PROPOSED ACTION:	Issuance of an Incidental Harassment Authorization for Anacortes Ferry Terminal Tie-up Slip Dolphins and Wingwall Replacement Project, Anacortes, Washington.
TYPE OF STATEMENT:	Final Environmental Assessment
LEAD AGENCY:	U.S. Department of Commerce National Oceanic and Atmospheric Administration National Marine Fisheries Service
RESPONSIBLE OFFICIAL:	Donna S. Wieting, Director Office of Protected Resources, National Marine Fisheries Service
FOR FURTHER INFORMATION:	Shane Guan National Marine Fisheries Service Office of Protected Resources Permits and Conservation Division 1315 East West Highway Silver Spring, MD 20910 301-427-8401
LOCATION:	Anacortes, Washington
ABSTRACT:	This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources' proposal to issue an Incidental Harassment Authorization, pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act, to the Washington State Department of Transportation for the take of small numbers of marine mammals incidental to conducting the Anacortes Ferry Terminal Tie-up Slip Dolphins and Wingwall Replacement Project in Anacortes, Washington.
DATE:	April 2015

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LIST OF ACRONYMS AND ABBREVIATIONS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB	decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
ft	feet
FR	Federal Register
IHA	Incidental Harassment Authorization
m	meter
mi	miles
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OMB	Office of Management and Budget
PSO	Protected Species Observer
PTS	Permanent hearing threshold shift
SAR	NMFS Marine Mammal Stock Assessment Report
TTS	Temporary hearing threshold shift
USFWS	US Fish and Wildlife Service
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferry

Chapter 1 Introduction and Purpose and Need

1.1. Description of Proposed Action

The Marine Mammal Protection Act (MMPA) prohibits the incidental taking of marine mammals. The incidental take of a marine mammal falls under three categories: mortality, serious injury, or harassment, which includes injury and behavioral effects. The MMPA defines harassment as any act of pursuit, torment, or annoyance which: (1) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (2) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). There are exceptions to the MMPA's prohibition on take, such as the authority at issue here for us to authorize the incidental taking of small numbers of marine mammals by harassment upon the request of a U.S. citizen provided we follow certain statutory and regulatory procedures and make determinations. This exception is discussed in more detail in Section 1.2.

We propose to issue an Incidental Harassment Authorization (IHA) to the Washington State Department of Transportation (WSDOT) under the MMPA for the taking of small numbers of marine mammals, incidental to WSDOT's Anacortes Ferry Terminal Tie-up Slip Dolphins and Wingwall Replacement Project in Anacortes, Washington. We do not have the authority to permit, authorize, or prohibit WSDOT's construction activities.

Our proposed action is a direct outcome of WSDOT requesting an IHA under Section 101(a)(5)(D) of the MMPA to take marine mammals, by harassment, incidental to conducting the Anacortes Ferry Terminal Tie-up Slip Dolphins and Wingwall Replacement Project. Pile removal and pile driving activities associated with that Project have the potential to take, by harassment, marine mammals. WSDOT therefore requires an IHA for incidental take.

Our issuance of an IHA to WSDOT is a major federal action under the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations in 40 CFR §§ 1500-1508, and NOAA Administrative Order (NAO) 216-6. Thus, we are required to analyze the effects of our proposed action.

This Environmental Assessment (EA), titled "*Issuance of an Incidental Harassment Authorization for Anacortes Ferry Terminal Tie-up Slip Dolphins and Wingwall Replacement Project, Anacortes, Washington*," (hereinafter, EA) addresses the potential environmental impacts of two alternatives, namely:

- Issue the Authorization to WSDOT under the MMPA for Level B harassment of marine mammals during WSDOT's Anacortes Ferry Terminal Tie-up Slip Dolphins and Wingwall Replacement Project, taking into account the prescribed means of take, mitigation measures, and monitoring requirements required in the proposed Authorization; or

- Not issue an Authorization to WSDOT in which case, for the purposes of NEPA analysis only, we assume that the activities would proceed and cause incidental take, without the mitigation and monitoring measures that would otherwise be prescribed in the proposed Authorization.

1.1.1. Background on WSDOT's MMPA Application

On April 1, 2014, WSDOT submitted a request to NOAA requesting an IHA for the possible harassment of small numbers of 11 marine mammal species incidental to construction associated with the Anacortes Ferry Terminal Tie-up Slips Dolphin and Wingwall Replacement in the city of Anacortes, on Fidalgo Island, adjacent to Guemes Channel, Skagit County, Washington, between September 1, 2015, and August 31, 2016.

The purpose of this project at the Anacortes ferry terminal is to replace the aging timber wingwalls and dolphins in Tie-up Slips 3 and 4 with standard steel and concrete designs. This will allow the ferries to safely moor at the terminal and provide the necessary protection of the terminal from the docking of ferries. The following specific aspects of the proposed construction project are likely to result in the take of marine mammals: vibratory pile removal and pile driving.

1.1.2. Marine Mammals in the Action Area

The proposed construction project could adversely affect the following marine mammal species under NMFS jurisdiction:

- Harbor seal (*Phoca vitulina*)
- California sea lion (*Zalophus californianus*)
- Northern elephant seal (*Mirounga angustirostris*)
- Steller sea lion (*Eumetopias jubatus*)
- Killer whale (*Orcinus orca*)
- Pacific white-sided dolphin (*Lagenorhynchus obliquidens*)
- Gray whale (*Eschrichtius robustus*)
- Humpback whale (*Megaptera novaeangliae*)
- Minke whale (*Balaenoptera acutorostrata*)
- Harbor porpoise (*Phocoena phocoena*)
- Dall's porpoise (*P. dalli*)

1.2. Purpose and Need

The MMPA prohibits "takes" of marine mammals, with a number of specific exceptions. The applicable exception in this case is an authorization for incidental take of marine mammals in section 101(a)(5)(D) of the MMPA.

Section 101(a)(5)(D) of the MMPA directs the Secretary of Commerce (Secretary) to authorize, upon request, the incidental, but not intentional, taking of small numbers of marine mammals of

a species or population stock, by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if we make certain findings and provide a notice of a proposed authorization to the public for review. Entities seeking to obtain authorization for the incidental take of marine mammals under our jurisdiction must submit such a request (in the form of an application) to us.

We have issued regulations to implement the Incidental Take Authorization provisions of the MMPA (50 CFR Part 216) and have produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for authorizations. All applicants must comply with the regulations at 50 CFR § 216.104 and submit applications requesting incidental take according to the provisions of the MMPA.

Purpose: The primary purpose of our proposed action—the issuance of an Authorization to WSDOT—is to authorize (pursuant to the MMPA) the take of marine mammals incidental to WSDOT's proposed activities. The IHA, if issued, would exempt WSDOT from the take prohibitions contained in the MMPA.

To authorize the take of small numbers of marine mammals in accordance with Section 101(a)(5)(D) of the MMPA, we must evaluate the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and not have an unmitigable adverse impact on the availability of affected marine mammal species for certain subsistence uses. We cannot issue an IHA if it would result in more than a negligible impact on marine mammal species or stocks or if it would result in an unmitigable adverse impact on subsistence.

In addition, we must prescribe, where applicable, the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat (i.e., mitigation), paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, we must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. Authorizations must also include requirements or conditions pertaining to the monitoring and reporting of such taking, in large part to better understand the effects of such taking on the species. Also, we must publish a notice of a proposed Authorization in the *Federal Register* for public notice and comment.

The underlying purpose of this action is therefore to determine whether the take resulting from WSDOT's Anacortes Ferry Terminal Tie-up Slips Dolphin and Wingwall Replacement Project would have a negligible impact on affected marine mammal species or stocks and would not have an unmitigable adverse impact on the availability of marine mammals for taking for subsistence uses, and to develop mitigation and monitoring measures to reduce the potential impacts.

Need: On April 1, 2014, WSDOT submitted an application demonstrating both the need and potential eligibility for issuance of an IHA in connection with the activities described in section 1.1.1. We now have a corresponding duty to determine whether and how we can authorize take by Level B harassment incidental to the activities described in WSDOT's application. Our responsibilities under section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame the need for this proposed action.

Any alternatives considered under NEPA must meet the agency's statutory and regulatory requirements. Our described purpose and need guide us in developing reasonable alternatives for consideration, including alternative means of mitigating potential adverse effects. Thus, we are developing and analyzing alternative means of developing and issuing an Authorization, which may require the applicant to include additional mitigation and monitoring measures in order for us to make our determinations under the MMPA.

1.3. The Environmental Review Process

NEPA compliance is necessary for all "major" federal actions with the potential to significantly affect the quality of the human environment. Major federal actions include activities fully or partially funded, regulated, conducted, authorized, or approved by a federal agency. Because our issuance of an Authorization would allow for the taking of marine mammals consistent with provisions under the MMPA and incidental to the applicant's activities, we consider this as a major federal action subject to NEPA.

Under the requirements of NAO 216-6 section 6.03(f)(2)(b) for incidental harassment authorizations, we prepared this EA to determine whether the direct, indirect and cumulative impacts related to the issuance of an IHA for incidental take of marine mammals during the conduct of WSDOT's Anacortes Ferry Terminal Tie-up Slips Dolphin and Wingwall Replacement Project at the Washington State Ferry Terminal in Anacortes, Washington, could be significant. If we deem the potential impacts to be not significant, this analysis, in combination with other analyses incorporated by reference, may support the issuance of a Finding of No Significant Impact (FONSI) for the proposed Authorization.

1.3.1. Laws, Regulations, or Other NEPA Analyses Influencing the EA's Scope

We have based the scope of the proposed action and nature of the two alternatives considered in this EA on the relevant requirements in section 101(a)(5)(D) of the MMPA. Thus, our authority under the MMPA bounds the scope of our alternatives. We conclude that this analysis—when combined with the analyses in the following documents—fully describes the impacts associated with the proposed construction project with mitigation and monitoring for marine mammals. After conducting a review of the information and analyses for sufficiency and adequacy, we incorporate by reference the relevant analyses on WSDOT's proposed action as well as discussions of the affected environment and environmental consequences within the following documents, per 40 CFR §1502.21 and NAO 216-6 § 5.09(d):

- *Request for an Incidental Harassment Authorization under the Marine Mammal Protection Act: Anacortes Tie-up Slips Dolphin and Wingwall Replacement* (WSDOT, 2014),
- *Biological Assessment Reference. Washington State Ferries, Washington State Department of Transportation*. (WSF, 2014).

MMPA APPLICATION AND NOTICE OF THE PROPOSED AUTHORIZATION

The CEQ regulations (40 CFR § 1502.25) encourage federal agencies to integrate NEPA's environmental review process with other environmental reviews. We rely substantially on the public process for developing proposed Authorizations and evaluating relevant environmental information and provide a meaningful opportunity for public participation as we develop corresponding EAs. We fully consider public comments received in response to our publication of the notice of proposed Authorization during the corresponding NEPA process.

We considered WSDOT's proposed mitigation and monitoring measures and determined that they would help ensure that the Project would effect the least practicable impact on marine mammals. These measures include: (1) conducting in-water construction only during daylight hours, when visual monitoring of marine mammals can be conducted; (2) implementing a soft start for all impact and vibratory pile driving; and (3) implementing shutdown measures if a marine mammal within a zone of influence appears disturbed by the work activity. Through the MMPA process, we preliminarily determined that, provided that WSDOT implements the required mitigation and monitoring measures, the impact of the Project on marine mammals would be, at worst, a temporary modification in behavior of small numbers of certain species of marine mammals that may be hauled out in the vicinity of the proposed activity.

We also prepared a *Federal Register* notice (80 FR 11648; March 4, 2015) on the proposed activity and request that the public submit comments, information, and suggestions concerning WSDOT's request, the content of our proposed IHA, and potential environmental effects related to the proposed issuance of the Authorization. During the 30-day public comment period, NMFS received one comment from the Marine Mammal Commission regarding the ambient noise measurements and the received level for Level B harassment zone. All comments will be addressed in the *Federal Register* notice announcing our final decision on the proposed issuance of the IHA.

In summary, the analyses referenced above support our conclusion that, with the incorporation of the proposed monitoring and mitigation measures, the issuance of an IHA to WSDOT for the Anacortes Ferry Terminal Tie-up Slips Dolphin and Wingwall Replacement Project would not result in any significant direct, indirect, or cumulative impacts. Based on our MMPA analysis, the intermittent frequency and short duration of the harassment from the construction project would allow adequate time for the marine mammals to recover from potentially adverse effects. Furthermore, the referenced analyses concluded that additive or cumulative effects of the construction project on its own or in combination with other activities, are not expected to occur.

Finally, the environmental analyses did not identify any significant environmental issues or impacts.

1.3.2. Scope of Environmental Analysis

Given the limited scope of the decision for which we are responsible (*i.e.*, issue the IHA including prescribed means of take, mitigation measures, and monitoring requirements, or not issue the IHA), this EA provides more focused information on the primary issues and impacts of environmental concern related specifically to our issuance of the IHA. This EA does not further evaluate effects to the elements of the human environment listed in Table 1, because previous environmental reviews (WSF, 2014) have shown that the issuance of an IHA for activities similar to WSDOT's proposed construction project would not significantly affect those components of the human environment. Moreover, those analyses are consistent with our MMPA analysis concluding that there would be no significant impacts to marine mammals.

Table 1. Components of the human environment not affected by our issuance of an IHA.

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans		Military Activities
Non-Indigenous Species	Geography	Oil and Gas Activities
Seabirds	Land Use	Recreational Fishing
	Oceanography	Shipping and Boating
	State Marine Protected Areas	National Historic Preservation Sites
	Federal Marine Protected Areas	National Trails and Nationwide Inventory of Rivers
	National Estuarine Research Reserves	Low Income Populations
	National Marine Sanctuaries	Minority Populations
	Park Land	Indigenous Cultural Resources
	Prime Farmlands	Public Health and Safety
	Wetlands	Historic and Cultural Resources
	Wild and Scenic Rivers	
	Ecologically Critical Areas	

1.3.3. Comments on This EA

NAO 216-6 established NOAA procedures for complying with NEPA and the implementing NEPA regulations issued by the CEQ. Consistent with the intent of NEPA and the clear direction in NAO 216-6 to involve the public in NEPA decision-making, we released the Draft EA for public comment on the potential environmental impacts of our issuance of an IHA, as well as comment on the activities described in WSDOT's MMPA application and in the *Federal Register* notice (80 FR 11648; March 4, 2015) of the proposed IHA. During the 30-day public comment period, NMFS only received comments from the Marine Mammal Commission. All

comments are addressed in the *Federal Register* notice announcing our final decision on the proposed issuance of the IHA.

1.4. Other Permits, Licenses, or Consultation Requirements

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action.

1.4.1. National Environmental Policy Act

Issuance of an Authorization is subject to environmental review under NEPA. NMFS may prepare an EA, an EIS, or determine that the action is categorically excluded from further review. While NEPA does not dictate substantive requirements for an Authorization, it requires consideration of environmental issues in federal agency planning and decision making. The procedural provisions outlining federal agency responsibilities under NEPA are provided in CEQ's implementing regulations (40 CFR §§ 1500-1508).

1.4.2. Marine Mammal Protection Act

The MMPA and its provisions that pertain to the proposed action are discussed above in section 1.2.

1.4.3. Endangered Species Act (ESA)

The humpback whale and the Southern Resident stock of killer whale are the only marine mammal species currently listed under the ESA that could occur in the vicinity of WSDOT's proposed construction projects. Under section 7 of the ESA, the Federal Highway Administration (FHWA) and WSDOT have consulted with NMFS West Coast Regional Office (WCRO) on the proposed WSDOT Anacortes Ferry Terminal tie-up slip dolphins and wingwall replacement project. WCRO issued a Biological Opinion on July 15, 2014, which concludes that the proposed Anacortes Ferry Terminal tie-up slip dolphins and wingwall replacement project may affect, but is not likely to adversely affect the listed marine mammal species and stocks.

The issuance of an IHA to WSDOT constitutes an agency action that authorizes an activity that may affect ESA-listed species and, therefore, is subject to section 7 of the ESA. As the effects of the activities on listed marine mammals were analyzed during a formal consultation between the FHWA and NMFS, and as the underlying action has not changed from that considered in the consultation, the discussion of effects that are contained in the Biological Opinion and accompanying memo issued to the FHWA on July 15, 2014, pertains also to this action. Therefore, NMFS has determined that issuance of an IHA for this activity would not lead to any effects to listed marine mammal species apart from those that were considered in the consultation on FHWA's action.

1.4.4. Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency which may adversely affect essential fish habitat (EFH) identified under the MSFCMA. All WSF terminals are within Pacific groundfish, coastal pelagic, and Pacific salmon EFH. Coastal pelagic fish are primarily associated with the open-ocean and coastal areas, and are not likely to occur near WSF terminals.

WSDOT and the FHWA determined that the project would not adversely affect EFH. NMFS WCRO concurs with this determination. Therefore, consultation under the MSA and conservation recommendations pursuant to MSA (section 305(b)(4)(A)) are not necessary. The FHWA must initiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH.

Chapter 2 Alternatives

2.1. Introduction

NEPA and the CEQ implementing regulations (40 CFR §§ 1500-1508) require consideration of alternatives to proposed major federal actions and NAO 216-6 provides NOAA policy and guidance on the consideration of alternatives to our proposed action. An EA must consider all reasonable alternatives, including the Preferred Alternative. It must also consider the No Action Alternative, even if it that alternative does not meet the stated purpose and need. This provides a baseline analysis against which we can compare the other alternatives.

To warrant detailed evaluation as a reasonable alternative, an alternative must meet our purpose and need. In this case, as we previously explained in Chapter 1 of this EA, an alternative only meets the purpose and need if it satisfies the requirements under section 101(a)(5)(D) the MMPA. We evaluated each potential alternative against these criteria; identified one action alternative along with the No Action Alternative; and carried these forward for evaluation in this EA. This chapter describes the alternatives and compares them in terms of their environmental impacts and their achievement of objectives.

As described in Section 1.2, the MMPA requires that we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider WSDOT's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measure to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death, wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);
- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);
- Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base; activities that block or limit passage to or from biologically

important areas; permanent destruction of habitat; or temporary destruction/disturbance of habitat during a biologically important time; and

- For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Alternative 1 (the Preferred Alternative) includes a suite of mitigation measures intended to minimize potentially adverse interactions with marine mammals.

2.2. Description of WSDOT's Proposed Activities

WSDOT proposes to conduct Anacortes Ferry Terminal Tie-up Slips Dolphin and Wingwall Replacement Project Project at the Washington State Ferry (WSF) Terminal in Anacortes, Washington, to replace the aging timber wingwalls and dolphins in Tie-up Slips 3 and 4 with standard steel and concrete designs. This will allow the ferries to safely moor at the terminal and provide the necessary protection of the terminal from the docking of ferries.

The project will replace the aging timber wingwalls and dolphins in Tie-up Slips 3 and 4 (Figures 1 and 2) with standard steel and concrete designs. The aging timber facilities are beginning to deteriorate from combined docking operations, salt water infusion and wood rot organisms. The timber piles that will be permanently removed are listed in Table 1.

WSDOT plans to re-use eight existing 36-inch steel piles (remove and relocate) and install 52 new permanent steel piles (24-, 30-, and 36-inch) with a vibratory hammer. In addition, WSDOT may install one temporary dolphin consisting of one 24-inch steel pile and/or the contractor may elect to temporarily install four 24-inch steel piles at the location of each dolphin and wingwall to be used as a pile driving template for the permanent piles (Table 2). These four temporary piles will be removed once the corresponding landing aid is completed, then installed at the location of the next structure, and completely removed at the end of the project. Between one and five temporary piles will be installed at any given time during the project.

A vibratory hammer will be used for pile removal and driving. No impact pile driving or proofing is necessary. Existing timber piles may also be removed by direct pull. Pile driving and removal will be conducted from a barge containing a derrick, crane, and other necessary equipment. The barge will be anchored and/or spudded. No barge dynamic positioning system (DPS) will be used on this project.

Table 1. Timber piles to be removed

Structure	Number of Piles Removed
Slip 3 Wingwalls	46
Slip 3 Left Dolphin	35
Slip 3 Right Inner	35
Slip 3 Right Outer	51
Slip 4 Wing Dolphins	70
Slip 4 Right Outer	35
Total	**272**

Table 2. Project Piles to be Installed

Structure Name	Location	Depth (ft)	Existing Steel Piles	Temporary Steel Piles*	New Permanent Steel Piles			Total
			36”	24”	36”	30”	24”	
Dolphin 1	Slip 3 left intermediate	-28	-	4	1	4	-	**9**
Dolphin 2	Slip 3 right inner (double sided)	-28	-	4	2	4	-	**10**
Dolphin 3	Slip 3 right outer (double sided)	-30	-	4	10	6	-	**20**
Dolphin 4	Slip 4 right outer	-27	-	4	3	6	-	**13**
Wingwall 1	Slip 3	-28	8	-	-	-	4	**12**
Wingwall 2	Slip 4	-25	-	-	4	-	8	**16**
Temporary Dolphin	Protective Dolphin	-34	-	1	-	-	-	**1**
Total			**8**	**5**[1]	**20**	**20**	**12**	**81**

[1] No more than five temporary piles will be in place at any one time.

2.2.1. Dates and Duration

In-water construction is planned to take place between September 2015 and February 2016. The on-site work will last approximately 135 days with pile removal and driving taking place over approximately 36 days. All work will occur in water depths between -25 and -34 feet mean low low water (MLLW).

Duration estimates of each of the pile driving elements follow:

- The daily construction window for pile removal or driving will begin no sooner than 30 minutes after sunrise to allow for initial marine mammal monitoring, and will end 30 minutes before sunset to allow for post-construction marine mammal monitoring.

- Vibratory pile removal of the existing timber piles will take approximately 10 to 15 minutes per pile. Vibratory removal will take less time than driving, because piles are vibrated to loosen them from the soil, and then pulled out with the vibratory hammer turned off. Assuming the worst case of 15 minutes per pile (with no direct pull or clamshell removal), removal of 272 piles at the Anacortes terminal will take 68 hours over nine days of pile removal.

- Vibratory pile driving of the steel piles will take approximately 20 minutes per pile, with three to five piles installed per day. Assuming 20 minutes per pile, and three piles per day, driving of 81 piles at the Anacortes terminal will take 27 hours over 27 days.

The total worst-case time for pile removal is nine days, and 27 days for pile installation. The actual number of pile-removal/driving days is expected to be less.

2.2.2. Specified Geographic Region

The proposed activities will occur at the Anacortes ferry terminal located in Anacortes, Washington. The terminal is adjacent to Guemes Channel, tributary to the Georgia Basin.

The Anacortes ferry terminal, serving State Route 20, is located in the city of Anacortes, on Fidalgo Island, adjacent to Guemes Channel, Skagit County, Washington. Guemes Channel is tributary to the Georgia Basin. The terminal is located in Section 22, Township 35 North, Range 1 East. This is the primary terminal for all WSDOT ferry departures to the San Juan Islands and Vancouver Island. Land use in the area is a mix of residential, business, and local parks.

2.2.3. Detailed Description of Activities

The following construction activities are anticipated:

- Remove three 35-pile dolphins, one 51-pile dolphin, 70 piles associated with wing-dolphins, and 46 piles associated with wingwalls. These piles will be removed with a vibratory hammer or by direct pull and clamshell removal.
- If necessary, vibratory pile-drive one to five 24-inch steel piles for use as a temporary template at each structure location.
- Vibratory pile-drive up to six 30-inch steel piles and up to ten 36-inch steel piles for each new dolphin.
- Place precast concrete diaphragm on new dolphins.
- Attach fender panel to new fender pile.
- Remove temporary piles.
- At Slip 3 wingwalls, vibratory pile-drive up to four 24-inch steel piles (two per wingwall).
- At Slip 4 wingwalls, vibratory pile-drive and up to four 24-inch steel piles (two per wingwall), and eight 36-inch steel piles (four per wingwall).
- Attach rubber fenders between plumb piles.

Approximately 441 tons of creosote-treated timbers will be removed from the marine environment. The total mudline footprint of the existing dolphins is 258 ft^2. The total mudline footprint of the new dolphins will be 263 ft^2, an increase of five square feet. However, the footprint of the new steel dolphins will be more open, allowing fish movement between the piles. The new dolphins and wingwalls will have 52 piles, compared to the existing structures, which have 272 tightly clustered piles with no space between them.

Detailed descriptions of these activities are provided below.

Vibratory Hammer Pile Removal

Vibratory hammer extraction is a common method for removing timber piling. A vibratory hammer is a large mechanical device mostly constructed of steel (weighing 5 to 16 tons) that is suspended from a crane by a cable. It is attached to a derrick and positioned on the top of a pile. The pile is then unseated from the sediments by engaging the hammer, creating a vibration that loosens the sediments binding the pile, and then slowly lifting up on the hammer with the aid of the crane.

Once unseated, the crane will continue to raise the hammer and pull the pile from the sediment. When the pile is released from the sediment, the vibratory hammer is disengaged and the pile is pulled from the water and placed on a barge for transfer upland. Vibratory removal will take approximately 10 to 15 minutes per pile, depending on sediment conditions.

The piling will be loaded onto the barge or into a container and disposed of offsite in accordance with State of Washington Administrative Code (WAC) 173-304 Minimum Functional Standards for Solid Waste Handling and mitigation.

Direct Pull and Clamshell Pile Removal

Older timber pilings are particularly prone to breaking at the mudline because of damage from marine borers and vessel impacts, and must be removed because they can interfere with the installation of new pilings. In some cases, removal with a vibratory hammer is not possible if the pile is too fragile to withstand the hammer force.

Broken or damaged piles may be removed by wrapping the piles with a cable and pulling them directly from the sediment with a crane. If the piles break below the waterline, the pile stubs may be removed with a clamshell bucket, a hinged steel apparatus that operates like a set of steel jaws. The bucket will be lowered from a crane and the jaws will grasp the pile stub as the crane pulls up. The broken piling and stubs will be loaded onto the barge for off-site disposal. Clamshell removal will be used only if necessary. Direct pull and clamshell removal do not produce noise that could impact marine mammals.

Vibratory Hammer Pile Installation

Vibratory hammers are commonly used in steel pile installation where sediments allow and may involve the same vibratory hammer used in pile extraction. The pile is placed into position using a choker and crane, and then vibrated between 1,200 and 2,400 vibrations per minute. The vibrations liquefy the sediment surrounding the pile allowing it to penetrate to the required seating depth. The type of vibratory hammer that will be used for the project will likely be an APE 400 King Kong (or equivalent) with a drive force of 361 tons.

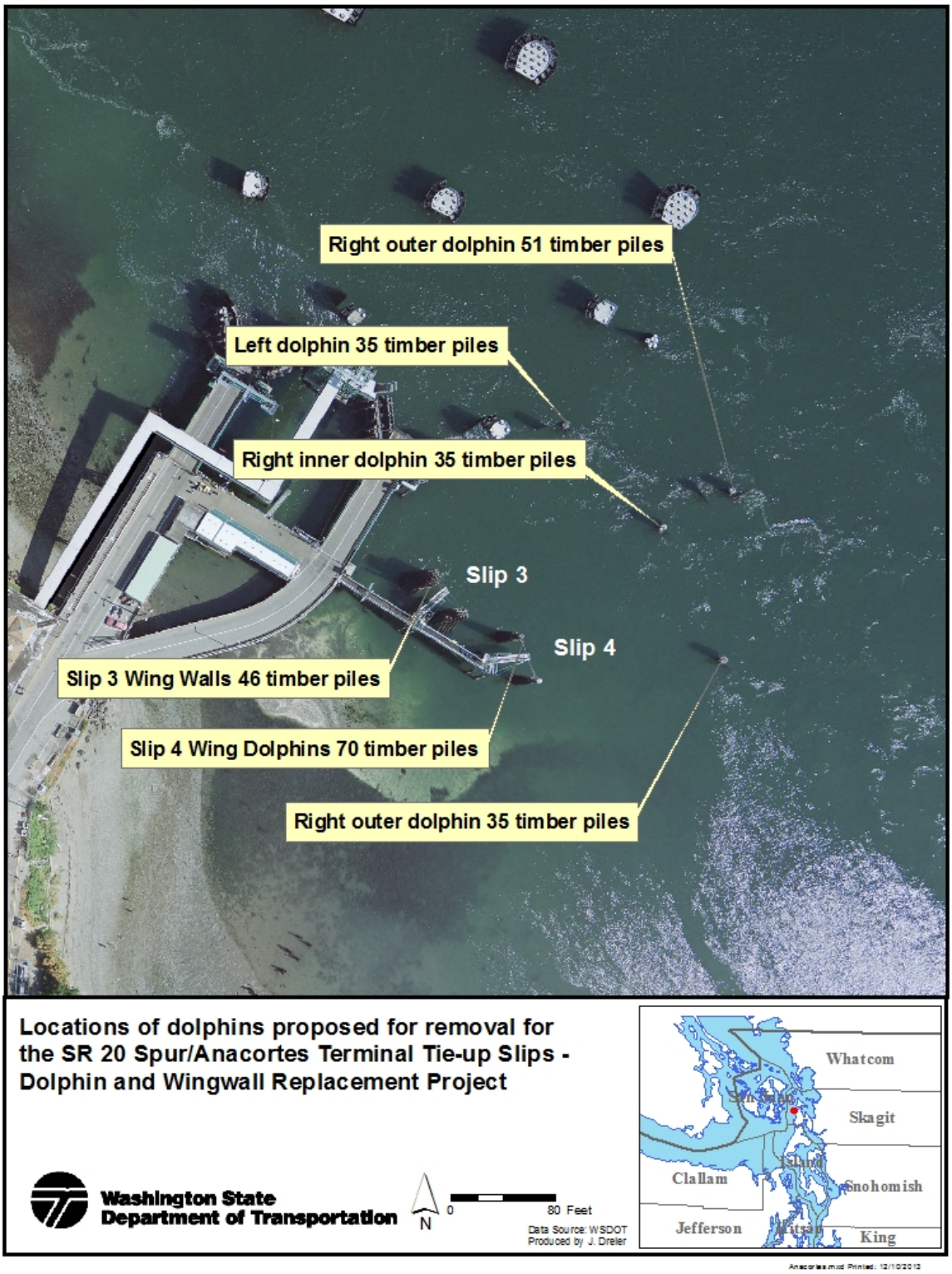

Figure 1. Dolphins to be Removed.

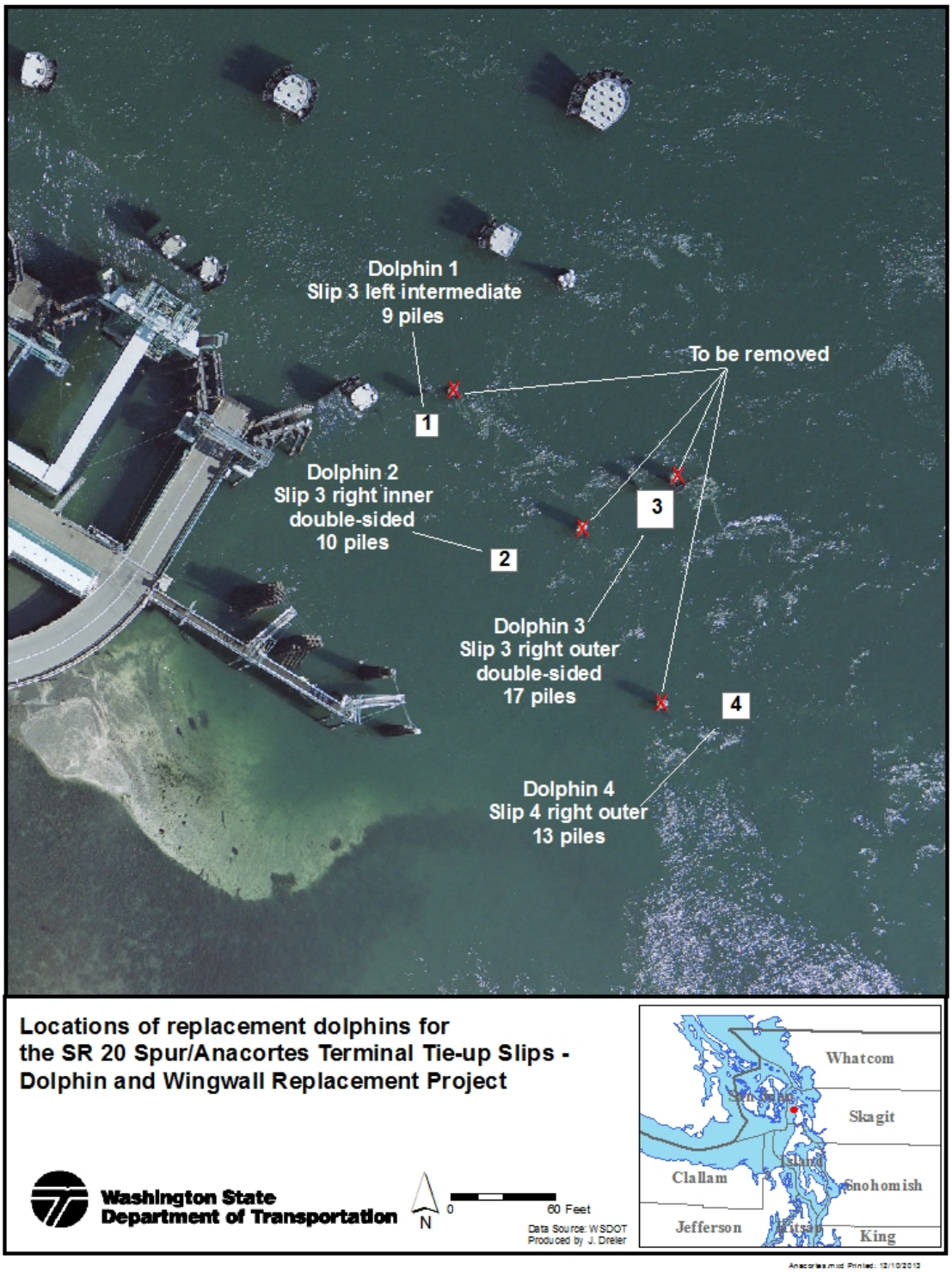

Figure 2. Replacement Dolphin Locations.

2.3. Description of Alternatives

2.3.1. Alternative 1 – Issuance of an Authorization with Mitigation Measures

The proposed action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, we would issue an IHA (valid from September 1, 2015, through August 31, 2016) to WSDOT allowing the incidental take, by Level B harassment, of nine species of marine mammals, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the proposed IHA, if issued, along with any additions based on consideration of public comments.

MITIGATION MEASURES

For WSDOT's proposed Anacortes Ferry Terminal Tie-up Slips Dolphin and Wingwall Replacement Project, WSDOT worked with NMFS and proposed the following mitigation measures to minimize the potential impacts to marine mammals in the Project vicinity. The primary purposes of these mitigation measures are to minimize sound levels from the activities, to monitor marine mammals within designated zones of influence corresponding to NMFS' current Level B harassment thresholds and, if marine mammals with the ZOI appear disturbed by the work activity, to initiate immediate shutdown or power down of the piling hammer, making it very unlikely potential injury or TTS to marine mammals would occur and ensuring that Level B behavioral harassment of marine mammals would be reduced to the lowest level practicable.

<u>Time Restriction</u>

Work would occur only during daylight hours, when visual monitoring of marine mammals can be conducted. In addition, all in-water construction will be limited to the period between September 1, 2015, and February 15, 2016.

<u>Establishment of Level B Harassment Zones of Influence</u>

Because WSDOT will not use impact pile driving for the proposed construction work, no Level A exclusion zone exists for marine mammals. NMFS currently uses received level of 120 dB as the onset of Level B harassment from non-impulse sources such as vibratory pile driving and pile removal. Although ambient measurement during March at the vicinity of Anacortes Ferry Terminal showed that the median ambient noise level is at 123 dB re 1 µPa, WSDOT will use 120 dB re 1 µPa as the isopleths for modeling its Level B harassment zone. WSDOT is considering collecting ambient noise data before in-water construction and adjust the Level B behavioral harassment zone based on measurements.

The 120-dB Level B harassment ZOIs from in-water vibratory pile removal and pile driving are modeled based on in-water measurements at the WSDOT Port Townsend Ferry Terminal (Laughlin 2011) and Friday Harbor Ferry Terminal (Laughlin 2010) constructions. These modeled results are presented in Table 3 below.

Table 3. Modeled ZOI distances to Level B behavioral harassment from the pile driving and pile removal at WSDOT's Anacortes project area

Vibratory Pile Type/Method	Threshold	In-water ZOI (km)	In-air ZOI (m)
12-inch timber removal	120 dB_{RMS} re 1 µPa	2.3	----------
24-inch steel removal/driving	120 dB_{RMS} re 1 µPa	6.3	----------
30-inch steel driving	120 dB_{RMS} re 1 µPa	39.8	----------
36-inch steel driving	120 dB_{RMS} re 1 µPa	63.1	----------
All piles/in-air (harbor seals)	90 dB_{RMS} re 20 µPa	----------	30
All piles/in-air (other pinnipeds)	100 dB_{RMS} re 20 µPa	----------	10

Soft Start

WSDOT will implement "soft start" (or ramp up) to reduce potential startling behavioral responses from marine mammals. Soft start requires contractors to initiate noise from the vibratory hammer for 15 seconds at reduced energy followed by a 1-minute waiting period. The procedure will be repeated two additional times. Each day, WSDOT will use the soft-start technique at the beginning of pile driving, or if pile driving has ceased for more than one hour.

Shutdown Measures

WSDOT shall implement shutdown measures if southern resident killer whales are sighted within the vicinity of the project area and are approaching the Level B harassment zone (zone of influence, or ZOI) during in-water construction activities.

If a killer whale approaches the ZOI during pile driving or removal, and it is unknown whether it is a Southern Resident killer whale or a transient killer whale, it shall be assumed to be a Southern Resident killer whale and WSDOT shall implement the shutdown measure.

If a Southern Resident killer whale or an unidentified killer whale enters the ZOI undetected, in-water pile driving or pile removal shall be suspended until the whale exits the ZOI to avoid further level B harassment.

Further, WSDOT shall implement shutdown measures if the number of any allotted marine mammal takes reaches the limit under the IHA (if issued), if such marine mammals are sighted within the vicinity of the project area and are approaching the Level B harassment zone during in-water construction activities.

Coordination with Local Marine Mammal Research Network

Prior to the start of pile driving, the Orca Network and/or Center for Whale Research will be contacted to find out the location of the nearest marine mammal sightings. The Orca Sightings Network consists of a list of over 600 (and growing) residents, scientists, and government agency personnel in the U.S. and Canada. Sightings are called or emailed into the Orca Network and

immediately distributed to other sighting networks including: the Northwest Fisheries Science Center of NOAA Fisheries, the Center for Whale Research, Cascadia Research, the Whale Museum Hotline and the British Columbia Sightings Network.

'Sightings' information collected by the Orca Network includes detection by hydrophone. The SeaSound Remote Sensing Network is a system of interconnected hydrophones installed in the marine environment of Haro Strait (west side of San Juan Island) to study orca communication, in-water noise, bottom fish ecology and local climatic conditions. A hydrophone at the Port Townsend Marine Science Center measures average in-water sound levels and automatically detects unusual sounds. These passive acoustic devices allow researchers to hear when different marine mammals come into the region. This acoustic network, combined with the volunteer (incidental) visual sighting network allows researchers to document presence and location of various marine mammal species.

With this level of coordination in the region of activity, WSDOT will be able to get real-time information on the presence or absence of whales before starting any pile driving.

MONITORING AND REPORTING MEASURES

Monitoring Measures

WSDOT shall employee NMFS-approved protected species observers (PSOs) to conduct marine mammal monitoring for its Anacortes tie-up dolphins and wingwall replacement project. The PSOs will observe and collect data on marine mammals in and around the project area for 30 minutes before, during, and for 30 minutes after all pile removal and pile installation work. If a PSO observes a marine mammal within a ZOI that appears to be disturbed by the work activity, the PSO will notify the work crew to initiate shutdown measures.

Monitoring of marine mammals around the construction site shall be conducted using high-quality binoculars (e.g., Zeiss, 10 x 42 power). Due to the different sizes of ZOIs from different pile sizes, two different ZOIs and monitoring protocols corresponding to a specific pile size will be established. Specifically, during vibratory timber removal, and 24" steel vibratory pile driving and removal, one land-based PSO will monitor the area from the terminal work site, and one boat with a driver and a PSO will travel through the monitoring area. During 30/36" vibratory pile driving, one land-based PSO will monitor the area from the terminal work site, and two boats with two drivers and two PSOs will travel through the monitoring area.

Data collection during marine mammal monitoring will consist of a count of all marine mammals by species, a description of behavior (if possible), location, direction of movement, type of construction that is occurring, time that pile replacement work begins and ends, any acoustic or visual disturbance, and time of the observation. Environmental conditions such as weather, visibility, temperature, tide level, current, and sea state would also be recorded.

Reporting Measures

WSDOT would be required to submit a final monitoring report within 90 days after completion of the construction work or the expiration of the IHA (if issued), whichever comes earlier. This report would detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed. NMFS would have an

opportunity to provide comments on the report, and if NMFS has comments, WSDOT would address the comments and submit a final report to NMFS within 30 days.

In addition, NMFS would require WSDOT to notify NMFS' Office of Protected Resources and NMFS' Stranding Network within 48 hours of sighting an injured or dead marine mammal in the vicinity of the construction site. WSDOT shall provide NMFS with the species or description of the animal(s), the condition of the animal(s) (including carcass condition, if the animal is dead), location, time of first discovery, observed behaviors (if alive), and photo or video (if available).

In the event that WSDOT finds an injured or dead marine mammal that is not in the vicinity of the construction area, WSDOT would report the same information as listed above to NMFS as soon as operationally feasible.

2.3.2. Alternative 2 – No Action Alternative

We are required to evaluate the No Action Alternative per CEQ NEPA regulations. The No Action Alternative serves as a baseline to compare the impacts of the Preferred and other Alternatives. Under the No Action alternative, we would not issue an IHA to WSDOT for the proposed construction project.

Under the No Action Alternative, WSDOT could choose not to proceed with their proposed activities or to proceed without an IHA. If they choose the latter, WSDOT would not be exempt from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

For purposes of this EA, we characterize the No Action Alternative as WSDOT not receiving an IHA and WSDOT conducting construction activities for its proposed Anacortes Ferry Terminal Tie-up Slips Dolphin and Wingwall Replacement Project without the protective measures and reporting requirements required by an IHA under the MMPA. We take this approach to meaningfully evaluate the primary environmental issues—the impact on marine mammals from these activities in the absence of protective measures.

2.4. Alternatives Considered but Eliminated from Further Consideration

NMFS considered whether other alternatives could meet the purpose and need and support WSDOT's proposed construction project. An alternative that would allow for the issuance of an IHA with no required mitigation or monitoring was considered but eliminated from consideration, as it would not be in compliance with the MMPA and therefore would not meet the purpose and need. For that reason, this alternative is not analyzed further in this document. No other alternatives that would meet the purpose and need of the Project were identified.

Chapter 3 Affected Environment

This chapter describes existing conditions in the proposed action areas. Complete descriptions of the physical, biological, and social environment of the action area are contained in the documents listed in Section 1.3.1 of this EA. We incorporate those descriptions by reference and briefly summarize or supplement the relevant sections for marine mammals in the following subchapters.

3.1. Physical Environment

3.1.1. Natural Environment

The Anacortes Ferry Terminal, serving State Route 20, is located in Anacortes, Skagit County, Washington. Anacortes is located in northwestern Washington State, northeast of the Olympic Mountains and approximately 80 miles north of Seattle.

The ferry terminal is adjacent to Ship Harbor, tributary to Guemes Channel and the Georgia Basin. The marine environment supports concentrations of marine mammals, seabirds, fish and invertebrates occupying in-water and nearshore habitats and beaches.

3.1.2. Essential Fish Habitat

The area includes marine habitat, and is within designated Pacific groundfish, coastal pelagic and Pacific salmonid EFH.

3.2. Biological Environment

The primary component of the biological environment that would be impacted by the proposed action and alternatives would be marine mammals, which would be directly impacted by the authorization of incidental take. We briefly summarize this component of the biological environment here.

3.2.1. Marine Mammals

The marine mammal species under NMFS jurisdiction most likely to occur in the proposed construction area include Pacific harbor seal (*Phoca vitulina richardsi*), northern elephant seal (*Mirounga angustirostris*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus*) (eastern Distinct Population Segment, or DPS), killer whale (*Orcinus orca*) (transient and Southern Resident stocks), gray whale (*Eschrichtius robustus*), humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*P. dali*), and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*). Only the Southern Resident killer whales and humpback whales are listed as endangered species under the Endangered Species Act (ESA).

General information on the marine mammal species found in Washington coastal waters can be found in Caretta et al. (2014), which is available at the following URL: http://www.nmfs.noaa.gov/pr/sars/pdf/po2013.pdf. Refer to that document for information on these species. A list of marine mammals in the vicinity of the action and their status are

provided in Table 4. Specific information concerning these species in the vicinity of the proposed action area is provided in detail in the WSDOT's IHA application (WSDOT 2014), please refer to that document for detailed information.

Table 4. Marine Mammal Species Potentially Present in Region of Activity

Species	ESA Status	MMPA Status	Occurrence
Harbor Seal	Not listed	Non-depleted	Frequent
California Sea Lion	Not listed	Non-depleted	Frequent
Northern Elephant Seal	Not listed	Non-depleted	Occasional
Steller Sea Lion (eastern DPS)	Not listed	Under review	Rare
Harbor Porpoise	Not listed	Non-depleted	Frequent
Dall's Porpoise	Not listed	Non-depleted	Occasional
Pacific White-sided dolphin	Not listed	Non-depleted	Occasional
Killer Whale	Endangered (Southern Resident)	Depleted	Occasional
Gray Whale	Delisted	Unclassified	Occasional
Humpback Whale	Endangered	Depleted	Rare
Minke Whale	Not listed	Non-depleted	Rare

3.3. Social Environment

Because our proposed action and alternatives relate only to the authorization of incidental take of marine mammals, the components of the social environment are not relevant to our proposed action (see subchapter 1.3.2 - Scope of Environmental Analysis). Therefore, no further analysis of the social environment is required here.

Chapter 4 Environmental Consequences

This chapter of the EA analyzes the impacts of the two alternatives and addresses the potential direct, indirect, and cumulative impacts of our issuance of an IHA. WSDOT's application and other related environmental analyses identified previously facilitate this analysis.

Under the MMPA, we have evaluated the potential impacts of WSDOT's construction program activities in order to determine whether to authorize incidental take of marine mammals. Under NEPA, we have determined that an EA is appropriate to evaluate the potential significance of environmental impacts resulting from the issuance of an IHA.

4.1. Effects of Alternative 1 – Issuance of an IHA with Mitigation Measures

Alternative 1 is the Preferred Alternative, under which we would issue an IHA to WSDOT allowing the incidental take, by Level B harassment, of 11 species of marine mammals from September 1, 2015, through August 31, 2016, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the IHA, if issued. We would incorporate the mitigation and monitoring measures and reporting described earlier in this EA into a final IHA.

4.1.1. Impacts to Marine Mammal Habitat

No permanent impacts to marine mammal habitat are proposed to or would occur as a result of the proposed Project. The WSDOT's proposed Anacortes tie-up slips dolphin and wingwall replacement project would not modify the existing habitat. Therefore, no restoration of the habitat would be necessary. A temporary, small-scale loss of foraging habitat may occur for marine mammals, if the marine mammals leave the area during pile extraction and driving activities.

Acoustic energy created during pile replacement work would have the potential to disturb fish within the vicinity of the pile replacement work. As a result, the affected area could temporarily lose foraging value to marine mammals. During pile driving, high noise levels may exclude fish from the vicinity of the pile driving. Hastings and Popper (2005) identified several studies that suggest fish will relocate to avoid areas of damaging noise energy. The acoustic frequency and intensity ranges that have been shown to negatively impact fish (FHWG 2008) and an analysis of the potential noise output of the proposed Project indicate that Project noise has the potential to cause temporary hearing loss in fish over a distance of approximately 42 meters from pile driving activity. If fish leave the area of disturbance, pinniped foraging habitat in that area may have temporarily decreased foraging value when piles are driven using impact hammering.

The duration of fish avoidance of this area after pile driving stops is unknown. However, the affected area represents an extremely small portion of the total foraging range of marine mammals that may be present in and around the project area.

Because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or marine mammal populations.

Project-related impacts to Pacific groundfish, coastal pelagic and Pacific salmon EFH are expected to be negligible due to the following reasons:

- Piles will be driven with a vibratory hammer, which will not cause injury or mortality to fish species
- The project is not expected to significantly affect the distribution or abundance of potential Pacific groundfish, coastal pelagic or Pacific salmon prey species in the action area due to its small scale.
- Though a low number of prey species individuals may be disturbed during in-water work, impacts will be short-term and limited to the immediate area around the pile.
- Though a low number of prey species individuals may be exposed to localized turbidity, impacts will be short-term and limited to the immediate vicinity of the pile.

4.1.2. Impacts to Marine Mammals

We expect that behavioral disturbance or displacement resulting from the activities associated with the Project have the potential to impact marine mammals. The majority of impacts are likely to occur from pile driving and pile removal activities. Pile driving and removal activities associated with the construction could cause pinniped behavioral modification and temporary displacement within the vicinity of the action area through: (1) noise generated from pile removal and pile driving; and (2) visual disturbance from construction activities and crew. These activities are not anticipated to result in injury, serious injury, or mortality of any marine mammal species and none is proposed to be authorized.

4.1.2.1.Acoustic Impacts

When considering the influence of various kinds of sound on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Based on available behavioral data, audiograms have been derived using auditory evoked potentials, anatomical modeling, and other data, Southall et al. (2007) designate "functional hearing groups" for marine mammals and estimate the lower and upper frequencies of functional hearing of the groups. The functional groups and the associated frequencies are indicated below (though animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range):

- Low frequency cetaceans (13 species of mysticetes): functional hearing is estimated to occur between approximately 7 Hz and 22 kHz (however, a study by Au *et al*.,

(2006) of humpback whale songs indicate that the range may extend to at least 24 kHz);

- Mid-frequency cetaceans (32 species of dolphins, six species of larger toothed whales, and 19 species of beaked and bottlenose whales): functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High frequency cetaceans (eight species of true porpoises, six species of river dolphins, *Kogia*, the franciscana, and four species of cephalorhynchids): functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and
- Pinnipeds in Water: functional hearing is estimated to occur between approximately 75 Hz and 75 kHz, with the greatest sensitivity between approximately 700 Hz and 20 kHz.

As mentioned previously in this document, 11 marine mammal species are likely to occur in the proposed project area. WSDOT and NMFS determined that in-water pile removal and pile driving during the Anacortes tie-up slip dolphin and wingwall replacement project has the potential to result in behavioral harassment of the marine mammal species and stocks in the vicinity of the proposed activity.

Marine mammals exposed to high-intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak et al. 1999; Schlundt et al. 2000; Finneran et al. 2002; 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is unrecoverable, or temporary (TTS), in which case the animal's hearing threshold will recover over time (Southall et al. 2007). Since marine mammals depend on acoustic cues for vital biological functions, such as orientation, communication, finding prey, and avoiding predators, hearing impairment could result in the reduced ability of marine mammals to detect or interpret important sounds. Repeated noise exposure that causes TTS could lead to PTS.

Experiments on a bottlenose dolphin (*Tursiops truncates*) and beluga whale (*Delphinapterus leucas*) showed that exposure to a single watergun impulse at a received level of 207 kPa (or 30 psi) peak-to-peak (p-p), which is equivalent to 228 dB (p-p) re 1 μPa, resulted in a 7 and 6 dB TTS in the beluga whale at 0.4 and 30 kHz, respectively. Thresholds returned to within 2 dB of the pre-exposure level within 4 minutes of the exposure (Finneran *et al*. 2002). No TTS was observed in the bottlenose dolphin. Although the source level of one hammer strike for pile driving is expected to be much lower than the single watergun impulse cited here, animals being exposed for a prolonged period to repeated hammer strikes could receive more noise exposure in terms of sound exposure level (SEL) than from the single watergun impulse (estimated at 188 dB re 1 μPa2-s) in the aforementioned experiment (Finneran *et al*. 2002).

Chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al*. 2009). Masking is the obscuring of sounds of interest by other sounds, often at similar

frequencies. Masking generally occurs when sounds in the environment are louder than, and of a similar frequency as, auditory signals an animal is trying to receive. Masking can interfere with detection of acoustic signals, such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired.

Masking occurs at the frequency band which the animals utilize. Since noise generated from in-water vibratory pile removal and driving is mostly concentrated at low frequency ranges, it may have little effect on high-frequency echolocation sounds by odontocetes (toothed whales), which may hunt California sea lion and harbor seal. However, the lower frequency man-made noises are more likely to affect the detection of communication calls and other potentially important natural sounds, such as surf and prey noise. The noises may also affect communication signals when those signals occur near the noise band, and thus reduce the communication space of animals (e.g., Clark *et al*. 2009) and cause increased stress levels (e.g., Foote *et al*. 2004; Holt *et al.* 2009).

Unlike TS, masking can potentially impact the species at community, population, or even ecosystem levels, as well as individual levels. Masking affects both senders and receivers of the signals and could have long-term chronic effects on marine mammal species and populations. Recent science suggests that low frequency ambient sound levels in the world's oceans have increased by as much as 20 dB (more than 3 times, in terms of SPL) from pre-industrial periods, and most of these increases are from distant shipping (Hildebrand 2009). All anthropogenic noise sources, such as those from vessel traffic and pile removal and driving, contribute to the elevated ambient noise levels, thus intensifying masking.

Nevertheless, the sum of noise from WSDOT's proposed Anacortes tie-up slip dolphin and wingwall replacement project construction activities is confined to a limited area by surrounding landmasses; therefore, the noise generated is not expected to contribute to increased ocean ambient noise. In addition, due to shallow water depths in the project area, underwater sound propagation of low-frequency sound (which is the major noise source from pile driving) is expected to be poor.

Finally, in addition to TS and masking, exposure of marine mammals to certain sounds could lead to behavioral disturbance (Richardson *et al*. 1995), such as: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities, such as socializing or feeding; visible startle response or aggressive behavior, such as tail/fluke slapping or jaw clapping; avoidance of areas where noise sources are located; and/or flight responses (e.g., pinnipeds flushing into water from haulouts or rookeries).

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, or reproduction. Some of these types of significant behavioral modifications include:

- Drastic change in diving/surfacing patterns (such as those thought to be causing beaked whale strandings due to exposure to military mid-frequency tactical sonar);
- Habitat abandonment due to loss of desirable acoustic environment; and
- Cessation of feeding or social interaction.

The onset of behavioral disturbance from anthropogenic noise depends on both external factors (characteristics of noise sources and their paths) and the receiving animals (hearing, motivation, experience, demography), and is therefore difficult to predict (Southall *et al*. 2007).

The proposed project area is not a prime habitat for marine mammals, nor is it considered an area frequented by marine mammals. Therefore, behavioral disturbances that could result from anthropogenic noise associated with WSDOT's construction activities are expected to affect only a small number of marine mammals on an infrequent and limited basis.

4.1.2.2.Visual Disturbance

The activities of workers in the project area may also cause behavioral reactions by marine mammals, such as pinnipeds flushing from the jetty or pier or moving farther from the disturbance to forage. However, observations of the area show that it is unlikely that more than 10 to 20 individuals of pinnipeds would be present in the project vicinity at any one time. Therefore, even if pinnipeds were flushed from the haul-out, a stampede is very unlikely, due to the relatively low number of animals onsite. In addition, proposed mitigation and monitoring measures would minimize the startle behavior of pinnipeds and prevent the animals from flushing into the water.

4.1.2.3.Estimated Take of Marine Mammals by Level B Incidental Harassment

As discussed above, in-water pile removal and pile driving (vibratory and impact) generate loud noises that could potentially harass marine mammals in the vicinity of WSDOT's proposed Anacortes Ferry Terminal tie-up slip dolphin and wingwall replacement project.

As mentioned earlier in this document, currently NMFS uses 120 dB re 1 µPa and 160 dB re 1 µPa at the received levels for the onset of Level B harassment from non-impulse (vibratory pile driving and removal) and impulse sources (impact pile driving) underwater, respectively. Table 5 summarizes the current NMFS marine mammal take criteria.

Table 5. Current Acoustic Exposure Criteria for Non-explosive Sound Underwater

Criterion	Criterion Definition	Threshold
Level A Harassment (Injury)	Permanent Threshold Shift (PTS) (Any level above that which is known to cause TTS)	180 dB re 1 µPa (cetaceans) 190 dB re 1 µPa (pinnipeds) root mean square (rms)

Level B Harassment	Behavioral Disruption (for impulse noises)	160 dB re 1 µPa (rms)
Level B Harassment	Behavioral Disruption (for non-impulse noise)	120 dB re 1 µPa (rms)

As explained above, ZOIs will be established that encompass the areas where received underwater sound pressure levels (SPLs) exceed the applicable thresholds for Level B harassment. There will not be a zone for Level A harassment in this case, because source levels from vibratory hammer do not exceed the threshold for Level A harassment, and no impact hammer will be used in the proposed project.

As mentioned earlier, the 123-dB Level B harassment ZOIs are modeled based on in-water measurements at the WSDOT Port Townsend Ferry Terminal (Laughlin 2011) and Friday Harbor Ferry Terminal (Laughlin 2010) constructions (Table 4). Incidental take is calculated for each species by estimating the likelihood of a marine mammal being present within a ZOI during active pile removal/driving. Expected marine mammal presence is determined by past observations and general abundance near the Anacortes ferry terminal during the construction window. Ideally, potential take is estimated by multiplying the area of the ZOI by the local animal density. This provides an estimate of the number of animals that might occupy the ZOI at any given moment. However, there are no density estimates for any Puget Sound population of marine mammal.

As a result, the take requests were estimated using local marine mammal data sets, and information from state and federal agencies. All haulout and observation data available are summarized in Section 3 of WSDOT's IHA application.

The calculation for marine mammal exposures is estimated by:

> Exposure estimate = N (number of animals in the area) * Number of days of pile removal/driving activity

Estimates include Level B acoustical harassment during vibratory pile removal and driving. All estimates are conservative, as pile removal/driving will not be continuous during the work day. Using this approach, a summary of estimated takes of marine mammals incidental to WSDOT's Anacortes Ferry Terminal tie-up dolphins and wingwall replacement work are provided in Table 6.

Table 6. Estimated numbers of marine mammals that may be exposed to received pile removal levels above 123 dB re 1 µPa (rms)

Species	Estimated marine mammal takes	Abundance	Percentage
Pacific harbor seal	900	14,612	6.0%
California sea lion	180	296,750	0.06%
Steller sea lion	360	52,847	0.7%
Northern elephant seal	72	124,000	0.06%
Harbor porpoise	612	10,682	5.7%
Dall's porpoise	108	42,000	0.3%
Killer whale, transient	70	354	20%

Killer whale, Southern Resident	4	81	5.0%
Pacific white-sided dolphin	360	25,233	1.4%
Gray whale	36	18,017	0.2%
Humpback whale	30	2,043	1.5%
Minke whale	10	202 - 600	1.7 - 5%

4.2. Effects of Alternative 2 – No Action Alternative

Under the No Action Alternative, we would not issue an IHA to WSDOT. As a result, WSDOT would not receive an exemption from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

The impacts to elements of the human environment resulting from the No Action Alternative—conducting the Anacortes tie-up slip dolphin and wingwall replacement project in the absence of required protective measures for marine mammals under the MMPA—would be greater than those impacts resulting from Alternative 1, the Preferred Alternative.

4.2.1. Impacts to Marine Mammal Habitat

Under the No Action Alternative, the construction project would have no additional effects on the physical environment beyond those resulting from WSDOT's activities, which we evaluated earlier in this document (see Section 4.1.1). Even if there are no mitigation measures imposed, impacts to marine mammal habitat would be minimal at the action area. This Alternative would result in similar effects on the physical environment as Alternative 1.

4.2.2. Impacts to Marine Mammals

Under the No Action Alternative, WSDOT's activities could result in increased amounts of Level B harassment to marine mammals due to the absence of mitigation and monitoring measures that would be required under the IHA. While it is difficult to provide an exact number of takes that might occur under the No Action Alternative, the numbers would be expected to be larger than those presented in Table 6 above, because WSDOT would not be required to follow mitigation measures to reduce the number of takes.

If the activities proceeded without the protective measures and reporting requirements required by a final Authorization under the MMPA, the direct, indirect, and cumulative effects on the human or natural environment of not issuing the IHA would include the following:

- There could be increases in the number of behavioral responses because of the lack of mitigation measures required in the IHA. If WSDOT does not use soft starts while conducting the pile driving and removal activities, the incidental take of marine mammals would likely occur at higher levels than we have already identified and evaluated above, because animals would not be warned to leave the area before full power driving or removal occurs; and

- We would not be able to obtain the monitoring and reporting data needed to assess the anticipated impact of the activity upon the species or stock and to increase knowledge of the species, as required under the MMPA.

4.3. Compliance with Necessary Laws – Necessary Federal Permits

We have determined that the issuance of an IHA is consistent with the applicable requirements of the MMPA, MSFMCA, and our regulations. Please refer to Section 1.4 of this EA for more information.

4.4. Unavoidable Adverse Impacts

WSDOT's application and the other environmental analyses identified previously (WSF 2007) summarize unavoidable adverse impacts to marine mammals or to their populations to which they belong or on their habitats occurring in the proposed project area. We incorporated those documents by reference to include potential effects on other species.

We acknowledge that the incidental take authorized would potentially result in unavoidable adverse impacts to individual animals that would be harassed as a result of the Project. However, we do not expect WSDOT's activities to have adverse consequences on the viability of marine mammals in the Pacific Ocean or in Puget Sound, and we do not expect the marine mammal populations in that area to experience reductions in reproduction, numbers, or distribution that might appreciably reduce their likelihood of surviving in the wild. We expect that the numbers of individuals of all species taken by harassment would be small (relative to species or stock abundance) and that the proposed Anacortes tie-up slip dolphin and wingwall replacement project and the take resulting from the proposed project activities would have a negligible impact on the affected species or stocks of marine mammals.

The MMPA requirement of ensuring the proposed action has no unmitigable adverse impact to subsistence uses does not apply here because there are no permitted subsistence uses of marine mammals in the region.

4.5. Cumulative Effects

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

Past, present, and foreseeable impacts to marine mammal populations include the following: commercial whaling; climate change affecting the prey base and habitat quality as a result of global warming; ship strikes; fishing gear entanglement; exposure to biotoxins and the resulting bioburden; acoustic masking from anthropogenic noise; competition with commercial fisheries; and killer whale predation. These activities account for cumulative impacts to regional and worldwide populations of marine mammals, many of whom are a small fraction of their former

abundance. However, quantifying the biological costs for marine mammals within an ecological framework is a critical missing link to our assessment of cumulative impacts in the marine environment and assessing cumulative effects on marine mammals (Clark *et al.*, 2009). Despite these regional and global anthropogenic and natural pressures, available trend information indicates that most local populations of marine mammals in the Pacific Ocean are stable or increasing (Carretta *et al.*, 2013).

The proposed construction project would add another, albeit localized and temporary, activity in Washington coast. This activity would be limited to a small area in the City of Anacortes for a relatively short period of time. This section provides a brief summary of the human-related activities affecting the marine mammal species in the action area.

4.5.1. Ferry Terminal Construction

Beside the proposed Anacortes tie-up slip dolphin and wingwall replacement project, WSDOT also performs other types of coastal construction activities. Between August 2010 and February 2011, WSDOT conducted pile driving activities associated with the Manette Bridge replacement in the city of Bremerton in Kitsap County. From November 2012 to February 2013, WSDOT's Washington State Ferry (WSF) replaced a cable-lift transfer span at the Port Townsend Ferry Terminal. In addition, WSF is also working on replacement of the dolphin structure at the Orcas Island and Friday Harbor ferry terminals between September 2013 and February 2014. Furthermore, WSF is planning several other ferry terminal engineering projects, which include Mukilteo Multimodal Project, Seattle Terminal building and north trestle replacement, Vashon Ferry Terminal seismic retrofit, and Southworth Terminal timber trestle and terminal replacement, and Spur/Friday Harbor Terminal timber trestle and terminal replacement and Coupeville Terminal bridge timber towers preservation in the foreseeable future. Additionally, the U.S. Navy Base in Kitsap Washington is extending a pier in the Puget Sound region. These activities, however, are not expected to have significant impacts to the overall region environment as the activities involved are brief, localized, and of small scales. In addition, most of these projects will not be occurring concurrently.

4.5.2. Marine Pollution

Marine mammals are exposed to contaminants via the food they consume, the water in which they swim, and the air they breathe. Point and non-point source pollutants from coastal runoff, offshore mineral and gravel mining, at-sea disposal of dredged materials and sewage effluent, marine debris, and organic compounds from aquaculture are all lasting threats to marine mammals in the project area. The long-term impacts of these pollutants, however, are difficult to measure.

The persistent organic pollutants (POPs) tend to bioaccumulate through the food chain; therefore, the chronic exposure of POPs in the environment is perhaps of the most concern to

high trophic level predators such as Southern Resident killer whales, Eastern Pacific gray whales, California sea lions, Pacific harbor seals, and Steller sea lions.

The WSDOT's construction and demolition activities associated with the Anacortes tie-up slip dolphin and wingwall replacement project are not expected to cause increased exposure of POPs to marine mammals in the project vicinity due to the small scale and localized nature of the activities. Additionally, the WSDOT will use barges to carry out all construction debris and demolition material for proper disposal.

4.5.3. Disease

Disease is common in many marine mammal populations and has been responsible for major die-offs worldwide, but such events are usually relatively short-lived.

As recent as April 2010, five gray whales were found dead in Puget Sound. The die-off raised concerns among researchers who monitor gray whales and the health of marine mammals in the region. The total number of recent mortalities remains well below the peak numbers documented in big mortality year and the 5 that have died so far in 2010 is still under the average for an entire year. These mortalities are currently being investigated by scientists from the Northwest Marine Mammal Stranding Network including NMFS, Cascadia Research, Central Puget Sound Marine Mammal Stranding Network, and Washington Department of Fish and Wildlife.

4.5.4. Commercial and Private Marine Mammal Watching

Although marine mammal watching is considered by many to be a non-consumptive use of marine mammals with economic, recreational, educational and scientific benefits, it is not without potential negative impacts. One concern is that animals may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle *et al.* 1993; Laist *et al*. 2001; Jensen and Silber 2004; Douglas *et al.* 2008). Another concern is that preferred habitats may be abandoned if disturbance levels are too high. Several recent research efforts have monitored and evaluated the impacts of people closely approaching, swimming, touching and feeding marine mammals and has suggested that marine mammals are at risk of being disturbed ("harassed"), displaced or injured by such close interactions. Researchers investigating the adverse impacts of marine mammal viewing activities have reported boat strikes, disturbance of vital behaviors and social groups, separation of mothers and young, abandonment of resting areas, and habituation to humans (Nowacek *et al.* 2001).

There are no known marine mammal watching operations based in the vicinity of the proposed action area. Marine mammal watching operations, however, especially killer whale watching operations, are common in the nearby Greater Puget Sound area, and thus marine mammals that occur in both the action area and the Puget Sound area could be adversely affected by such marine mammal watching operations over time. However, the proposed WSDOT's Anacortes

ferry terminal construction work is not like to add additional cumulative adverse effects due to its small spatial scale and brief duration.

4.5.5. Shipping

The Puget Sound is home to major Pacific Northwest shipping routes; literally thousands of vessels enter and leave the major ports of Washington State and British Colombia. In addition, to cargo ships, vacation cruise lines, and fishing vessels that travel on a regular basis throughout the region, there are scores of recreational vehicles, ferry traffic, and whale watching boats. While long-term studies are needed to better understand the impact of vessel traffic on marine mammals like whales, short-term research has already begun and findings suggest that boat noise directly affects the behavior of marine mammals. Increased boat traffic not only has the potential to increase the likelihood of ship strike of marine mammals, it also contributes to increased ambient noise level. The proposed action area is mainly served by WSDOT ferries that shuttle among different city ports within the Puget Sound region. There is no increase in ferry services and number in the foreseeable future.

4.5.6. Commercial Fishing

Commercial fisheries may affect marine mammals indirectly by altering the quality of their habitat. The removal of large numbers of fish (both target and non-target or bycatch species) from a marine ecosystem can change the composition of the fish community, altering the abundance and distribution of prey available for marine mammals. In addition, by removing large amounts of biomass, commercial fisheries compete with other consumers that depend on the target species for food, which can, in turn, increase competition between different piscivorous predators. Nevertheless, the proposed action area is a ferry terminal where no fishing activity is occurring. The proposed ferry terminal replacement will not change the current status quo of commercial fisheries in the Puget Sound area.

4.5.7. Climate Change

Global climate change could significantly affect the marine resources of the Northwest Pacific region. Possible impacts include temperature and rainfall changes and potentially rising sea levels and changes to ocean conditions. These changes may affect the coastal marine ecosystem in the proposed action area by increasing the vertical stratification of the water column and changing the intensity and rhythms of coastal winds and upwelling. Such modifications could cause ecosystem regime shifts as the productivity of the regional ecosystem undergoes various changes related to nutrients input and coastal ocean process (FWS 2011).

The precise effects of global climate change on the action area, however, cannot be predicted at this time because the coastal marine ecosystem is highly variable in its spatial and temporal scales.

4.5.8. Summary of Cumulative Effects

Although commercial harvest no longer takes place, whale watching, coastal construction and development, marine pollution, and disease continue to result in some level of impact to marine mammal populations in the area. Nonetheless, the proposed construction work at the Anacortes Ferry Terminal would only add negligible additional impacts to marine mammals in the project area due to the limited project footprint within the action area.

The pile driving and pile removal activities associated with the Anacortes tie-up slip dolphin and wingwall replacement project are well planned to minimize impacts to the biological and physical environment of the areas by implementing mitigation and monitoring protocols. Therefore, NMFS has determined that the WSDOT's Anacortes tie-up slip dolphin and wingwall replacement project would not have a significant cumulative effect on the human environment, provided that the mitigation and monitoring measures described in Sections 2.3.4 and 2.3.5 are implemented.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted

No other persons or agencies were consulted in preparation of this EA.

Prepared By

Shane Guan
Fishery Biologist
Permits and Conservation Division
Office of Protected Resources, NOAA/National Marine Fisheries Service

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