

Marine Mammal Monitoring Report
Seward Highway MP 75-90, Geotechnical Activities
Turnagain Arm, Alaska
April 6 – June 7, 2015



Prepared for:



State of Alaska Department
of Transportation and Public Facilities
4111 Aviation Drive
Anchorage, Alaska 99519-6900

Prepared by:

HDR
2525 C Street, Suite 305
Anchorage, Alaska 99503

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Acronyms and Abbreviations

DOT&PF	Alaska Department of Transportation and Public Facilities
ESA	Endangered Species Act
hrs	Hours
mins	Minutes
MMPA	Marine Mammal Protection Act
MP	Milepost
NMFS	National Marine Fisheries Service
PSO	Protected Species Observer

1.0 INTRODUCTION

The Alaska Department of Transportation and Public Facilities (DOT&PF), in cooperation with the Federal Highway Administration, plans to make improvements to the Seward Highway between Milepost (MP) 75 and 90, which is between the south end of Turnagain Arm and Girdwood, Alaska, approximately 37 miles south of Anchorage. Improvements will include the construction of new bridges; expansion of the roadway; improvement of the curvature of the highway's alignment; construction of a new intersection and parking lots at MP 89.7; and resurfacing of the road in the project area. In spring 2015, DOT&PF completed geotechnical sampling to support design and construction activities. Borings tests were conducted from skid- or truck-mounted drill rigs at 26 locations below the mean high water elevation at five bridge sites in April and June 2015. These five bridges are located at the Placer River, Placer River Overflow, Portage Creek 1, Portage Creek 2, and Twentymile River (Figure 1-1).

Prior to beginning geotechnical work, DOT&PF consulted with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service to ensure that proposed project activities complied with the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA). Consultation determined that the Cook Inlet beluga whale (*Delphinapterus leucas*) is an ESA-listed species frequently observed within the project area. The western Distinct Population Segment of the Steller sea lion (*Eumetopias jubatus*), also an ESA-listed species, is rarely reported within the project area. Other marine mammals that could occur but have rarely been reported within the project area include killer whales (*Orcinus orca*) and harbor seals (*Phoca vitulina*, Attachment A). All marine mammals are protected under the MMPA.

Noise from in-water geotechnical activities could harm marine mammals protected under the ESA and MMPA if animals approach too closely to construction or sampling sites. NMFS has defined levels of harassment and "do-not-exceed" criteria for marine mammals to various sound sources under the MMPA (70 *Federal Register* 1871-75). For the purposes of geotechnical activities, all continuous noise was not expected to exceed the threshold of 120 decibels re 1 micro-pascal root mean square; therefore, the harassment threshold for this project was based on the impulse noise threshold of 160 decibels re 1 micro-pascal root mean square. For this project, the disturbance zone for 160 decibels was set at a 350-meter (1,150-foot) radius from the sound source.

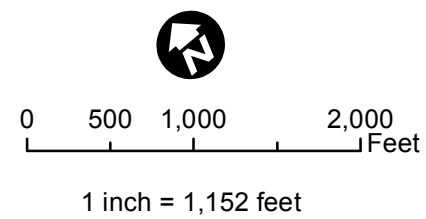
Based on the consultation with the NMFS, harassment of beluga whales within the 350 meters [1,150 feet] disturbance zone would be considered a "take" under the ESA (Title 16 United States Code § 1532) for the in-water geotechnical activities associated with this project. In order to mitigate possible incidental harassment of marine mammals, DOT&PF, acting on behalf of the Federal Highway Administration, implemented a number of mitigation measures as outlined in Letters of Concurrence with NMFS dated 26 February and 6 May 2015 (Attachment A). Foremost of these mitigation measures was the presence of protected species observers (PSOs) during all in-water geotechnical sampling. The purpose of the PSOs was to monitor and record the presence/absence of marine mammals and communicate their observations to the project superintendent. PSOs were authorized to halt geotechnical activities if a marine mammal(s) was

observed approaching the harassment zone. PSOs also determined when a marine mammal(s) had left the harassment zone and in-water geotechnical activities could recommence.

The purpose of this *Marine Mammal Monitoring Report* is to summarize the data collected during marine mammal monitoring efforts in association with geotechnical activities for the Seward Highway MP 75 to 90 Road and Bridge Rehabilitation Project.



- PSO Observation Locations
- Railroad
- Proposed Centerline



SEWARD HWY MP 75-90
 PROJECT OVERVIEW AND OBSERVATION
 LOCATIONS
 TURNAGAIN ARM
 DATE: 8/11/2015

FIGURE 1-1

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2.0 METHODS

2.1 Monitoring Methods

PSOs provided marine mammal monitoring during geotechnical activities at bridges along the Seward Highway, including the Twentymile River, Placer River, Placer River Overflow, Portage Creek 1, and Portage Creek 2. Each PSO completed project-specific training, which supported standardized and accurate observations and data collection. A clear authorization and communication system was in place to ensure PSOs and the drilling crew understood their respective roles and responsibilities.

PSOs worked in two-person teams to increase the probability of detecting marine mammals, confirm sightings, ensure PSO safety, and reduce observer fatigue. PSO breaks were planned to ensure that two PSOs were always on duty prior to and throughout the high-tide period to increase the probability of detecting marine mammals, maximize data collection, and improve efficiency in clearing the harassment zone once animals left the area.

At the start of a shift, PSOs began observing for marine mammals within the 350-meter (1,150-foot) harassment zone for 30 minutes prior to the commencement of in-water work. During the 30 minutes, one PSO remained downstream while the other moved upstream to clear the entire harassment zone. After 30 minutes, when the PSOs were certain that the harassment zone was clear of marine mammals, they authorized in-water work to begin. Once the upstream area was cleared, both PSOs remained on the downstream side (unless beluga whales were present).

Under the LOC issued on 6 May 2015, DOT&PF were allowed to continue ongoing in-water work during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring of the entire 350 meter harassment zone, provided both the in-water activities and marine mammal monitoring continued.

During in-water work, PSOs monitored the outer edge of the harassment zone to ensure that no marine mammals approached. Observers scanned the water at least every 15 minutes from horizon to horizon with high-quality 7 x 50 millimeter binoculars, and used the naked eye to scan the remainder of the time. A high-powered spotting scope was also available for scanning greater distances at the Twentymile River observation location. Observers positioned themselves at optimal locations at each bridge to ensure beluga whales were observed prior to entering the harassment zone (Figure 1-1). For example, at Twentymile Bridge, approximately 1.5 to 2 hours before high tide one observer would walk out to the lookout location (Figure 1-1). This allowed PSOs to notify the drilling crew that beluga whales or other marine mammals were in the area and headed toward Twentymile River. The drilling crew was then prepared to shut down quickly. The lookout observation location was only used for Twentymile River observations.

When beluga whales were observed swimming upstream past the Twentymile River highway bridge, one PSO would remain downstream at the observation location while the other traveled upstream to observe the group. The PSO upstream recorded the distance beluga whales were observed swimming upstream. The same PSO would remain upstream until all beluga whales

were observed swimming downstream and the harassment zone area had been cleared. PSOs continued to sweep the water with binoculars and the naked eye to identify other marine mammals potentially entering the area, while continuing to monitor and track the first group sighted.

2.2 Shutdown Procedures

When marine mammals swam on a trajectory that could take it into the 350-meter (1,150-foot) harassment zone, the PSO authorized the immediate shutdown of in-water activities before the marine mammals entered the harassment zone. PSOs communicated through a two-way radio or cell phone with the drilling crew to shut down in-water geotechnical activities. If marine mammals were likely to enter the harassment zone, shutdown notification included a buffer to ensure that a submerged animal did not enter the harassment zone unnoticed. Once a shutdown had been initiated, in-water activities did not restart until the animal(s) had moved outside of the harassment zone or had not been seen for 30 minutes. The PSO notified the drilling crew when work could recommence.

2.3 Data Collection

PSOs used iPads with a marine mammal monitoring application and Global Positioning System capabilities to document communication with the drilling crew, environmental conditions, and marine mammal observations. Hardcopy forms were available in the field if any technical failures occurred. PSOs recorded monitoring efforts and all communication with the drilling crews, including startup and shutdown notifications. Data were checked for quality assurance and quality control daily by PSOs and weekly by the lead PSO.

Environmental conditions were documented at the beginning and end of each monitoring period and every half hour or as conditions changed. Data collected included PSO name(s), location of the observation station, time of observation, sea state (determined by wave height), amount of glare, weather conditions, and visibility in meters (see Attachment B).

When a marine mammal(s) was sighted, PSOs recorded the time when the animal(s) was first sighted and used a range finder and binoculars to determine the animal's distance and direction or bearing. Since the PSOs were typically not standing at the exact location of in-water activities, the iPad application calculated the location of the animal in relation to the in-water construction activities and the harassment zone based on the distance and bearing. The PSOs recorded the species sighted, number of individuals, age class or color classification, behavior and movement, and distances from project activities to the sighting (see Attachment B). If beluga whales traveled upstream, PSOs tracked and recorded the distance they traveled upstream on a hardcopy map.

3.0 RESULTS

3.1 Monitoring Effort

Marine mammal monitoring occurred during in-water geotechnical work in April and June. Monitoring occurred in April over 20 days between the hours of 0645 and 1931 at four bridge locations: Twentymile River, Placer River Overflow, Portage Creek 1, and Portage Creek 2. No monitoring or geotechnical work was completed during nighttime hours (Table 3-1).

In June, monitoring occurred over 7 days at the Placer River Bridge, typically 24 hours per day, unless in-water work was temporarily halted due to changes in drilling holes and tidal influences (Table 3-2). A total of 380 hours and 28 minutes of monitoring occurred during in-water geotechnical activities (Table 3-1 and Table 3-2).

Table 3-1: April Marine Mammal Monitoring Effort for Seward Highway MP 75-90, Geotechnical Activities

Start time – End Time (Duration, hrs:mins)				
Day	Twentymile	Placer Overflow	Portage Creek 1	Portage Creek 2
April 6	0915 – 1145 (02:30)	-	-	-
April 7	0922 – 1139 (02:17)	-	-	-
April 8	0847 – 1858 (10:10)	0832 – 1931 (10:59)	-	-
April 9	0700 – 1840 (11:40)	0716 – 1835 (11:18)	-	-
April 10	0659 – 1852 (11:53)	0807 – 1900 (10:53)	-	-
April 11	0700 – 1413 (07:12)	0645 – 1500 (08:15)	-	-
April 13	0829 – 1857 (10:28)	0828 – 1900 (10:32)	-	-
April 14	0700 – 1757 (10:57)	0643 – 1115 (04:32)	-	-
April 15	0659 – 1815 (11:15)	-	0745 – 1830 (10:44)	-
April 16	0655 – 1900 (12:05)	-	0700 – 1547 (08:46)	-
April 17	0700 – 1332 (06:32)	-	-	-
April 19	0820 – 1811 (09:51)	-	-	-
April 20	0704 – 1817 (11:13)	-	-	-
April 21	0700 – 1618 (09:17)	-	-	-
April 22	0700 – 1840 (11:39)	-	-	-
April 23	0700 – 1235 (05:35)	-	-	1608 – 1855 (0247)
April 24	-	-	-	0657 – 1741 (10:44)
April 25	-	-	-	0702 – 1156 (04:54)
April 27	-	-	-	0828 – 1830 (10:01)
April 28	-	-	-	0641 – 1235 (05:54)
Total	144 hrs 33 mins	56 hrs 29 mins	19 hrs 30 mins	34 hrs 20 mins

Table 3-2: June Marine Mammal Monitoring Effort for Seward Highway MP 75-90, Geotechnical Activities

Start time – End Time (Duration, hrs:mins)	
Day	Placer River
June 1	0729 – Midnight (16:31)
June 2	Midnight - Midnight (24:00)
June 3	Midnight – Midnight (24:00)
June 4	Midnight – 1200 (12:00)
June 5	1100 – Midnight (13:00)
June 6	Midnight – Midnight (24:00)
June 7	Midnight – 1205 (12:05)
Total	125 hrs 36 mins

3.2 Environmental Conditions

Table 3-3 summarizes the environmental conditions for observation location both an average and a range are provided for the sea state, glare, visibility and cloud cover. Environmental conditions during April varied from sunshine to steady snow. Visibility decreased during periods of increased glare over the waters across Cook Inlet and during periods of steady rain and snow. Weather conditions varied occasionally from one bridge to another when both crews were working. For example, Twentymile River observation location could experience overcast skies while Placer River Overflow Bridge experienced snow that reduced visibility.

In June, weather conditions at Placer River were consistent throughout the 7 days of monitoring, with light to steady rain and occasional periods of overcast skies. Weather conditions there were slightly better, with partly cloudy skies for a few hours of monitoring, on day 1 and day 7 of monitoring. Visibility throughout the 24-hour monitoring periods decreased during periods of steady rain and nighttime hours.

Although visibility was occasionally reduced, in-water geotechnical activities were never shut down due to weather conditions.

Table 3-3: Environmental Conditions

Location	Days of Monitoring	Days Rain Occurred	Days Snow Occurred	Weather Conditions	Average/Range			
					Sea State	Glare (%)	Visibility (m)	Cloud Cover (%)
Twentymile River	16	10	7	Overcast, Light Rain, Steady Rain, Partly Cloudy, Light Snow, Snow, Sunny	1	6	1,394	71
					0 - 3	0 - 75	350 – 2,000	0 - 100
Placer River Overflow	6	3	4	Overcast, Light Rain, Steady Rain, Partly Cloudy, Light Snow, Snow, Sunny	1	0	880	63
					0 - 1	0 - 40	200 – 1,000	5 - 100
Portage Creek 1	2	1	0	Light Rain, Overcast, Partly Cloudy	0	0	1,469	100
					0	0	1000 – 2,000	100
Portage Creek 2	4	1	0	Sunny, Partly Cloudy, Overcast, Light Rain	1	0	1,016	66
					0 - 2	0 - 10	800 – 1,200	0 - 100
Placer River	7	7	0	Light Rain, Steady Rain, Partly Cloudy, Overcast	0	0	835	95
					0 - 1	0 - 20	100 – 1,500 ^a	20 - 100

^aVisibility less than 350 meters occurred during dusk and nighttime hours.

Note: m = meters.

3.3 Marine Mammal Observations

Marine mammals observed during monitoring efforts included Cook Inlet beluga whales, harbor seals, harbor porpoises (*Phocoena phocoena*), and one dead minke whale (*Balaenoptera acutorostrata*). NMFS was contacted immediately with the location of the dead minke whale. Beluga whales, harbor porpoises, and harbor seals were observed during monitoring efforts at Twentymile River. A harbor seal and the dead minke whale were recorded during Portage Creek 2 monitoring efforts as was one sighting of beluga whales that were located toward the mouth of Twentymile River. No marine mammals were observed during Placer River Overflow, Portage Creek 1, and Placer River monitoring efforts. Table 3-4 and Table 3-5 summarize marine mammal observations during monitoring efforts for the Seward Highway MP 75-90 geotechnical activities. Figure 3-1: Marine Mammal Observations displays the initial sighting location of all marine mammals observed and the farthest upstream beluga whales were documented. Letters listed in the figure are the group letter mentioned in Table 3-4 and Table 3-5.

No marine mammal takes occurred during in-water geotechnical activities; shutdown of all in-water geotechnical activities occurred prior to animals entering the harassment zone.

3.3.1 Cook Inlet Beluga Whales

Beluga whales were observed on 15 of the 16 days of monitoring at Twentymile Bridge; (6 April–23 April); however, one observation of beluga whales at Twentymile River (on 24 April 2015) came from monitoring efforts at the Portage Creek 2 monitoring location (Table 3-4). Beluga whales were also observed twice on two separate days during both high tides at the Twentymile River. Even though no in-water activities occurred at night (at Twentymile Bridge), roadway flaggers present throughout the night mentioned they could hear beluga whales breathing during nighttime hours. Beluga whales were initially observed from the Twentymile River observation location a maximum of 2 hours and 9 minutes prior to the estimated high tide at Twentymile River. Attachment B provides a summary of high tides and beluga whale presence within the Twentymile River (Figure 3-1).

There were 18 observations of beluga whale groups, with each group size ranging from 3 to 30 animals. White, gray, and dark gray animals were recorded. The coloration of a beluga whale may indicate age class (Blees et al. 2009). Calves, indicated by their dark coloration, were recorded in 14 of the group sightings. The majority of calf sightings seemed to be young born the same year based on their small size, dark coloration, and inseparable proximity to the adult white beluga whales. PSOs photographed some of the calves observed (see Attachment C). Research has shown that the color of a beluga whale may be perceived as white or gray, depending on the environmental conditions. This should be taken into consideration when using color to ultimately assess the age class of beluga whales observed (Blees et al. 2009).

In general, beluga whales were observed traveling and milling, and occasionally suspected of feeding. There was no observed change in behavior due to in-water geotechnical activities. Beluga whales typically traveled along the deepest channels; these were usually the only areas with water a few hours before high tide. Sometimes beluga whales were observed traveling quickly and directly from Turnagain Arm into Twentymile River, and upstream, while at other

times they were observed milling in Turnagain Arm and at the mouth of Twentymile River before traveling into the river. Beluga whales did not always surface frequently when traveling or milling, which made it difficult at times for PSOs to determine group numbers, track whales at a distance, and determine when beluga whales had traveled upstream. Beluga whales were also observed traveling just below the surface, occasionally creating a slight wake or footprint.

During 13 of the sightings, beluga whales were observed traveling upstream in the Twentymile River, past both the highway bridge and the railroad bridge, and beyond the 350-meter (1,150-foot) harassment zone. Beluga whales were documented swimming around a bend in the river on several occasions, up to approximately 1,330 meters (4,364 feet) upstream. This made it difficult for the upstream PSO to observe them without walking around the river bend, which sometimes was obstructed by small side channels. Therefore, beluga whales may have traveled farther upstream than indicated during each sighting.

Twentymile River has a frequently used recreational boat launch and parking lot located next to the bridge. On 9 April 2015, a fisherman was dip-netting for hooligan from the rocks at the boat launch while the whales were in the vicinity. There was no observed reaction to the fisherman. On 10 April 2015 at 1220, approximately three beluga whales were observed upstream from the highway bridge. A small motorboat traveling from upstream to downstream seemed to startle the animals. The whale farthest upstream was observed surfacing and quickly diving. The motorboat came to a stop to watch for the whales, but they did not reappear. The second PSO, located downstream, observed the three whales quickly exiting from underneath the bridge at 1224, and the whales continued to leave the Twentymile River heading towards Turnagain Arm. The beluga whales did not return after leaving the harassment zone. This was the only observed change in behavior during monitoring efforts.

On thirteen occasions, in-water work was shut down due to the presence of beluga whales. On three additional occasions work was already shutdown for other stop-work occurrences, including changes in drilling holes, shifts ending, equipment breakdown delays, weather conditions, or other reasons when beluga whales were initially sighted. Table 3-4 indicates the duration of each shutdown. Shutdowns typically occurred when beluga whales were at the mouth of Twentymile River to ensure the animals did not enter the harassment zone during in-water activities.

3.3.2 *Other Marine Mammals*

Harbor porpoises were observed on 1 day of monitoring. Three harbor porpoises were observed from the lookout observation location swimming against the current at 1456 on 21 April 2015. About an hour later, at 1602, one harbor porpoise was observed within the Twentymile River approximately 621 meters (2,037 feet) from in-water activities (at the highway bridge). About 5 minutes later and 600 meters (1,969 feet) away from the bridge, the harbor porpoise turned around and left the Twentymile River. These animals were observed just before low tide, which occurred at approximately 1746 that day. No shutdown notification was initiated because, at the time, in-water work had already ceased due to an equipment breakdown.

Harbor seals were observed eight times, once at Portage Creek 2 and five times at the Twentymile River observation location; the remaining two observations occurred only at the lookout observation location. Each sighting included one individual. In general, observations were concurrent with or near the time that beluga whales were present, except for the sighting of a harbor seal in Portage Creek 2, when no beluga whales were present. One harbor seal was documented upstream of the Twentymile River bridge, approximately 375 meters (1,230 feet) from in-water work.

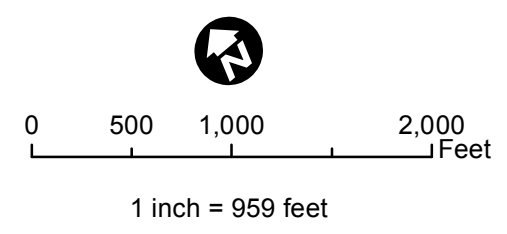
In general, in-water work was already shut down for beluga whales when harbor seals were observed. However, on 15 April, in-water work was stopped initially by a harbor seal at 1716, and beluga whales were observed less than 15 minutes after work was stopped. Drilling crews decided to end their shift early that day. When a harbor seal was observed in Portage Creek 2, the drilling crew was on break when shutdown would have been initiated.

On April 27, PSOs observed eagles feeding on the carcass of a minke whale approximately 1 mile away from the mouth of Portage Creek 2 (near MP 77). NMFS was contacted immediately regarding the stranding.

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- | Common Name | | ● PSO Observation Locations |
|-------------------|-----------------------|-----------------------------|
| ● Beluga Whale | — Railroad | |
| ● Harbor Porpoise | — Proposed Centerline | |
| ● Harbor Seal | | |
| ● Minke Whale | | |
| ● Upstream Extent | | |



SEWARD HWY MP 75-90
 MARINE MAMMAL OBSERVATIONS
 TURNAGAIN ARM
 DATE: 8/11/2015

FIGURE 3-1

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Table 3-4: Beluga Whale Observations at the Twentymile River

Group	Day	Initial Sighting Time ^a	Initial Sighting Time at Lookout Location	Duration of Sighting (hrs:mins)	White	Gray	Dark Gray	Unkn.	Total Count	Entered 350 – meter H Zone	Shutdown Duration (hrs:min)	Initial Sighting Distance ^b (m)	Closest Distance (m)	Distance Traveled Upstream ^c (m)	Behavior
A	April 6	9:00 ^d	-	2:45	3	4	1	0	8	Yes	1:10 ^e	23	<5	681	Travel, Mill
B	April 8	9:30	-	2:27	7	7	2	0	16	Yes	2:46	1652	<5	1,268	Mill, Travel
C	April 9	10:11	9:45	1:15	6	2	2	0	10	Yes	1:40	676	<5	600	Travel, Suspected Foraging
D	April 10	10:50	10:30	1:52	4	2	1	0	7	Yes	2:13	1,700	<5	321	Mill Suspected Foraging
E	April 11	12:28	12:10	0:59	2	1	1	0	4	No	- ^e	1,419	1,000	-	Travel, Mill
F	April 13	16:08	15:02	0:18	-	-	-	3	3	No	-	1,954	1,600	-	Travel, Mill
G	April 14	17:24	16:18	0:02	-	-	-	3	3	No	-	825	825	-	Travel
H	April 15	7:00 ^d	-	0:10	3	0	0	0	3	Yes	0:58	35	<5	100	Travel
I	April 15	17:28	17:13	1:15	14	4	2	0	20	Yes	- ^e	439	<5	1,301	Mill, Travel
J	April 16	7:01 ^d	-	0:29	8	10	1	0	19	Yes	1:11	121	<5	748	Travel, Swim
K	April 16	18:16	-	0:24 ^f	4	10	1	0	15	Yes	- ^e	757	<5	765	Travel, Mill
L	April 17	7:01 ^d	-	1:43	8	10	3	9	30	Yes	2:22	112	<5	1,330	Travel
M	April 19	9:40 ^{dg}	-	1:00	12	11	1	3	27	Yes	1:42 ^e	684	50	22	Travel, Swim
N	April 20	7:59	-	2:34	9	8	3	0	20	Yes	2:38	407	<5	589	Travel, Mill
O	April 21	8:42	-	1:57	6	4	2	0	12	Yes	2:36	786	<5	959	Travel, Mill
P	April 22	9:15	9:00	3:18	4	8	1	0	13	Yes	3:35 ^e	1,708	<5	1,172	Travel, Mill
Q	April 23	10:58	10:00	1:36	6	5	1	0	12	No	0:16 ^e	1,667	350	-	Travel, Mill
R	April 24	13:05	-	0:34	10	0	0	0	10	No	0:35 ^e	1,500	1,500	-	Suspected Foraging, Porpoise
Total		-	-	24:38	106	86	22	18	232	-	23:42	-	-	-	-

^aInitial sighting time is the time when the PSO at the Twentymile River observation location spotted beluga whales.

^bInitial sighting distance for observer standing at Twentymile River observation location, .

^cApproximate distance beluga whales were observed upstream from the bridge. At times observers were not able to see around the river bend, beluga whales may have traveled farther upstream than indicated. Also, beluga whales were sometimes already present and upstream when observations began. Distances upstream are not calculated based on a straight line; they were adjusted for the bend in the river.

^dBeluga whales were present when monitoring effort began.

^eIn-water work was stopped for reasons other than marine mammal presence for some or all of the sighting duration.

^fBeluga whales were still present in Harassment Zone when PSOs stopped observing 30 minutes after in-water construction work had ended.

^gWhen PSOs started observations at 8:20, drilling crew had mentioned that two beluga whales had been observed upstream at 7:45. Beluga whales were far upstream beyond the bend, out of sight; therefore, PSO's initial sighting time was 9:40 when beluga whales began to make their way downstream.

Table 3-5: Other Marine Mammal (Harbor Seal, Harbor Porpoise, and Minke Whale) Observations

Group	Date	Species	Initial Sighting	Initial Sighting Time at Lookout Location	Duration (hrs:mins)	Observation Location	Total Count	Entered H Zone	Initial Sighting Distance^a (m)	Closest Distance (m)	Behavior
S	April 11	Harbor Seal	13:17	-	0:25	Twentymile	1	Yes	297	100	Swim, Look
T	April 13	Harbor Seal	-	14:56	0:10	Lookout	1	No	-	-	Travel, Swim
U	April 14	Harbor Seal	17:24	16:18	0:05	Twentymile	1	No	418	400	Rest
V	April 15	Harbor Seal	17:10	16:45	1:20	Twentymile	1	Yes	1841	350	Look, Travel
W	April 19	Harbor Seal	10:30	-	0:14	Twentymile	1 ^b	Yes	375	20	Curious, Look
X	April 19	Harbor Seal	11:15	-	0:12	Twentymile	1 ^b	Yes	551	200	Porpoise, Play
Y	April 21	Harbor Porpoise	-	14:56	0:10	Lookout	3 ^c	No	1902	-	Travel
Z	April 21	Harbor Porpoise	16:02	14:56	0:05	Twentymile	1 ^c	No	621	600	Travel
AA	April 24	Harbor Seal	13:18	-	0:21	Portage Creek 2	1	Yes	677	20	Swim, Look
BB	April 27	Minke Whale	13:32	-	-	Portage Creek 2	1	No	1720	1720	Dead ^d

^aDistance from construction activities to animals. Initial distance is from PSO stationed at bridge location, not from lookout location.

^bInitial sighting time is the time the PSO at the bridge (not at the lookout observation location) first spotted animals. Multiple sightings of this harbor seal.

^cThree harbor porpoises were observed from the lookout observation location swimming against the current. About an hour later one harbor porpoise was observed within Twentymile River.

^dSighted approximately 1 mile from the mouth of Portage Creek, was dead on mudflats. Believed to be a minke whale.

4.0 DISCUSSION

The presence of marine mammals during monitoring efforts for the Seward Highway MP 75 to 90 geotechnical activities was greater than expected. NMFS has maintained a database of all opportunistic sightings of beluga whales within Cook Inlet since 2008; beluga whales had been documented near Twentymile River only twice, in late April 2012 (Attachment A). The monitoring effort for geotechnical activities has expanded previous knowledge about the presence and frequency of beluga whales near and upstream of the Twentymile River. Beluga whales were present almost daily during monitoring efforts and were consistently observed swimming upstream, milling, and potentially feeding. There was no observed change in behavior due to geotechnical activities.

The closest National Oceanic and Atmospheric Administration water level station used for tide prediction and verification is located in Anchorage, Alaska (station 9455920, NMFS 2015). Based on PSO observations of the tide during monitoring efforts, high tide occurred at the Twentymile River approximately 1 hour after high tide predictions in Anchorage. A summary of high tides and the presence of beluga whales is located in Attachment B. PSOs noticed that during tides with a lower high tide height, beluga whales were first sighted closer to high tide and typically stayed toward the channel mouth of the Twentymile river. On days when the high tide height was greater, beluga whales were first observed 1 to 2 hours before high tide and would travel upstream past the bridges.

Previously, harbor seals and harbor porpoises had rarely been documented within the project area (Attachment A). Harbor seals were observed several times in the presence of beluga whales. Harbor porpoises were also observed in Turnagain Arm and the Twentymile River right before low tide. Recreational activities on the Twentymile River include fishing, pack rafting, and sightseeing trips. Fishing for eulachon (also known as hooligan, *Thaleichthys pacificus*) and coho salmon (*Oncorhynchus kisutch*) are the most common activities conducted at the river, followed by sightseeing (USDA 2010). Hooligan fishing in the Twentymile River opens April 1; however, the run does not typically pick up until late April and peaks in mid- to late May (ADF&G 2015). Coho salmon fishing occurs in late July to August (USDA 2010). Motor boats may affect beluga whale behavior in the river, as PSOs documented a change in behavior when a motor boat approached.

Our observations of beluga whales, harbor seals, and harbor porpoises indicate a higher level of marine mammal activity than indicated by previous opportunistic sightings. There are several possible scenarios why there have been low opportunistic sightings in the past. The public may not know they can report sightings or feel obliged to do so. Beluga whale presence near and upstream of the Twentymile River may occur more frequently before the hooligan run peaks and the public has an increased presence. Large crowds may deter beluga whales from traveling far upstream, keeping them toward the mouth of the Twentymile River. Until further research is conducted, these questions will remain unanswered.

The monitoring effort for the Seward Highway MP 75 to 90 geotechnical activities was successful in complying with the Letters of Concurrence, MMPA, and ESA. Having a team of

two PSOs located at each bridge allowed PSOs to place themselves at optimal locations to ensure marine mammals were identified early and shutdown notifications were communicated in a timely manner. It also allowed PSOs to observe groups of marine mammals as they traveled upstream and clear the upstream and downstream harassment zones once animals left the vicinity.

5.0 REFERENCES

- ADF&G (Alaska Department of Fish & Game). 2015. Area Sport Fishing Reports: Anchorage. https://www.adfg.alaska.gov/sf/FishingReports/index.cfm?ADFG=R2.summary&Area_key=1&RecordID=4
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- NMFS (National Marine Fisheries Service). 2015. Verified Tide and water levels for Anchorage Station. <http://tidesandcurrents.noaa.gov/waterlevels.html?id=9455920>
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Attachment A

Letters of Concurrence

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**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

February 26, 2015

Sandra Garcia-Aline
Division Administrator
Federal Highway Administration
P.O. Box 21648
Juneau, Alaska 99802-1648

Re: Seward Highway MP 75-90, for Geotechnical Activities, Turnagain Arm, Alaska; AKR-2015-9426

Dear Ms. Garcia-Aline:

The National Marine Fisheries Service (NMFS) has completed informal consultation with the Federal Highway Administration (FHWA) under section 7(a)(2) of the Endangered Species Act (ESA) regarding proposed geotechnical sampling to support the design and construction of the Seward Highway milepost (MP) 75-90 road and bridge rehabilitation. Geotechnical sampling is proposed to occur between March 1 and April 30, 2015 at a total of 26 boring locations that are below the mean high water (MHW) elevation. On June 3, 2014, FHWA sent NMFS a letter that designated the Alaska Department of Transportation and Public Facilities (ADOT) as their agent for all ESA informal consultations necessary to facilitate the Federal Aid Highway Program in Alaska. The FHWA has determined that this project may affect, but is not likely to adversely affect, endangered Cook Inlet beluga whales (*Delphinapterus leucas*) or their critical habitat.

NMFS received your request for consultation on December 30, 2014, as well as the Biological Assessment of December 2014. NMFS has reviewed your request, Biological Assessment, applicable scientific literature, and other sources of information. Based on our analysis of this information, NMFS concurs with your determination that this project is not likely to adversely affect Cook Inlet beluga whales or their critical habitat. A complete administrative record of this consultation is on file in this office.

DESCRIPTION of the PROPOSED ACTION and ACTION AREA

The proposed road and bridge rehabilitation project starts at MP 75 (the north end of Turnagain pass) where it follows the southern route of Turnagain Arm and ends near the intersection with the Alyeska Highway at MP 90 (Girdwood), approximately 37 miles south of Anchorage (Figure 1). Included in the project area are: Portage Glacier Road intersection, Twentymile River boat launching area, and Alaska Railroad Portage Station. The Seward Highway parallels the coastline of the upper Turnagain Arm and crosses Glacier Creek, Kern Creek, Peterson Creek, Twentymile River, Portage Creek, Placer River, Ingram Creek, and several unnamed streams between MP 75-90.



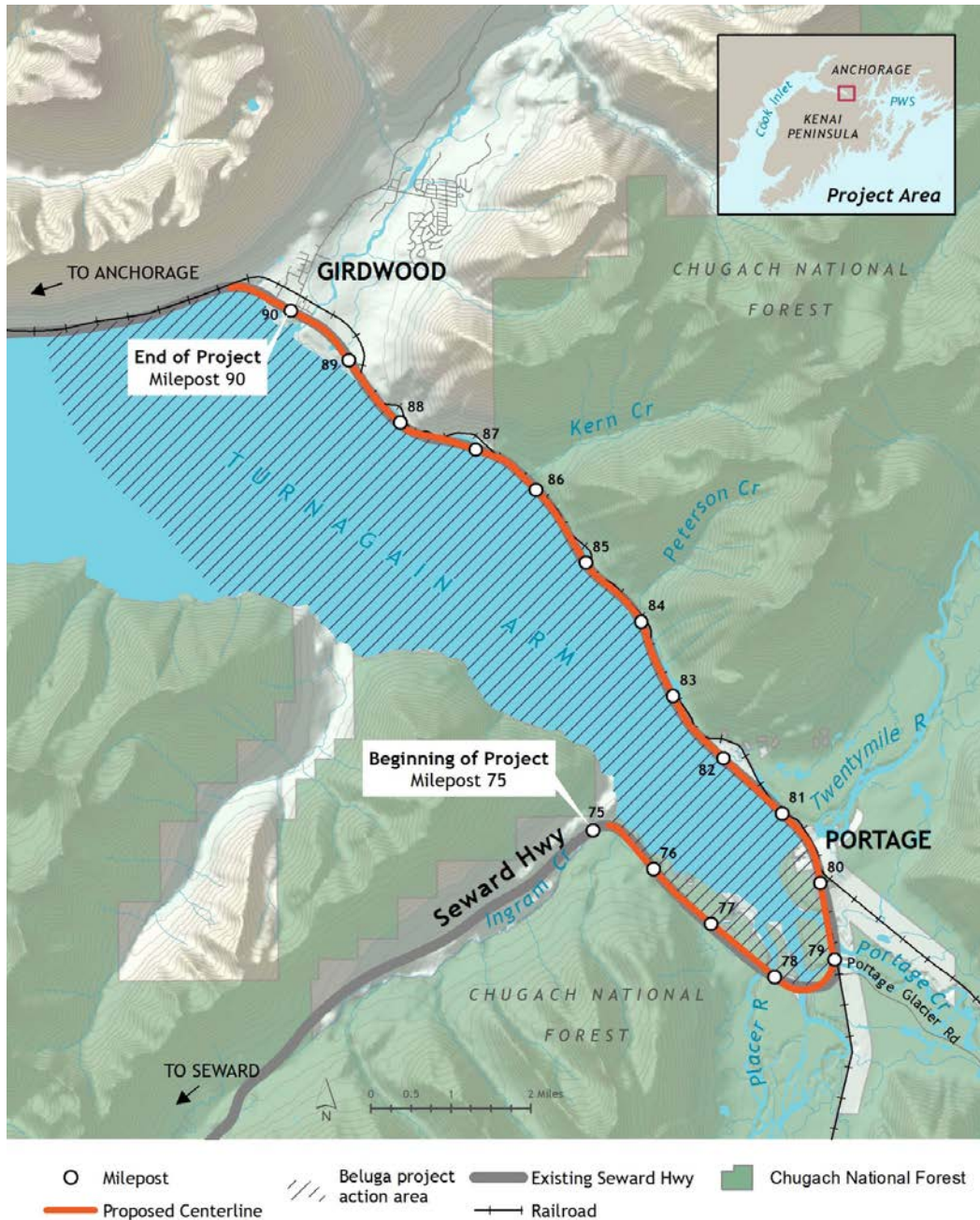


Figure 1. Project area (orange line with mile markers) and project action area (black diagonal lines).

DOT proposes to complete geotechnical sampling to support the design and construction of the Seward Highway MP 75-90 road and bridge rehabilitation project. Geotechnical sampling is proposed to occur between March 1 and April 30, 2015 at a total of 26 boring locations, below the MHW elevation, at five bridge sites and one roadway site.

Geotechnical work would consist of borings and soil penetration tests. A skid or truck mounted drill rig with a hollow-stem auger would be used for both borings and soil penetration tests. The

geotechnical sites located within critical habitat are primarily associated with new bridge locations in southeast Turnagain Arm, which include:

- Placer River
- Placer River Overflow
- Portage Creek #1
- Portage Creek #2
- Twentymile River

One geotechnical site that is not associated with a new bridge location, but is located below MHW (within critical habitat) and adjacent to the existing roadbed, would be drilled during low tide conditions.

Geotechnical activities for new bridge alignments at Placer River Overflow, Portage Creek #1, Portage Creek #2, and Twentymile River would occur below MHW from existing bridge decks and would include drilling through the surface of the bridge. Geotechnical drilling for a new bridge at Glacier Creek would be conducted from the existing bridge and would occur above the MHW but within the creek. No in-water drilling work would occur at Ingram Creek, Peterson Creek, Kern Creek, or Virgin Creek.

At Placer River, in addition to working from the existing bridge deck, geotechnical activities for a new bridge alignment would require placing the drill rig on a platform in the water upstream from the existing bridge. The platform would consist of either a floating, segmented flexible barge system or a landing craft. If a barge system were used, it would be positioned using skiffs with outboard motors and held in place by using three or four anchors controlled by independent winches. The same skiffs would be used to transport personnel from a staging area (likely at the Seward Highway pullout adjacent to the Placer River) to and from the platform. Because some borings are in areas affected by tides, it is possible that the platform would be grounded during low tide periods. Because a floating platform is needed to drill at the Placer River, work must be done during ice-free conditions; this is expected to occur during early spring 2015.

Borings

Depending on subsurface conditions, two boring methods will be used in Turnagain Arm:

- Cased rotary drilling operations: this process would use water or National Science Foundation (NSF)-certified drilling fluids and a drill casing. The cased rotary drilling method would not discharge drill cuttings at the mud/water interface, as all drill cuttings would come to the surface and not enter the water.
- Hollow stem auger drilling operations: this process would not use drilling fluids and or a casing, which results in releasing the native soil drill cuttings at the mud/water interface. Instead, it involves the use of an auger that displaces cuttings up the outer flutes of the drill and allows soil sampling instruments to pass through the center of the hollow stem auger to take undisturbed soil samples.

Based on recently completed upland drilling operations near the action area, both methods are expected to be equally used.

Each cased rotary drilling operation would use a casing that separates the drilling accessories and samples from the aquatic environment, to control and contain fluids and sediments. The casing has a maximum outside diameter of 8 inches (20.3 centimeters [cm]) and extends from a minimum of approximately 2 feet (ft.) (0.6 meters[m]) above the highest expected water level to approximately 30 ft. (9 m) below the mud line. Placement of the casing to this depth below the mud line creates a seal, captures cuttings, recirculates drill fluids, and prevents disturbance to the surrounding sediments.

Depending on bridge length and the associated number of bridge piers, 4-6 borings and 4-6 discrete penetrometer tests (DPT) would be used to collect geotechnical data. Borings associated with bridge piers and abutment foundations would be advanced to 100-250 ft. (30-76 m) below ground surface. The borings associated with the general road bed would be advanced to 15 ft. (5 m) below ground surface. The nominal outer diameter of the drilling casing would be approximately 8 inches (20.3 cm).

For each hollow stem boring, native soils and drill cuttings would be released at the mud line and dispersed by the water currents. Native substrate material is expected to consist of silt, sand, clay, and alluvial gravels. Only water or NSF certified drilling fluids for drinking water wells would be used.

The maximum volume of cuttings from each boring is estimated to be about 0.5 cubic yards (0.4 cubic meters), with less material for holes less than 250 ft. (76 m) deep. Borings below ordinary high water would be backfilled with hydrated bentonite chips or bentonite grout. The duration for each drill hole is estimated to vary between one 12-hour shift and seven or eight 24-hour shifts (3.5-4 days) for deeper borings.

Soil Penetration Tests

Two types of soil penetration tests would be performed: standard penetration tests (SPTs) and DPTs. One SPT and one DPT would be completed at each bridge foundation element, such as an abutment or bridge pier. The system to complete SPTs and DPT is composed of a 140 pound (52 kilograms [kg]) hammer dropping 30 inches (0.8 m) onto a 3 inch (8 cm) diameter steel rod. The energy associated with the hammer is 375 foot pounds (508 joules), significantly less than the energy from pile driving hammers, which is usually greater than 100,000 foot pounds (135.6 kilojoules).

SPTs are completed at approximately 5 ft. (1.5 m) intervals. SPTs would be performed within cased borings by driving a sampling tube into the soils underlying the casing bottom. The sampling tubes range in length from approximately 19 to 32 inches (48.3 to 81.3 cm). The tube is pushed approximately 18 inches (45.7 cm) into the soil. SPTs are performed by using a split barrel sampling tube with an approximately 2 inch (51 millimeters [mm]) outside diameter. After the tube is removed from the boring, the split barrel of the tube is typically opened and the sample is removed from the tube and processed on the platform. In a typical boring, it takes approximately 25 hammer blows (1-2 minutes) to drive the spoon 1 ft. (0.3 m). On average, there are 1-2 SPT tests per hour; once depths of 100 ft. (30 m) are reached, SPT sample frequency decreases to one test every 2-3 hours.

DPTs are not conducted within a boring. DPT sampling is conducted with a blunt tipped rod that is driven into the soil. The same system, consisting of a 140 pound (52 kg) hammer dropping 30 inches (0.8 m) onto a 3 inch (8 cm) diameter steel rod, is used. However, the rods are driven continuously to 100 ft. (30.5 m) or refusal, which takes approximately 6-8 hours, and blows per foot are recorded. The refusal criterion for a DPT is 1,000 blows per ft. and for a SPT is 50 blows per 0.5 ft.

Action Area

The action area is defined in the ESA regulations (50 CFR 402.02) as the area within which all direct and indirect effects of the project will occur. The action area is distinct from and larger than the project footprint because some project elements may affect listed species some distance from the project footprint. The action area, therefore, extends out to a point where no measurable effects from the project are expected to occur.

Since 1997 NMFS has used generic sound exposure thresholds to determine whether an activity produces sounds that might result in impacts to marine mammals (70 FR 1871). NMFS is currently developing comprehensive guidance on sound levels likely to cause injury and behavioral disruption to marine mammals. However, until such guidance is available, NMFS uses the following conservative thresholds of sound pressure levels¹, expressed in root mean square² (rms), from broadband sounds that cause behavioral disturbance. NMFS uses the following conservative thresholds for sound pressure levels that cause behavioral disturbance, referred to as Level B harassment under section 3(18)(D) of the Marine Mammal Protection Act (MMPA):

- impulsive sound (in-water): 160 dB re 1 $\mu\text{Pa}_{\text{rms}}$
- continuous sound (in-water): 120 dB re 1 $\mu\text{Pa}_{\text{rms}}$
- continuous and impulsive sound (in-air): 100 dB re 20 $\mu\text{Pa}_{\text{rms}}$ for harbor seals, 90 dB re 20 $\mu\text{Pa}_{\text{rms}}$ for all other pinnipeds

NMFS uses the following conservative thresholds for underwater sound pressure levels that cause injury, referred to as Level A harassment under section 3(18)(C) of the MMPA (no thresholds have been established for in-air Level A harassment):

- 180 dB re 1 $\mu\text{Pa}_{\text{rms}}$ for whales
- 190 dB re 1 $\mu\text{Pa}_{\text{rms}}$ for pinnipeds

Any potential direct and indirect effects from the Seward Highway MP 75-90 geotechnical activities on the endangered Cook Inlet beluga whales and their critical habitat are expected to be confined to the action area (Figure 1). The action area includes Turnagain Arm and several stream crossings (Placer River, Placer River Overflow, Portage Creek #1, Portage Creek #2, and Twentymile River), which support anadromous salmon (Figures 2-5).

¹ Sound pressure is the sound force per unit micropascals (μPa), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of 1 square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 μPa , and the units for underwater sound pressure levels are dB re 1 μPa and the units for in-air sound pressure levels are dB re 20 μPa .

² Root mean square (rms) is the square root of the arithmetic average of the squared instantaneous pressure values.

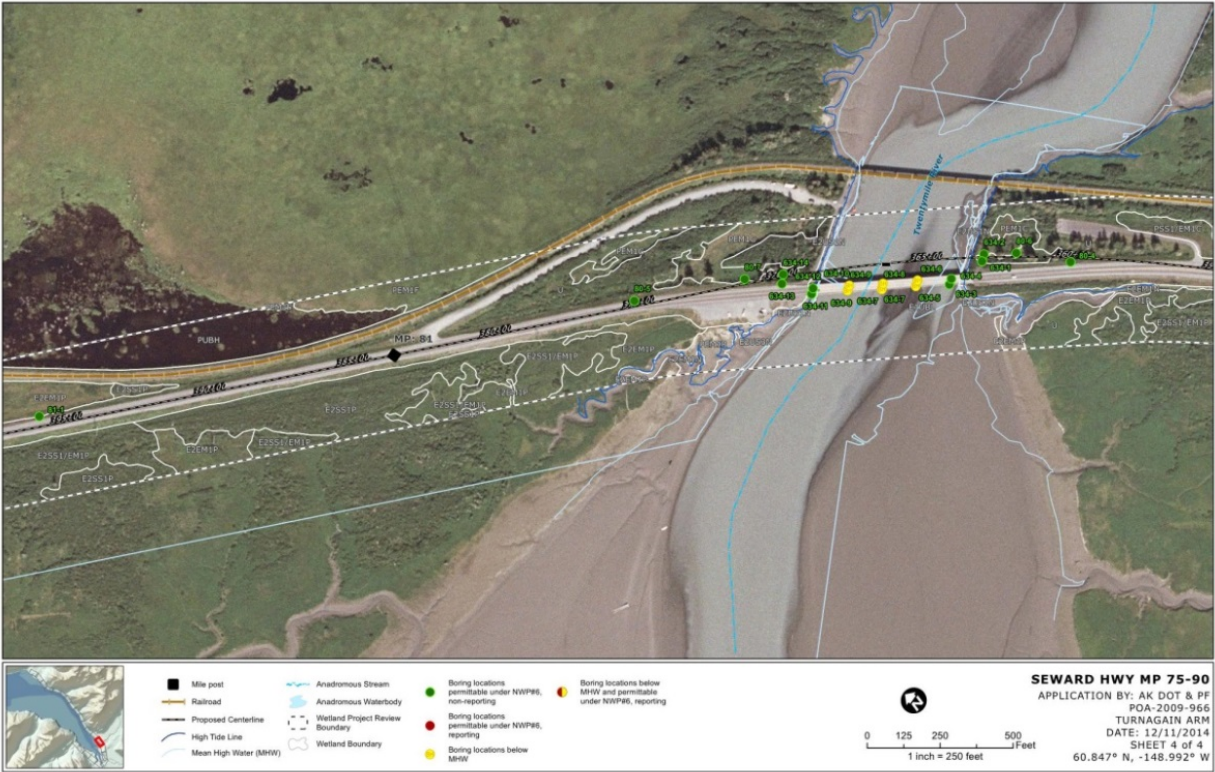


Figure 2. The proposed boring locations at Twentymile River.

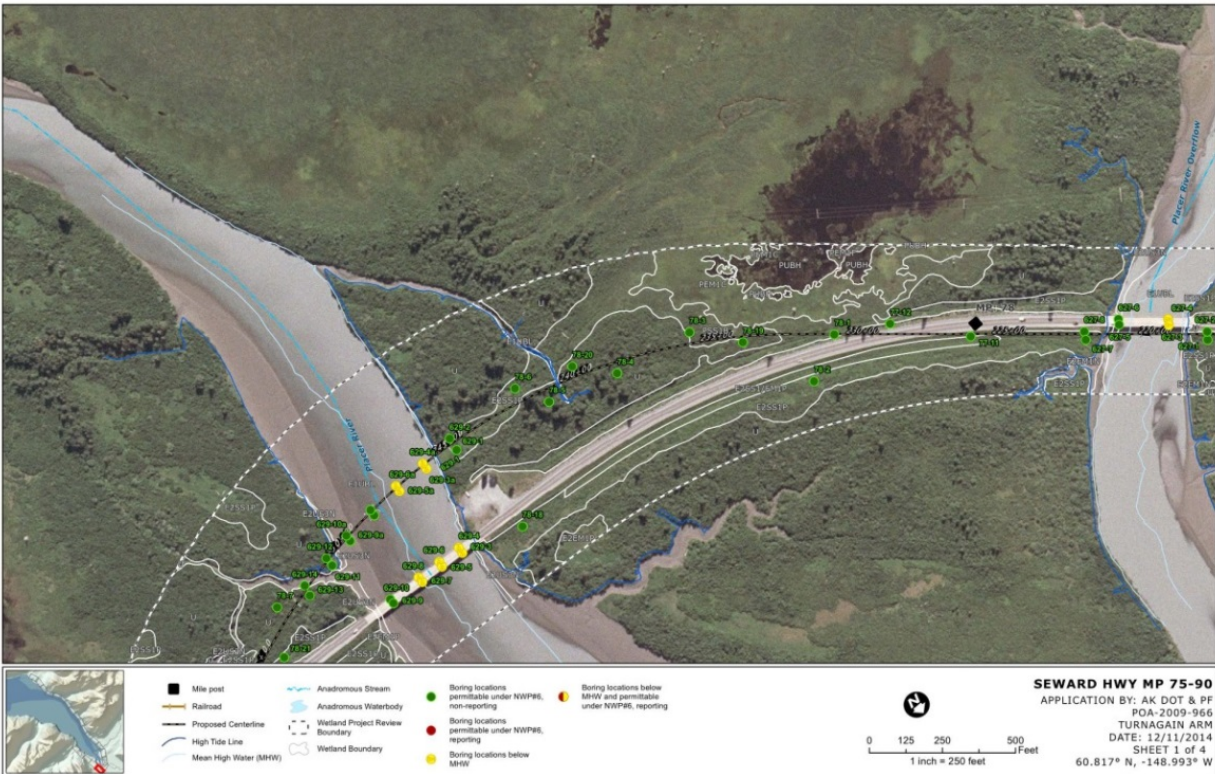


Figure 3. The proposed boring locations at Placer River and Placer River overflow.

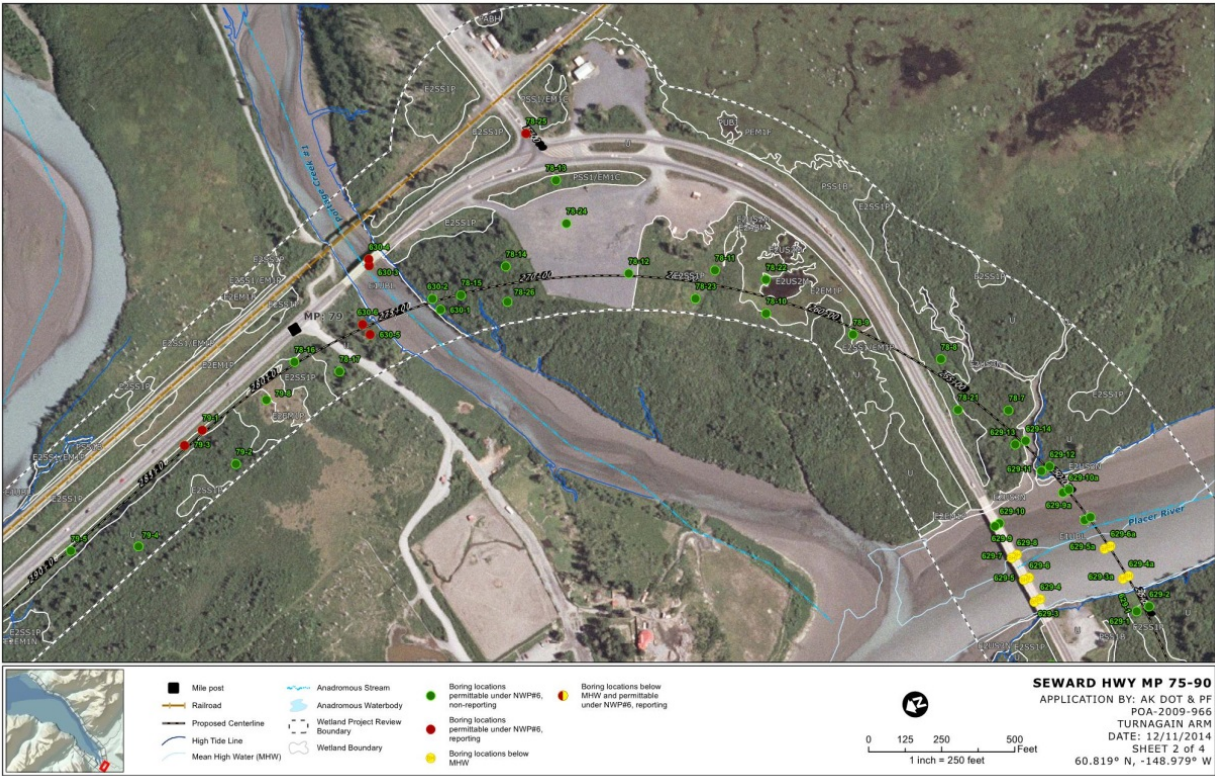


Figure 4. The proposed boring locations at Portage Creek #1.

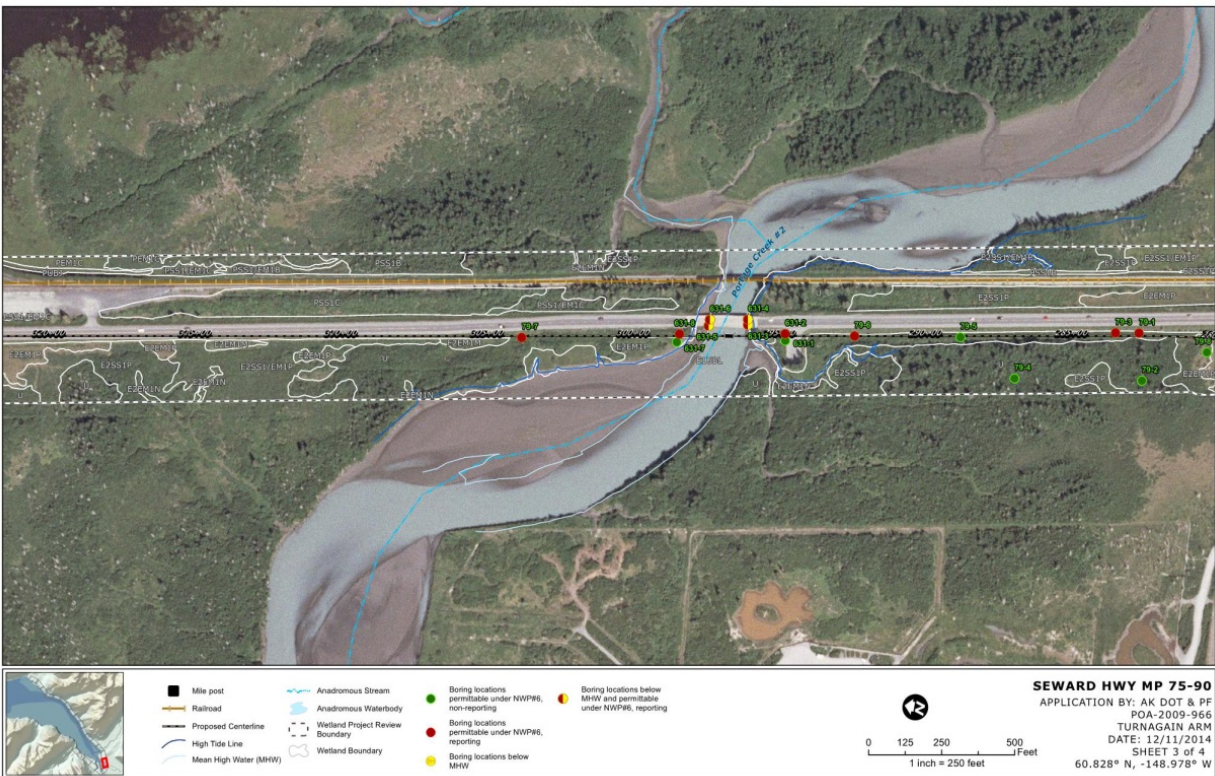


Figure 5. The proposed boring locations at Portage Creek #2.

MITIGATION MEASURES

Although it is anticipated that beluga whale density will be low in the action area during construction operations in March-April (Goetz et al. 2012, NMFS unpublished data), to mitigate possible incidental harassment of beluga whales and adverse effects to its critical habitat, FHWA has provided assurance that the following mitigation measures will be implemented:

1. A protected species observer (PSO) shall be present before and during all in-water activity (drilling, SPTs and DPTs).
2. The PSO shall be able to accurately identify beluga whales at a distance identified as the 160 dB disturbance zone:
 - 2.1. A 160 dB re $1\mu\text{Pa}_{\text{rms}}$ disturbance zone of 1,150 ft. (350 m) radius from the sound source will be maintained for all drilling, hammering to drive drill casings, and soil penetration tests in all stream channels (wet or dry) that are located in critical habitat.
3. The PSO shall be able to see the entire 160 dB disturbance zone.
 - 3.1. All in-water noise activity will cease whenever the 160 dB disturbance zone is not fully visible. In-water noise activities will not commence until marine mammal observation conditions make it possible to see the entire disturbance zone.
 - 3.2. DPT testing and hammering to drive drill casings will only be conducted during daylight hours.
4. The PSO shall have binoculars, charts, compass, and a rangefinder, (or equivalent) and have the ability to use these instruments to plot the position of all observed marine mammals within 328 ft. (100 m) of their actual location. The PSO shall have a means to communicate directly and at all times with the project superintendent, and shall keep a log book of all activities and marine mammal sightings.
5. The PSO shall have no other primary duty beyond those associated with marine mammal monitoring and associated tasks.
6. The PSO shall have the authority and means to order a shutdown (stop activity) of in-water noise activities when a marine mammal(s) is detected within the 160 dB disturbance zone.
7. Prior to all in-water noise activity, the PSO shall scan the 160 dB disturbance zone for the presence of beluga whales and other marine mammals for 30 minutes before commencing in-water noise activities (DPT and hammering to drive drill casings). If one or more beluga whales or other marine mammals are present within the 160 dB disturbance zone during this 30 minute observation period, in-water noise activities shall not begin until all marine mammals vacate the 160 dB disturbance zone on their own accord. The 160 dB disturbance zone would then be monitored by the PSO during in-water work to prevent takes of beluga whales and other marine mammals.
8. A “ramp up” procedure for the DPT and hammering to drive drill casings will consist of three hammer strikes followed by a one minute waiting period. The three-strike, one-minute wait sequence shall be repeated three times before commencing operational hammering. If the hammering activity has stopped for more than one hour, the ramp up procedure will be reinitiated.
9. During the in-water noise activity, the PSO shall scan the 160 dB disturbance zone for the presence of beluga whales or other marine mammals within the zone, or imminent approach of this species towards the zone. Before one or more beluga whales or other marine mammals enter the 160 dB disturbance zone, all such activity shall be ordered by the PSO to cease

immediately, and shall not begin again until the zone is free of marine mammals that have left of their own accord or until marine mammals have not been observed in the zone after 30 minutes of visual scanning under conditions in which the entire zone is visible.

9.1. The PSO authorizes commencement of operations.

10. In-water work will be effectively isolated from surrounding waters to contain and minimize turbidity and sedimentation.
11. Only water or NSF-certified drilling fluids for drinking water wells would be used.
12. Borings below ordinary high water would be backfilled with hydrated bentonite chips or bentonite grout.
13. The project will comply fully with state water quality standards.
14. Equipment will be inspected daily for leaks and proper function to ensure that equipment is clean and free of external petroleum based products.
15. To the extent practicable, all equipment will be fueled and all maintenance will be performed at least 100 ft. (30.5 m) from wetlands and waters.
 - 15.1. Secondary containment will be used at all vehicle and equipment fueling sites and maintenance sites.
 - 15.2. Secondary containment will also be used to the extent practicable for the drilling fluids resulting from borings.
16. Staging areas will be located above MHW and outside environmentally sensitive areas and their functioning buffers.

LISTED SPECIES

Cook Inlet beluga whales are a small, isolated population generally found in the shallow, coastal waters of the upper inlet. The 2012 abundance estimate for this population was 312 animals, with a ten-year trend (2002-2012) of -0.6 percent annually (Allen and Angliss 2014). Aerial surveys, satellite tagged beluga whales, and opportunistic sightings indicate these whales remain in Cook Inlet year round (Goetz et al. 2012). During summer and fall, beluga whales concentrate near coastal mudflats and river mouths. Their distribution changes in winter, most likely because sea ice makes inhabiting shallow waters hazardous for whales. By December these whales generally move offshore and away from the concentration areas in upper Cook Inlet, as their range widens to include central offshore waters (e.g., East and West Forelands, Kalgin Island). This pattern continues through March.

Beluga whales are among the most adept users of sound of all marine mammals and use sound, rather than sight, for many important functions. It is possible the beluga whales' unfused vertebrae, and thus their movable head, allowed for adaptations for highly directional hearing. These whales hear over a large range of frequencies, from about 40 Hertz (Hz) to 150 kilohertz (kHz) (Au 1993). However, their hearing is most acute at middle frequencies, between 10-75 kHz (Fay 1988). At lower frequencies, around 40 Hz, the whale's hearing threshold is about 140 dB re 1 μ Pa. In the best hearing range, at about 40 kHz, the threshold is 40 dB re 1 μ Pa. Beluga whales communicate and echolocate at relatively high frequencies where they have a lower hearing threshold and greater hearing sensitivity.

During echolocation, beluga whales generally produce signals with peak frequencies of 40-120 kHz, and the signal's intensity can change with location and background noise levels (Au et al.

1985). Complementing their excellent hearing, beluga whales have one of the most diverse vocal repertoires of all marine mammals. They are able to make a variety of vocalizations (e.g., whistles, buzzes, groans, roars, trills, peeps), which lead to their nickname as sea canaries.

NMFS conducted Cook Inlet beluga whale abundance surveys in June, 1994-2012 (Shelden et al. 2013), not during the timing window for these proposed geotechnical activities (March-April). During 1999-2002, 18 beluga whales were captured in upper Cook Inlet and fitted with satellite tags to provide information on their movements during late summer, fall, winter, and spring. Data from tagged whales (14 tags operated during June 1999 through May 2003) show that beluga whales use upper Cook Inlet, specifically Chickaloon Bay and Knik Arm, intensively during June-November. From December-May, these whales spent more time in mid Cook Inlet and Turnagain Arm (Goetz et al. 2012). Although the satellite tagged whales moved widely around Cook Inlet, there was no indication that beluga whales migrate seasonally in and out of Cook Inlet (Goetz et al. 2012).

NMFS collects opportunistic sightings as reported by volunteers from airplanes, vessels, and shorelines. This information indicated that during 2008-2013 there were 46 reports of beluga whales (465 whales) from Bird Point to Ingram Creek, ranging in group size from 1-100 beluga whales (NMFS unpublished data). However, beluga whales were only reported twice in upper Turnagain Arm, near Twentymile River, during the months of March-April: five whales observed on April 23, 2012 and three whales observed on April 24, 2012 (NMFS unpublished data).

NMFS designated critical habitat for the Cook Inlet beluga whale (76 FR 20180; April 11, 2011), including two areas in Cook Inlet that comprise 3,013 square mi (mi²). Area 1 is 741 mi² of marine habitat north of a line from the mouth of Threemile Creek (61°08.5' N, 151°04.4' W) connecting to Point Possession (61°02.1' N, 150°24.3' W), with the exception of waters by the Port of Anchorage. Area 2 is 2,275 mi² of marine habitat, south of Area 1 to southern parts of Cook Inlet, including Kachemak Bay. The proposed project occurs in Area 1.

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 of the 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 will 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 positive effects with no adverse effects to listed species.

NMFS must also determine the effects of a federal action on any designated critical habitat for listed species

Direct effects to beluga whales from the proposed geotechnical sampling include noises in the marine environment associated with boring and soil penetration tests, and hammering to drive drill casings.

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

Noise produced during the geotechnical activities could affect beluga whales. Possible impacts to beluga whales exposed to loud sounds include: mortality, directly from the noise or indirectly from a reaction to the noise; injury; and disturbance, which ranges from severe (e.g., abandon vital habitat) to mild (e.g., startle response). Underwater noise is the primary concern for beluga whales. The proposed geotechnical activities will introduce sounds into the water. However, these noises are not expected to adversely affect Cook Inlet beluga whales due to the proposed mitigation measures and construction timing that minimizes the probability of beluga whales being in the action area.

All geotechnical drilling and DPT testing would occur in close proximity to the existing bridges in the tidally influenced reaches of the Placer River, Placer River Overflow, Portage Creek #1, Portage Creek #2, and Twentymile River. Water depths in this area are relatively shallow, at approximately 23 ft. (7 m)³ deep, during high tide conditions. During low tide conditions, nearshore drill locations would range from 0-5 ft. (0-1.5 m) deep in the river channel. These relatively shallow water depths would help reduce sound transmission over wide distances through water.

Due to the absence of empirical data on sound source levels for small scale geotechnical drilling in Alaska, estimated sound source levels were used from a Washington State Department of Transportation (WSDOT 2007) hydro-acoustic monitoring study. Measurements for underwater noise were recorded during boring operations at a distance of 32.8 ft. (10 m) 22.6 ft. (6.9 m) beneath the water surface in water of 45 ft. (13.7 m) depth at the boring location (Table 1).

The mitigation measures, therefore, include a conservative Level B disturbance zone. The 1150 ft. (350 m) radius Level B disturbance zone compares to that of projects in which sound energy output was measured from the driving of larger diameter piles using higher energy impacts (Table 2). Measured peak output for continuous boring-generated noise associated with this project is not expected to exceed 120 dB Level B disturbance levels at 1,150 ft. (350 m).

The geotechnical work would occur within the river banks, which would help confine noise generated by the drilling and penetration testing activities, and hammering to drive drill casings. This work would be temporary, with geotechnical activities expected to occur during the course of about 30 days; and some borings below the MHW would be completed in a dry environment (if available). However, disturbance could be caused by use of a hydraulic drill rig or barge; and drilling and penetration testing noise and hammering to drive drill casings, all generated at depth, would likely be transmitted through saturated substrates.

³ High tide line is 22.9 ft. (7 m); Mean lower low water is 0 ft. (0 m) (North America Vertical Datum of 1988).

Table 1. Summary of underwater sound measurements results at 33 ft. (10 m).¹

Measurement (33ft. [10 m])	Time (a.m.)	Activity	Drill Depth (ft.)	No. of Strikes	Peak dB ²	Peak Average dB	RMS dB	SEL, dB ²
Underwater 1	11:08	Ambient	n/a	n/a	n/a	n/a	141	n/a
Underwater 1	11:09	Hammering	32	49	181	178	158 ³	148
Underwater 1	11:26	Drilling	37	n/a	152	151	143	n/a
Underwater 1	11:38	Hammering	37	26	180	177	158 ³	148
Underwater 1	11:53	Hammering	42	20	177	174	154 ³	147

¹Underwater sound measurements are reported as dB referenced to 1 µPa.

²Loudest strike measured.

³Average of all strikes.

n/a – no applicable

Note: Comparatively, the acoustics group measured a 36 inch (914 mm) steel pile in 2006 at this same general location, which generated a peak value of 206 dB, an average root mean square (rms) value of 195 dB, and a sound exposure level (SEL) of 180 dB (WSDOT 2007).

Table 2. Noise activities and physical characteristics in Turnagain Arm, Alaska compared to similar noise activities in other areas.

Project/Location	PROPOSED PROJECT Seward Highway MP 75-90, Alaska	Test pile driving program at the Port of Anchorage, Alaska	Test pile program, Hood Canal, Washington
Radius (m) of area encompassed to 160 dB re 1µPa _{rms}	350	350	425 ¹
Pile size (cm)	8	36	91
Pile type	steel rod	H pile	Tubular
Approximate water depths (m) up to 1,000 m from project area	1.5–7	9–20	10–90
Similar to proposed project	n/a	n/a	n/a
Different from proposed project	n/a	Pile is more than 4 times larger; water is 3-6 times deeper	Pile is more than 11 times larger; water is 4.5-7 times deeper
Reference	HDR (2014)	URS (2007)	Illingworth and Rodkin Inc. 2013

n/a – not applicable

¹A bubble curtain was used during impact pile driving, but provided inconsistent sound attenuation from nearly 10 dB to no apparent attenuation.

Because of the small-scale drilling equipment being used, environmental conditions (working in dry or shallow water, and locations within relatively narrow river channels), and the mitigation measures (includes using PSOs and protocols for cessation of operations if marine mammals enter the 160 dB disturbance zone), it is unlikely that there would be temporary or permanent hearing impairment to any marine mammals, including beluga whales.

Geotechnical activities are planned to occur during a season (March-April) and at a time (low tide) when the projected density of Cook Inlet belugas is expected to approach zero. Additional

mitigation measures will guard against in-water activity when beluga whales may be nearby. Therefore, any effects due to underwater noise associated with geotechnical activities would be insignificant (unable to detect low energy transmission that may propagate through dewatered substrate or shallow water) and discountable (extremely low probability of encountering belugas during project activities further reduced by implementation of mitigation measures).

Critical Habitat

The proposed action has the potential to affect beluga whales through the disturbance or modification of their critical habitat. Five physical or 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. Mean Lower Low Water and within 5 mi of high and medium flow anadromous fish streams

During geotechnical drilling activities, the presence of in-water machinery, project associated noises, increased sediment suspension, and contamination have the potential to impact PCE 1. These impacts are anticipated to be short-term and of such small scale as to be insignificant at each location. Therefore, any adverse effects to this PCE would be insignificant.

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

Sound levels generated from geotechnical activities and barge use may result in localized juvenile fish displacement, but are not expected to harm fish. Any prey displacement will be temporary and will not affect beluga whale prey availability, especially anadromous adult prey that are not present until later in the year. After the geotechnical activities, prey species would repopulate affected areas and would be available to beluga whales as before. Therefore, any adverse effects to this PCE would be insignificant

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

Changes in sediment suspension and turbidity could affect PCE 3. Some geotechnical activities (drilling and casing removal) could cause a temporary increase in suspended sediments and turbidity. However, only water or NSF-certified drilling fluids for drinking water wells would be used in the course of conducting borings. Native sediments that may be introduced to marine waters are not expected to contain contaminants at a level that would affect marine life, especially when one takes into account the extreme tidal exchange and the small volume of fill that may be re-suspended. Furthermore, the drilling contractor would comply with Alaska Department of Environmental Conservation and U.S. Environmental Protection Agency regulations prohibiting water pollution by implementing procedures for refueling and hazardous materials. Therefore, the proposed action's effects upon this PCE are expected to be insignificant.

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

Project noise is the only aspect of this proposed action that could create a barrier to passage of Cook Inlet beluga whales. Noise will result from geotechnical activities (boring and soil penetration tests, and hammering to drive drill casings, and casing removal). Therefore, this project may affect PCE 4. Beluga whales can respond in a variety of ways to noise from in-water

activities, from mild behavioral changes to habitat abandonment. The use of PSOs would provide the ability for the drilling activity to be shut down upon approach of one or more beluga whales towards the 160 dB disturbance zone. Implementation of mitigation actions will allow free passage of Cook Inlet beluga whales through the action area. Therefore, any adverse effects to this PCE would be 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 impact of this proposed action upon beluga whales would likely be underwater noise associated with the geotechnical drilling and soil penetration tests; and hammering to drive drill casings. However, information on how beluga whales respond to noise from geotechnical activity is not well documented. Available data for somewhat comparable activities such as pile-driving noise, which is orders of magnitude louder, indicate that the most likely response to project noise would be avoidance. Any habitat avoidance by beluga whales that may occur from geotechnical activity noise would be temporary, occurring only during these activities (about 30 days).

PSOs will be present during all in-water activity. This will minimize the probability of exposing beluga whales and other protected marine mammal species to in-water noise thresholds ≥ 160 dB re 1 μ Pa for impulse noise and ≥ 120 dB re 1 μ Pa for continuous noise. Minimization and avoidance measures will prevent harassment of beluga whales during geotechnical activities. Therefore, any adverse effects to this PCE would be insignificant.

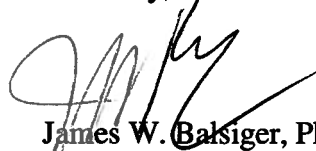
CONCLUSION

Based on this analysis, NMFS concurs with your determination that the proposed action may affect, but is not likely to adversely affect, Cook Inlet beluga whales or their critical habitat.

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 Barbara Mahoney at (907) 271-3448 or barbara.mahoney@noaa.gov.

Sincerely,



James W. Balsiger, Ph.D.
Administrator, Alaska Region

cc: Kelly Petersen Kelly.Petersen@alaska.gov
John McPherson John.McPherson@hdrinc.com
Leslie Robbins Leslie.Robbins@hdrinc.com

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**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

May 06, 2015

Sandra Garcia-Aline
Division Administrator
Federal Highway Administration
P.O. Box 21648
Juneau, Alaska 99802-1648

Re: Seward Highway MP 75-90, for Geotechnical Activities, Turnagain Arm, Alaska;
Reinitiation; AKR-2015-9426

Dear Ms. Garcia-Aline:

The National Marine Fisheries Service (NMFS) recently conducted an informal consultation with Federal Highway Administration (FHWA) under section 7(a)(2) of the Endangered Species Act (ESA), regarding proposed geotechnical sampling to support the design and construction of the Seward Highway milepost (MP) 75-90 road and bridge rehabilitation. FHWA determined that this project may affect, but is not likely to adversely affect, endangered Cook Inlet beluga whales (*Delphinapterus leucas*) or their critical habitat. In a letter dated February 26, 2015 NMFS concurred with that determination.

On April 2, 2015, NMFS received a letter from FWHA requesting reinitiation of that informal consultation based upon substantial changes to the project description. Specifically, the proposal is to change this geotechnical and geophysical survey project from daylight-only drilling operations to 24-hour drilling operations. In addition, the project termination date would change from April 30, 2015 to May 31, 2015. FHWA determined that this modification to the geotechnical sampling project may affect, but is not likely to adversely affect, endangered Cook Inlet beluga whales or adversely modify their critical habitat.

In your request for reinitiation you included a new project description, additional mitigation measures, and a re-evaluation of project effects on beluga whales and their critical habitat. NMFS has reviewed your reinitiation request, your additional information, and other sources of pertinent information. Based on our analysis of this information, NMFS concurs with your determination that the modification to the existing geotechnical survey is not likely to adversely affect Cook Inlet beluga whales or adversely modify their critical habitat. A complete administrative record of this consultation is on file in this office.



Description of the Proposed Action and Action Area

The proposed road and bridge rehabilitation project starts at MP 75 (the north end of Turnagain pass) where it follows the southern route of Turnagain Arm and ends near the intersection with the Alyeska Highway at MP 90 (Girdwood), approximately 37 miles south of Anchorage (Figure 1). Included in the project area are: Portage Glacier Road intersection, Twentymile River boat launching area, and Alaska Railroad Portage Station. The Seward Highway parallels the coastline of the upper Turnagain Arm and crosses Glacier Creek, Kern Creek, Peterson Creek, Twentymile River, Portage Creek, Placer River, Ingram Creek, and several unnamed streams between MP 75-90.

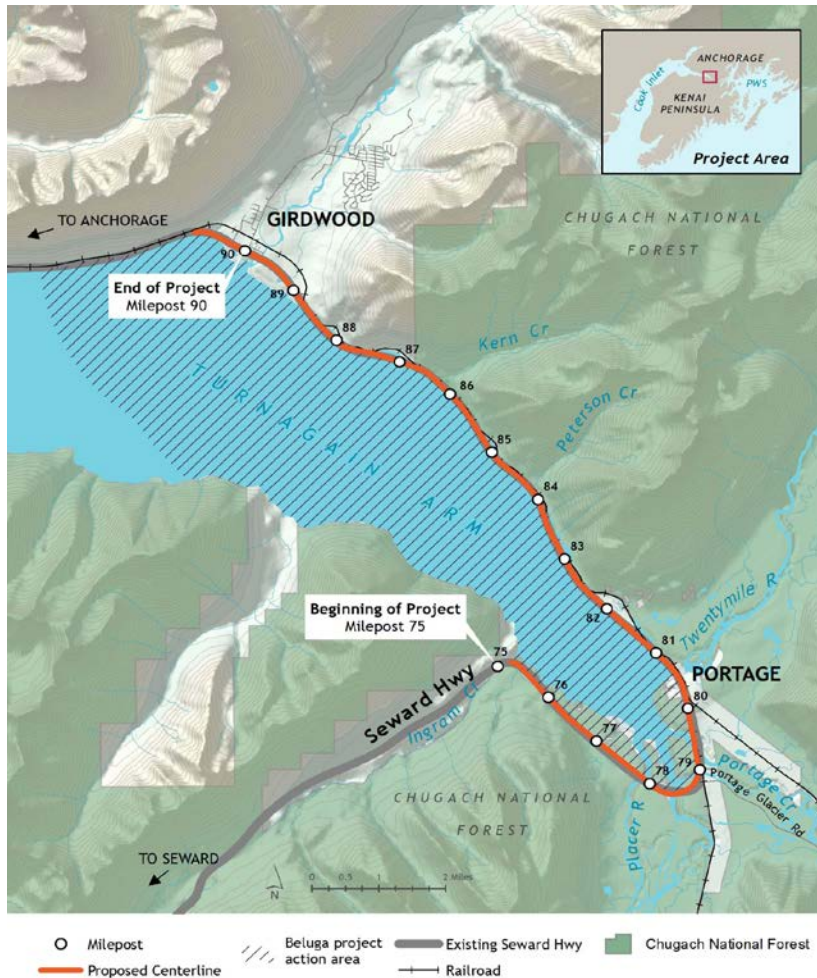


Figure 1. Project area (orange line with mile markers) and project action area (black diagonal lines).

The Alaska Department of Transportation and Public Facilities (ADOT) proposes to complete geotechnical sampling to support the design and construction of the Seward Highway MP 75-90 road and bridge rehabilitation project. Geotechnical sampling occurred during March and April, and the construction window covered under the existing ESA consultation ended on April 30,

2015. However, to complete the sampling at all 26 boring locations (below the MHW elevation, at five bridge sites and one roadway site), ADOT requests the ability to conduct 24-hour drilling operations and other geotechnical sampling through May 31, 2015.

Geotechnical work consists of borings and soil penetration tests. A skid or truck mounted drill rig would be used for both borings and soil penetration tests. The geotechnical work was completed at Twentymile River, and ADOT would like to continue this work at sites primarily associated with new bridge locations in southeast Turnagain Arm, which include:

- Placer River
- Placer River Overflow
- Portage Creek #1
- Portage Creek #2

Geotechnical activities for new bridge alignments at Placer River Overflow, Portage Creek #1, and Portage Creek #2, would continue to occur below MHW from existing bridge decks, and would include drilling through the surface of the bridge.

At Placer River, in addition to working from the existing bridge deck, geotechnical activities for a new bridge alignment would require placing the drill rig on a platform in the water upstream from the existing bridge. The platform would consist of either a floating, segmented flexible barge system or a landing craft. If a barge system were used, it would be positioned using skiffs with outboard motors and held in place by using three or four anchors controlled by independent winches. The same skiffs would be used to transport personnel from a staging area (likely at the Seward Highway pullout adjacent to the Placer River) to and from the platform. Because some borings are in areas affected by tides, it is possible that the platform would be grounded during low tide periods. Because a floating platform is needed to drill at the Placer River, work must be done during ice-free conditions; this is expected to occur during May 2015.

Borings

The boring method used in Turnagain Arm by ADOT is the cased rotary drilling operations. This process uses water or National Science Foundation (NSF)-certified drilling fluids and a drill casing. The cased rotary drilling method does not discharge drill cuttings at the mud/water interface. Each cased rotary drilling operation uses a casing that separates the drilling accessories and samples from the aquatic environment, to control and contain fluids and sediments. The casing has a maximum outside diameter of 8 inches (20.3 centimeters [cm]) and extends from a minimum of approximately 2 feet (ft.) (0.6 meters[m]) above the highest expected water level to approximately 30 ft. (9 m) below the mud line. Placement of the casing to this depth below the mud line creates a seal, captures cuttings, recirculates drill fluids, and prevents disturbance to the surrounding sediments.

Depending on bridge length and the associated number of bridge piers, 4-6 borings would be used to collect geotechnical data. Borings associated with bridge piers and abutment foundations would be advanced to 100-250 ft. (30-76 m) below ground surface. The borings associated with the general road bed would be advanced to 15 ft. (5 m) below ground surface. The nominal outer diameter of the drilling casing would be approximately 8 inches (20.3 cm).

The maximum volume of cuttings from each boring is estimated to be about 0.5 cubic yards (0.4 cubic meters), with less material for holes less than 250 ft. (76 m) deep. The duration for each drill hole is estimated to vary between one 12-hour shift and seven or eight 24-hour shifts (3.5-4 days) for deeper borings.

Soil Penetration Tests

Standard penetration tests (SPTs) would be performed at each bridge foundation element, such as an abutment or bridge pier. The system to complete SPTs is comprised of a 140 pound (52 kilograms [kg]) hammer dropping 30 inches (0.76 m) onto a 3 inch (8 cm) diameter steel rod. The energy associated with the hammer is 375 foot pounds (508 joules), significantly less than the energy from industrial pile driving hammers, which typically exert more than 100,000 foot pounds (135.6 kilojoules) of energy.

SPTs are completed at approximately 5 ft. (1.5 m) intervals. SPTs would be performed within cased borings by driving a sampling tube into the soils underlying the casing bottom. In a typical boring, it takes approximately 25 hammer blows (1-2 minutes) to drive the sampling device 1 ft. (0.3 m). On average, there are 1-2 SPT tests per hour; once depths of 100 ft. (30 m) are reached, SPT sample frequency decreases to one test every 2-3 hours.

Action Area

The action area is defined in the ESA regulations (50 CFR 402.02) as the area within which all direct and indirect effects of the project will occur. The action area is distinct from and larger than the project footprint because some elements of the project may affect listed species some distance from the project footprint. The action area, therefore, extends out to a point where no measurable effects from the project are expected to occur.

Since 1997 NMFS has used generic sound exposure thresholds to determine whether an activity produces sounds that might result in impacts to marine mammals (70 FR 1871). NMFS is currently developing comprehensive guidance on sound levels likely to cause injury and behavioral disruption to marine mammals. However, until such guidance is available, NMFS uses the following conservative thresholds of sound pressure levels¹, expressed in root mean square² (rms), from broadband sounds that cause behavioral disturbance. NMFS uses the following conservative thresholds for sound pressure levels that cause behavioral disturbance, referred to as Level B harassment under section 3(18)(D) of the Marine Mammal Protection Act (MMPA):

- impulsive sound (in-water): 160 dB re 1 $\mu\text{Pa}_{\text{rms}}$
- continuous sound (in-water): 120 dB re 1 $\mu\text{Pa}_{\text{rms}}$
- continuous and impulsive sound (in-air): 100 dB re 20 $\mu\text{Pa}_{\text{rms}}$ for harbor seals, 90 dB re 20 $\mu\text{Pa}_{\text{rms}}$ for all other pinnipeds

¹ Sound pressure is the sound force per unit micropascals (μPa), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of 1 square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 μPa , and the units for underwater sound pressure levels are dB re 1 μPa and the units for in-air sound pressure levels are dB re 20 μPa .

² Root mean square (rms) is the square root of the arithmetic average of the squared instantaneous pressure values.

NMFS uses the following conservative thresholds for underwater sound pressure levels that cause injury, referred to as Level A harassment under section 3(18)(C) of the MMPA (no thresholds have been established for in-air Level A harassment):

- 180 dB re 1 $\mu\text{Pa}_{\text{rms}}$ for whales
- 190 dB re 1 $\mu\text{Pa}_{\text{rms}}$ for pinnipeds

NMFS defines the action area for this project as the area within which project-related noise levels are ≥ 120 dB re 1 $\mu\text{Pa}_{\text{rms}}$ for continuous noise or ≥ 160 dB re 1 $\mu\text{Pa}_{\text{rms}}$ for impulsive noise (i.e., the point where no measurable effect from the project would occur). Effects from non-noise related activities are not expected to extend more than a few meters from the source. Received sound levels associated with hammering to drive drill casings, small-bore drilling, and soil penetration tests are anticipated to drop below these threshold levels within 350 m of the source. To define the action area, we considered the diameter and type of piles, the pile-driving method, and empirical measurements of noise from similar projects (Tables 1 and 2). However, if FWHA or ADOT, in coordination with NMFS, chooses to perform Sound Source Verification to determine the actual area that would be ensonified to at least 120 dB re 1 $\mu\text{Pa}_{\text{rms}}$, the size of the action area (and thus the area within which effects to listed species are expected) may be altered to reflect those site-specific measurements.

All direct and indirect effects from the Seward Highway MP 75-90 geotechnical activities on threatened and endangered species and designated critical habitat are expected to be confined to the action area as depicted in Figure 1. The action area includes Turnagain Arm and several stream crossings (Placer River, Placer River Overflow, Portage Creek #1, and Portage Creek #2), which support anadromous salmon and eulachon (Figures 2-4).

Mitigation Measures

Although it is anticipated that beluga whale density may increase in the action area, particularly Twentymile River, during construction operations in May (Goetz et al. 2012, NMFS unpublished data), to mitigate possible incidental harassment of beluga whales and adverse effects to critical habitat, FHWA will require that the following mitigation measures be implemented:

1. To avoid the loudest impulse noise type associated with this action (average estimated peak at 174-178 dB re 1 $\mu\text{Pa}_{\text{rms}}$) during May, discrete penetration testing will not occur as originally requested.
2. The 160 dB re 1 $\mu\text{Pa}_{\text{rms}}$ disturbance zone of 1,150 ft. (350 m) radius from the sound source will be maintained for all drilling, hammering to drive drill casings, and soil penetration tests in all wet stream channels that are located in critical habitat.
 - 2.1. Activities that occur at low tide in the de-watered stream channels will not require marine mammal monitoring.
3. A protected species observer (PSO) will be present before and during all in-water activity (drilling, SPTs).
4. The PSO will be able to accurately identify beluga whales at a distance of 350 m and will also be able to accurately identify the presence of whales by their breathing sounds.

5. The PSO will have the authority and means to order immediate shutdown (stop activity) of in-water activities when any threatened or endangered marine mammal(s) is detected (by any means) within, or is judged by the PSO to be likely to enter, the 350-m radius harassment zone.
6. The PSO will have no other primary duty beyond those associated with marine mammal monitoring and associated tasks. PSOs will be on duty in shifts no longer than four hours in duration with one hour minimum breaks between shifts to minimize observer fatigue.
7. Prior to initiating in-water operations, and prior to re-commencing in-water operations from a shut-down condition, the PSO will scan the 350-m radius harassment zone for the presence of beluga whales and other marine mammals for 30 minutes.
 - 7.1. If one or more beluga whales or other listed marine mammals are present within the 350-m radius harassment zone during this 30 minute observation period, in-water activities will not begin until all listed marine mammals are observed to vacate the 350-m radius harassment zone of their own accord, or until 30 minutes have elapsed since the last sighting of listed marine mammals in the 350-m radius harassment zone under conditions in which the entire 350-m radius harassment zone is visible. Only then will the PSO authorize in-water work to commence.
8. Throughout all in-water noise activity, the PSO will scan the 350-m radius harassment zone for the presence of beluga whales or other marine mammals. If the PSO determines that Cook Inlet beluga whales or other listed marine mammals are within, or appear likely to enter, the 350 m radius harassment zone, the PSO will immediately order cessation of all in-water activities that produce noise capable of harassing Cook Inlet beluga whales (continuous sound ≥ 120 dB re 1 $\mu\text{Pa}_{\text{rms}}$, or impulsive sound ≥ 160 dB re 1 $\mu\text{Pa}_{\text{rms}}$).
9. The PSO will have binoculars, charts, compass, GPS, and a rangefinder, (or equivalent) and have the ability to use these instruments to accurately plot the position of all observed marine mammals.
10. The PSO will have a means to communicate directly and at all times with the senior on-site project manager/supervisor.
11. ADOT may continue ongoing in-water work during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare or other conditions prevent effective marine mammal monitoring of the entire 350-m radius harassment zone, provided both the the in-water noise-generating activity and marine mammal monitoring continues (acknowledging that monitoring will occur at a reduced level of effectiveness). A PSO will continue to monitor the visible (and audible) portion of the 350-m harassment zone throughout the duration of activities producing in-water noise.
12. Drilling operations will not be initiated from a 'shutdown condition' when the complete 350-m radius harassment zone is not visible for a contiguous 30-minute pre-operational monitoring period (whether due to darkness, low light, high sea state, fog, ice, heavy rain, glare, or other conditions).
 - 12.1. A shutdown condition is defined as a duration of 30 minutes or more when in-water noise does not occur from the following activities:
 - 12.1.1. Installing the drill casing
 - 12.1.2. Rotary mud drilling
 - 12.1.3. Standard soil penetration testing
 - 12.1.4. Removal or installation of drill string and other down-hole tools

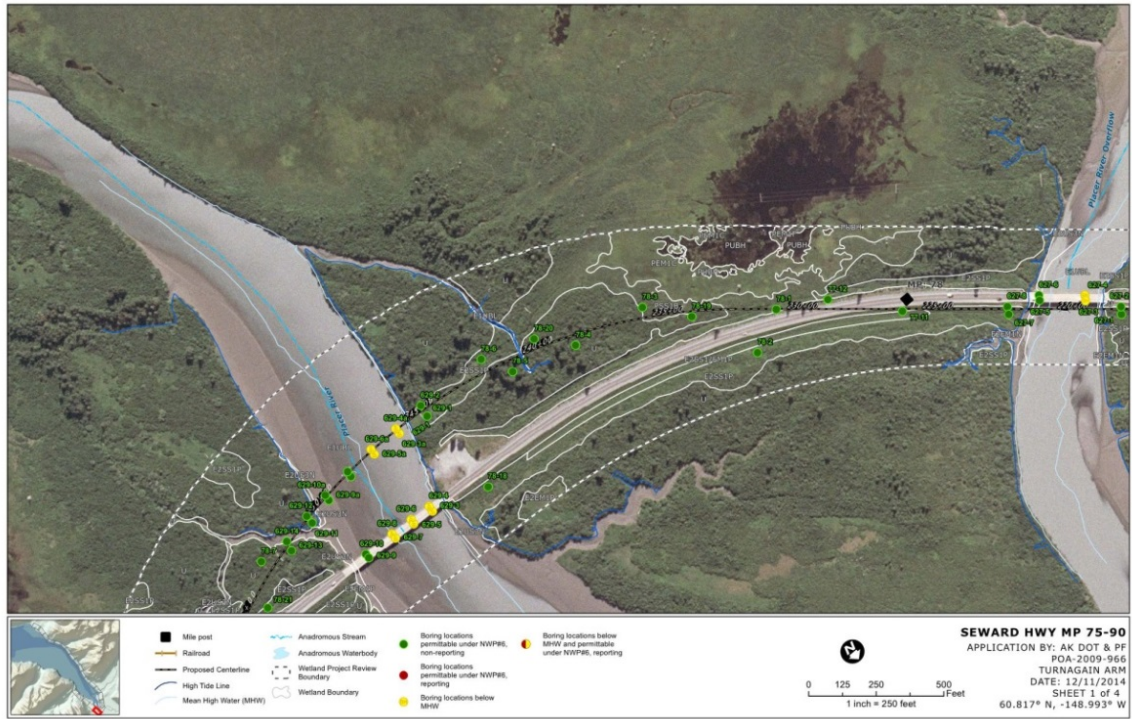


Figure 2. The proposed boring locations at Placer River and Placer River overflow.

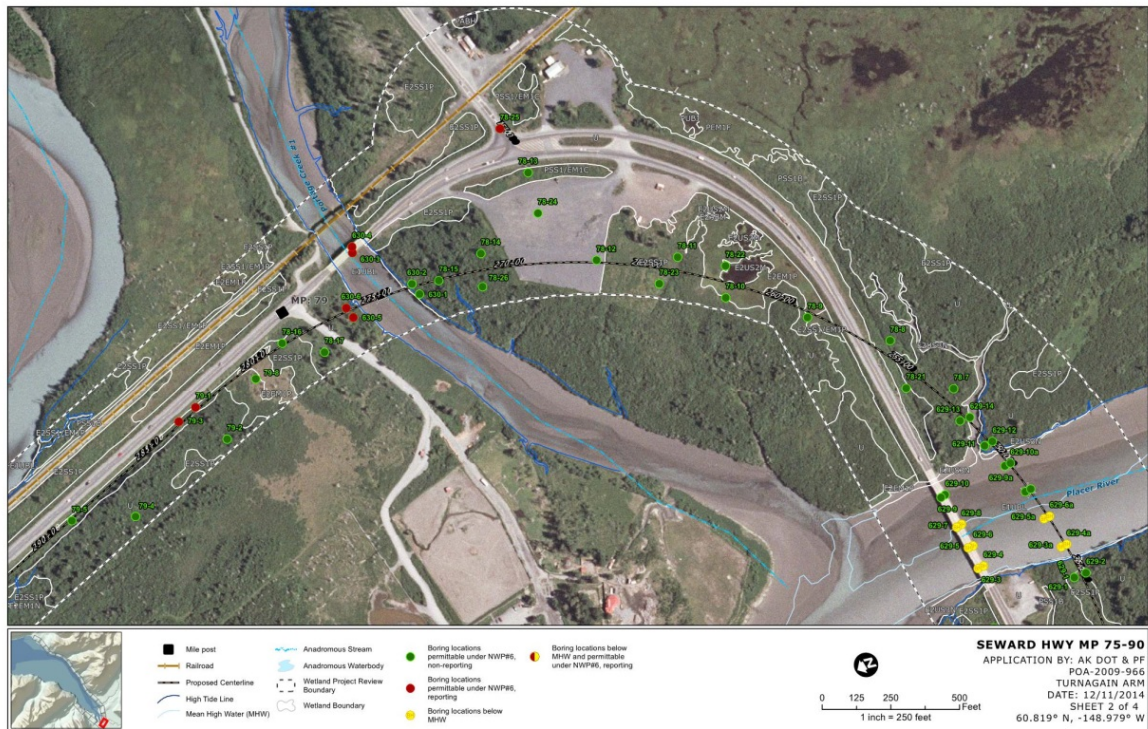


Figure 3. The proposed boring locations at Portage Creek #1.

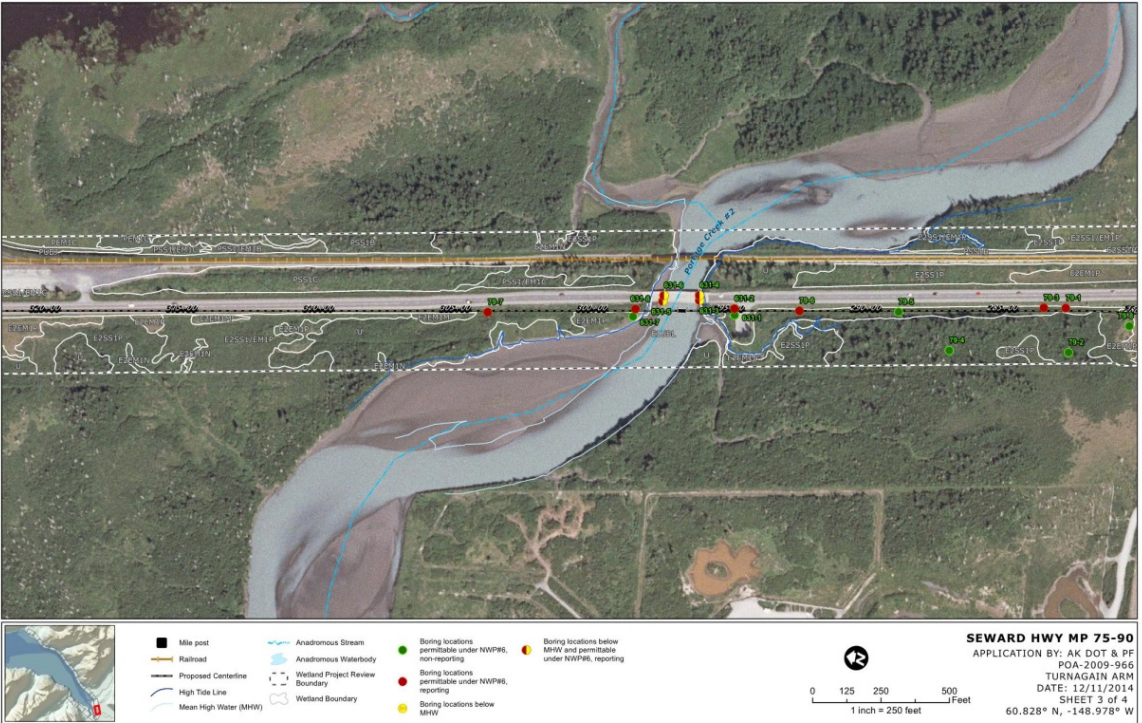


Figure 4. The proposed boring locations at Portage Creek #2.

- 13. In-water work will be effectively isolated from surrounding waters to contain and minimize turbidity and sedimentation.
- 14. Only water or NSF-certified drilling fluids for drinking water wells would be used.
- 15. Borings below ordinary high water would be backfilled with hydrated bentonite chips or bentonite grout.
- 16. The project will comply fully with state water quality standards.
- 17. Equipment will be inspected daily for leaks and proper function to ensure that equipment is clean and free of external petroleum based products.
- 18. To the extent practicable, all equipment will be fueled and all maintenance will be performed at least 100 ft. (30.5 m) from wetlands and waters.
- 19. Secondary containment will be used at all vehicle and equipment fueling sites and maintenance sites.
 - 19.1. Secondary containment will also be used to the extent practicable for the drilling fluids resulting from borings.
- 20. Staging areas will be located above MHW and outside environmentally sensitive areas and their functioning buffers.
- 21. A report will be submitted to NMFS AKR within 90 days of completion of the geotechnical fieldwork (March-May 2015). The report will summarize all activities and monitoring results (i.e., shore-based [and vessel] visual monitoring) conducted during in-water geotechnical surveys. The Technical Report will include the following:

- 21.1. Summaries of monitoring effort, including:
 - 21.1.1. date and time intervals during which monitoring occurred,
 - 21.1.2. a digital record of waters monitored (strip transect shape files or transect lines and widths that were effectively monitored,
 - 21.1.3. visibility conditions (distance),
 - 21.1.4. beaufort sea state,
 - 21.1.5. weather conditions,
 - 21.1.6. marine mammal observation data, including: geographic coordinates, species, group size, group age composition, group gender composition, behaviors observed, reactions to project activity, distance of group at time of initial sighting, and closest approach to work sites.
- 21.2. Analyses of the effects from various factors that influences detectability of marine mammals (e.g., sea state, number of observers, fog, glare, etc.).
- 21.3. Analyses of the effects from survey operations.

Listed Species and Critical Habitat

Cook Inlet Beluga Whales

The best available historical abundance estimate of the Cook Inlet beluga whale population was from a survey in 1979 which resulted in an estimate of 1,293 whales (Calkins 1989). NMFS began conducting comprehensive and systematic aerial surveys of the beluga population in 1993. These surveys documented a decline in beluga abundance from 653 whales in 1994 to 347 whales in 1998, a decline of nearly 50%. In response to this decline, in 2000, NMFS designated the Cook Inlet beluga whale population as depleted under the Marine Mammal Protection Act. Abundance data collected since 1999 indicate that the population did not increase, and the lack of population growth led NMFS to list the Cook Inlet beluga whale as endangered under the ESA on October 22, 2008 (73 FR 62919). The most recent comprehensive abundance survey (from 2014) indicates a population estimate of 340 belugas, with the population continuing to show a negative trend since 1999.

The distribution of Cook Inlet belugas has changed significantly since the 1970s. Fewer sightings of belugas the lower Inlet in recent decades (Hansen and Hubbard 1999; Speckman and Piatt 2000; Rugh et al. 2000, 2010) indicate that the summer range has contracted to the mid and upper Inlet, coincident with their decline in population size. The range contraction brings animals in a small range proximal to Anchorage during summer months, where there is increased potential for disturbance from human activities.

NMFS collects opportunistic sightings as reported by volunteers from airplanes, vessels, and shorelines. This information indicated that during 2008-2013 there were 46 reports of beluga whales (465 whales) from Bird Point to Ingram Creek, ranging in group size from 1-100 beluga whales (NMFS unpublished data). Although ADOT collected additional beluga whale sightings during April while working at Twentymile River, its report has not been finalized; and ADOT will not continue work at Twentymile River through May. NMFS has recorded only two beluga whale sightings in upper Turnagain Arm during March-April and both were near Twentymile River: 1) five whales were observed on April 23, 2012; and 2) three whales observed on April 24, 2012 (NMFS unpublished data). Additional information on Cook Inlet beluga whale biology

and habitat (including critical habitat) is available at:
<http://alaskafisheries.noaa.gov/protectedresources/whales/beluga.htm>.

Cook Inlet Beluga Whale Critical Habitat

NMFS designated critical habitat for the Cook Inlet beluga whale on April 11, 2011 (76 FR 20180). NMFS excluded all waters off the Port of Anchorage east of a line connecting Cairn Point (61°15.4'N., 149°52.8'W.) and Point MacKenzie (61°14.3'N., 149°59.2'W.) and north of a line connecting Point MacKenzie and the north bank of the mouth of Ship Creek (61°13.6'N., 149°53.8'W.) (see Figure X). The project is located entirely within Cook Inlet Beluga Whale Critical Habitat Area 1.

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

The potential effects of the proposed action on listed species and critical habitat include acoustic disturbance (noise) and habitat alteration.

Beluga Whales and Noise

Direct effects to beluga whales from the proposed modification to the geotechnical sampling project include noises in the marine environment associated with boring and soil penetration tests, and hammering to drive drill casings, from:

1. 24 hour drilling operations, which include periods when visual survey conditions are not conducive to effectively monitor the designated 350 m radius harassment zone, and
2. Drilling operations through May 31, 2015.

The ability to hear and transmit sounds is vital to marine mammal survival. Marine mammals use sound to gather information about their environment, communicate, and detect prey and predators. Therefore, noise produced during the extended geotechnical activities could affect beluga whales. Possible impacts to beluga whales exposed to loud sounds (exceeding 180 dB) include: mortality, directly from the noise or indirectly from a reaction to the noise and injury. Sounds less than 180 dB can cause disturbance, which ranges from severe (e.g., abandon vital habitat) to mild (e.g., startle response). Underwater noise is the primary concern for beluga whales. The proposed geotechnical activities will introduce sounds into the water, including at night. However, these noises are not expected to adversely affect Cook Inlet beluga whales due to the proposed mitigation measures and locations (not at Twentymile River), which reduce the probability of beluga whales being in the action area.

All geotechnical drilling would occur in close proximity to the existing bridges in the tidally influenced reaches of the Placer River, Placer River Overflow, Portage Creek #1, and Portage Creek #2. Water depths in this area are relatively shallow, at approximately 23 ft. (7 m)³ deep, during high tide conditions. During low tide conditions, nearshore drill locations would range from 0-5 ft. (0-1.5 m) deep in the river channel. These relatively shallow water depths would help reduce sound transmission over wide distances through water.

Due to the absence of empirical data on sound source levels for small scale geotechnical drilling in Alaska, estimated sound source levels were used from a Washington State Department of Transportation (WSDOT 2007) hydro-acoustic monitoring study. Measurements for underwater noise were recorded during boring operations at a distance of 32.8 ft. (10 m) 22.6 ft. (6.9 m) beneath the water surface in water of 45 ft. (13.7 m) depth at the boring location (Table 1).

The mitigation measures, therefore, include a conservative Level B disturbance zone. The 1,150 ft. (350 m) radius Level B disturbance zone compares to that of projects in which sound energy output was measured from the driving of larger diameter piles using higher energy impacts (Table 2). Measured peak output for continuous boring-generated noise associated with this project is not expected to exceed 120 dB level B harassment levels for constant sound or 160 dB Level B disturbance levels for impulsive sounds at 1,150 ft. (350 m).

The geotechnical work would occur within the river banks, which would help confine noise generated by the drilling and penetration testing activities, and hammering to drive drill casings. This work would be temporary, with geotechnical activities expected to continue during the course of about 31 days in May 2015. Some borings below the MHW would be completed in a dry environment (if available).

Because of the small-scale drilling equipment being used, environmental conditions (working in dry or shallow water, and locations within relatively narrow river channels), and the mitigation measures (includes using PSOs and protocols to stop operations if marine mammals enter the 350-m radius harassment zone), it is unlikely that there would be temporary or permanent hearing impairment to any marine mammals, including beluga whales.

Geotechnical activities are planned to continue through May 31, 2015, focusing working around low tide when most work areas are dewatered. The projected density of Cook Inlet belugas within the 350-m zone of harassment is expected to be low. Project mitigation measures will guard against in-water activity when beluga whales may be nearby, so it is extremely unlikely that beluga whales would be exposed to noise levels sufficient to cause harassment or injury. Therefore, we expect any effects due to underwater noise associated with geotechnical activities to be discountable.

Cook Inlet Beuga Whale Critical Habitat

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

³ High tide line is 22.9 ft. (7 m); Mean lower low water is 0 ft. (0 m) (North America Vertical Datum of 1988).

Table 1. Summary of underwater sound measurements results at 33 ft. (10 m)¹.

Activity	Drill Depth (ft.)	No. of Strikes	Peak dB ²	Peak Average dB	RMS dB ¹	SEL, dB ²
None (Ambient)	No data	No data	No data	No data	141	No data
Hammering	32	49	181	178	158 ³	148
Drilling	37	No data	152	151	143	No data
Hammering	37	26	180	177	158 ³	148
Hammering	42	20	177	174	154 ³	147

¹Underwater sound measurements are reported as dB referenced to 1 µPa.

²Loudest strike measured.

³Average of all strikes.

n/a – no applicable

Note: Comparatively, the acoustics group measured a 36 inch (91.4 cm) steel pile in 2006 at this same general location, which generated a peak value of 206 dB, an average root mean square (rms) value of 195 dB, and a sound exposure level (SEL) of 180 dB (WSDOT 2007).

Table 2. Noise activities and physical characteristics in Turnagain Arm, Alaska compared to similar noise activities in other areas.

Project / Location	Radius (m) of area ensonified to 160 dB re 1µPa _{rms}	Pile size (cm)	Pile type	Approx. water depth within 1000 m of source	Project comparison	Reference
PROPOSED PROJECT						
Seward Highway MP 75-90, Alaska ¹	350	8	steel rod	1.5-7	n/a	HDR (2014)
Test pile driving program at the Port of Anchorage, Alaska ²	350	36	H pile	9-20	Pile is more than 4 times larger; water is 3-6 times deeper	URS (2007)
Test pile program, Hood Canal, Washington ³	425 ⁴	91	Tubular	10-90	Pile is more than 11 times larger; water is 4.5-7 times deeper	Illingworth and Rodkin Inc. 2012

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

During geotechnical drilling activities, the presence of in-water machinery, project associated noises, increased sediment suspension, and contamination have the potential to impact PCE 1. These impacts are anticipated to be short-term and of such small scale as to be undetectable at each location. Therefore, any adverse effects to this PCE would be insignificant.

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

Sound levels generated from geotechnical activities and barge use may result in localized juvenile fish displacement, but are not expected to harm fish. Any prey displacement will be temporary and will not affect beluga whale prey availability, especially anadromous adult salmon which are not present until later in the year. Upon conclusion of geotechnical activities at a particular location, prey species would reoccupy affected areas and would be available to beluga whales as before. Therefore, any adverse effects to this PCE would be insignificant.

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

Changes in sediment suspension and turbidity could affect PCE 3. Some geotechnical activities (drilling and casing removal) could cause a temporary increase in suspended sediments and turbidity. However, only water or NSF-certified drilling fluids for drinking water wells would be used in the course of conducting borings. Native sediments that may be introduced to marine waters are not expected to contain contaminants at a level that would affect marine life, especially when one takes into account the extreme tidal exchange and the small volume of fill that may be re-suspended. Furthermore, the drilling contractor would comply with Alaska Department of Environmental Conservation and U.S. Environmental Protection Agency regulations prohibiting water pollution by implementing procedures for refueling and hazardous materials. Therefore, the proposed action's effects upon this PCE are expected to be insignificant.

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

Project noise is the only aspect of this proposed action that could create a barrier to passage of Cook Inlet beluga whales. Noise will result from geotechnical activities (hammering to drive drill casings, boring and soil penetration tests, and casing removal). Therefore, this project may affect PCE 4. Beluga whales can respond in a variety of ways to noise produced by in-water activities, from mild behavioral changes to habitat abandonment. The use of PSOs during in-water noise-producing activity would provide the ability for in-water noise-producing activities to be shut down upon approach of one or more beluga whales towards the 350-m radius harassment zone. Implementation of mitigation actions will allow free passage of Cook Inlet beluga whales through the action area. Therefore, any adverse effects to this PCE would be 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 impact of this proposed action upon beluga whales would likely be underwater noise associated with the soil penetration tests; and hammering to drive drill casings, and

geotechnical drilling. However, information on how beluga whales respond to noise from these activities is not well documented. Most available data are for activities that are analogous, but not comparative; pile-driving noise is orders of magnitude louder. Therefore, we have concluded that the most likely response by Cook Inlet beluga whales to project noise would be avoidance. Any habitat avoidance by beluga whales that may occur from geotechnical activities would be temporary, occurring only during May 2015.

PSOs will be present during all in-water activity, during the day and night. This will minimize the probability of exposing beluga whales and other marine mammal species to in-water noise thresholds more than 160 dB re 1 μ Pa for impulse noise and more than 120 dB re 1 μ Pa for continuous noise. Minimization and avoidance measures are expected to prevent harassment of beluga whales during geotechnical activities. Therefore, any adverse effects to this PCE would be insignificant.

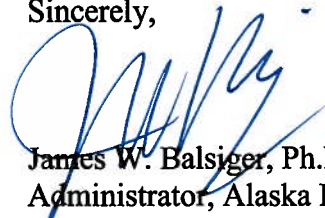
CONCLUSION

Based on this analysis, NMFS concurs with your determination that the proposed modification to your geotechnical sampling may affect, but is not likely to adversely affect, Cook Inlet beluga whales or their critical habitat.

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 Barbara Mahoney at (907) 271-3448 or barbara.mahoney@noaa.gov.

Sincerely,



James W. Balsiger, Ph.D.
Administrator, Alaska Region

cc: Brian Elliott brian.elliott@alaska.gov
John McPherson john.mcpherson@hdrinc.com
Kelly Petersen kelly.petersen@alaska.gov

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

May 27, 2015

Sandra Garcia-Aline
Division Administrator
Federal Highway Administration
P.O. Box 21648
Juneau, Alaska 99802-1648

Re: Seward Highway MP 75-90, for Geotechnical Activities, Turnagain Arm, Alaska;
Reinitiation Number 2; AKR-2015-9426

Dear Ms. Garcia-Aline:

The National Marine Fisheries Service (NMFS) recently conducted an informal consultation with Federal Highway Administration (FHWA) under section 7(a)(2) of the Endangered Species Act (ESA), regarding proposed geotechnical sampling to support the design and construction of the Seward Highway milepost (MP) 75-90 road and bridge rehabilitation. FHWA determined that this project may affect, but is not likely to adversely affect, endangered Cook Inlet beluga whales (*Delphinapterus leucas*) or their critical habitat. In a letter dated February 26, 2015, NMFS concurred with that determination.

On April 2, 2015, NMFS received a letter from FWHA requesting reinitiation of that informal consultation based upon substantial changes to the project description. Specifically, that proposal changed the geotechnical and geophysical survey project from daylight-only drilling operations to 24-hour drilling operations. In addition, the project termination date was changed from April 30, 2015, to May 31, 2015. FHWA determined that this modification to the geotechnical sampling project may have affected, but was not likely to adversely affect, endangered Cook Inlet beluga whales or their critical habitat. In a letter dated May 6, 2015, NMFS concurred with that determination.

On May 22, 2015, NMFS received a letter from FWHA requesting a second reinitiation of that informal consultation based upon the need for additional time during which to conduct the specified work. This need arose due to lack of availability of equipment during the proposed time frame. Specifically, FHWA asked that the project be allowed to continue through June 15, 2015. No other changes to the project description are proposed.

The nature and methodology of the work covered by this consultation remain unchanged. The requested time extension for the project will actually reduce the already insignificant impact of this project on the endangered Cook Inlet beluga whale. Our best information indicates that, as



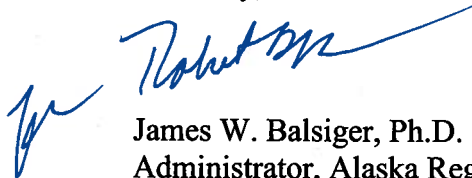
the eulachon (*Thaleichthys pacificus*) spawning activity in the rivers at the terminus of Turnagain Arm diminishes in late May, the presence of Cook Inlet beluga whales becomes less likely until August, when the whales re-enter those waters in pursuit of coho salmon (*Oncorhynchus kisutch*).

Based on our analysis of this information, NMFS concurs with your determination that the requested time extension for this geotechnical survey is not likely to adversely affect Cook Inlet beluga whales or their critical habitat. A complete administrative record of this consultation is on file in this office. Please refer to our letter of May 6, 2015, (enclosed) for a description of your action and our analysis of the effects of the project as previously proposed during a time window when Cook Inlet beluga whales had a slightly greater chance of occurring in the area.

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 Greg Balogh at (907) 271-3023 or Greg.balogh@noaa.gov.

Sincerely,



James W. Balsiger, Ph.D.
Administrator, Alaska Region

Enclosure: May 6, 2015, NMFS letter of concurrence for reinitiation of AKR-2015-9426

cc: Brian Elliott brian.elliott@alaska.gov
John McPherson john.mcpherson@hdrinc.com
Kelly Petersen kelly.petersen@alaska.gov

Attachment B

Data Attributes and Definitions

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Table B-1: Data Attributes and Definitions

Data Attribute	Attribute Definition and Units Collected
<i>Monitoring Effort</i>	
Survey Date, Start and End Time	Military Time, recorded when the PSO shift begins and ends
Station	Observation Location
Recorder and Observer	Indicate PSO team
<i>Environmental Conditions (Collected every 30 minutes, or as conditions change)</i>	
Weather Conditions	Dominant weather conditions, collected every 30 minutes: (S) Sunny, (PC) Partly Cloudy, (LR) Light Rain, (R) Steady Rain, (F) Fog, (OC)Overcast, (LS) Light Snow, (SN) Snow
Sea State	Sea state as measured on the Beaufort scale (0-5): (0) calm-flat, sea like a mirror (1) light air-ripples; (2) light breeze-small wavelets, crests with a glassy appearance and do not break; (3) gentle breeze-large wavelets, crests begin to break, foam of glassy appearance; (4) moderate breeze-small waves become larger with fairly frequent white horses; (5) fresh breeze-moderate waves, more pronounced long form white horses are formed, chance of spray; (6) the white foam crests are more extensive everywhere, probably some spray; (7) no work due to high winds and low visibility
Cloud Cover (%)	Amount of cloud cover
Visibility	Distance to which a marine mammal could be sighted
Glare (%)	Amount of water obstructed by glare
Ice or Rain	Indicate if ice or rain was present
Tide	Predicted hourly data information gathered from National Oceanic and Atmospheric Administration was onsite
<i>Construction and Communication Activities</i>	
Type of Activity	General Communication, Start: In-Water Work, End: In-water Work, Shutdown Notification, Restart: In-water work
Time of Event	Document time of construction activities take place and all communication between PSOs and construction crews.
Type of Construction Activity	Type of construction activity
Communication /Notes	Document information that was communicated between PSOs and construction crew.
<i>Marine Mammal Sighting Data</i>	
Daily Sighting number	Each day the group number starts at one and continues sequentially for each sighting.
Observation Instrument	Indicate which instrument was used to enter the distance and bearing: Laser Rangefinder, or Binoculars.

Data Attribute	Attribute Definition and Units Collected
Time of Initial and Last Sighting	Document time animals are initially sighted and time animals are last sighted.
Species	Species observed
Time Animal(s) Entered or Exited the Harassment Zone	Military Time, recorded when animals entered and exited harassment zone
Number of Individuals	Document the minimum and maximum number of animals counted. Record the count the observer believes to be the most accurate.
Number of Individuals in Each Class	Number of beluga whales for each color classification. For other marine mammals, indicate the age class. If possible, indicate the sex of the animals.
In-water Construction Activities at Time of Sighting	Document if construction activities were occurring when animals were initially observed.
Distance from Marine Mammal to Activities	Distance from marine mammals to construction activities when group is initially sighted, closest approach to activities, and final sighting.
Behavior of Marine Mammal	Indicate primary and secondary behaviors: (BR) Breach, (DI) Dive, (DE) Dead, (DS) Disorientation, (FI) Fight, (FO) Forage, (MI) Mill, (PL) Play, (PO) Porpoise, (SL) Slap, (SP) Spyhop, (SW) Swim, (TR) Travel, (UN) Unknown (HO) Hauled-out, (RE) Rest, (LO) Look (CU) Curious
Change in Behavior	Indicate and describe if there is a change in behavior.
Group Cohesion	Orientation of animals within the group and how far apart animals are.

Attachment C

High Tides and Beluga Whale Presence

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Table C-1: Comparison of High Tide Times and Beluga Whale Presence

Date	Estimated Twentymile River High Tide ^a	Height (ft)	Initial Beluga Whale Sighting Time	Initial Sighting in relation to High Tide	Distance Traveled Upstream ^b (m)
April 6	10:00	30.6	9:00 ^c	> 1 hr before high tide	681 ^c
April 6	22:36	29.8	-	-	-
April 7	10:24	31.0	No Beluga Whales Present		
April 7	23:06	29.8	-	-	-
April 8	11:00	30.3	9:30	1 hr 30 mins before high tide	1,268
April 8	23:48	28.7	-	-	-
April 9	11:30	29.3	10:11	1 hr 19 mins before high tide	1,217
April 9	0:24	28.1	-	-	-
April 10	12:12	28.7	10:50	1 hr 22 mins before high tide	321
April 11	1:24	27.2	-	-	-
April 11	13:12	26.8	12:28	44 mins before high tide	NA
April 12	2:36	26.4	-	-	-
April 12	14:24	25.5	-	-	-
April 13	3:54	26.4	-	-	-
April 13	15:54	25.1	16:08	14 mins after high tide	NA
April 14	5:06	27.1	-	-	-
April 14	17:18	26.2	17:24	6 mins after high tide	NA
April 15	6:12	28.7	7:00 ^c	unknown	100 ^c
April 15	18:24	28.4	17:28	56 mins before high tide	1,301
April 16	7:00	30.4	7:01 ^c	unknown	748 ^c
April 16	19:24	30.0	18:16	1 hr 8 mins before high tide	765
April 17	7:48	31.7	7:01 ^c	> 47 mins before high tide	1,330
April 17	20:18	30.9	-	-	-
April 18	8:24	32.3	-	-	-
April 18	21:06	31.8	-	-	-
April 19	9:12	33.9	7:45/9:40 ^{cd}	> 1 hr 27 mins before high tide ^d	22 ^c
April 29	21:48	32.2	-	-	-
April 20	9:48	33.2	7:59	1 hr 49 mins before high tide	589
April 20	22:36	31.3	-	-	-
April 21	10:30	32.3	8:42	1 hr 48 before high tide	959
April 21	23:18	30.2	-	-	-
April 22	11:12	30.8	9:03	2 hr 9 mins before high tide	1,172
April 23	0:06	29.1	-	-	-
April 23	11:54	29.1	10:58	56 mins before high tide	NA
April 24	0:54	27.9	-	-	-
April 24	12:42	27.4	13:05	23 mins after high tide	NA

^aVerified National Oceanic and Atmospheric Administration tidal predictions for Anchorage (NMFS 2015) plus 1 hour for Twentymile tide estimate.

^bApproximate distance beluga whales were observed upstream from the bridge. At times observers were not able to see around the river bend, beluga whales may have traveled farther upstream than indicated. Also beluga whales were sometimes already present and upstream when observations began. Distances upstream are not calculated based on a straight line; they were adjusted for the bend in the river.

^cBeluga whales were present when monitoring effort began; beluga whales could have traveled farther upstream than indicated.

^dWhen PSOs started observations at 8:20, drilling crew had mentioned that two beluga whales had been observed upstream at 7:45. Beluga whales were far upstream beyond the bend, out of sight; therefore, PSOs initial sighting time was 9:40 when beluga whales began to make their way downstream.

Note: - represents no monitoring occurred; NA indicates when belugas did not travel upstream, m = meters, ft = feet,

Attachment D

Photographs

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Group A: April 6 Beluga Whale



Group I: April 15 Beluga Whale



Group I: April 15 Beluga Whale (Mother and Calf)









Group Z: April 21 Harbor Porpoise (in Twentymile)







