



**BILLING CODE 3510-22-P**

**DEPARTMENT OF COMMERCE**

**National Oceanic and Atmospheric Administration**

**[RTID 0648-XR040]**

**Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Long Beach Cruise Terminal Improvement Project in the Port of Long Beach, California**

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

**ACTION:** Notice; Issuance of an Incidental Harassment Authorization.

**SUMMARY:** In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA), as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to Carnival Corporation & PLC (Carnival) to incidentally take, by Level A harassment and Level B harassment, five species of marine mammals during the Port of Long Beach Cruise Terminal Improvement Project in Port of Long Beach, California.

**DATES:** This Authorization is effective from November 19, 2019 through November 18, 2020.

**FOR FURTHER INFORMATION CONTACT:** Wendy Piniak, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the authorization, 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/national/marine-mammal->

*protection/incidental-take-authorizations-construction-activities*. In case of problems accessing these documents, please call the contact listed above.

## **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 may be provided to the public for review.

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 the species or stocks for taking for certain subsistence uses (referred to in shorthand as “mitigation”); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

## **Summary of Request**

On February 15, 2019, NMFS received a request from Carnival for an IHA to take marine mammals incidental to the Port of Long Beach Cruise Terminal Improvement Project in Port of Long Beach (POLB), California. The application was deemed adequate and complete on July 12, 2019. Subsequent revisions to the application were submitted by Carnival on September 13, 2019. Carnival's request is for take of five species of marine mammals by Level B harassment and one of these five species by Level A harassment. Neither Carnival nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate. In-water activities (pile installation and dredging) associated with the project are anticipated to require five months.

## **Description of Activity**

Carnival requested authorization for take of marine mammals incidental to in-water activities associated with the Port of Long Beach Cruise Terminal Improvement Project in POLB, California. The purpose of the project is to make improvements to its existing berthing facilities at the Long Beach Cruise Terminal at the Queen Mary located at Pier H in the POLB, in order to accommodate a new, larger class of cruise ships. The project will also resolve safety issues in the existing parking structure and vessel mooring. Implementation of the project requires installation of two high-capacity mooring dolphins, fenders, and a new passenger bridge system, and dredging at the existing berth and the immediate surrounding area. In-water construction will include installation of a maximum of 49 permanent, 36-inch (91.4 centimeters (cm)) steel pipe piles using impact and vibratory pile driving. Sounds produced by these activities may

result in take, by Level A harassment and Level B harassment, of marine mammals located in the POLB, California.

In-water activities (pile installation and dredging) associated with the planned project are anticipated to begin mid-November, 2019, and be completed by mid-April, 2020, however Carnival requested the IHA for one year from the date of issuance. Pile driving activities will occur for 26 days and dredging activities will occur for 30 days during the planned project dates. In-water activities will occur during daylight hours only.

A detailed description of the planned activities is provided in the **Federal Register** notice announcing the proposed IHA (84 FR 54867; October 11, 2019). Since that time no changes have been made to Carnival's planned activities. Therefore, a detailed description is not provided here. Please refer to the proposed IHA **Federal Register** notice for a detailed description of the activity.

### **Comments and Responses**

A notice of NMFS' proposal to issue an IHA to Carnival was published in the **Federal Register** on October 11, 2019 (84 FR 54867). That notice described, in detail, Carnival'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 a comment letter from the Marine Mammal Commission (Commission); 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>.

*Comment 1:* The Commission states that NMFS' standard 7-decibel (dB) source level reduction when bubble curtains are to be used during pile driving is not appropriate because bubble curtains that are placed immediately around the pile do not achieve consistent reductions in sound levels because they cannot attenuate ground-borne sound. The Commission recommends that NMFS consult with the relevant experts regarding the appropriate source level reduction factor to use to minimize far-field effects on marine mammals for all relevant incidental take authorizations and, until the experts have been consulted, refrain from using a source level reduction factor when bubble curtains are to be implemented.

*Response:* While it is true that noise level reduction measured at different received ranges does vary, given that both Level A harassment and Level B harassment estimation using geometric modeling is based on noise levels measured at near-source distances (~10 meters (m)), NMFS believes it reasonable to use a source level reduction factor for sound attenuation device (bubble curtain) implementation during impact pile driving. As noted in responses to previous comments on the source level reduction factor for sound attenuation device, NMFS reviewed Caltrans' bubble curtain "on and off" studies conducted in San Francisco Bay in 2003 and 2004. The equipment used for bubble curtains has likely improved since 2004 but due to concerns for fish species, Caltrans has not able to conduct "on and off" tests recently. Based on 74 measurements (37 with the bubble curtain on and 37 with the bubble curtain off) at both near (less than 100 m) and far (greater than 100 m) distances, the linear averaged received level reduction is 6 dB. If limiting the data points (a total of 28 measurements, with 14 during bubble curtain on and 14 during bubble curtain off) to only near distance measurements,

the linear averaged noise level reduction is 7 dB. Based on this analysis, we conclude that there is not a significant difference of source level reduction between near and far-distance measurements. Based on these measures and analysis, NMFS has conservatively used the reduction of 7 dB of the source level for impact zone estimates. In the case of Carnival's impact and vibratory pile driving isopleth estimates using an air bubble curtain for source level reduction, NMFS also reviewed Austin *et al.* (2016), which provided measurements of impact and vibratory pile driving using a variety of hammer types on a variety of piles in different locations near Anchorage, Alaska. We specifically examined the measurements in Tables 8 and 9 for SPL rms and SELs-s data for impact pile driving and Table 11 for SPL rms data for vibratory pile driving. At ~10 m Austin *et al.* (2016) measured reductions in mean SELs-s (impact pile driving) and SPL rms (vibratory pile driving) of 10 dB (or higher) when comparing two piles with a hydraulic hammer (pile IP10 with bubble curtain and IP1 unattenuated). At distances farther away from a pile (*e.g.*, 1 km), a variety of factors can influence the measured SPL (including transmission loss, benthic type, pile location, *etc.*). Austin *et al.* (2016) did not present measurements at multiple distances for the same pile with and without bubble curtains making it difficult to interpret or compare measurements at farther distances. NMFS will evaluate the appropriateness of using an alternative source level reduction factor for sound attenuation device implementation during pile driving for all relevant incidental take authorizations as more data become available and contact experts as appropriate. Nevertheless, at this point, we think that a 7 dB reduction is reasonable to be used as a source level reduction factor in this scenario.

*Comment 2:* The Commission notes that to estimate the 5 Level A harassment takes for harbor seals, NMFS used the density estimate derived from sightings data (MBC Applied Environmental Sciences 2016), the Level A harassment ensonified area, and the number of days of activities. To minimize unnecessary delays if the authorized numbers of Level A harassment takes are met, the Commission recommends that NMFS increase the Level A harassment takes from 5 to at least 26 based on one harbor seal occurring within the 120-m Level A harassment zone on each of the days when impact pile driving will occur.

*Response:* Following the method for calculating Level B harassment takes for all species, to calculate Level A harassment takes for harbor seals we used the following equation: *Level A harassment zone area \* density \* # of pile driving days*. For the entire Level A harassment zone, the calculations are as follows:

- For impact pile driving:  $0.114852$  (Level A zone area) \*  $1.38$  (density) \*  $26$  days =  $4.12$  seals;
- For vibratory pile driving:  $0.003154$  (Level A zone area) \*  $1.38$  (density) \*  $26$  days =  $0.11$  seals.

For the entire Level A harassment zone, the total is  $4.23$  seals, rounded to the estimated 5 takes by Level A harassment for harbor seals.

This level of take is estimated to occur if no mitigation measures are implemented. Required mitigation measures include shutdown zones that will likely reduce/eliminate Level A harassment take in the entire vibratory pile driving Level A harassment zone, and a portion of the impact pile driving Level A harassment zone (required shutdown zone of 50 m). As the closest known regularly used haul out site for

pinnipeds is approximately 3 km from the project site, we have no information to indicate that there will be more animals than predicted by the density estimates near the project site. We consulted with the applicants and NMFS' West Coast Regional Office in Long Beach, CA. The applicants conducted limited on-site surveys during winter 2018-19 and observed no harbor seals near the project site. NMFS staff with local expertise (and stranding coordinators) were not aware of harbor seals frequenting the POLB, and believed that the MBC Applied Environmental Sciences (2016) survey densities were adequate, and that an increase in the estimated Level A harassment takes was not needed (Laura McCue, personal communication). The MBC Applied Environmental Sciences (2016) survey report also notes that harbor seals were "most commonly observed resting or foraging along riprap shorelines, particularly the breakwaters of the Outer Harbor, and 83 percent of total observations of this species were made in the Outer Harbor (Figure 10-1)." Based on the information we have on density and haul out sites, and that we have conservatively estimated the level of take assuming no mitigation, we believe that 5 takes by Level A harassment for harbor seals is appropriate.

*Comment 3:* The Commission states that it is unclear whether Carnival would keep a running tally of the extrapolated takes to ensure the authorized takes are not exceeded. The Commission notes that they do not believe that keeping track of only the observed takes is sufficient when the Level B harassment zones extend to more than 8 km and recommends adjusting the takes based on the extent of the Level B harassment zone based on the sighting distance and number of PSOs monitoring at a given time. The Commission recommends that NMFS ensure that Carnival keeps a running tally of the total takes for each species to comply with section 3(i) of the draft authorization ("If a

species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, is observed entering or within the monitoring zone (Table 2), pile driving activities must shut down immediately using delay and shutdown procedures. Activities must not resume until the animal has been confirmed to have left the area or the 15 minute observation time period has elapsed.”).

*Response:* We agree that Carnival must ensure they do not exceed authorized takes. We have included in the authorization that Carnival 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 4:* The Commission recommended that NMFS refrain from using the proposed renewal process for Carnival’s authorization. If NMFS elects to use the renewal process frequently or for authorizations that require a more complex review or for which much new information has been generated, the Commission recommended that NMFS provide the Commission and other reviewers the full 30- day comment period as set forth in section 101(a)(5)(D)(iii) of the MMPA.

*Response:* We appreciate the Commission's input and direct the reader to our recent response to a similar comment, which can be found at 84 FR 52464 (October 2, 2019; 84 FR 52466).

### **Description of Marine Mammals in the Area of Specified Activities**

A detailed description of the species likely to be affected by Carnival’s project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local

occurrence, were provided in the **Federal Register** notice for the proposed IHA (84 FR 54867; October 11, 2019). Since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to the proposed IHA **Federal Register** notice for these descriptions; we provide a summary of marine mammals that may potentially be present in the project area here (Table 1). Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SAR; <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website (<https://www.fisheries.noaa.gov/find-species>).

Table 1 lists all species with expected potential for occurrence in the POLB and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2018). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most

species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Pacific SARs (*e.g.*, Carretta *et al.*, 2019). All values presented in Table 1 are the most recent available at the time of publication and are available in the 2018 Final SARs (Carretta *et al.*, 2019) (available online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>).

**Table 1 -- Marine Mammals Potentially Present Within Port of Long Beach, California During the Specified Activity**

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N) <sup>1</sup>	Stock abundance (CV, N <sub>min</sub> , most recent abundance survey) <sup>2</sup>	PBR	Annual M/SI <sup>3</sup>
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae						
Gray whale	<i>Eschrichtius robustus</i>	Eastern North Pacific	-, -, N	26,960 (0.05, 25,849, 2016)	801	139
Family Balaenopteridae (rorquals)						
<i>Blue whale</i>	<i>Balaenoptera musculus</i>	Eastern North Pacific	E, D, Y	1,647 (0.07, 1,551, 2011)	2.3	≥19
<i>Fin whale</i>	<i>Balaenoptera physalus</i>	California/Oregon/Washington	E, D, Y	9,029 (0.12, 8,127, 2014)	81	≥43.5
Humpback whale	<i>Megaptera novaeangliae</i>	California/Oregon/Washington	-, -, Y	2,900 (0.05, 2,784, 2014)	16.7	≥40.2
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Short-beaked common dolphin	<i>Delphinus delphis</i>	California/Oregon/Washington	-, -, N	969,861 (0.17, 839,325, 2014)	8,393	≥40
Long-beaked common dolphin	<i>Delphinus capensis</i> <sup>4</sup>	California	-, -, N	101,305 (0.49, 68,432, 2014)	657	≥35.4
Common bottlenose dolphin	<i>Tursiops truncatus</i>	Coastal California	-, -, N	453 (0.06, 346, 2011)	2.7	≥2.0
<i>Risso's dolphin</i>	<i>Grampus griseus</i>	California/Oregon/Washington	-, -, N	6,336 (0.32, 4,817, 2014)	46	≥3.7

<i>Pacific white-sided dolphin</i>	<i>Lagenorhynchus obliquidens</i>	California/Oregon/Washington	-, -, N	26,814 (0.28, 21,195, 2014)	191	7.5
<i>Northern right whale dolphin</i>	<i>Lissodelphis borealis</i>	California/Oregon/Washington	-, -, N	26,556 (0.44, 18,608, 2014)	179	3.8
Order Carnivora – Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
California sea lion	<i>Zalophus californianus</i>	U.S.	-, -, N	257,606 (N/A, 233,515, 2014)	14,011	>320
Family Phocidae (earless seals)						
Harbor seal	<i>Phoca vitulina</i>	California	-, -, N	30,968 (0.157, 27,348, 2012)	1,641	43

<sup>1</sup> 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.

<sup>2</sup> NMFS marine mammal stock assessment reports online at:

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments>. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable. California sea lion population size was estimated from a 1975-2014 time series of pup counts (Lowry *et al.* 2017), combined with mark-recapture estimates of survival rates (DeLong *et al.* 2017, Laake *et al.* 2018).

<sup>3</sup> These values, found in NMFS' 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.

<sup>4</sup> The NMFS SARs identify *Delphinus capensis* as the scientific name for the long-beaked common dolphin, however the Committee on Taxonomy (2018) provisionally considers the Eastern North Pacific form of the long-beaked common dolphin as a subspecies, *Delphinus delphis bairdii*, following the usage of Hershkovitz (1966).

*NOTE - Italicized species are not expected to be taken or authorized.*

### *Habitat*

No ESA-designated critical habitat overlaps with the project area. A migration Biologically Important Area (BIA) for gray whales overlaps with the project area, however as described in the **Federal Register** notice for the proposed IHA (84 FR 54867; October 11, 2019) gray whales are rarely observed in the POLB and sound from the planned project's in-water activities is not anticipated to propagate large distances outside the POLB.

## **Potential Effects of Specified Activities on Marine Mammals and their Habitat**

Underwater noise from impact and vibratory pile driving and down-the-hole drilling activities associated with the planned Port of Long Beach Cruise Terminal Improvement Project have the potential to result in harassment of marine mammals in the vicinity of the action area. The **Federal Register** notice for the proposed IHA (84 FR 54867; October 11, 2019) included a discussion of the potential effects of such disturbances on marine mammals and their habitat, therefore that information is not repeated in detail here; please refer to the **Federal Register** notice (84 FR 54867; October 11, 2019) for that information.

### **Estimated Take**

This section provides an estimate of the number of incidental takes authorized through this IHA, which informs 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 will primarily be by Level B harassment, as use of the acoustic sources (*i.e.*, pile driving) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A

harassment) to result, for phocids (harbor seals) because predicted auditory injury zones are larger than for mid-frequency species and otariids. Auditory injury is unlikely to occur for mid-frequency cetaceans and otariids. The planned mitigation and monitoring measures (see *Mitigation* and *Monitoring and Reporting* sections below) are expected to minimize the severity of such taking to the extent practicable. With implementation of the planned mitigation and monitoring measures (see *Mitigation* section), no Level B harassment or Level A harassment is anticipated or authorized for low-frequency cetaceans (humpback whales and gray whales). As described previously, no mortality is anticipated or proposed to be 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) 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 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 (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  $\mu$ Pa (rms) for continuous (*e.g.*, vibratory pile-driving, drilling) and above 160 dB re 1  $\mu$ Pa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Carnival’s planned activity includes the use of continuous (vibratory pile driving) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1  $\mu$ Pa (rms) thresholds 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). Carnival’s planned activity includes the use includes the use of continuous (vibratory pile driving) and impulsive (impact pile driving) sources.

These thresholds are provided in Table 2 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 2 -- Thresholds Identifying the Onset of Permanent Threshold Shift**

Hearing Group	PTS Onset Thresholds* (Received Level)	
	Impulsive	Non-impulsive
<b>Low-Frequency (LF) Cetaceans</b>	$L_{p,0-pk,flat}$ : 219 dB $L_{E,p,LF,24h}$ : 183 dB	$L_{E,p,LF,24h}$ : 199 dB
<b>Mid-Frequency (MF) Cetaceans</b>	$L_{p,0-pk,flat}$ : 230 dB $L_{E,p,MF,24h}$ : 185 dB	$L_{E,p,MF,24h}$ : 198 dB
<b>High-Frequency (HF) Cetaceans</b>	$L_{p,0-pk,flat}$ : 202 dB $L_{E,p,HF,24h}$ : 155 dB	$L_{E,p,HF,24h}$ : 173 dB
<b>Phocid Pinnipeds (PW) (Underwater)</b>	$L_{p,0-pk,flat}$ : 218 dB $L_{E,p,PW,24h}$ : 185 dB	$L_{E,p,PW,24h}$ : 201 dB
<b>Otariid Pinnipeds (OW) (Underwater)</b>	$L_{p,0-pk,flat}$ : 232 dB $L_{E,p,OW,24h}$ : 203 dB	$L_{E,p,OW,24h}$ : 219 dB

\* Dual metric 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 are recommended for consideration.

Note: Peak sound pressure level ( $L_{p,0-pk}$ ) has a reference value of 1  $\mu\text{Pa}$ , and weighted cumulative sound exposure level ( $L_{E,p}$ ) has a reference value of 1  $\mu\text{Pa}^2\text{s}$ . In this table, thresholds are abbreviated to be more reflective of International Organization for Standardization standards (ISO 2017). The subscript “flat” is being included to indicate peak sound pressure are flat weighted or unweighted within the generalized hearing range of marine mammals (*i.e.*, 7 Hz to 160 kHz). 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 weighted 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 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.

The sound field in the project area is the existing background noise plus additional construction noise from the planned project. Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. The maximum (underwater) area ensonified is determined by the topography of the POLB including hard structure breakwaters which bound the southern portion of the POLB and preclude sound from transmitting beyond the outer harbor of the POLB (see Figure 5 of the application). Additionally, vessel traffic and other commercial and industrial activities in the project area may contribute to elevated background noise levels which may mask sounds produced by the project.

Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$$TL = B * \text{Log}_{10} (R_1/R_2), \text{ where}$$

TL = transmission loss in dB

B = transmission loss coefficient; for practical spreading equals 15

$R_1$  = the distance of the modeled SPL from the driven pile, and

$R_2$  = the distance from the driven pile of the initial measurement

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures

and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source ( $20 \cdot \log[\text{range}]$ ). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source ( $10 \cdot \log[\text{range}]$ ). A practical spreading value of fifteen is often used under conditions, such as the project site at Pier H in the POLB where water increases with depth as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Practical spreading loss is assumed here.

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. In order to calculate distances to the Level A harassment and Level B harassment thresholds for the 36 inch steel piles planned in this project, NMFS used acoustic monitoring data from other locations. In their application, Carnival presented several reference sound levels based on underwater sound measurements documented for other pile driving projects of the west coast of the U.S. (see Tables 1.3 and 1.5 of the application). Empirical data from a recent sound source verification (SSV) study conducted as part of the Anacortes Ferry Terminal Project, in the state of Washington were used to estimate the sound source levels (SSLs) for impact pile driving and vibratory pile driving. The Anacortes Ferry Terminal Project were generally assumed to best approximate the construction activities and environmental conditions found in the Carnival's planned project in that the Anacortes Ferry Terminal Project also involved driving 36 inch piles

into a similar substrate type (sand and silt) with a diesel hammer of similar power (ft-lbs) (WSDOT 2018). Carnival also presented several references for the number of piles installed per day and the number of strikes (impact pile driving) or minutes (vibratory pile driving) required to install each pile from similar projects on the U.S. west coast. As the Anacortes Ferry Terminal Project was assumed to be most similar to Carnival's planned project (and generally had the highest values), number of strikes (impact pile driving) or minutes (vibratory pile driving) required to install each pile from this Anacortes Ferry Terminal Project were used to calculate Level A harassment and Level B harassment isopleths (WSDOT 2018). Based on data from these projects, the applicant anticipates that a maximum of 5 piles could be installed via impact pile driving per day and 5 piles could be installed via vibratory pile driving per day.

Carnival used NMFS' Optional User Spreadsheet, available at <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance>, to input project-specific parameters and calculate the isopleths for the Level A harassment and Level B harassment zones for impact and vibratory pile driving. When the NMFS Technical Guidance (2016) was published, in recognition of the fact that 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 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 pile driving, the NMFS User Spreadsheet predicts the distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would incur PTS.

Table 3 provides the sound source values and input used in the User Spreadsheet to calculate harassment isopleths for each source type. For the impact pile driving source level, Carnival used levels measured at the Anacortes Ferry Terminal Project (peak SPL [SPLpk]: 207 dB re: 1  $\mu$ Pa at 10 m; SPL rms: 189 dB re: 1  $\mu$ Pa at 10 m; and single strike sound exposure level [SELS-s]: 175 dB re: 1  $\mu$ Pa at 10 m at the 90<sup>th</sup> percentile) as reported in WSDOT (2019, Table 7-14). For the vibratory pile driving source level, Carnival also used levels measured at the Anacortes Ferry Terminal Project (SPL: 170 dB re: 1  $\mu$ Pa (rms) at 11 m) as reported in WSDOT (2019, Table 7-15). Carnival will implement bubble curtains (*e.g.* pneumatic barrier typically comprised of hosing or PVC piping that disrupts underwater noise propagation; see *Mitigation* section below) and has reduced the source levels of both impact and vibratory pile driving by 7 dB (a conservative estimate based on several studies including Austin *et al.*, 2016). For impact pile driving, Level A harassment isopleths were calculated using the cumulative SEL metric (SELS-s) as it produces larger isopleths than SPLpk. Isopleths for Level B harassment associated with impact pile driving (160 dB) and vibratory pile driving (120 dB) were calculated using SPL (rms) values and can be found in Table 4.

**Table 3 -- User Spreadsheet Input Parameters Used for Calculating Harassment**

**Isopleths**

User Spreadsheet Parameter	Impact Pile Driving	Vibratory Pile Driving
Spreadsheet Tab Used	E.1) Impact pile driving	A. 1) Drilling/ Vibratory pile driving
Source Level (SELS-s or SPL rms)	168 SELs-s <sup>a,b</sup>	163 dB SPL rms <sup>a,b</sup>
Source Level (SPLpk)	207	N/A
Weighting Factor Adjustment (kHz)	2	2.5
Number of piles	5	5
Number of strikes per pile	675	N/A
Number of strikes per day	2,700	N/A
Estimate driving duration (min) per pile	N/A	31.5
Activity Duration (h) within 24-h period	N/A	2.625
Propagation (xLogR)	15 Log R	15 Log R
Distance of source level measurement (meters)	10	11
Other factors	Using bubble curtain	Using bubble curtain

a. WSDOT (2019)

b. Austin *et al.* 2016

**Table 4 -- Calculated Distances to Level A Harassment and Level B Harassment**

**Isopleths During Pile Driving**

Source	Level A Harassment Zone (meters)					Level B Harassment Zone (meters)	Level B Harassment Zone Ensonified Area (km <sup>2</sup> )
	Low-frequency cetacean	Mid-frequency cetacean	High-frequency cetacean	Phocid pinniped	Otariid pinniped	Cetaceans & Pinnipeds	Cetaceans & Pinnipeds
Impact Pile Driving	224.7	8.0	267.6	120.2	8.8	292.7	0.39
Vibratory Pile Driving	19.4	1.7	28.7	11.8	0.8	8,092.1	27.42
Source	PTS Onset Isopleth – Peak (meters)						
Impact Pile Driving	1.6	N/A	21.5	1.8	N/A		

### *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. Marine mammal densities were obtained from MBC Applied Environmental Sciences (2016) and Jefferson *et al.* (2013). MBC Applied Environmental Sciences (2016) conducted marine mammal and bird visual surveys in the POLB over a 12-month period from September, 2013 to August, 2014. The survey area included a substantial portion of the project action area. MBC Applied Environmental Sciences (2016) conducted point count surveys on one day each month within a number of distinct study units including one encompassing approximately half of the existing Carnival dock. These data are relatively recent, and occurred in the POLB in the habitats and locations potentially impacted by the specified activity, and as such as they are the best available survey data for the project action area for the species they observed. MBC Applied Environmental Sciences (2016) reported raw sightings numbers per month per species. To estimate density from the MBC Applied Environmental Sciences (2016) data, the two-dimensional area of their combined survey area (based on their sampling quadrants) was calculated using GIS and graphics in their report showing the limits of each sampling quadrant. The maximum monthly observed number of observations for each species observed and the total study area (30.35 km<sup>2</sup>) was used to calculate density (Table 6). During POLB surveys, MBC Applied Environmental Sciences (2016) observed common dolphins (not identified to species, however to be conservative, this number was used for both species), common bottlenose dolphins, California sea lions, and harbor seals. They did not observe gray or humpback whales and therefore, did not provide density estimates for these species.

The U.S. Department of the Navy (Phase III, 2017) created a Marine Species Density Database (NMSDD) for the Hawaii-Southern California Training and Testing Study Area. To characterize marine species density for large oceanic regions, the Navy reviews, critically assesses, and prioritizes existing density estimates from multiple sources and developed a systematic method for selecting the most appropriate density estimate for each combination of species, area, and season. The resulting compilation and structure of the selected marine species density data resulted in the Navy Marine Species Density Database (NMSDD) (DoN, 2017). The NMSDD uses data from Jefferson *et al.* (2014) to estimate densities for gray and humpback whales in Southern California. Jefferson *et al.* (2014) reported the results of aerial visual marine mammal surveys from 2008-2013 in the Southern California Bight, including areas around the Channel Islands. Although the survey area did not include the POLB, it did include nearshore waters not far to the south of the Port. Density estimates were based on airborne transects and utilized distance sampling methods and these estimates are the best information available on densities for gray and humpback whales in southern California (DoN, 2017) (Table 5). Note, that in the **Federal Register** notice announcing the proposed IHA (84 FR 54867; October 11, 2019) we used density estimates for gray and humpback whales from Jefferson *et al.* (2013). The data presented in Jefferson *et al.* (2014) and Jefferson *et al.* (2013) are from the same surveys, and Jefferson *et al.* (2014) presents slight revisions from Jefferson *et al.* (2013). DoN NMSDD (2017) incorporates these revisions and is considered best available information for these species in this region, and we have revised the density estimates presented in Table 5 for gray and humpback whales accordingly.

**Table 5 -- Marine Mammal Density Information (species densities used for take calculations are denoted by asterisks\*)**

Common Name	Stock	POLB Max Monthly Number 2013-2014 (MBC Applied Environmental Sciences 2016)	Max Density (km <sup>2</sup> ) (MBC Applied Environmental Sciences 2016) <sup>1</sup>	Max Density (km <sup>2</sup> ) (DoN, 2017)
Gray whale	Eastern North Pacific	0	0	0.01791*
Humpback whale	CA/OR/WA	0	0	0.00908*
Short-beaked common dolphin	CA/OR/WA	40 <sup>2</sup>	1.32*	0.3340
Long-beaked common dolphin	California	40 <sup>2</sup>	1.32*	2.5290
Common bottlenose dolphin	Coastal California	5	0.17*	0.0765
California sea lion	U.S.	95	3.13*	0.0627
Harbor seal	California	42	1.38*	0.183

<sup>1</sup> Surface area of MBC Applied Environmental Sciences survey region estimated as 30.35 km<sup>2</sup> via GIS. Density as # marine mammals/km<sup>2</sup>.

<sup>2</sup> Only identified as “Common Dolphin” and not identified to the species level – to be conservative we used this number for both species.

### *Take Calculation and Estimation*

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

#### Level B Harassment Calculations

The following equation was used to calculate potential take due to Level B harassment per species: *Level B harassment zone area \* density \* # of pile driving days.*

As described above, there will be a maximum of 26 days of pile driving and it is anticipated that a maximum of 5 piles could be installed via impact pile driving per day and 5 piles could be installed via vibratory pile driving per day. We also used the

maximum density estimates reported by MBC Applied Environmental Sciences (2016) and DoN (2017) for these species in this region (Table 5). Therefore, the resulting take estimates assume all pile driving conducted when species are in their highest densities in the POLB producing conservative estimates (see Table 6). We present the number of estimated takes due to Level B harassment by impact and vibratory pile driving separately in Table 7, however as these activities are anticipated to occur on the same day (but not at the same time), individuals impacted by impact pile driving are also impacted by vibratory pile driving. As each individual can only be taken once in 24 hours, we conservatively authorize the larger estimate of takes due to vibratory pile driving. Note that while a small number of takes by Level B harassment are estimated using these calculations for gray whales and humpback whales, no takes are authorized as the applicants will implement mitigation measures (shutdowns; see *Mitigation* section below) that will preclude take of these species.

#### Level A Harassment Calculations

Carnival intends to avoid Level A harassment take by shutting down pile driving activities at approach of any marine mammal to the representative Level A harassment (PTS onset) ensonification zone up to a practical shutdown monitoring distance. As small and cryptic harbor seals may enter the Level A harassment zone (120.2 m for impact pile driving) before shutdown mitigation procedures can be implemented, and some animals may occur between the maximum Level A harassment ensonification zone (120.2 m for impact pile driving) and the maximum shutdown zone (50 m, see *Mitigation* section), we based our estimates for potential take due to Level A harassment for harbor seals on the

calculations below (*Level A harassment zone/pile installation method \* density \* # of pile driving days*).

- For impact pile driving:  $0.114852$  (Level A zone area) \*  $1.38$  (density) \*  $26$  days =  $4.12$  seals.
- For vibratory pile driving:  $0.003154$  (Level A zone area) \*  $1.38$  (density) \*  $26$  days =  $0.11$  seals.

For the entire Level A harassment zone, the total is  $4.23$  seals. Based on these calculations we conservatively estimate that 5 of the Level B harassment takes calculated above for harbor seals have the potential to be takes by Level A harassment (Table 6).

**Table 6 -- Authorized Take by Level A Harassment and Level B Harassment, by Species and Stock, Resulting from Planned Carnival Project Activities**

Common Name	Stock	Density (km <sup>2</sup> )	Activity	Level B Harassment zone (km <sup>2</sup> )	Estimated Take Daily	Days of Activity	Total Level B Take	Level A Take	Total Authorized Take	Authorized Take as Percentage of Stock
Gray whale	Eastern North Pacific	0.01791	Impact pile driving	0.39	<0.01	26	0.2	0	0	0.00
			Vibratory pile driving	27.42	0.49	26	12.77			
Humpback whale	CA/OR/WA	0.00908	Impact pile driving	0.39	<0.01	26	0.01	0	0	0.00
			Vibratory pile driving	27.42	0.25	26	6.47			
Short-beaked common dolphin	CA/OR/WA	1.32	Impact pile driving	0.39	0.51	26	13.38	0	942	0.10
			Vibratory pile driving	27.42	36.19	26	941.05			
Long-beaked common dolphin	California	1.32	Impact pile driving	0.39	0.51	26	13.38	0	942	0.92
			Vibratory pile driving	27.42	36.19	26	941.05			

Common bottlenose dolphin	Coastal California	0.17	Impact pile driving	0.39	0.07	26	1.72	0	122	26.93
			Vibratory pile driving	27.42	4.66	26	121.20			
California sea lion	U.S.	3.13	Impact pile driving	0.39	1.22	26	31.74	0	2,232	0.87
			Vibratory pile driving	27.42	85.82	26	2231.44			
Harbor seal	California	1.38	Impact pile driving	0.39	0.54	26	13.99	5	984	3.18
			Vibratory pile driving	27.42	37.84	26	983.83			

There are a number of reasons why the estimates of potential incidents of take are likely to be conservative. We used conservative estimates of density to calculate takes for each species. Additionally, in the context of stationary activities such as pile driving, and in areas where resident animals may be present, this number represents the number of instances of take that may occur to a small number of individuals, with a notably smaller number of animals being exposed more than once. While pile driving can occur any day throughout the in-water work window, and the analysis is conducted on a per day basis, only a fraction of that time is actually spent pile driving. The potential effectiveness of mitigation measures in reducing the number of takes is also not quantified in the take estimation process. For these reasons, these take estimates may be conservative, especially if each take is considered a separate individual animal.

### **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.

In addition to the measures described later in this section, Carnival will employ the following standard mitigation measures:

- Conduct briefings between construction supervisors and crews and the marine mammal monitoring team prior to the start of all pile driving activity, and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures;
- For in-water heavy machinery work other than pile driving (*e.g.*, standard barges, etc.), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include the following activities: (1) movement of the barge to the pile location; or (2) positioning of the pile on the substrate via a crane (*i.e.*, stabbing the pile);
- Work may only occur during daylight hours, when visual monitoring of marine mammals can be conducted;
- For those marine mammals for which Level B harassment take has not been requested, in-water pile driving will shut down immediately if such species are observed within or entering the monitoring zone (*i.e.*, Level B harassment zone); and
- If take reaches the authorized limit for an authorized species, pile installation will be stopped as these species approach the Level B harassment zone to avoid additional take.

The following measures apply to Carnival's mitigation requirements:

*Establishment of Shutdown Zone for Level A Harassment* - For all pile driving activities, Carnival will establish a shutdown zone. The purpose of a shutdown zone is generally to define an area within which shutdown of activity will occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area).

Conservative shutdown zones of 300 m and 8,100 m for impact and vibratory pile driving respectively will be implemented for low-frequency cetaceans to prevent incidental harassment exposure for these activities. Monitoring of such a large area is practicable in the POLB because the jetties create confined entrances to the Port and Protected Species Observers (PSOs) monitoring at these entrances can ensure no animals enter to Port and shutdown zones (see Figures 3 and 4 of the applicant’s Marine Mammal Mitigation and Monitoring Plan for location of PSOs). For impact and vibratory pile driving, Carnival will implement shutdown zones of 10 m for mid-frequency cetaceans and otariid pinnipeds and 50 m for phocid pinnipeds. These shutdown zones will be used to prevent incidental Level A harassment exposures from impact pile driving for mid-frequency cetaceans and otariid pinnipeds, and to reduce the potential for such take for phocid pinnipeds (Table 7). The placement of PSOs during all pile driving activities (described in detail in the *Monitoring and Reporting Section*) will ensure shutdown zones are visible. The 50 m zone is the practical distance Carnival anticipates phocid pinnipeds can be effectively observed in the project area.

**Table 7 -- Monitoring and shutdown zones for each project activity**

Source	Monitoring Zone (m)	Shutdown Zone (m)
Impact Pile Driving	300 <sup>1</sup>	Low-frequency cetaceans: 300 Phocid pinnipeds: 50 Mid-frequency cetaceans and otariid pinnipeds: 10
Vibratory Pile Driving	8,100	Low-frequency cetaceans: 8,100 Phocid pinnipeds: 50 Mid-frequency cetaceans and otariid pinnipeds: 10

<sup>1</sup> Carnival is also required to establish and implement a Level A harassment monitoring zone during impact pile driving for harbor seals extending to 120 m.

*Establishment of Monitoring Zones for Level B Harassment* - Carnival will establish monitoring zones to correlate with Level B harassment zones which are areas where SPLs are equal to or exceed the 160 dB re: 1  $\mu$ Pa (rms) threshold for impact pile driving and the 120 dB re: 1  $\mu$ Pa (rms) threshold during vibratory pile driving. Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring zones enable observers to be aware of and communicate the presence of marine mammals in the project area outside the shutdown zone and thus prepare for a potential cease of activity should the animal enter the shutdown zone. Carnival will implement a 300 m monitoring zone for impact pile driving and an 8,100 m monitoring zone for vibratory pile driving (Table 7). Placement of PSOs on vessels at entrances to POLB outside the breakwaters will allow PSOs to observe marine mammals traveling into the POLB (see Figures 3 and 4 of the applicant's Marine Mammal Mitigation and Monitoring Plan for location of PSOs). As the applicants anticipate impact and vibratory pile driving to occur in close temporal succession, the applicants indicate they plan to use 7 observers for all pile driving activities.

*Soft Start* - The use of soft-start procedures are believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, contractors will be required to provide an initial set of strikes from the hammer at reduced energy, with each strike followed by a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins. Soft start will be implemented at the start of each day's impact pile driving and at any time following

cessation of impact pile driving for a period of 30 minutes or longer. Soft start is not required during vibratory pile driving activities.

*Pile driving energy attenuator* - Use of a marine pile-driving energy attenuator (*i.e.*, air bubble curtain system) will be implemented by Carnival during impact and vibratory pile driving of all steel pipe piles. The use of sound attenuation will reduce SPLs and the size of the zones of influence for Level A harassment and Level B harassment. Bubble curtains will meet the following requirements:

- The bubble curtain must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column.
- The lowest bubble ring shall be in contact with the mudline for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent mudline contact. No parts of the ring or other objects shall prevent full mudline contact.
- The bubble curtain shall be operated such that there is proper (equal) balancing of air flow to all bubblers.
- The applicant shall require that construction contractors train personnel in the proper balancing of air flow to the bubblers and corrections to the attenuation device to meet the performance standards. This shall occur prior to the initiation of pile driving activities.

*Pre-Activity Monitoring* - Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs will observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone will be cleared when a marine mammal has not been observed within the zone for that 30-minute

period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes. If the Level B harassment zone has been observed for 30 minutes and non-permitted species are not present within the zone, soft start procedures can commence and work can continue even if visibility becomes impaired within the Level B harassment monitoring zone. When a marine mammal permitted for take by Level B harassment is present in the Level B harassment zone, activities may begin and Level B harassment take will be recorded. If work ceases for more than 30 minutes, the pre-activity monitoring of both the Level B harassment and shutdown zone will commence again.

*Timing and Environmental Restrictions* - Carnival will only conduct pile driving activities during daylight hours. To ensure the monitoring zone for low-frequency cetaceans can be adequately monitored to preclude all incidental take of these species, pile driving activities may not be conducted in conditions with limited visibility (heavy fog, heavy rain, and Beaufort Sea states above 4) that would diminish the PSO's ability to adequately monitor this zone.

Based on our evaluation of the applicant's planned measures, NMFS has determined that the 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 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.

### *Marine Mammal Visual Monitoring*

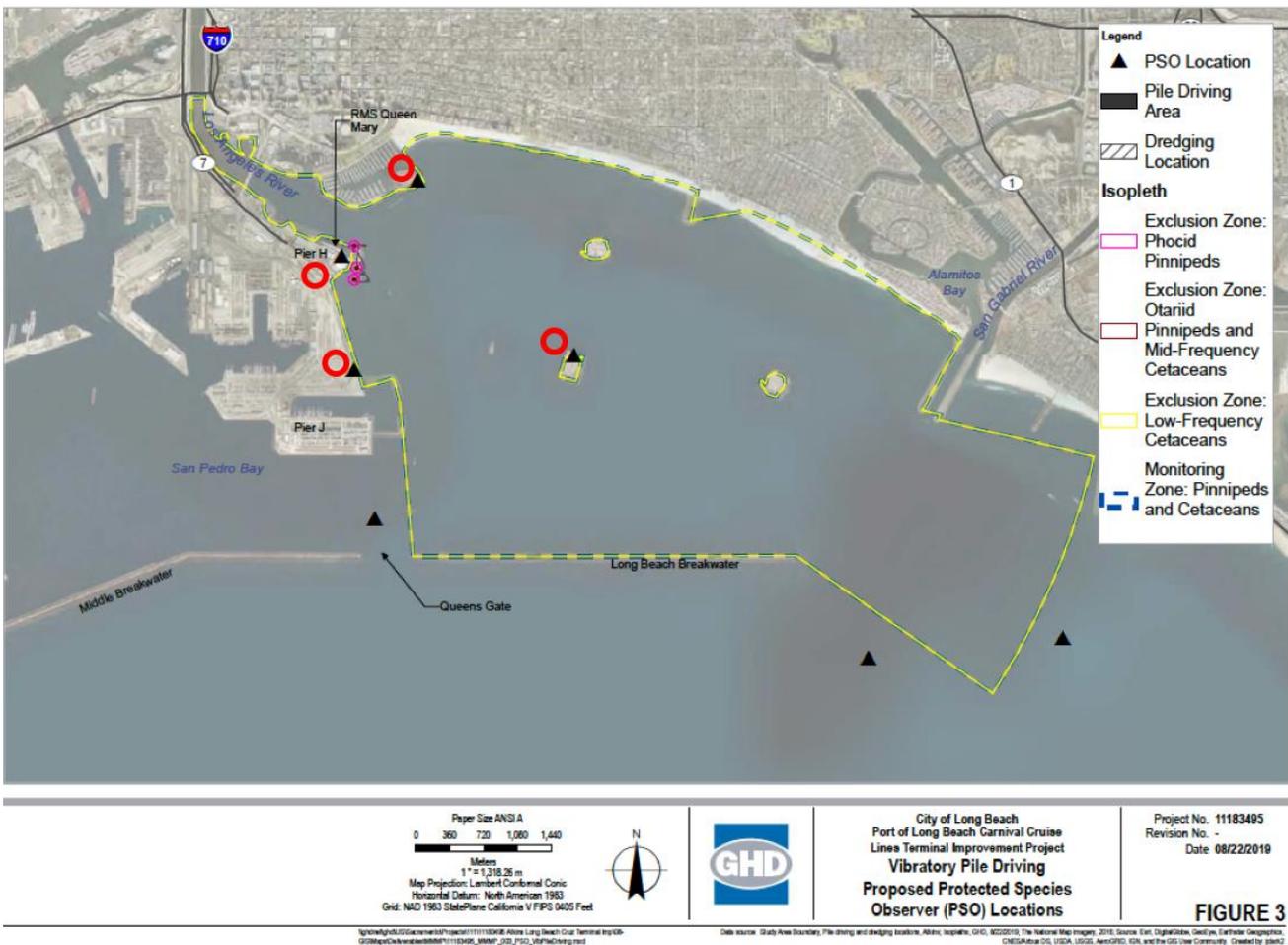
Monitoring shall be conducted by NMFS-approved observers. Trained observers shall be placed from the best vantage point(s) practicable to monitor for marine mammals and implement shutdown or delay procedures when applicable through communication with the equipment operator. Observer training must be provided prior to project start, and shall include instruction on species identification (sufficient to distinguish the species in the project area), description and categorization of observed behaviors and interpretation of behaviors that may be construed as being reactions to the specified activity, proper completion of data forms, and other basic components of biological monitoring, including tracking of observed animals or groups of animals such that repeat sound exposures may be attributed to individuals (to the extent possible).

Monitoring will be conducted 30 minutes before, during, and 30 minutes after pile driving activities. In addition, observers shall record all incidents of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven. Pile driving activities include the time to install a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than 30 minutes.

A total of seven PSOs will be based on land and vessels. During all pile driving activities observers will be stationed at the project site (Pier H) and six other locations in the POLB and at the entrance to the POLB. These stations will allow full monitoring of the impact and vibratory pile driving monitoring zones. At least 4 PSOs are required during impact pile driving and at least 7 PSOs are required during vibratory pile driving as shown in Figure 2. All PSOs locations are required during vibratory pile driving

(shown as triangles in Figure 2), and PSOs must be located at the 4 PSO locations closest to the project site (shown as triangles next to circles) during impact pile driving.

**Figure 2 -- Location of PSOs During Project Activities (Adapted from Figure 3 in the Marine Mammal Monitoring Plan, dated September, 2019).**



PSOs will scan the waters using binoculars, and/or spotting scopes, and will use a handheld GPS or range-finder device to verify the distance to each sighting from the

project site. All PSOs will be trained in marine mammal identification and behaviors and are required to have no other project-related tasks while conducting monitoring. In addition, monitoring will be conducted by qualified observers, who will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. Carnival will adhere to the following PSO qualifications:

- (i) Independent observers (*i.e.*, not construction personnel) are required.
- (ii) At least one observer must have prior experience working as an observer.
- (iii) Other observers may substitute education (degree in biological science or related field) or training for experience.
- (iv) Where a team of three or more observers are required, one observer shall be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer.
- (v) Carnival shall submit observer CVs for approval by NMFS.

Additional standard observer qualifications include:

- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when

in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and

- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

Observers will be required to use approved data forms (see data collection forms in the applicant's Marine Mammal Mitigation and Monitoring Plan). Among other pieces of information, Carnival will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. In addition, Carnival will attempt to distinguish between the number of individual animals taken and the number of incidences of take. We require that, at a minimum, the following information be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Weather parameters (*e.g.*, percent cover, visibility);
- Water conditions (*e.g.*, sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity, and if possible, the correlation to SPLs;

- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Description of implementation of mitigation measures (*e.g.*, shutdown or delay);
- Locations of all marine mammal observations; and
- Other human activity in the area.

A draft report will be submitted to NMFS within 90 days of the completion of marine mammal monitoring, or 60 days prior to the requested date of issuance of any future IHA for projects at the same location, whichever comes first. The report will include marine mammal observations pre-activity, during-activity, and post-activity during pile driving days (and associated PSO data sheets/raw sightings data), and will also provide descriptions of any behavioral responses to construction activities by marine mammals and a complete description of all mitigation shutdowns and the results of those actions and an extrapolated total take estimate based on the number of marine mammals observed during the course of construction. A final report must be submitted within 30 days following resolution of comments on the draft report.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury, serious injury or mortality, Carnival will immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator. The report will include the following information:

- Description of the incident;
- Environmental conditions (*e.g.*, Beaufort sea state, visibility);

- Description of all marine mammal observations 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) (if equipment is available).

Activities will not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Carnival to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Carnival will not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that Carnival discovers an injured or dead marine mammal, and the lead PSO 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 as described in the next paragraph), Carnival will immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS West Coast Stranding Hotline and/or by email to the West Coast Regional Stranding Coordinator. The report will include the same information identified in the paragraph above. Activities will be able to continue while NMFS reviews the circumstances of the incident. NMFS will work with Carnival to determine whether modifications in the activities are appropriate.

In the event that Carnival discovers an injured or dead marine mammal and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate

to advanced decomposition, or scavenger damage), Carnival will report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS West Coast Stranding Hotline and/or by email to the West Coast Regional Stranding Coordinator, within 24 hours of the discovery. Carnival will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

### **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’ 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).

Pile driving activities associated with the Port of Long Beach Cruise Terminal Improvement Project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment (behavioral disturbance) or Level A harassment (auditory injury), incidental to underwater sounds generated from pile driving. Potential takes could occur if individuals are present in the ensonified zone when pile driving occurs. Level A harassment is only anticipated for harbor seals.

No serious injury or mortality is anticipated given the nature of the activities and measures designed to minimize the possibility of injury to marine mammals. The potential for these outcomes is minimized through the construction method and the implementation of the planned mitigation measures. Specifically, vibratory and impact hammers will be the primary methods of installation. Piles will first be installed using vibratory pile driving. Vibratory pile driving produces lower SPLs than impact pile driving. The rise time of the sound produced by vibratory pile driving is slower, reducing the probability and severity of injury. Impact pile driving produces short, sharp pulses with higher peak levels and much sharper rise time to reach those peaks. When impact pile driving is used, implementation of soft start and shutdown zones significantly reduces any possibility of injury. Given sufficient “notice” through use of soft starts (for impact driving), marine mammals are expected to move away from a sound source that is annoying prior to it becoming potentially injurious. Carnival will use up to seven PSOs

stationed strategically to increase detectability of marine mammals, enabling a high rate of success in implementation of shutdowns to avoid injury for most species.

Carnival's planned activities are localized and of relatively short duration (a maximum of 26 days of pile driving for 49 piles). The project area is also very limited in scope spatially, as all work is concentrated on a single pier. Localized and short-term noise exposures produced by project activities may cause short-term behavioral modifications in pinnipeds and mid-frequency cetaceans. Moreover, the planned mitigation and monitoring measures are expected to further reduce the likelihood of injury, as it is unlikely an animal would remain in close proximity to the sound source, as well as reduce behavioral disturbances.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.*, Thorson and Reyff 2006; HDR, Inc. 2012; Lerma 2014; ABR 2016). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. The pile driving activities analyzed here are similar to, or less impactful than, numerous other construction activities conducted in Southern California, which have taken place with no known long-term adverse consequences from behavioral harassment. Level B harassment will be reduced to the level of least practicable adverse impact through use of mitigation measures described herein and, if sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area

while the activity is occurring. While vibratory pile driving associated with the planned project may produce sounds above ambient at greater distances from the project site, thus intruding on some habitat, the project site itself is located in an industrialized port, the majority of the ensonified area is within in the POLB, and sounds produced by the planned activities are anticipated to quickly become indistinguishable from other background noise in port as they attenuate to near ambient SPLs moving away from the project site. Therefore, we expect that animals annoyed by project sound would simply avoid the area and use more-preferred habitats.

In addition to the expected effects resulting from authorized Level B harassment, we anticipate that a small number of harbor seals may sustain some limited Level A harassment in the form of auditory injury. However, animals that experience PTS would likely only receive slight PTS, *i.e.* minor degradation of hearing capabilities within regions of hearing that align most completely with the energy produced by pile driving (*i.e.*, the low-frequency region below 2 kHz), not severe hearing impairment or impairment in the regions of greatest hearing sensitivity. If hearing impairment occurs, it is most likely that the affected animal's threshold would increase by a few dBs, which in most cases is not likely to meaningfully affect its ability to forage and communicate with conspecifics. As described above, we expect that marine mammals will be likely to move away from a sound source that represents an aversive stimulus, especially at levels that would be expected to result in PTS, given sufficient notice through use of soft start.

The project also is not expected to have significant adverse effects on affected marine mammal habitat. The planned project activities will not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to

leave the area of disturbance, thus temporarily impacting marine mammal foraging opportunities in a limited portion of the foraging range. However, because of the short duration of the activities, the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality is anticipated or authorized.
- The Level A harassment exposures (harbor seals only) are anticipated to result only in slight PTS, within the lower frequencies associated with pile driving;
- The anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior that will not result in fitness impacts to individuals;
- The specified activity and ensonification area is very small relative to the overall habitat ranges of all species and does not include habitat areas of special significance (BIAs or ESA-designated critical habitat); and
- The presumed efficacy of the planned mitigation measures in reducing the effects of the specified activity to the level of least practicable adverse impact.

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 monitoring and mitigation measures, NMFS finds that the total marine mammal take from the planned 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.

Table 7 demonstrates the number of animals that could be exposed to received noise levels that could cause Level B harassment and Level A harassment (harbor seals only) for Carnival's planned activities in the project area site relative to the total stock abundance. Our analysis shows that less than one-third of each affected stock could be taken by harassment (Table 7). The numbers of animals authorized to be taken for these stocks would be considered small relative to the relevant stock's abundances even if each estimated taking occurred to a new individual – an extremely unlikely scenario.

Based on the analysis contained herein of the planned activity (including the planned 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 size 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 will not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

### **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 action with respect to environmental consequences on the human environment. This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassments 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 qualifies to be categorically excluded from further NEPA review.

### **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.

No incidental take of ESA-listed species is authorized 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.

**Authorization**

NMFS has issued an IHA to Carnival for the incidental take of marine mammals due to in-water construction work associated with the Port of Long Beach Cruise Terminal Improvement Project in Port of Long Beach, California from November 19, 2019 to November 18, 2020, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

**Dated:** November 19, 2019.

**Donna S. Wieting,**

*Director, Office of Protected Resources,*

*National Marine Fisheries Service.*

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