatically be reduced as it enters the water via the impedance contrast that reduces how much in-air sound passes through the air-water interface. It is anticipated that construction noise that enters the water would not be detectable above ambient aquatic sound levels. The noise levels from construction equipment and placement of fill material are unlikely to reach the threshold levels considered by NMFS to be harmful or injurious to marine mammals, nor would they reach levels considered to constitute harassment. Additionally, mitigation measures such as 2.3.6 through 2.3.16 would avoid impacts on beluga whales and other ESA-listed species by delaying or shutting down blasting and fill placement until the animals have cleared the shutdown zone. Therefore, behavioral and acoustic disturbance of marine mammals as a result of fill placement are expected to be insignificant.

6.1.2 Vessel Noise, Presence, and Strikes

It is anticipated that all blasting and fill placement would take place from the landside of the construction site. Trucks or rail cars would transport fill and other construction materials over land. The extreme tide changes and extensive mudflats along the Project site would make vessel use difficult and limit use to high-tide events of short duration. Therefore, impacts from vessel use, including noise, disturbance, and vessel strike are not anticipated.

6.1.3 Habitat Loss or Modification

Permanent fill could affect PCE 1 (intertidal and subtidal waters of Cook Inlet with depths less than 9.1 meters (30 feet) MLLW within approximately 8 km (5 mi) of high- and medium-flow accumulation anadromous fish streams) present in the action area. Habitat alteration could change beluga whale and Steller sea lion behavior, distribution, or abundance. Additionally, changes to habitat can affect prey behavior and abundance. These changes could ultimately

reduce beluga whale calving success, impair their ability to secure prey, or increase their susceptibility to predation. Steller sea lions are not known to pup in Upper Cook Inlet.

The loss of approximately 105 acres of intertidal habitat is not expected to result in reduced availability of prey for beluga whales or other ESA-listed marine mammals. Fish and benthos studies were conducted in 2006 to identify fish and benthic species in Turnagain Arm. Adult and juvenile salmon were present throughout the Turnagain Arm estuary. This study concluded that juvenile coho are the most abundant juvenile salmonid in nearshore marine areas, with young-of-the-year being the dominant cohort (Pentec 2007). Juvenile sockeye, chum, and Chinook salmon are present, but in lower abundance. The habitat to be filled is used as migrating, rearing, and foraging habitat for salmon. However, habitats with the same attributes as the area to be filled exist in many other areas of Turnagain Arm. Therefore, permanent fill placement is not expected to have a meaningfully measurable effect on beluga whales and would have an insignificant effect on PCE 1.

6.1.3.1 INCREASED TURBIDITY AND SEDIMENTATION

Changes in sediment suspension and turbidity could affect PCE 3 (waters free of toxins or other agents of a type and amount harmful to Cook Inlet beluga whales). Construction, particularly fill placement, could cause a temporary increase in suspended sediments and turbidity. Increased turbidity resulting from fill placement would not likely affect beluga whales. Beluga whales are tolerant of existing high-turbidity levels in Turnagain Arm. The average natural turbidity of Upper Cook Inlet typically ranges from 400 to 600 Nephelometric Turbidity Units.

Because beluga whales are often observed traveling and feeding in extremely turbid areas and are adapted for survival through periods of extended darkness, any effects resulting from small turbidity increases during fill placement would be negligible. Beluga whales are known to use echolocation (Turl 1990) and are not highly dependent on their vision; therefore, temporary increases in turbidity associated with construction activities are unlikely to affect beluga whale feeding, navigation, or other vital behaviors. Additional sedimentation or turbidity is not expected to affect Steller sea lions, as the existing turbidity of Cook Inlet has already precluded it from becoming an important feeding area for sea lions.

Additionally, a SWPPP will be developed and implemented during all construction phases and follow CWA requirements. The SWPPP will be approved through the USEPA during the permitting process. DOT&PF will obtain all appropriate federal and state water quality permits. Although the increase of turbidity and sedimentation is not likely to affect ESA-listed marine mammals, SWPPP and other mitigation measures would minimize the amount of small material that enters waters.

6.1.3.2 POLLUTION AND WATER QUALITY

Pollution is listed as a threat of low concern for the Cook Inlet beluga whale; however, a material spill of contaminants such as oil, natural gas, or other harmful substances could lead to a potentially catastrophic event. As such, a material spill is listed as a threat of high relative concern (NMFS 2016). Additionally, contaminants, stormwater runoff, and accidental hazardous material spills could affect PCE 3 (waters free of toxins or other agents of a type and amount harmful to the Cook Inlet beluga whale).

Fill placed along the Seward Highway and around the bridge pilings will be contaminant-free. Ground disturbance from construction could result in stormwater runoff transporting contaminants to water. With the increase in area of impermeable surfaces (roadway and parking lots), the volume of runoff could also increase. If transfer of contaminants from stormwater or sediments were to occur, it is anticipated that they would be quickly dispersed and diluted due to the high tidal mixing within the area.

Standard procedures will be implemented to reduce potential runoff and accidental contamination. The Project will follow refueling and containment regulations implemented by USEPA and the Alaska Department of Environmental Conservation (ADEC) prohibiting water pollution, including placement of refueling stations and containment at least 30.5 meters (100 feet) from a waterbody. Furthermore, a SWPPP will be developed and implemented during all construction phases and follow CWA requirements. The SWPPP will be approved through the USEPA during the permitting process. DOT&PF will obtain all appropriate federal and state water quality permits. With the implementation of mitigation measures associated with those permits, the proposed Project is not anticipated to affect water quality for beluga whales or beluga whale critical habitat.

6.1.4 Cook Inlet Beluga Whale Critical Habitat

The proposed action has the potential to affect beluga whales through the disturbance or modification of their critical habitat. Five physical and biological features of this habitat (primary constituent elements [PCEs]) are essential to the beluga whale conservation (76 FR 20180; April 11, 2011):

PCE 1: Intertidal and subtidal waters of Cook Inlet with depths less than 30 ft. [feet] Mean Lower Low Water and within 5 mi of high and medium flow anadromous fish streams

During construction, Project-associated noises, increased sediment suspension, and contamination have the potential to impact PCE 1 . These impacts are anticipated to be short term and therefore insignificant at any single location because construction activities would move from site to site as the Project progresses.

The Project potentially could also affect beluga whale movement through the loss and alteration of critical habitat by placing fill below mean high water. Even though this is a permanent placement of fill, the effect is expected to be minimal considering beluga whales have been observed traveling and foraging along existing rock-armored shoreline within Turnagain Arm (Cornick and Saxon-Kendall 2008, 2009, AKBMP 2024).

PCE 2: Primary prey species consisting of four species of Pacific salmon (Chinook, chum, coho, and sockeye), Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole

The Project has the potential to impact Cook Inlet beluga whale primary prey species by displacement or injury from proposed Project-associated noise and loss of habitat by fill placement. Eulachon and salmon are seasonally found in Turnagain Arm and may be affected by this Project. Pacific cod, walleye pollock, saffron cod, and yellowfin sole have not been documented in the action area (LGL 2015).

It is unlikely that this proposed Project would impact the Cook Inlet beluga whale primary prey species by displacement or injury from proposed Project-associated noise and habitat loss by fill placement. Project construction plans will avoid the relatively large and important runs of eulachon and salmon smolt outmigration (no in-water work April 1 through June 15). In-water construction would be localized and conducted at low tide when feasible, so other prey species would be able to avoid the disturbance. All salmon-bearing streams will be crossed using fish passage culverts, as required, or larger bridges such as at Bird and Indian Creeks. No streams will be blocked by fill placement. Noise from upland blasting and marine fill placement would not affect prey species and would not measurably affect beluga whale prey availability. Consequently, the proposed Project would have insignificant and discountable effects on PCE 2.

PCE 3: Waters free of toxins or other agents of a type or amount harmful to Cook Inlet beluga whales

It is unlikely that PCE 3 would be affected by the Project. A temporary increase in suspended sediments and turbidity could occur as a result of fill placement. Because Turnagain Arm is naturally extremely turbid, a slight increase in suspended sediment and turbidity levels is anticipated to have negligible impacts on Cook Inlet beluga whales known to use echolocation to navigate through these waters.

Contaminants, stormwater runoff, and accidental hazardous material spills associated with the proposed Project may occur; however, mitigation measures contained within the SWPPP would reduce the amount of contaminants, stormwater runoff, and other material spills. Although fill placement along the Seward Highway will be free of contaminants, as verified by a sampling and analysis plan, ground disturbance from construction could possibly result in stormwater runoff transporting contaminants to water. Runoff patterns could be altered due to the increase in impermeable surface area (e.g., the roadway).

The proposed Project will follow refueling and containment regulations implemented by USEPA and ADEC, including placement of refueling stations and containment at least 30.5 meters (100 feet) from a waterbody. Furthermore, an approved SWPPP will be developed and implemented during all construction phases. DOT&PF will obtain all appropriate federal and state water quality permits. However, should contaminants from stormwater or sediments enter fluvial or nearshore waters, it is anticipated that they would be quickly dispersed and diluted due to rapid mixing within Turnagain Arm. As a result, the effects from this proposed Project upon PCE 3 would be insignificant.

PCE 4: Unrestricted passage within or between the critical habitat areas

NMFS expects beluga whale passage would remain unrestricted as a result of this Project because Cook Inlet beluga whales are expected to adapt to, and continue to travel along, the newly positioned rock-armored shorelines within Turnagain Arm, just as they adapted to and now travel along the current rock-armored shorelines. Some whales may temporarily experience restrictions to passages into upper Turnagain Arm due to noises associated with the proposed Project. However, it is not anticipated that this effect would appreciably reduce the value of critical habitat for the conservation of these whales because: 1) the construction effects would

be temporary; 2) construction would be limited in spatial extent at any given time, ensuring that alternative habitat sites remain available to the whales; 3) work would be conducted at as low of tide as feasible; 4) trained PSOs will be present to clear ESA-listed marine mammal clearance and shutdown zones prior to uplands blasting and in-water fill placement; and 5) in-water work will not occur from April 1 through June 15. Therefore, any adverse effects to PCE 4 would be insignificant and discountable.

PCE 5: Waters with in-water noise below levels resulting in the abandonment of critical habitat areas by Cook Inlet beluga whales

The primary potential impact on Cook Inlet beluga whales and other ESA-listed marine mammals from the proposed Project likely would be through in-water noise associated with uplands blasting and fill placement. It is not anticipated that habitat avoidance would occur as a result of blasting and fill placement because these activities would be temporary and intermittent, limited to the times when blasting and fill placement occur. Minimization and avoidance measures would reduce harassment of beluga whales during construction as detailed below.

PSOs will be present during all in-water fill placement and uplands blasting. This would reduce the chance of exposing beluga whales and Steller sea lions to in-water noise above the 160 dB_{rms} threshold for impulsive noise and 120 dB_{rms} threshold for continuous and intermittent noise. DOT&PF will implement a shutdown radius for the preclearance and shutdown zones at:

- 1.5 km (4,921 feet) for impulsive noise for land-based blasting
- 300 meters (984 feet) for continuous and intermittent noise for in-water fill placement

If ESA-listed marine mammals are observed entering these shutdown zones, activities will be shut down or delayed until they are no longer within the shutdown zone.

Although numerous sources of in-water noise are currently in Cook Inlet, no evidence exists that noise levels have resulted in the abandonment or decreased use of critical habitat areas during other projects around Turnagain Arm, such as the Seward Highway MP 75 to 90 project; or in Knik Arm, such as the Port of Alaska Modernization Program or the Port MacKenzie construction and upgrades. Noise effects from the proposed Project are extremely unlikely to result in the abandonment or measurable decreased use of critical habitat areas by Cook Inlet beluga whales; therefore, the effects would be insignificant and discountable.

6.2 Delayed Consequences

6.2.1 Effects on Prey Species

The Project may affect beluga whale primary prey species (PCE 2: Primary prey species consisting of four species of Pacific salmon [Chinook, sockeye, chum, and coho], eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole) in Turnagain Arm, including migratory species that use habitats in portions of Upper and Lower Cook Inlet.

6.2.1.1 ACOUSTIC DISTURBANCE

Prey species of fish could be displaced or injured from noise produced by fill placement. Underwater noise could deter adult salmon from entering spawning habitat and disturb juveniles in rearing habitat. Injuries sometimes fatal to fish from high underwater SPLs have included loss of hearing (TTS and PTS), temporary stunning, swim bladder rupture, hemorrhaged eyes and internal organs, and elevated stress levels (Yelverton et al. 1975; Turnpenny et al. 1994; Hastings 1995; Caltrans 2001; NMFS 2002; Hastings and Popper 2005). The pressure within the swim bladder of fish can change as the fluctuation of pressure associated with a sound wave passes through the fish. This can cause the swim bladder to rupture or create pressure on surrounding internal organs. Elevated levels of stress can cause reduced reproductive success and increased vulnerability to predation (Fagerlund et al. 1995); however, stress is unlikely to affect prey species as a population and is more likely to affect individuals.

Noise can also affect prey species movement, either by masking signals important for prey escape from predators or displacing prey species into surrounding environments. If prey escape signals are masked, it could lead to a temporary increase in prey availability and benefit beluga whale foraging (Hastings and Popper 2005). Construction noise may also displace prey species into similar surrounding environments or deeper water, which can be more turbid, requiring additional energy expenditure (Fagerlund et al. 1995). Studies have shown that fish can perceive underwater sounds from a frequency of 50 to 2,000 Hz, with 800 Hz being the peak sensitivity frequency (Popper et al. 2013).

Noise impacts from in-water fill placement and in-air blasting are not expected to affect fish or predator-prey relationships. Predicted underwater noise attributed to uplands blast sound energy into adjacent marine waters is not anticipated to exceed disturbance thresholds for fish (150 dB_{rms}); nor would it approach peak or sound exposure level injury thresholds for any size class of fish.

6.2.1.2 HABITAT LOSS OR MODIFICATION

The loss of intertidal habitat could potentially affect prey species. Fill placement (roughly 105 acres or 0.43 square km) in intertidal waters along the Seward Highway is considered small compared to the available fish habitat surrounding the fill placement areas (Figure 2-2; Figure 2-3), and the greater Turnagain Arm as a whole, estimated at 247,000 acres (1,000 square km). At replacement bridge locations, the number of piles associated with each bridge would be reduced, providing a small increase in available habitat within streams and creeks. During the replacement and construction of new bridges and culverts, sections of riverbank habitat may need to be removed and replaced with appropriate fish passage culverts as determined by ADF&G. This may cause juvenile fish to be more susceptible to predation from the reduction in hiding places available. Competition for unaffected areas for foraging and predator escape may increase. Considering minimal fill placement would occur within juvenile and prey species habitat outside intertidal areas, and the Project would reduce the number of piles at specific bridges along Turnagain Arm, it is unlikely that prey species would be affected by the loss of habitat.

Construction activities, including in-river pile driving, marine fill placement, and removal of vegetative sections, could temporarily increase sediment suspension and turbidity. Amplified

suspended sediment could hinder adult respiratory function, potentially stalling fish in areas until water is clear. Foraging could also be impeded by increased water turbidity.

6.2.2 Effects From Railway Realignment

Railroad realignment as part of the proposed Project would move the railroad tracks from a small number of areas where potential beluga whale habitat in the nearshore is dewatered during lower tide levels to areas where nearshore habitats are never dewatered, even at low tide levels, and remain accessible to beluga whales. Some potential exists that beluga whales could then be exposed to regular operational noise from the Alaska Railroad in these areas where the train previously was farther from their habitat. Community scientists as part of the Alaska Beluga Monitoring Program have noted that beluga whales have been observed diving longer and being less active at the surface while trains are nearby, potentially indicating a response to its presence (J. Seymour, Pers. Coms.). Therefore, realignment of the tracks may have a small effect on beluga whales in those areas where tracks are realigned closer to areas that are consistently watered and available to beluga whales.

It is possible that noise from railroad operations may be decreased because of the proposed Project. Currently, trains are required to use airhorns when approaching popular areas along Turnagain Arm where pedestrians frequently trespass across Alaska Railroad tracks (such as Beluga Point). The proposed Project includes pedestrian over- or under-passes at Beluga Point and Windy Corner, which may result in less trespassing and a reduction of train horn usage. This would be a minor but beneficial effect to beluga whales if it were to occur.

6.2.3 Vessel Noise, Presence, and Strikes

The use of the emergency boat ramp at Windy Corner may have an effect on beluga whales or Steller sea lions if they are present nearby when the ramp is used. As part of the proposed Project, only emergency services would be able to access the boat ramp, which would otherwise be locked and unavailable for use by the public. However, small vessels are known to potentially have effects on beluga whale behavior (Stewart 2012), which could include longer dive intervals, tighter group formations, or even avoidance in some situations.

Girdwood Fire Department currently trains with their emergency response boat at the Twentymile River, which is an important feeding area for beluga whales during the eulachon run and other times of the year. Twentymile River is also relatively constrained, with little room for beluga whales and vessels to co-occur, compared to Turnagain Arm, thus any effects within the river likely have an outsized impact. It is not anticipated that the emergency use boat ramp at Windy Corner would increase Girdwood Fire Department training, but rather it may shift trainings from only occurring at the constrained Twentymile River into the wider Turnagain Arm, which could be a minor but beneficial effect to beluga whales by reducing usage at an important foraging area.

6.3 Cumulative Effects

6.3.1 Pollution

With the continued growth of the Cook Inlet region, pollutants entering the inlet from industry and urban areas could increase. Primary sources of pollutants include runoff from streets and highways as well as discharge from oil and gas, and coastal development projects. National Pollutant Discharge Elimination System permits and regulations by the state (ADEC) and federal (USEPA) government would control the amount of pollutants that enter the Cook Inlet region. Developers will continue to be required to renew permits and verify compliance with permit conditions to protect Cook Inlet resources.

With oil and gas development in Cook Inlet, a potential exists for accidental blowouts or spills. While no oil and gas development projects are within the action area, a large spill could impact beluga whale movement and distribution in Cook Inlet.

6.3.2 Recreation, Tourism, and Whale Watching

Traffic to the Kenai Peninsula would continue to increase as the Cook Inlet region experiences continual growth in population, recreational activities, and tourism. Frequently, locals and tourists stop along the Seward Highway to view wildlife, including beluga whales traveling in and out of Turnagain Arm. Due to the hazards of boating in Turnagain Arm, which include strong currents, a tidal range of more than 9 meters (29.5 feet), and continually shifting mud flats, no boat-based whale-watching industry currently exists.

6.3.3 Research

Research is important for understanding the ecology and biology of the Cook Inlet beluga whale. Annual surveys and monitoring activities include the Anchorage Coastal Beluga Survey, NMFS aerial surveys, tagging studies, and photograph and video identification projects (see Section 5.1.8. Although research activities could potentially kill, injure, harass, or change beluga whale behavior, impacts from many individual and multiple threats are unknown; therefore, it is important for research to continue to fill gaps in the knowledge base.

6.3.4 Climate Change

Climate change poses a wide range of threats to the Cook Inlet beluga whale by exacerbating threats already in place. Climate change can affect the marine environment through changes in suspended sediments from increase freshwater runoff, temperature, pH, and salinity. These changes can amplify the effects of contaminants by altering toxicity and bioavailability (Schiedek et al. 2007).

Climate change indirectly affects the noise levels in the ocean environment (Reeder and Chiu 2010). Ice reduction resulting from warming temperatures could result in a less noisy ocean environment; however, ocean acidification as a result of climate change can increase noise pollution by decreasing the concentrations of sea salts that absorb low frequency sounds (NMFS 2016).

6.4 Recommended Additional Minimization and Avoidance Mitigation Measures

In addition to mitigation measures listed in Section 2.3, following NMFS recommendations, DOT&PF has proposed the following voluntary measures for avoidance, minimization, or mitigation of potential adverse effects to anadromous fish streams that produce forage fish for the beluga whale and to designated critical habitat for the Cook Inlet beluga whale:

- For all Project-related crossings of fish-bearing waters that incorporate bridges or culverts, DOT&PF will design, construct, and maintain the conveyance structures in accordance with the Memorandum of Agreement that DOT&PF has with ADF&G to ensure that appropriate stream crossing culverts are designed to provide efficient fish passage for all fish life stages following American Association of State Highway and Transportation Officials fish passage design guidelines.
- DOT&PF will avoid and minimize impacts to waters of the U.S., including wetlands, to the extent practicable. DOT&PF has proposed compensatory mitigation for unavoidable impacts to wetlands as part of the USACE Section 404 permit, to the extent practicable, in accordance with the reasonable requirements of the CWA.
- DOT&PF will organize Project-related construction in anadromous streams to minimize adverse effects to salmon during critical life stages, when practicable. DOT&PF will incorporate timing windows as specified by the ADF&G Division of Habitat into construction contract specifications for in-stream work. DOT&PF will design and construct stream crossings so as not to impede fish passage or impair the hydrologic functioning of the waterbody.
- DOT&PF will implement EFH conservation measures as agreed upon with NMFS during the EFH consultation process for this Project.
- Based on preliminary engineering done to date, the newly built and replaced bridge crossings will be designed to minimize impacts on EFH by placing as few piles as feasible within or below ordinary high water. Designs will be continually evaluated to minimize impacts on EFH.
- DOT&PF will obtain federal permits required by Section 404 of the CWA and Section 10 of the Rivers and Harbors Act from the USACE prior to initiation of Project-related construction activities in wetlands and waterbodies. DOT&PF will also obtain necessary state permits and authorizations as required, and will incorporate stipulations into construction contract specifications.
- No vehicles or equipment will be fueled or serviced within 30.48 meters (100 feet) of wetlands, fish-bearing streams, or marine waters with the exception of “low-mobility” equipment used for pile driving, drilled shaft construction, or other bridge construction. An appropriate plan will be developed detailing the fueling process for this equipment, with materials to immediately contain and clean-up spilled petroleum products. Fuel will be stored a minimum of 30.48 meters (100 feet) from any waterbody or wetland.
- Spill response supplies adequate in type and quantity for the equipment being used on the property will be on site and readily accessible at all times.

- The Project will incorporate best management practices and compliance with applicable ADEC, USEPA, and U.S. Coast Guard requirements on contaminants and spill response to minimize the potential for fuel spills and contamination.
- An appropriate SWPPP and SPCC Plan will be developed for the Project prior to construction. The plans will include detailed fueling instructions and spill response protocols. NMFS will review the SPCC Plan prior to the start of construction.
- Contaminant-free embankment and surface materials will be used in construction.
- Stream banks where culverts and bridges would be replaced will be re-contoured and re-vegetated with native vegetation to minimize erosion and provide fish habitat.
- DOT&PF will be subject to USEPA and ADEC jurisdiction under the Alaska Pollutant Discharge Elimination System for stormwater discharges resulting from Project-related construction activities.
- To minimize impacts of construction noise on beluga whales and other ESA-listed marine mammals, in-water fill placement and uplands blasting will be conducted while PSOs are on site, and PSOs will be authorized to halt the activity if a beluga whale or other ESA-listed marine mammal is observed approaching or within the harassment isopleth for that activity. In-water fill placement or uplands blasting will not commence until the ESA-listed marine mammal has left the area.
- In-water fill placement and demolition will occur within 3 hours of low tide, as feasible, to minimize noise impacts on beluga whales and other ESA-listed marine mammals.
- In-water work will be effectively isolated to contain and minimize turbidity and sedimentation.

7 Recommended Effects Determination

7.1 Cook Inlet Beluga Whale

The Project **may affect** Cook Inlet beluga whales because:

- Cook Inlet beluga whales are known to occur in the action area during spring and fall when work would be occurring; and
- Uplands blasting and in-water fill placement may temporarily increase underwater noise in the action area to levels that may exceed Level B harassment thresholds as defined by NMFS under the MMPA.

The Project is **not likely to adversely affect** Cook Inlet beluga whales because:

- DOT&PF has committed to mitigation measures such as clearance and shutdown zones prior to and during in-water fill placement and uplands blasting to avoid disturbing beluga whales; and
- Use of vessels during construction is not anticipated.

Though the recommended effect determination is **not likely to adversely affect** Cook Inlet beluga whales, the potential adverse effects on Cook Inlet beluga whales are anticipated to be further reduced by the following measure:

- DOT&PF will require that in-water fill placement or upland blasting be delayed if a beluga whale is observed approaching the applicable shutdown zone.

7.2 Cook Inlet Beluga Whale Critical Habitat

A **may affect** determination is warranted for Cook Inlet beluga whale critical habitat because:

- The action area is located within designated critical habitat; and
- In-water fill placement and uplands blasting may temporarily increase underwater noise in portions of designated critical habitat.

A **not likely to adversely affect** determination is warranted for Cook Inlet beluga whale critical habitat because:

- The temporary and intermittent increase in underwater noise levels in a small portion of designated critical habitat would not result in measurable changes to habitat quality; and
- Observations of beluga whales near the Seward Highway during past in-water construction programs, such as the Seward Highway MP 75 to 90 project, suggest that beluga whales are not displaced from critical habitat due to underwater noise. Therefore, the Project is not expected to measurably change beluga whale use of critical habitat.

7.3 Steller Sea Lion

The Project **may affect** western DPS Steller sea lions because:

- Steller sea lions may occur in the action area during the proposed period of in-water work; and
- In-water fill placement and uplands blasting would temporarily increase underwater noise in the action area to levels that may exceed Level B harassment thresholds as defined by NMFS under the MMPA.

The SSH Project is **not likely to adversely affect** western DPS Steller sea lions because:

- DOT&PF has committed to mitigation measures such as clearance and shutdown zones prior to and during in-water fill placement and uplands blasting to avoid disturbing Steller sea lions;
- Use of vessels is unlikely.

Though the recommended effect determination is **not likely to adversely affect** Steller sea lions, the potential adverse effects on Steller sea lions are anticipated to be further reduced by the following measures:

- DOT&PF will require that in-water fill placement or upland blasting be delayed if a Steller sea lion is observed approaching the applicable shutdown zone.

7.4 Steller Sea Lion Critical Habitat

A **no effect** determination is warranted for western DPS Steller sea lion critical habitat because:

- The action area is not located in or near designated Steller sea lion critical habitat.

8 References

61N Environmental

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Appendix A. Project Plans and Map Set

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Project Plans and Map Set
Not Included in Submittal

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