BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XR026]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Jordan Cove Energy Project, Coos Bay, Oregon

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: NMFS has hereby issued an incidental harassment authorization to Jordan Cove Energy Project, LP (JCEP) for authorization to take marine mammals incidental to pile driving associated with construction of the Jordan Cove Liquified Natural Gas (LNG) terminal and ancillary projects. This project is being tracked on the Permitting Dashboard, which can be accessed at *https://www.permits.performance.gov/permitting-projects/jordan-cove-lng-terminal-and-pacific-connector-gas-pipeline*.

DATES: The IHA is effective October 1, 2020 through September 30, 2021.

ADDRESSES: Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. In case of problems accessing these documents, please call the contact listed below.

FOR FURTHER INFORMATION CONTACT: Jaclyn Daly, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the take of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization is provided to the public for review. Under the MMPA, take is defined as meaning to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other "means of effecting the least practicable adverse impact" on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stocks for taking for certain subsistence uses (referred to in shorthand as "mitigation"); and requirements pertaining to the monitoring and reporting of such takings must be set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On April 23, 2019, NMFS received a request from JCEP for an IHA to take marine mammals incidental to pile driving associated with the Jordan Cove LNG Project, Coos Bay, Oregon. The application was deemed adequate and complete on August 16, 2019. JCEP requested the take of a small number of seven species of marine mammals by Level B harassment. Neither JCEP nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate. The IHA is effective from October 1, 2020, through September 30, 2021.

Description of Proposed Activity

Overview

JCEP is proposing to construct an LNG terminal in Coos Bay, install a pipeline, conduct dredging to allow for a broader operational weather window, widen the TransPacific Parkway (TPP) to facilitate construction traffic, and carry out two habitat-related compensatory mitigation projects. A subset of this work would occur under the issued IHA. Pile driving is the primary means by which marine mammals within Coos Bay may be taken by Level B harassment. Work associated with the project may occur year-round beginning in October 2020; however, impact pile driving is restricted to the in-water work window established to protect salmonids (October 1 to February 15, annually). In-water vibratory pile driving may occur year-round. Pile driving at various locations may occur simultaneously; however, JCEP would only use one hammer at any given site.

Dates and Duration

LNG Terminal construction will begin in 2020, with a target in-service date in the first half of 2024. NMFS has authorized take that may occur from the pile driving activities in the

first year of construction (October 1, 2020 through September 30, 2021). Conformance to the ODFW regulatory in-water work window for dredging and in-water impact driving will be implemented to reduce impacts on listed fish species per other permitting authorities. The in-water work window is the period of October 1 to February 15, and the period outside the in-water work window is February 16 to September 30.

JCEP estimates pile driving may occur over 230 days from October 1, 2020 through September 30, 2021. The majority of this pile driving would be at the water's edge but would result in elevated in-water noise levels. Pile driving may occur from approximately 10 minutes to 5 hours per day depending on the pile driving location and pile driving method. At any given location, only one hammer will be used.

Specific Geographic Region

JCEP would construct the LNG terminal and ancillary projects within Coos Bay, Oregon. Coos Bay is an approximately 55.28 km^2 estuary in Coos County, Oregon, A detailed description of the area is provided in the **Federal Register** notice of proposed IHAs (84 FR 63618; November 18, 2019) and is not repeated here. Please see that **Federal Register** notice for more information.

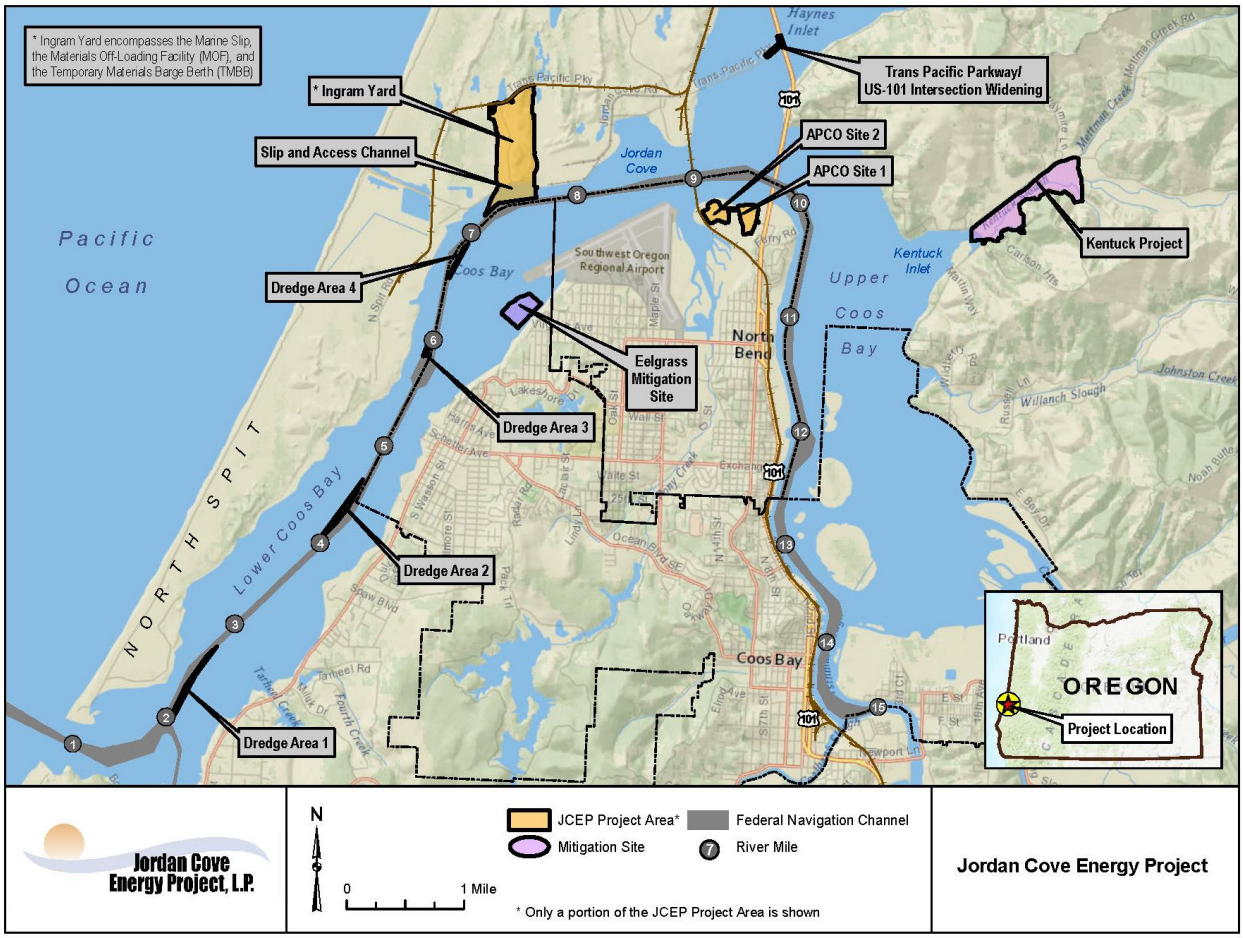

Figure 1-- Jordan Cove LNG Terminal Project Area and Location of Ancillary Activities.

Detailed Description of Specific Activity

JCEP is proposing to construct an LNG facility on the bay side of the North Spit of Coos Bay at about Channel Mile (CM) 7.3, along the existing federal navigation channel. The LNG Terminal would be capable of receiving and loading ocean-going LNG carriers, to export LNG to Asian markets, and sized to export 7.8 million metric tons of LNG per annum. The LNG Terminal is located in what is referenced as Ingram Yard in Figure 1 and would include a gas conditioning plant, a utility corridor, liquefaction facilities (including five liquefaction trains), two full-containment LNG storage tanks, and LNG loading facilities. The LNG Terminal also would include a marine slip, access channel, material offloading facility (MOF), and temporary

materials barge berth (TMBB), collectively referred to as the Marine Facilities. These Marine Facilities are the focus of JCEP's application as these are within or connected to the waters of Coos Bay where marine mammals may be present.

Table 1 below summarizes the piles installed at the terminal and ancillary projects. A detailed description of the specified activity is in the **Federal Register** notice of proposed IHA (84 FR 63618; December 18, 2019) and is not repeated here. Please see that **Federal Register** notice for more information. No changes have been made to the specified activities described therein.

Table 1--Total Piles Associated with the Jordan Cove LNG Terminal and Ancillary Activities

Method	Pile Type	In-the-dry vs In-water vs Behind Cofferdam?	Total Piles	Location	Driving Days[a]	Duration Driving per Day (min)
LNG Terminal						
Vibratory	Sheet Pile	In-the-dry	1,246	MOF (outside in water work window)	97	309
Vibratory	Sheet Pile	In-the-dry	623	MOF (inside in water work window)	48	309
Vibratory	Sheet Pile	In-the-dry	113	W. berth wall, 2.5% nearest berm (outside in water work window)	8.5	329
Vibratory	Pipe Pile	In-the-dry	6	TMBB mooring pile (inside in water work window)	10	9
Ancillary Activities (all would occur inside in-water work window)						
Impact	Timber	Behind cofferdam	1,150	TPP/US-101 intersection	60	50
Vibratory					60	100
Vibratory	Sheet Pile	In-water	311	TPP/US-101 intersection	16	100
Impact	Pipe Pile	In-water with BCA (for impact driving)	36	TPP/US-101 intersection	9	20
Vibratory					9	30
Vibratory	Pipe Pile	In-water	33	APCO sites	9	30

a. May occur concurrently with other pile-driving activities but only one pile hammer would be operating in any given area.
TPP/US-101 – TransPacific Parkway/U.S. Highway 101

Method	Pile Type	In-the-dry vs In-water vs Behind Cofferdam?	Total Piles	Location	Driving Days[a]	Duration Driving per Day (min)
MOF – Material Offloading Facility TMBB – Temporary Material Barge Berth LNG Terminal – Liquid Natural Gas Terminal BCA – Bubble Curtain Attenuation or equivalent						

Comments and Responses

A notice of NMFS' proposal to issue an IHA to Jordan Cove was published in the **Federal Register** on November 18, 2019 (84 FR 63618). That notice described, in detail, Jordan Cove's proposed activity, the marine mammal species that may be affected by the activity, the anticipated effects on marine mammals and their habitat, proposed amount and manner of take, and proposed mitigation, monitoring and reporting measures. During the 30-day public comment period, NMFS received comment letters from the Marine Mammal Commission (Commission) and the Oregon Shores Conservation Coalition (OSCC) on behalf of Rogue Climate, Sierra Club, Cascadia Wildlands, Rogue Riverkeeper, Oregon Wild, Pipeline Awareness Southern Oregon, Western Environmental Law Center, Center for Biological Diversity (hereafter collectively referred to as OSCC). Comments contained in those letters, including the Commission's recommendations, and our responses are provided here, and the comments have been posted online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*. We note that OSCC made a general comment urging NMFS to implement all of the Commission's recommendations; therefore, any response directed at the Commission also satisfies OSCC comment.

Comment 1: The Commission contends that modeling conducted by JASCO to estimate distances to the Level B harassment threshold for vibratory driving sheet piles at the terminal (i.e. in-the-dry) applied data that resulted in a higher broadband source level (SL) than that used

for in-water vibratory pile driving (i.e., 163 dB rms vs 160 dB rms, respectively); therefore, the higher SL should also be used in the in-water pile driving acoustic analysis. The Commission recommends that NMFS (1) use 163 rather than 160 dB re 1 µPa at 1 m as the SL for vibratory installation of sheet piles at TPP/U.S. 101 intersection, (2) revise the Level A and B harassment zones accordingly, and (3) re-estimate the numbers of takes of harbor seals.

Response: The purpose of JASCO's modeling was to estimate distances to NMFS Level B harassment distances from in-the-dry vibratory pile driving using a sophisticated propagation model (Appendix D in JCEP's application). JASCO's report clearly identified their propagation model incorporates, among other things, a one-third octave band SL spectrum rather than a single broadband SL to estimate distances to the Level B harassment threshold. JASCO chose the spectrum from the Port of Oakland Berth 23 project and reported the one-third octave band SLs in their report. In contrast, JCEP modeled in-water pile driving propagation using a simple practical spreading loss model (i.e., 15logR) that incorporates a single broadband SL (in this case the average, broadband SL based on various projects and provided in Caltrans (Table I.2.2)). These modeling approaches are not comparable. Spectra data for vibratory sheet pile driving is currently limited (most data sources, like Caltrans, do not provide accompanying spectral data with their source levels) and therefore there are few one-third octave band spectra available for JASCO to apply to its sound propagation model.

Essentially, the Commission is recommending that because JASCO used the Berth 23 spectrum in its propagation model, JCEP and NMFS must limit themselves to using the single, broadband SL calculated from the Berth 23 project (which was not used in JASCO's model) and apply it to the in-water pile driving practical spreading loss model. This approach ignores all other broadband source level data available. That is, the 160 dB rms broadband SL applied to

JCEP's in-water acoustic analysis represents the typical SL averaged from all data available in Caltrans and is a reasonable and justified SL. Further, 160dB rms has consistently been applied by NMFS in previous sheet pile driving projects where site specific data are absent without question from the Commission, including the recently issued IHA for the U.S. Army Corps of Engineers pile driving project in Coos Bay (85 FR 1140, January 9, 2020).

For the reasons described above, NMFS disagrees with the Commission that it is necessary to apply the single broadband SL from the Port of Oakland Berth 23 project to the in-water pile driving acoustic analysis simply because the spectrum generated for that project was used in JASCO's in-the-dry model. Therefore, we did not recalculate Level B harassment zones and as a result, did not adjust harbor seal takes based on modified harassment zones.

Comment 2: The Commission noted that the potential for Level A harassment from impact pile driving at APCO sites 1 and 2 was not analyzed. Should there be a possibility that impact driving may be necessary to install the 24-in piles at APCO Sites 1 and 2, the Commissions recommends that NMFS estimate the extents of the Level A harassment zones and revise the various tables accordingly in the FR notice and final incidental harassment authorization.

Response: JCEP has clarified that proofing 24-in piles at APCO Sites 1 and 2 with an impact hammer may occur and that the pile driving scenario would be similar to that at the US101/TPP site. Therefore, the analysis at the US101/TPP site has been applied to the APCO Sites, including implementing the same shutdown zones to avoid Level A harassment of all marine mammals; therefore, no Level A harassment is anticipated or authorized.

Comment 3: The Commission noted there is potential for vibratory hammering to occur for 80 minutes per day during installation of 24-in piles at the TPP/U.S. 101 intersection;

however, JCEP (and NMFS) used a 30 minute duration in the User Spreadsheet to calculate distances to Level A harassment zones. The Commission recommends that NMFS recalculate the Level A harassment zones to account for the maximum time that vibratory installation could occur on a given day and revise Tables 9 and 10 in the **Federal Register** notice accordingly.

Response: JCEP has clarified the 80 minute duration presented in their application and subsequently carried over the proposed IHA is a typographical error. All vibratory pile driving is expected to be limited to 30 minutes per day. Therefore, NMFS has determined no further analysis is necessary.

Comment 4: The Commission recommends that NMFS finish reviewing and finalize its recommended proxy source levels for both impact and vibratory installation of the various pile types and sizes and make them available to the public as they are completed.

Response: As the Commission notes, NMFS is developing proxy source level recommendations for impact and vibratory pile driving based on all available data, and we intend to make that information available to the public as it is developed. Until that time, NMFS has advised applicants and the Commission that Caltrans 2015 represents the most complete pile driving source level compilation, and applicants should defer to these data absent any project site specific data.

Comment 5: The Commission disagrees with NMFS's application of a 7 dB source level reduction in its acoustic analysis because bubble curtains placed immediately around the pile do not attenuate ground-borne source and there are data available that indicate less sound reduction has been achieved in certain cases and NMFS is in possession of that data. The Commission recommends that NMFS (1) consult with acousticians, including those at UW-APL, regarding the appropriate source level reduction factor to use to minimize near-field (<100 m) and far-field

(>100 m) effects on marine mammals or (2) use the data NMFS has compiled regarding source level reductions at 10 m for near-field effects and assume no source level reduction for far-field effects for all relevant incidental take authorizations.

Response: The Commission has raised this concern before and NMFS refers readers to our response, which may be found in the notice of issuance of an IHA to Carnival (84 FR64833, November 25, 2019), incorporated here by reference.

Comment 6: The Commission recommends that NMFS strongly encourage JCEP to collect *in-situ* data during impact pile driving of half the piles with and half without use of the bubble curtain and require JCEP to position the far-field hydrophone at least 5 m in depth and at least 100 m or 20 times the source depth away from the pile, whichever is greater.

Response: The Oregon Department of Fish and Wildlife (ODFG), NMFS, and the U.S. Fish and Wildlife Service restrict JCEP from impact pile driving without a bubble curtain to protect ESA-listed species. NMFS has no authority to override this restriction through this IHA; therefore, NMFS is not requiring JCEP to test bubble curtain effectiveness. With respect to hydrophone placement, JCEP has updated its acoustic monitoring plan to reflect the far-field hydrophone will be placed in at least 5 m water depth and at least 100 m or 20 times the source depths away from the pile, whichever is greater.

Comment 7: The Commission had concerns regarding our approach for estimating harbor seals take in the proposed IHA and provided alternative methods of calculating those take estimates. The Commission recommends that NMFS (1) use a density of (a) 16.0 seals/km^2 rather than 3 seals/km^2 for fall/winter and (b) 32.0 seals/km^2 rather than 6.0 seals/km^2 for spring and summer; (2) refrain from using JCEP's movement model; and (3) recalculate the number of Level B harassment takes of harbor seals accordingly.

Response: The Commission recommends NMFS apply harbor seal densities for both winter and summer based on winter survey data. For winter, the Commission recommends we apply the highest density value of 11.1 seals/km^2 stated in AECOM (2018) and apply a correction factor (1.53 seals; Huber *et al.*, 2001) to the number of seals used in AECOM's calculation, resulting a density of 16 seals/km^2. NMFS agrees applying a correction factor to harbor seal haulout counts is a conservative approach to estimating density and has done so in our revised take estimates for both summer and winter (see *Estimated Take* section). However, NMFS finds the density values reported in AECOM 2018 are not actually density values. AECOM inappropriately applied the opportunistic boat-based survey area (15.09 km^2), which was a separate effort than the drone-based aerial survey counts, to the haulout count data to estimate a density. Therefore, NMFS finds the density values in AECOM's report are not accurate and that the count of 167 animals solely represents the abundance of harbor seals at the two haulout sites surveyed.

The Commission then recommended applying a spring/summer density of 32 seals/km^2 (16 *2) based on the 50 percent summer/winter density ratio NMFS originally proposed (6.2 for summer and 3.0 for winter). NMFS finds this approach ill-advised for many reasons. First, as discussed above, the values provided in AECOM 2018 are not true densities. Moreover, even if the density was accurate, it would represent seals near the bay's entrance, whereas JCEP would be conducting all in-water pile driving in areas far removed from where the winter haulout counts were conducted. More importantly, the Commission's approach is to base summer density on winter density, which essentially disregards all ODFW spring/summer data at all four haulout sites within Coos Bay (which is a good bay-wide representation of where JCEP would be working). Finally, the Commission's recommendation is to double the density in summer based

on the originally proposed summer/winter density ratio, despite the fact that the Commission takes issue with the originally proposed winter density. For all these reasons, NMFS has not implemented the Commission's recommended summer and winter densities.

The Commission's recommendation also does not consider the contextual factors associated with data collection locations and pile driving locations. The Commission questions why the density in AECOM 2018 was not used as it was recently used for estimating take for another project within Coos Bay. Above, we discuss why this is not a true density; however, we also find that applying the AECOM 2018 stated "density" is more appropriate for the U.S. Army Corps of Engineers project as it is taking place at the jetties, which are in close proximity to the harbor seal haul-out sites where those data were collected. As discussed in the notice of proposed IHA, all in-water pile driving for the Jordan Cove project will take place at the U.S.101/TPP site (which is located in the northern part of Coos Bay, behind a berm that is fully enclosed except for two small locations), and APCO sites, which are in the eastern portion of Coos Bay, far from the bay's entrance. NMFS finds these contextual factors are important when estimating take.

NMFS further considered the Commission's overall concern that the number of harbor seals takes proposed may be an underestimate. Therefore, we adjusted harbor seal take numbers based on all appropriate survey data and project location relative to those data. First, we applied the 1.53 correction factor, as recommended by the Commission, to harbor seal haulout counts to calculate a density for both summer and winter. Our proposed IHA explained why we did not do this initially (i.e., the June 2014 survey is taken during peak abundance times; however, that density is applied through the summer when seal abundance may decrease) but upon re-evaluation we determined the 1.53 correction factor is appropriately more conservative. The

Commission also took issue with JCEP calculating density based on the area of Coos Bay; however, ODFW's June 2014 survey data includes counts for all four haulout sites within Coos Bay (including the single haulout near the APCO sites); therefore, applying the area of Coos Bay (55.28 km^2) to generate a harbor seal bay-wide density is appropriate. In total, this results in a spring/summer density of 9.2 seals/km^2 (333 seals observed x 1.53)/55.28).

Because the haulout survey data from AECOM 2018 only included two of the four haulout sites, as described above, we estimated haulout abundance at the two un-surveyed haulouts, based on the ratio of animals observed during the ODFW surveys (this assumes equal habitat distribution throughout the year which we have determined is reasonable). This results in a fall/winter density of 3.0 seals/km^2. We provide more detail on these calculations in the *Estimated Take* section below.

The Commission recommended NMFS not apply JCEP's movement method for estimating harbor seal take from out-of-water pile driving at the Jordan Cove terminal site and states that it results in an underestimate of take. The Commission's concern is that the movement model is a new, unique method and varies from any take estimate approaches in other authorizations. NMFS disagrees with the Commission's suggestion that "consistency" is a paramount consideration above others in evaluating take estimates. While consistency in use of the best available science is the goal, it may be more appropriate (and a better use of the best available science) or equally appropriate to use different inputs or methods in different circumstances. More specifically, the Commission took issue with the model description (*e.g.*, seals "drift") and that current speeds were applied that were slower than average swim speeds. We do not agree the Commission's issue is of scientific concern because, as described in the proposed IHA notice, this speed falls within the bounds of harbor seal swim speeds used in Navy

modeling. The Commission also postulated JCEP's simple movement method does not account for any estimate of the probability of occurrence. We find this statement is not accurate, as JCEP's movement model does account for density and Level B harassment area; the same parameters included in the standard method which the Commission recommended we use as an alternative to the movement method. Lastly, we note the Commission's letter failed to recognize that JCEP conservatively applied the findings from JASCO's vibratory model for piles set back 30 ft (9 m) from the water's edge to all piles that are to be installed within 100 ft (30 m) of the water's edge, as described in our notice of proposed IHA. Therefore, the Commission's assumption the movement model underestimates takes is not supported.

For all the reasons provided above, we implemented some but not all of the Commission's specific recommendations. We applied a correction factor to harbor seal haulout counts and adjusted harbor seal densities for both the in-water (fall/winter) and out-of-water (spring/summer) work windows using the same methods as in the proposed IHA. As described in the notice of proposed IHA, NMFS finds JCEP's movement method, while innovative, is a reasonable approach to estimating take and we have continued to apply it with the adjusted densities described above and in the *Estimated Take* section.

Comment 8: The Commission recommends that NMFS revise its estimated takes of California sea lions to at least 654 and estimated takes of Steller sea lions to at least 327 because the take estimates should be based on the total number of days pile driving is expected to occur at the project sites combined, and AECOM's May 2017 survey data indicate the potential for at least two and potentially three California sea lions to occur in the project area on any given day.

Response: In our proposed IHA, NMFS estimated one California sea lion and one Steller sea lion could be observed on any given calendar day of pile driving (n=270). To be

conservative, NMFS increased the number of California sea lion that could occur on any given day to two animals based on the Commission's comment in the final IHA. However, the Commission is incorrect that 327 days of pile driving (the input if pile driving at each location occurred on independent days) should be used in our take estimate. That approach would assume that animals are taken more than once on any given day and would be overly conservative for species that are more likely to remain near the bay's entrance and likely display seasonal use of Coos Bay. California sea lions or Steller sea lions are unlikely to be exposed to pile driving noise at the U.S. 101/TPP site given its location behind a berm; however, we conservatively included all pile driving activity in our take estimate. Also, there were no sightings of either species on AECOM's 4-day fall/winter survey; therefore, their presence during this time is likely much less than that in spring/summer. The Commission's recommendation to treat the sites independent of each other does not take these contextual factors into account and results in a gross overestimate of potential take. Therefore, 230 calendar days of pile driving is the appropriate input into our estimated take calculations. We have authorized 460 California sea lion takes (2 animals x 230 days), by Level B harassment, and retained the 230 Steller sea lion takes, by Level B harassment, as originally proposed.

Comment 9: The Commission recommends that NMFS (1) update and use its various templates for **Federal Register** notices and draft authorizations and (2) conduct a more thorough review of the notices, draft authorizations, and final authorizations to ensure accuracy, completeness, and consistency.

Response: The Commission has provided this recommendation previously. NMFS makes every reasonable effort to publish the best possible products for public comment.

Comment 10: The Commission recommends that NMFS (1) specify, in the **Federal Register** for the authorization issuance and the final authorization, that JCEP would be required to (a) conduct its activities during daylight hours only, (b) keep a running tally of both observed and extrapolated takes, and (c) delay or cease pile driving if PSOs cannot observe the entirety of the shut-down zone due to low-visibility conditions, and (2) specify in section 5(a) of the final authorization that two PSOs would be required to monitor at each site when pile-driving activities occur.

Response: The **Federal Register** notice for the proposed action (84 FR 63618, November 18, 2019) did not include a description of the time of day that the activity would take place. NMFS has noted below, in the *Changes from Proposed IHA to Final IHA* section, that the applicant has indeed clarified their intention for pile driving to occur during daylight hours. NMFS agrees that the **Federal Register** notice for a proposed action should detail whether a specified activity will take place during daylight hours only, or whether an activity may, or will, take place at night. NMFS bases its determinations on how an applicant describes their activities and expects that an applicant will carry out a project as it is described in the associated application and **Federal Register** notices. Additionally, NMFS includes here a requirement that ''should environmental conditions deteriorate such that marine mammals within the entire shutdown zone would not be visible (*e.g.,* fog, heavy rain), pile driving and removal must be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.'' This requirement implies that a shutdown zone should either be visible due to daylight, or an applicant must illuminate the shutdown zone to allow sufficient visibility. Therefore, NMFS does not agree that it is necessary to stipulate that the activity may only occur during daylight hours.

JCEP's Marine Mammal Monitoring Plan clearly stipulates that two PSOs will be on-site at each pile driving location. However, NMFS agrees that this description should be contained in the IHA and has done so. We have also included in the authorization that JCEP must include extrapolation of the estimated takes by Level B harassment based on the number of observed exposures within the Level B harassment zone and the percentage of the Level B harassment zone that was not visible in the draft and final reports.

Comment 11: The Commission recommends that NMFS require that JCEP report: (1) the number of strikes per pile or strikes per day in section 5(d)(ii); and (2) pulse durations associated with impact pile driving and the spectra for all pile types and installation methods in section 5(d)(iii) of the final authorization.

Response: These components are included in JCEP's acoustic monitoring plan; however, NMFS has also included the Commission's recommended components specifically in the IHA.

Comment 12: The Commission recommends that NMFS (1) stipulate that a renewal is a one-time opportunity in all **Federal Register** notices requesting comments on the possibility of a renewal, on its webpage detailing the renewal process, and in all draft and final authorizations that include a term and condition for a renewal, (2) ensure that action proponents have met all renewal requirements prior to proposing to issue a renewal in the **Federal Register**, and (3) follow its own renewal process of informing all commenters on the original authorization of the opportunity to submit additional comments on the proposed renewal.

Response: NMFS' website indicates that Renewals are good for "up to another year of the activities covered in the initial IHA." NMFS has never issued a Renewal for more than one year and in no place have we implied that Renewals are available for more than one year. Any given FR notice considering a Renewal clearly indicates that it is only being considered for one

year. Accordingly, changes to the Renewal language on the website, notices, and authorizations are not necessary.

NMFS is also already evaluating each renewal request against the criteria clearly described on our website and is following our own renewal process of informing all commenters on the original authorization. We believe the Commission provided recommendations 2 and 3 in light of recent action wherein we inadvertently neglected to alert the Commission about a specific renewal request and the preliminary monitoring report was not available at the time of the proposed Renewal IHA. However, once we noticed the error, we republished the notice of proposed Renewal IHA (along with a preliminary monitoring report) in the **Federal Register** for that project. Therefore, NMFS is already implementing the Commission's recommendation.

Comment 13: OCSS indicated JCEP's IHA application did not consider impacts to ESA-listed marine mammals from tanker transit and incorrectly identifies certain activities (e.g., land-based construction activities, channel-widening dredging activities) as not expecting to result in take of marine mammals.

Response: NMFS' IHA authorizes take of marine mammals incidental to one-year of pile driving associated with the Jordan Cove LNG Terminal; therefore, vessel transit is not part of the specified activities as the terminal would not be complete. No incidental take of ESA-listed marine mammal species was requested or expected to result from this activity and we did not authorize such in the IHA. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

With respect to other activities, as described in JCEP's application, channel-widening dredging activities would not occur under the IHA, but would occur in subsequent years. We recognize the timing description in the proposed IHA notice was not clear. JCEP will be

excavating a 30-acre access channel at the terminal site (located far from any haulout), which requires the dredging of 1.4 million cubic yards of sand and silt. At times, dredging could be conducted concurrent with pile driving. In our proposed notice, we described why dredging is not expected to result in take (*i.e.*, it is located at least 500 m from any haulout site, dredging would not occur during the pupping season, harbor seals are likely habituated to past and present routine dredging, and non-harbor seal presence in Coos Bay is rare). The proposed IHA also included a mitigation measure that JCEP must implement a shutdown of dredging should a marine mammal come within 10 m of the dredge. That measure remains in the final IHA.

On-land construction activities are located at least 3 miles (4.8 km) from any major haulout site. While it is unlikely pinnipeds would randomly haul-out near construction activities, any disturbance would likely be captured as the animal enters the water and is exposed to pile driving noise. However, to minimize disturbance, we have included a measure in the final IHA that all JCEP personnel must abide by NMFS' Marine Mammal Viewing Guidelines, maintaining a 50-yard setback from any hauled-out pinniped.

***Comment 14*:** OCSS is concerned about the long-term, cumulative impacts associated with JCEP's project, during construction and once complete, and indicates NMFS should consider ODFW's analysis and recommendations on Jordan Cove's DEIS prior to any final decision on the proposed IHA. OCSS specifically suggests NMFS should consider ODFW's comments on the Jordan Cove DEIS regarding long-term habitat impacts such as the creation of the deepwater alcove at the proposed terminal site and eelgrass habitat impacts and the effectiveness of the proposed eelgrass mitigation plan.

Response: NMFS is a cooperating agency on the Federal Energy Regulatory Commission's EIS prepared pursuant to the National Environmental Policy Act (NEPA). The

EIS considers the individual and cumulative effects of the project on all aquatic resources, including habitat and marine mammal prey species. These impacts are fully described in Chapter 4 of the FEIS. Further, NMFS evaluated impacts to ESA-listed marine mammal prey such as salmonids and is requiring a number of fish mitigation measures be implemented in the Terms and Conditions of NMFS' Biological Opinion, issued January 10, 2020. These measures include salvaging fish (through relocation), using confined and/or confined bubble curtains during pile driving to reduce the potential for fish injury, monitoring and minimize suspended sediment loads, minimizing fish kills during dredging by maintain contact between the draghead and seafloor, and successfully restoring eelgrass habitat and other tidal wetland restoration project, among other things. We refer the reader to section 2.9.3 of the Incidental Take Statement contained within the Biological Opinion for a complete list of mitigation and minimization measures.

Comment 15*:* OSCC commented the MMPA allows the NMFS to authorize marine mammal take only if certain conditions are met and must provide for the monitoring_and reporting of such takings and must prescribe methods and means of effecting the "least practicable impact" on the species or stock and its habitat.

Response: NMFS has provided a detailed description on how we reached our conclusion that taking under the IHA would have a negligible impact on marine mammals species and stocks and would satisfy the small numbers standard. We have also provided mitigation, monitoring and reporting requirements JCEP must adhere to in the IHA.

Comment 15**:** OSCC questioned whether the construction dates contained within the IHA request are accurate. The OSCC notes that in May 2019, the Oregon Department of

Environmental Quality denied JCEP's request for Clean Water Act Section 401 Certification and therefore implied construction is unlikely to begin in October 2020.

Response: Any IHA issued by NMFS is only valid for otherwise lawful activities. If JCEP does not begin construction due to a permitting delay, harassment of marine mammals incidental to the specified activity would not occur. On January 16, 2020, JCEP indicated to NMFS that the construction start date in the IHA application (October 1, 2020), remains valid and therefore, the IHA reflects that anticipated start date.

***Comment 16*:** OSCC commented that the Applicant's materials appear to underestimate the impacts of noise on Pacific harbor seals and other identified marine mammal species in Coos Bay.

Response: OSCC is concerned pile driving (impact and vibratory) will lead to fish kills (including those piles driven in-the-dry) and marine mammal impacts will be similar to those demonstrated during offshore wind farm construction in Europe. OSCC cites modeled noise levels from offshore wind farm construction (250 dB peak-peak @ 1m; Bailey *et al.*, 2010) to justify this comment. In that study, the authors recorded noise levels in Moray Forth, Scotland, during installation of two 88 m tall wind turbines. Each pile required 5000-7000 strikes. The turbines were mounted on four-legged steel jackets fixed to the seabed using four (1.8 m diameter) tubular steel piles.

There are several issues with OSCC's argument. Foremost, OSCC's comparison between noise levels, an associated impacts to marine mammals and their prey, generated from installing 1.8 m diameter piles in the North Sea to the proposed project (sheet piles and 24-in piles in an estuary) are in no-way analogous, with much more sound produced by the former. In addition, the North Sea wind farm is located in an area far from everyday human disturbance

(other than shipping traffic). In contrast, animals residing within Coos Bay are subjected to daily human disturbance in all forms. Given the difference in baseline noise/disturbance exposure, we would expect the North Sea marine mammals to react more strongly to new stimuli than habituated marine mammals in Coos Bay.

Furthermore, OCSS cited noise levels that Bailey *et al*., (2010) clearly indicates are likely not accurate. Bailey *et al*. (2010) states the modeled 250 dB peak-peak SL probably greatly over-estimates the actual source as inspection of the data highlights that this fit exceeds the majority of the measured data at close range and source level calculated for the subset of data closest to the pile-driving (up to 1 km) was 226 dB re 1 µPa at 1 m (95% CI ± 14.2), which is similar to that predicted (225 dB re 1 µPa at 1 m) in the Environmental Statement (Talisman, 2005).

NMFS conducted a full analysis of the potential for marine mammal auditory injury and harassment based on NMFS' thresholds, which represent the best available science. At the terminal, JCEP conservatively applied findings from JASCO's acoustic analysis for piles set back 30 ft (9 m) from the water's edge to all piles within 100 ft (30 m) of the water's edge- a very conservative approach. There is no potential for PTS from piles driven at the terminal and where there is a small potential for PTS from piles driven in-water, JCEP will implement shutdown zones greater than the most conservative PTS isopleths. We also were conservative in estimating the potential for harassment, as described in the *Estimated Take* section. For these reasons, NMFS does not agree we have underestimated the impacts of noise on marine mammals incidental to pile driving.

Comment 17: OCSS suggested_NMFS should give further consideration to the potential injury to marine mammals likely to result from LNG tanker transit because the pile driving

associated with the proposed marine facilities is meant to facilitate LNG tanker transit to and from the proposed LNG Terminal.

Response: Under the MMPA, NMFS is required to assess the impacts to marine mammals from a specified activity. Here, the activity evaluation, and for which take was requested and is authorized, is limited to pile driving during the effective period of the IHA. No tanker transit would occur during the effective dates of the IHA as the terminal would not be complete.

Changes from Proposed IHA to Final IHA

The most substantive change since we published the Notice of proposed IHA, described above and in the *Estimated Take* section, is the increase in the Level B harassment take numbers for harbor seals from 8,754 to 13,984 and California sea lions from 230 to 460. In addition, we expanded the shutdown zones at the APCO sites to account for the potential for impact pile driving at these locations (not originally considered in the proposed IHA). We also included additional monitoring and reporting conditions in the IHA, some of which were reflected in JCEP's application and marine mammal and acoustic monitoring plans but were not contained within the proposed IHA. These additions include stipulating at least two PSOs must be stationed at each pile driving location and the entire shutdown zone must be visible during pile driving, reporting extrapolated takes in the draft and final reports, and reporting specific acoustic monitoring data, including, but not limited to, the number of impact driving strikes of the pile being measured and spectra. None of these modifications affect our negligible impact or small numbers determinations.

Description of Marine Mammals in the Area of Specified Activities

Systematic marine mammal surveys in Coos Bay are limited; therefore, JCEP conducted seasonal multi-day surveys in support of the IHA application and relied on Oregon Department of Fish and Wildlife (ODFW) aerial surveys as well as anecdotal reports (e.g., media reports) to better understand marine mammal presence in Coos Bay. Based on these data, seven marine mammal species comprising seven stocks have the potential to occur within Coos Bay during the project.

Table 2 lists all species with expected potential for occurrence in Coos Bay and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR) values, where known. Additional detail regarding the affected species and stocks, including local occurrence data in Coos Bay is fully described, in detail, in our notice of proposed IHA (84 FR 63618, December 18, 2019) and that information is not repeated here.

Table 2-- Marine Mammal Species Potentially Present within Coos Bay during the Jordan Cove LNG Project Construction

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N)[1]	Stock abundance (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray whale	*Eschrichtius robustus*	Eastern North Pacific	N, N	26,960 (0.05, 25,849, 2016)	801	139
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Killer Whale	*Orcinus orca*	West Coast Transient	N, N	521 (-, 243, 2012)	2.4	0
Family Phocoenidae (porpoises)						
harbor porpoise	*Phocoena phocoena*	Northern CA/Southern OR	N, N	35,769 (0.52, 23,749, 2011)	475	≥0.6

Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Northern elephant seal	*Mirounga angustirostris*	California breeding	N, N	179,000 (n/a, 81,368, 2010)	4,882	8.8
Steller sea lion	*Eumetopias jubatus*	Eastern U.S.	N,N	43,201 (-, 43,201, 2017)	2,592	113
California sea lion	*Zalophus californianus*	U.S.	N, N	257,606 (n/a, 233,515, 2014)	14,011	≥321
Family Phocidae (earless seals)						
Pacific harbor seal	*Phoca vitulina*	Oregon/Washington Coastal	N, N	24,732 (unk, -, 1999)[5]	unk	unk

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.
2- NMFS marine mammal stock assessment reports online at: www.nmfs.noaa.gov/pr/sars/. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.
3 - These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.
4- The minimum population estimate (NMIN) for the West Coast Transient stock of killer whales is derived from mark-recapture analysis for West Coast transient population whales from the inside waters of Alaska and British Columbia of 243 whales (95% probability interval = 180-339) in 2006 (DFO 2009), which includes animals found in Canadian waters.
5 Because the most recent abundance estimate is >8 years old (1999), there is no current estimate of abundance available for this stock. However, for purposes of our analysis, we apply the previous abundance estimate (24,732) which accounts for animals in water during aerial surveys.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

We provided discussion of the potential effects of the specified activity on marine mammals and their habitat in our **Federal Register** notice of proposed IHA (84 FR 63618; November 18, 2018). Therefore, we do not reprint the information here but refer the reader to that document. That document included a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat, as well as general background information on sound. The *Estimated Take* section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity.

The *Negligible Impact Analysis and Determination* section considers the content of this section and the material it references, the *Estimated Take* section, and the *Mitigation* section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform both NMFS' consideration of small numbers and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, Section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) 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).

Authorized takes would be by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to pile driving. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*e.g.*, shutdown zone measures*)* discussed in detail below in the Mitigation section, Level A harassment is neither anticipated nor authorized.

As described previously, no mortality is anticipated or authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (e.g., previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (*e.g.*, hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*,2007, Ellison *et al.*,2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a

manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 μPa (rms) for continuous (*e.g.*, vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources.

JCEP's proposed activity includes the use of continuous, non-impulsive (vibratory pile driving) and intermittent, impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μPa (rms), respectively, are applicable.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive).

These thresholds are provided in Table 3 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*.

Table 3--Thresholds identifying the onset of Permanent Threshold Shift

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	$L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	$L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	$L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	$L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	$L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	$L_{E,HF,24h}$: 173 dB

Phocid Pinnipeds (PW) (Underwater)	$L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	$L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	$L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	$L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds, which include source levels and transmission loss coefficient.

JCEP investigated potential source levels associated with their proposed pile driving activities. For piles driven in-water, JCEP used data from Caltrans (2015) and considered use of bubble curtains during impact driving to estimate source levels and in consideration of use of bubble curtains (required per ODFW regulations) and derive estimated distances to the appropriate NMFS Level B harassment isopleth (160 dB for impact driving, 120 dB for vibratory driving) using a practical (15logR) spreading model (Table 4).

Table 4--Estimated Source Levels for Piles Driving and Corresponding Level B Harassment Isopleths and Areas

Pile Type/Method/Location	Source Levels at 10 meters (dB)			Distance to Level B Threshold (m)[2]	Area (sq. km)[2]
	Peak	RMS	SEL	160/120 dB RMS Threshold (Level B harassment)	
LNG Terminal					
Sheet piles/24-in pipe piles (in-the-dry)	See Appendix D is JCEP's application			1,914	2.49
Ancillary Activities					
24-inch Pipe Piles at TPP/US-101– Impact with BCA	196[1]	183[1]	170[1]	341	0.136
14-inch Timber Piles at TPP/US-101– Impact within cofferdam	180	170	160	46	0.002
24-inch Pipe Piles at TPP/US-101, and APCO sites – Vibratory	-	165	165	10,000	TPP/US101 – 1.18 APCO – 0.40
14-inch Timber Piles at TPP/US-101 – Vibratory	-	162	162	6,310	1.18
Sheet Piles at TPP/US-101 – Vibratory	-	160	160	4,642	1.18

[1] Assumes a 7dB bubble curtain reduction from unattenuated sources in Caltrans (2015).
[2] Distance to threshold is calculated whereas area accounts for cutoffs from land.

For piles driven close to the water's edge (within 100 feet) but out-of-water (in water laden sediments) at the MOF, JCEP contracted JASCO to conduct more sophisticated acoustic modeling to determine if sound propagation through the sediment would contribute to elevated noise levels in-water above NMFS harassment thresholds. Appendix D in JCEP's application contains the full modeling report for vibratory pile driving, respectively, near the water's edge (within 9 m (30 feet)) at the MOF (note Appendix C contains impact pile driving model; however, no impact driving piles in-the-dry would occur under the IHA). The model methods, in summary, included use of a full-wave numerical sound propagation model to simulate the transmission of vibratory pile driving noise (based on one-third octave band levels) through

water-saturated soils into the water. One-third-octave band source levels for vibrating sheet piles were based on published hydrophone measurements of in-water sheet pile driving.

To model sound propagation from vibratory pile driving, JASCO used a modified version of the RAM parabolic-equation model (Collins 1993, 1996). The environmental data and source levels were input to underwater noise modeling software to estimate the underwater noise received levels (RL) that would be present in the water near the pile driving. The maximum modeled Level B harassment threshold distance for vibratory pile driving in-the-dry at the LNG Terminal site is 1,914 m. We note Jasco conservatively applied the findings from the vibratory model for piles set back 30 ft (9 m) from the water's edge to all piles that are to be installed within 100 ft (30 m) of the water's edge. The model predicted that the Level A harassment thresholds for all hearing groups would not be reached during vibratory pile driving at the Terminal (all in-the-dry piles) when considering five hours of vibratory pile driving per day (see Table 5-2 in Appendix B in JCEP's application).

When the NMFS Technical Guidance (2016) was published, in recognition of the fact that an ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth from in-water sources that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively

address the output where appropriate. For stationary sources such as pile driving, NMFS User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that exact distance the whole duration of the activity, it could incur PTS. Inputs used in the User Spreadsheet for all the in-water pile driving work and the resulting isopleths are reported in Table 5. We note none of the peak source levels exceed any Level A harassment threshold.

Table 5--NMFS User Spreadsheet Inputs For In-Water Pile Driving

USER SPREADSHEET INPUT					
	24-in Steel Impact	**14-in Timber Impact**	**24-in Steel Vibratory**	**Sheet Vibratory**	**14-in Timber Vibratory**
Spreadsheet Tab Used	E.1) Impact pile driving	E.1) Impact pile driving	A) Non-Impulse-Stat-Cont	A) Non-Impulse-Stat-Cont	A) Non-Impulse-Stat-Cont
Source Level (Single Strike/shot SEL/rms)	170 dB	160 dB	165 dB	160 dB	162 dB
Weighting Factor Adjustment (kHz)	2 kHz	2 kHz	2.5 kHz	2.5 kHz	2.5 kHz
a) Number of strikes per pile	200	100	N/A	N/A	N/A
a) Number of piles per day or activity duration	4	20	0.5 hours	1.67 hours	1.67 hours
Propagation (xLogR)	15	15	15	15	15
Distance of source level measurement (meters)+	10	10	10	10	10

The resulting Level A isopleths for in-water pile driving for each marine mammal hearing group are presented in Table 6 (the following discussion does not apply to in-the-dry piles as that was modeled by Jasco). The User Spreadsheet calculates a very small zone (less than 6 m) when considering 1.67 hours of vibratory driving piles in-water (this time does not include time it takes to reset the hammer to new piles) and JCEP would implement a minimum 10 m shutdown zone. Therefore, NMFS has determined there is no potential for Level A take

during any of the vibratory pile driving scenarios. During impact hammering in water (which occurs only at the TPP/US-101 and APCO sites), the potential for Level A take remains very small; however, it is greater than during vibratory driving. JCEP anticipates it could install up to 20 14-in timber piles per day. This could take several hours over the course of the entire day to reset piles; however, the resulting isopleth for all 20 piles is less than 56 meters for all species. When considering the installation of five 14-in timber piles (a more reasonable but still lengthy amount of time when considering animal movement), the Level A isopleth distance is also very small. Similarly, impact driving 24-in steel pipe piles at the TPP/US-101 site when considering the installation of four piles per day results in a small Level A harassment distance when using the User Spreadsheet. JCEP proposes to install 36 24-in piles over 9 days at this location to construct the work access bridge. The 36 piles installed at the TPP/US-101 site are located in an area that is behind a berm with infrequent harbor seal presence. For a seal to incur PTS, it must remain 63 m from the pile for the time it takes for four piles to be installed. These piles would only be proofed with the impact hammer; therefore, vibratory driving would occur first and then the hammer would have to be reset. In total, the amount of time it may take to install four piles is several hours. JCEP is proposing shutdown zones equal to or greater than the calculated Level A harassment isopleth distance for all pile driving. Because the zones are small and consider several hours in duration, NMFS believes the potential for Level A harassment is *de minimis* and is not proposing to issue take of any marine mammal by Level A harassment.

Table 6--Calculated Level A Harassment Isopleths Based on NMFS User Spreadsheet for In-water Pile Driving

Project Element Requiring Pile Installation	Source Levels at 10 meters (dB)		Distance to Level A Threshold[1] (m)				
	Peak[2]	RMS (vibratory)/ SEL	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocids	Otariids

		(impact)					
LNG Terminal							
Sheet Piles at MOF/South West Berth wall and 24-inch TMBB Mooring Piles – Vibratory (in water/in the dry)	--[4]	--[4]	NE	NE	NE	NE	NE
Ancillary Activities							
24-inch Pipe Piles at TPP/US-101 – Impact with BCA	201	170 SEL	117.0	4.2	139.3	62.6	4.6
14-inch Timber Piles at TPP/US-101– Impact within cofferdam	180	160 SEL	46.4	1.7	55.3	24.8	1.8
24-inch Pipe Piles at, TPP/US-101 and APCO sites – Vibratory in water	191	165 RMS	8.0	0.7	11.8	4.8	0.3
14-inch Timber Piles at TPP/US-101 – Vibratory within cofferdam	172	162 RMS	11.2	1.0	16.5	6.8	0.5
Sheet Piles at TPP/US-101 – Vibratory in water	175	160 RMS	8.2	0.7	12.2	5.0	0.4

[1] Level A thresholds are based on the NMFS 2018 Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing; cSEL threshold distances are shown. See footnote 3 below.

[2] All distances to the peak Level A harassment thresholds are not met.

[3] Since these piles will be driven on land, source values at 10m are not available; distances are calculated by JASCO modeling.

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations.

Harbor Seals

Over the last several decades, intermittent and independent surveys of harbor seal haul-outs in Coos Bay have been conducted. The most recent aerial survey of haul-outs in Washington and Oregon occurred in 2014 by ODFW. Those surveys were conducted during a time when the highest number of animals would be expected to haul out (*i.e.*, the latter portion of the pupping season [May and June] and at low tide). Based on logistic population growth models, harbor seal

populations of the Oregon Coast had reached carrying capacities during the late 1980s and early 1990s (Brown *et al.* 2005). Using these data, an estimation of harbor seal density within Coos Bay can be made by simply dividing the area of the Coos Bay estuary by the estimated abundance at all four haul-out sites.

The Coos Bay estuary has an area of 55.28 square kilometers, as measured using geographic information system (GIS) files available from the Coastal Atlas (2018). We used the ODFW 2014 June aerial survey data collected at all four major haulout sites throughout the Bay yielding 333 observed individuals to estimate harbor seal density in Coos Bay during the February 15- September 30 timeframe. In the proposed IHA, we did not apply the corrected abundance of 509 seals because those data are collected during times with higher abundance than the rest of the season. Therefore, we used the straight counts which, when considering a timeframe of February through September, is likely more representative of long-term abundance. The resulting density is 6.2 seals/km^2. While we feel this remains adequate, we recognize a level of uncertainty with how harbor seals move throughout the estuary (e.g., how many times a day they may transit past the terminal) and the inability to distinguish individual seals in the field; therefore, to be conservative we applied the 1.53 correction factor (Huber *et al.*, 2001) to ODFW's June harbor seal count resulting in a density of 9.2 seals/km^2 (509 seals/55.28 km^2).

To determine a fall/winter denisty for harbor seals, we applied seal count data based on AECOM's November/December 2018 survey. This survey included 3 days of aerial (drone) flyovers at the Clam Island and Pigeon Point haul-outs. In addition, AECOM separately conducted vessel-based transect surveys over a 3-day period and opportunistically logged marine mammal sightings. However, in their report, AECOM inappropriately applied the boat-based survey area to the harbor seal count data; therefore, we did not apply the density stated in

AECOM's report. We also recognized the counts were only conducted at two of the four haulout sites and that these haulout sites are near the Bay's entrance channel. Therefore, assuming equal seal distribution between haulouts throughout the year, we estimated how many harbor seals may have been counted at South Slough and Coos Port by AECOM based on the ratio of seals observed at all four haulouts in the summer. We believe assuming the ratio of seals using each haulout is likely consistent throughout the year is reasonable because of the likely resident status of harbor seals in the Bay year round and there are no known changes in the availability of the habitat for using throughout the year.

In the notice of proposed IHA, we estimated the winter density of harbor seals to be 3.0 seals/km^2 based on 167 harbor seals hauled out at the Clam Island and Pigeon Point sites on any one day of the AECOM surveys. However, as described above, when accounting for seals that may have been hauled out at the other two sites, we increased that density to 6.0 seals/km^2 in the final IHA. Based on all ODFW data, the average ratio of total seals seen at Coos Port and South Slough were 18 percent (62/343) and 13 percent (44/343), respectively. We then applied these ratios to estimate abundance at these two haulout sites during the fall/winter season based on the 167 seals observed at Clam Island and Pigeon Port (n=167) resulting in a total of 219 seals at all four haulout sites (167 seals at Clam Island and Coos Port + (167*0.18) + (167*0.13)). Multiplying by the 1.53 correction factor results in a total of 334 seals (219*1.53). Dividing that seal abundance by the area of Coos Bay results in fall/winter density of 6.0 seals/km^2 (334 seals/ 55.28km^2) which we applied to the October 1 – February 15th work window.

Other Pinnipeds

No data are available to calculate density estimates for non-harbor seal pinnipeds; therefore, JCEP applies a presence/absence approach considering group size for estimating take

for California sea lions, Steller sea lions, and Northern elephant seals. As described in the *Description of Marine Mammals* section, no haulouts for California sea lions and Steller sea lions exist within Coos Bay where harassment from exposure to pile driving could occur; however, these species do haul out on the beaches adjacent to the entrance to Coos Bay. These animals forage individually and seasonal use of Coos Bay have been observed, primarily in the spring and summer when prey are present. For this reason, JCEP estimates two California sea lions and one Steller sea lion may be present each day of pile driving (270 days). Northern elephant seals are not common in Coos Bay and also forage/travel individually. JCEP estimates one individual may be present within a given ensonified area greater than the NMFS harassment threshold one day for every seven days of pile driving.

Cetaceans

Similar to pinnipeds other than harbor seals, it is not possible to calculate density for cetaceans in Coos Bay as they are not common. Therefore JCEP estimates take based on a presence/absence approach and considers group size. During migration, gray whales species typically travels singly or as a mother and calf pair. This species has been reported in Coos Bay only a few times in the last decade and thus take of up to two individuals is requested as a contingency. The typical group size for transient killer whales is two to four, consisting of a mother and her offspring (Orca Network, 2018). Males and young females also may form small groups of around three for hunting purposes (Orca Network, 2018). Previous sightings in Coos Bay documented a group of 5 transient killer whales in May 2007 (as reported by the Seattle Times, 2007) and a pair of killer whales were observed during the 2017 May surveys. Considering most pile driving would occur outside the time period killer whales are less likely to be present, JCEP assumes that a group of three killer whales come into Coos Bay and could enter

a Level B harassment zone for one day up to five times per year which would allow for a combination of smaller (e.g., 2 animals) or larger (e.g., 5 animals) groups.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate.

Harbor Seals

ODFW and AECOM survey data suggest approximately 300 to 400 harbor seals are resident to Coos Bay. We also anticipate there is some flux between Coos Bay haulouts and nearby coastal haulouts, which likely contributes to the higher abundance estimates during the pupping season. Given the residency patterns, the standard approach for estimating take is likely insufficient to enumerate the number of harbor seals potentially taken by the specified activity. However, we do not believe that every harbor seal in the estuary (300 to 400 individuals) would be taken every day of pile driving given distances from haulouts to Level B harassment zones and pile driving durations within a day. Therefore, an approach balancing these two extremes needed to be developed.

NMFS typically relies on a standard calculation where estimated take = density x ensonified area x number of pile driving. This is considered a static approach in that it accounts for any given moment of pile driving- a snapshot in time. Typically, this approach allows for a sufficient amount of take from a typical pile driving project and we find it suitable for the Ancillary Activities because they would be limited in duration or would occur in areas where harbor seals are not expected to traverse frequently. However, the inputs described above are less applicable (and better methods are available) for estimating harbor seal take resulting from the vibratory pile driving that is planned at the LNG Terminal, because 1) vibratory driving at

the Terminal may be occurring for several hours per day, 2) Coos Bay is narrow and Level B harassment noise thresholds are expected to be exceeded across the width of Coos Bay at the Terminal, and 3) many harbor seals that haul out at Clam Island, and to a lesser extent, the other haulouts in Coos Bay, likely swim by the LNG Terminal work zone throughout the day. Because of these factors, individual animals are expected to move into the Level B ZOI throughout the day as active vibratory driving is occurring at the LNG Terminal, and harbor seal take would be underestimated without accounting for the movement of animals. Therefore, JCEP developed a calculation method whereby seals in the "model" are considered to move continuously past the LNG Terminal site. JCEP refers to this as the movement method.

JCEP's movement method uses the same base assumption as the typical static method described above—that harbor seals are distributed evenly across the estuary. However, this method then assumes that these evenly distributed harbor seals travel through the harassment zones and they use a current drift speed as a proxy for this drift but it could also be considered a slow swim speed (likely representative for animals milling around an estuary to which they are resident) as described below. The calculations used by JCEP to estimate harbor seal exposures(likely occurring to the same 300 to 400 individuals) is: (Seals/km^2 × (ZOI) km^2) + (Seals/km^2 × (Current) km/min × (Pile Driving) min/day × (Channel Width) km) = Seals/day. This calculation represents that take for each day is calculated by taking a snapshot of the seals that are in the Level B harassment zone when driving starts (i.e., the conventional static method), and then adding to that the seals that "flow" into the leading edge of the ZOI for the duration of pile driving. After harbor seals flow across the leading edge of the Level B harassment zone, they are considered taken.

Although seals are active swimmers and do not drift with the current, the purpose of the method was not to characterize actual movement but to estimate how many seals may pass into a given Level B harassment zone throughout the day. The method proposed by JCEP is a method designed to model the possibility seals may come within the Level B harassment zone in greater probability than a single snapshot in time in a given day (the static calculation method described above). In their Acoustic Integration AIM model, the U.S. Navy estimates harbor seal swim speeds range from 1-4 kilometers per hour (0.27 m/sec – 1.1 m/sec) (Table B-2 in Navy, 2017). The proposed method assumes a drift speed of 0.39 m/sec (1.4 km/hour), which is within this range. We note the data from which the Navy swim speeds are derived are primarily tagging data during dives and bouts of foraging where animals are likely lunging for prey and moving quickly. Therefore, because we are looking for representative swim speeds crossing zones and these animals are resident to Coos Bay, we believe the lower end of this range is representative of average swim speeds. Further, the proposed movement method assumes seals flow in one direction whereas it is more likely seals are moving in multiple directions, potentially not crossing or taking longer to cross a Level B harassment isopleth. When considering this straight-line movement assumption and that the speed proposed is within a reasonable swim speed, NMFS finds JCEP's method is acceptable to estimate the potential for exposure. More importantly, the resulting number of exposures from this method is an equally reasonable amount of take given the specified activity (Table 7). We do not anticipate the calculated exposures to represent the number of individuals taken but that these exposures likely will occur to the same individuals repeatedly as the population appears to be resident with some flux in abundance as evident by the lower sighting rates in winter months than near pupping season.

Table 7--Estimated harbor seal exposures

Method	Pile Type	Total Piles	Location	Animal Density[a]	Driving Days	Mins Driving per Day	Level B Zone Area from GIS (sq. km)[b,c]	Level B Takes Per Day[a]	Total Level B Takes (Year 1)[b]	Calculation Method
LNG Terminal Piles										
Vibratory	Sheet Pile	1,246	MOF (outside ODFW work window)	9.2	97	309	2.49	95.83	9,295.54	**Movement**
Vibratory	Sheet Pile	623	MOF (inside ODFW work window)	6.0	48	309	2.49	63.13	3,030.36	**Movement**
Vibratory	Sheet Pile	113	W. berth wall, 2.5% nearest berm (outside ODFW work window)	9.2	8.5	329	2.49	98.54	837.63	**Movement**
Vibratory	Pipe Pile	6	TMBB mooring pile (inside ODFW window)	6.0	10	9	3.19	19.22	192.16	**Static**
Ancillary Activities Piles (all inside ODFW window)										
Impact	Timber	1,150	TPP/US-101 intersection	6.0	60	50	NA	NA	NA	**Static**
Vibratory	Timber	1,150	TPP/US-101 intersection	6.0	60	100	1.18	7.14	428.22	**Static**
Vibratory	Sheet Pile	311	TPP/US-101 intersection	6.0	16	100	1.18	7.17	114.16	**Static**
Impact	Pipe Pile	36	TPP/US-101 intersection	6.0	9	20	NA[c]	NA	NA	**Static**
Vibratory	Pipe Pile	36	TPP/US-101 intersection	6.0	9	30	1.18	7.14	64.23	**Static**
Vibratory	Pipe Pile	33	APCO sites	6.0	9	30	0.40	2.39	21.47	**Static**
								Grand Total	**13,983.77**	

[a] Animal density is calculated for both in-water and out-of-water impact pile driving work windows as animal density is not uniform throughout the year.

[b] No takes are allocated to impact pile driving as vibratory pile driving, which has larger harassment isopleths, would occur on the same day.

[c] The calculated area of the Level B zone is influenced by land.

A summary of the amount of take, by species, with respect to stock size is provided in Table 8. For all marine mammal species, it is unlikely Level A harassment would occur due to implementation of shutdowns, the nature of the work and movement of animals throughout the bay. Cetaceans especially would likely move quickly through the area and JCEP would implement shutdown zones equal to most conservative Level A harassment distance based on the User Spreadsheet (i.e., the output that considers the maximum amount of piles driven in one day).

Table 8--Total Amount of Estimated Take, per species

Common name	Stock	Take		% of stock (stock size)
		Level A	Level B	
gray whale	Eastern North Pacific	0	2	< 1 (26,960)
killer whale	West Coast Transient	0	15	3 (521)
harbor porpoise	Northern CA/Southern OR	0	12	<1 (35,769)
Northern elephant sea	California breeding	0	33	< 1 (179,000)
Steller sea lion	Eastern U.S.	0	230	< 1 (41,638)
California sea lion	U.S.	0	460	< 1 (257,606)
Pacific harbor seal	Oregon/Washington Coast	0	13,984	< 2 (24,732)*

*The number of takes presented here (n= 13,984) represents potential exposures to 300-400 individual harbor seals, not the number of individuals taken.

Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) the manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

JCEP's project design greatly reduces marine mammal and fisheries impacts to in-water noise. JCEP is conducting the majority of pile driving (over 90 percent) at the LNG terminal site behind a berm or in-the-dry. Further, the bulk of the terminal slip would be excavated and dredged before being connected to the estuary. Excavated material would be used to restore the former Kentuck golf course to functional wetlands. JCEP will primarily use a vibratory hammer to reduce the potential for auditory injury; pre-drill the soil at the LNG terminal to loosen and facilitate a more efficient installation and optimize vibratory driving, implement NMFS' standard soft-start procedure for impact hammer pile-driving, avoid in-water impact pile driving from February 16 through September 30 which includes the harbor seal pupping season. When in-water impact driving is necessary, JCEP will use a bubble curtain that will distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column, balance bubbles around the pile, and have the lowest bubble ring on the seabed floor. JCEP would implement shutdown zones (Table 9) equal to the Level A harassment distances as calculated based on the maximum number of piles driven per day. No shutdown zones are required for pile driving in-the-dry at the LNG terminal. These zones are all relatively small; therefore, there is little concern for unnecessary project delays. These shutdown zones will also minimize noise exposure such that the severity of any Level B harassment is minimized. If a species for which take is not authorized is observed within Coos Bay and could be exposed to pile driving noise, JCEP would implement a shutdown zone that equates to the Level B harassment zone for that activity. In addition, should environmental conditions deteriorate such that marine mammals within the entire shutdown zone would not be visible (e.g., fog, heavy rain), pile driving and removal must be delayed until the PSO is confident marine mammals within the shutdown zone could be detected.

Table 9--Shutdown Zones, by pile driving activity and species

Species	Impact Pile Driving		Vibratory Pile-Driving	
	Timber Piles at TPP/US-101	Pipe Piles at TPP/US-101 and APCO	Pipe Piles, Timber Piles and Sheet Piles at TPP/US-101	Pipe Piles at APCO
Shutdown Zone				
Harbor Seal	30	70	10	10
Northern Elephant Seal	30	70	10	10
California Sea Lion	10	10	10	10
Stellar Sea Lion	10	10	10	10
Gray Whale	60	140	25	30
Killer Whale	10	10	10	10
Harbor Porpoise	60	140	25	30

Based on our evaluation of the applicant's proposed measures, NMFS has determined that the proposed mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

JCEP will implement a marine mammal monitoring plan that will include shutdown zones and monitoring areas. JCEP's Marine Mammal Monitoring Plan includes five components: 1) conduct a preconstruction survey; 2) monitor marine mammal occurrence near the project site during construction; 3) enforce shutdown zones (Table 9) for marine mammals; 4) record observations of marine mammals in the observable portions of the Level B harassment zones, including movement and behavior of animals; and 5) report the results of the

preconstruction survey and the construction monitoring, including take numbers. Each of these components is discussed in detail in the associated Marine Mammal Monitoring Plan, provided in Appendix E of JCEP's application.

At least two protected species observers (PSOs) will be on-watch during all pile driving. Monitoring locations will be specific to each activity and may be subject to change depending on physical conditions at the site. PSOs will be positioned on either land-based structures, the shoreline, or boats, depending on activity, best vantage point, and field and safety conditions. The PSOs will be stationed to observe shut-down zone and maximum visual coverage of the Level B harassment zones.

A two-person PSO team will complete a one-time, boat-based, 2-day pre-construction survey of potential Level B harassment zones prior to pile driving activities at the LNG Terminal Marine Facilities (Table 2). A one-day survey would be conducted at the TPP/US-101 and APCO sites prior to pile driving work. The surveys will include on-water observations at each of the pile driving locations to observe species numbers and general behaviors of animals in the area. Surveys will occur no earlier than seven days before the first day of construction at each activity site.

Special attention will be given to the two closest harbor seal haul-out sites in proximity to the project area—Clam Island and Pigeon Point—as described in Section 4 of the IHA application. On each of the monitoring days, monitoring will occur for up to 12 hours (weather-dependent), to include one low-tide survey and one high-tide survey in daylight hours. A small boat will be used for the survey from various locations that provide the best vantage points. The information collected from monitoring will be used for comparison with results of marine

mammal behaviors during pile-driving activities and will contribute to baseline monitoring data for the area.

Marine mammal observations will begin 30 minutes prior to the onset of pile driving. Monitoring the Level B harassment zone for a minimum of 30 minutes after pile-driving stops.

Recording marine mammal presence in the entirety of the vibratory driving Level B harassment zones is not practicable and is not planned The Level B harassment zone will be monitored out to visible distances and then using the daily density calculated for each species observed, the number of Level B harassment take will be extrapolated out to the full zone or if hydroacoustics data is available, the measured Level B harassment zone. PSOs will continue monitoring 30 minutes post pile driving each day.

A final marine mammal monitoring report shall be prepared and submitted within thirty days following resolution of comments on the draft report from NMFS. This report must contain the informational elements described in the Marine Mammal Monitoring Plan, including, but not limited to: dates and times (begin and end) of all marine mammal monitoring, a description of construction activities occurring during each daily observation period, weather and sightability conditions, sighting data (e.g., number of marine mammals observed, by species) PSO locations during marine mammal monitoring, any mitigation action, and other applicable parameters as listed in the IHA available at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*. The report must also distinguish between the number of individual animals taken and the number of incidences of take, such as ability to track groups or individuals, and the number of total takes estimated based on sighting capabilities.

In addition to marine mammal monitoring, JCEP, in coordination with NMFS, has developed a Hydroacoustic Monitoring Plan. This plan is designed to conduct sound source verification and verify that underwater noise thresholds are not exceeded over distances greater than predicted by the acoustic models used in JCEP's application and this analysis. For the 2020-2021 construction season, hydroacoustic monitoring will be conducted for a portion of all piles to be installed by impact or vibratory methods. In general, approximately 5 percent of each pile driving activity would be monitored, with a minimum of three and a maximum of 20 piles monitored.

Two hydrophones will be placed for each monitoring event, one placed close to the pile and one placed at a greater distance so that a transmission loss value can be measured. For in-water pile driving, the hydrophone nearest the pile will be placed at least 3H from the pile, where H is the water depth at the pile and 0.7 to 0.85H depth from the surface, or 10 meters, whichever is greater (NMFS 2012b). For all pile driving, including in-the-dry pile installation, hydrophones will be placed at least 1 meter below the surface and with a clear acoustic line-of-sight between the pile and the hydrophone. The other hydrophone will be placed at mid-column depth, at a distance at least 20 times the source depth from each pile being monitored, in waters at least 5 meters deep (NMFS 2012a). If the water velocity is 1.5 meters per second or greater, 1 to 3 meters off the bottom is recommended for near-field hydrophones and greater than 5 meters from the surface is recommended for any far-field hydrophones (FHWG 2013). A weighted tape measure will be used to determine the depth of the water. The hydrophones will be attached to a nylon cord, a steel chain, or other proven anti-strum features, if the current is swift enough to cause strumming of the line. The nylon cord or chain will be attached to an anchor that will keep the line the appropriate distance from each pile. The nylon cord or chain will be attached to a

float or tied to a static line at the surface. The distances will be measured by a tape measure, where possible, or a laser range-finder. The acoustic path (line of sight) between the pile and the hydrophone(s) should be unobstructed in all cases.

The on-site inspector/contractor will inform the acoustics specialist when pile driving is about to begin, to ensure that the monitoring equipment is operational. Underwater sound levels will be monitored continuously during the entire duration of each pile being driven, with a minimum one-third octave band frequency resolution. The wideband instantaneous absolute peak pressure and sound exposure level (SEL) values of each strike, and daily cumulative SEL (cSEL) should be monitored in real time during construction, to ensure that the project does not exceed its authorized take level. Peak and RMS pressures will be reported in dB (1 µPa). SEL will be reported in dB (1 μPa^2 per second). Wideband time series recording is strongly recommended during all impact pile driving.

Underwater sound levels will be continuously monitored during the entire duration of each pile being driven. The peak, root-mean-square (RMS) (impulse level), and SEL of each strike will be monitored in real time. The cSEL also will be monitored, assuming no contamination from other noise sources. Underwater sound levels will be measured in dB re:1 µPa. JCEP will submit a draft report on all monitoring conducted under the IHA within ninety calendar days of the completion of marine mammal and/or acoustic monitoring or sixty days prior to the issuance of any subsequent IHA for this project, whichever comes first. When applying for a subsequent IHA, JCEP will include a summary of the monitoring data collected to date with its application.

A final draft report, including data collected and summarized from all monitoring locations, will be submitted to NMFS within 90 days of completion of the hydroacoustic

monitoring. The results will be summarized in graphical form and will include summary statistics and time histories of impact sound values for each pile. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS. The report will include information of the circumstances surrounding the recordings (e.g., pile size, type, number of strikes, hydrophone distance to pile, spectrum, etc.) as presented in JCEP's Hydroacoustic Monitoring Plan.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as serious injury, or mortality, JCEP must immediately cease the specified activities and report the incident to the NMFS Office of Protected Resources (301-427-8401) and the West Coast Region Stranding Coordinator (206-526-4747). The report must include the time and date of the incident; description of the incident; environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility); description of all marine mammal observations and active sound source use in the 24 hours preceding the incident; species identification or description of the animal(s) involved; fate of the animal(s); and photographs or video footage of the animal(s).

Activities must not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with JCEP to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. JCEP may not resume pile driving activities until notified by NMFS.

In the event JCEP discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), JCEP must immediately report the incident to the Office of Protected Resources, NMFS, and the West Coast Region Stranding Coordinator,

NMFS. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with JCEP to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that JCEP discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the specified activities (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), JCEP must report the incident to the Office of Protected Resources, NMFS, and the West Coast Region Stranding Coordinator, NMFS, within 24 hours of the discovery.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are

incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the majority of our analyses applies to all species listed in Table 4 except for harbor seals, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. For harbor seals, there are meaningful differences in anticipated individual responses to activities, impact of expected take on the resident population in Coos Bay (all part of the Oregon/Washington stock), or impacts on habitat; therefore, we provide a supplemental analysis independent of the other species for which we have authorized take.

NMFS has identified key qualitative and quantitative factors, which may be employed to assess the level of analysis necessary to determine whether expected impacts associated with a specified activity will be negligible. These include (but are not limited to) the type and magnitude of taking, the amount and importance of the available habitat for the species or stock that is affected, the duration of the anticipated effect to the species or stock, and the status of the species or stock. When an evaluation of key factors shows that the anticipated impacts of the specified activity would clearly result in no greater than a negligible impact on all affected species or stocks, additional evaluation is not necessary. In this case, all the following factors are in place for all affected species or stocks except harbor seals:

- No takes by mortality, serious injury or Level A harassment are anticipated or authorized;
- Takes by Level B harassment are less than 3 percent of the best available abundance estimates for all stocks;

- Take would not occur in places and/or times where take would be more likely to accrue to impacts on reproduction or survival, such as within ESA-designated or proposed critical habitat, biologically important areas (BIA), or other habitats critical to recruitment or survival (*e.g.*, rookery);
- Take would occur over a short timeframe, being limited to the short duration a marine mammal would be present within Coos Bay during pile driving;
- Take would occur over an extremely small portion of species/stock range;
- The affected stocks are not known to be declining and/or are within OSP range; and
- Any impacts to marine mammal habitat from pile driving are temporary and minimal.

For all species and stocks, take, by Level B harassment only, would only occur within Coos Bay - a limited, confined area of any given stock's home range, including the Oregon/Washington stock of harbor seals. JCEP is not requesting, and NMFS is not expecting or authorizing, Level A harassment of marine mammals incidental to the specified activities.

For harbor seals, we further discuss our negligible impact finding in the context of potential impacts to the resident population, a small subset of the Oregon/Washington coastal stock, within Coos Bay. Similar to other stocks, take by mortality, serious injury, or Level A harassment is not anticipated or proposed to be authorized; takes would occur over a very small portion of the stock's range; and the affected stocks are not known to be declining. OSP for harbor seals is currently unknown; however, the stock was previously reported to be within its OSP range (Jeffries *et al.*, 2003, Brown *et al.*, 2005).

As discussed in the *Description of Marine Mammals and Their Habitat* section, a resident population of approximately 300-400 harbor seals that belong to the Oregon/Washington Coastal stock likely reside year-round within Coos Bay. The exact home range of this sub-population is

unknown but harbor seals, in general, tend to have limited home range sizes. Therefore, we can presume a limited number of harbor seals (approximately 300-400) will be repeatedly taken throughout the effective period of the IHA, though not necessarily on sequential days. It is possible a limited number of harbor seals may enter the bay occasionally (similar to occasional Steller sea lion and California sea lion presence) from nearby coastal haulouts (e.g., Cape Arago); however, these seals would likely not be repeatedly exposed throughout the entire year. For those animals exposed repeatedly, these exposures would occur throughout the year but not every single day (230 days of pile driving work total). In addition, pile driving work is spread throughout the Bay, thereby varying the areas where Level B harassment may occur. Regardless, in general, repeated exposure, especially over sequential days, of harbor seals to pile driving noise could result in impacts to reproduction or survival of individuals in certain circumstances. The following discussion analyzes the potential impacts from repeated pile driving exposure to Coos Bay harbor seals and describes why impacts to reproduction or survivorship that could have an adverse impact on the stock are not anticipated.

Harbor seals within Coos Bay are currently exposed to numerous anthropogenic noise sources. Coos Bay is highly developed along its coastline. Typical noise sources within Coos Bay include U.S. Army Corps of Engineers maintenance dredging, commercial shipping and fishing vessel traffic, and recreational boating. Despite these existing anthropogenic stressors, unpublished ODFW aerial survey data indicates that harbor seals in Coos Bay have been stable and likely approach carrying capacity (Wright *et al.*, 2019, pers. comm), similar to the status of the entire stock. In the absence of recent abundance estimates throughout its range, the current population trend of the Oregon/Washington Coastal stock is unknown; however, based on the analyses of Jeffries *et al.* (2003) and Brown *et al.* (2005), both the Washington and Oregon

portions of this stock were reported as reaching carrying capacity. As described in Southall *et al.* (2007), except for naïve individuals, behavioral responses depend critically on the principles of habituation and sensitization, meaning that an animal's exposure history with a particular sound and other contextual factors play a role in anticipated behaviors and consequences of those behaviors on survival and reproduction. Examples of contextual factors include proximity to a source, whether the source is approaching, and general novelty or familiarity with a source (Southall *et al.,* 2007).

AECOM's acoustic surveys indicate median background noise levels in Coos Bay are at or higher than the harassment threshold used in our analysis to estimate Level B harassment (120 dB rms). The range of background noise levels in the presence of working commercial vessels have been measured up to 164 dB rms at close but unknown distance from the source; however, we can assume those measurements were taken several tens of meters away from the vessel for safety and port access reasons. Overall, harbor seals are familiar with several anthropogenic noise sources in Coos Bay, pile driving is stationary (not perceived as approaching), and the haulout sites within Coos Bay are no less than 500 m from any pile driving location.

There are no known concentrated foraging areas around the terminal site or location of the ancillary activities. Further, JCEP would not conduct any impact pile driving during the pupping season, which would otherwise be introducing noise that has a greater potential for injury during critical life stages and when abundance and density of harbor seals are greatest.

In summary and as described above, although this small resident population is likely to be taken repeatedly throughout the year, the following factors primarily support our determination that the impacts resulting from JCEP's proposed activity are not expected to

adversely affect the species or stock through effects on annual rates of recruitment or survival on harbor seals:

- No mortality, serious injury, or Level A harassment is anticipated or authorized.
- Exposure resulting in Level B harassment would occur in a very small part of the Oregon/Washington Coastal stock's range.
- Animals exposed would primarily be limited to the 300-400 resident harbor seals in Coos Bay, a small percentage of the overall stock (approximately 2 percent).
- No in-water impact pile driving would occur during the pupping season; therefore, no impacts to pups from this activity is likely to occur. Vibratory pile driving near the water's edge may result in noise propagation near the MOF and ancillary activities; however, pupping sites are located outside the Level B harassment ensonification areas for any pile driving activity.
- Harbor seals in Coos Bay are habituated to several sources of anthropogenic noise sources with no evidence exposure is impacting rates or recruitment and survival (as evident from steady population numbers as derived from several years of ODFW aerial survey data).
- The Oregon/Washington coastal stock is subject to very low anthropogenic sources of mortality and serious injury (e.g., annual minimum level of human-caused mortality and serious injury is 10.6 harbor seals) and is likely reaching carrying capacity (Carretta, 2018).

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS finds that the total taking from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

For all stocks, the amount of authorized take is small (less than 3 percent; Table 8). Although the number of exposures of harbor seals is high, as described above, takes would likely occur to the small (approximately 300 to 400 animals) resident population of harbor seals within Coos Bay.

Based on the analysis contained herein of the proposed activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population sizes of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Based on the description of the specified activity, the measures described to minimize adverse effects on the availability of marine mammals for subsistence purposes, and the

proposed mitigation and monitoring measures, NMFS has determined that there will not be an unmitigable adverse impact on subsistence uses from JCEP's proposed activities.

Endangered Species Act (ESA)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq*.) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with the West Coast Region Protected Resources Division, whenever we propose to authorize take for endangered or threatened species.

No incidental take of ESA-listed marine mammal species is proposed for authorization or expected to result from this activity. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq*.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our proposed action (*i.e.*, the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassment authorizations with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this

categorical exclusion. Accordingly, NMFS has determined that the issuance of the IHA is categorically excluded from further NEPA review.

Authorization

As a result of these determinations, NMFS has issued an IHA to JCEP authorizing the take, by Level B harassment only, of marine mammals incidental to pile driving associated with construction of the Jordan Cove LNG Terminal and associated ancillary activities in Coos Bay, Oregon from October 1, 2020 through September 30, 2021, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A copy of the issued IHA can be found at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act*.

Dated: January 31, 2020.

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Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

[FR Doc. 2020-02338 Filed: 2/5/2020 8:45 am; Publication Date: 2/6/2020]