



January 30, 2019

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Re: Marine Mammal Monitoring Report for WETA Downtown San Francisco Ferry Terminal Expansion Project, San Francisco, California (NMFS reference no. SWR-2013-9595) - 2018

Dear Ms. Small:

This letter presents the results of marine mammal observing/monitoring performed by WRA, Inc. (WRA) at the Water Emergency Transportation Authority (WETA) Downtown San Francisco Ferry Terminal Expansion Project site (Project Area) in San Francisco, San Francisco County, California. This observation effort was required during pile driving activities (including pile removal) as per the project's Incidental Harassment Authorization (IHA) issued by the National Marine Fisheries Service (NMFS) on May 31, 2018 (NMFS reference no. SWR-2013-9595). The purpose of the observation effort was to both document and prevent/minimize "take" of harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*; hereafter sea lion), and other species.

The IHA specifies the quantity of allowable Level A and B "take" events (harassments; i.e., events that cause or may cause behavioral alterations/disruptions, but do not have the potential for injury or mortality) for each focal species, and recording such events (as observed) was a primary duty of the marine mammal observer (MMO).

WRA previously submitted a Marine Mammal Monitoring Report for the project (dated February 1, 2018) that summarized compliance efforts for the 2017 IHA.

Note: As outlined in the project's "Hydroacoustic Monitoring Plan" (April 2016), hydroacoustic monitoring was performed in 2017 by Illingworth & Rodkin, Inc., with the results presented in a report dated February 2018. Though such monitoring is typically stipulated for impact pile driving (which is not anticipated to occur on the project), WETA opted to perform monitoring during vibratory pile driving. Monitoring occurred during the installation of 24 piles (i.e., 24-inch, 30-inch, and 36-inch diameter steel piles), fulfilling the requirement that monitoring occur during the installation of at least 10 percent of relevant piles (no more than 200 such piles in total are expected to be driven over the course of the project.). As such, no hydroacoustic monitoring was performed in 2018.

Summary of Contents

Pile driving activities were performed in accordance with the IHA, with no indication that any marine mammals were harmed or injured as a result of these activities in 2018. Only one marine mammal was observed within the mandatory shutdown zone for active pile driving (no driving was occurring at the time), and a work shutdown occurred on this occasion to avoid any potential for Level A take. No Level A takes were recorded, and for all observed species the total amount of recorded Level B takes was substantially lower than the allowable amount as stipulated in the IHA.

Project Area Description

The waterside portion of the Project Area consists of an approximately 8-acre area featuring concrete/urban shoreline and adjacent waters of San Francisco Bay along The Embarcadero and San Francisco Bay Trail, between the Ferry Building and Pier 14 within the City of San Francisco. The Project Area is bounded by the Embarcadero and associated infrastructure/development to the south-west, the existing Ferry Building to the north, open waters of San Francisco Bay to the east, and Pier 14 to the south.

Methods

Pile driving/removal and associated marine mammal observation occurred on 59 days between June 25 and November 28, 2018 (Monitoring Period) and involved approximately 375 hours of observation. Only vibratory pile driving and pile extraction occurred; impact hammer driving was not utilized (as was the case in 2017). Pile elements varied and included the installation and extraction of 14-inch H-pile templates and demonstration piles, and the installation of 24-inch, 30-inch, and 36-inch steel piles. As stipulated in the IHA, one WRA MMO was present during observation periods¹; MMOs met the qualifications specified in section 4.1 of the 2018 Marine Mammal Monitoring Plan (MMMP).² MMOs received training in marine mammal observation methodology, the identification of species mammals expected to be present in the vicinity, and the project's protective measures relevant to these species. Nearly all observations were made by Jude Stalker (one of the primary MMOs on the project in 2017), with an additional MMO covering one day of observation.

In accordance with the IHA and the MMMP, monitoring during each pile driving period started at least 30 minutes prior to pile driving (or removal) initiation and ended at least 30 minutes after such work was completed for the day. The observer was stationed at pier and landside positions that afforded the best view of both the in-water work area and adjacent Bay waters. Typical observation locations were the southwestern (distal) side of the Agriculture Building, and the terminus of Pier 14 (adjacent to and east of the Project Area). Observations were made with a spotting scope (60 x zoom magnification), binoculars (8 x 42 magnification), and the naked eye. Conditions during observation periods were variable but generally favorable to marine mammal observations, with no fog present and average wind speeds ranging from 1-10 miles per hour. There were a few occurrences of rain and wind gusts up to 25 miles per hour with associated choppy water conditions.

¹ In contrast to the 2017 IHA, the 2018 IHA stipulated that two MMOs were required only during impact hammer driving.

² "Marine Mammal Monitoring Plan, [WETA] Downtown San Francisco Ferry Terminal Expansion Project." AECOM. May 2018. 16 pp.

The MMO recorded all observations of marine mammals. Information recorded for each observation included species, number of animals, approximate distance from the active in-water work area, behavior, direction of travel (if relevant), and any perceived reaction by the animals to work activities, as well as the specific stimulus that appeared to cause the reaction. Examples of such reactions were “alerts” (i.e. a clear indication that the animal was visually investigating a project-related acoustic disturbance) and “avoidance” (i.e., a change in swimming direction from the area apparently due to work activities).

Recording Take Events

Level B take events as covered by the IHA were logged by the observers based on two parameters: 1) “perceived harassment” as described above, i.e., observable behavior alterations in response to project-related stimuli, and 2) “modeled harassment” based on the proximity of observed animals to active pile driving in the context of defined zones within which potential harassment was assumed. The relevant Zones of Influence (ZOIs) for the latter parameter were provided by the MMMP, and dependent on marine mammal species and the size of pile being driven; they are shown in Table 1.

Table 1. Modeled ZOIs – Vibratory Hammer Driving

Pile diameter (in.)	Level A (harm) distance			Level B (harassment) distance
	Seals*	Cal sea lion	Harbor porpoise	All species
36	12 ft. (4 m)	1 ft. (<1.0 m)	24 ft. (7 m)	3,085 ft. (940 m)
30	5 ft. (1 m)	1 ft. (<1.0 m)	10 ft. (3 m)	1,476 ft. (450 m)
24	7 ft. (2 m)	1 ft. (<1.0 m)	14 ft. (4 m)	2,134 ft. (651 m)
14 H-pile**	< 3.3 ft. (< 1 m)	< 3.3 ft. (< 1 m)	< 3.3 ft. (< 1 m)	3,085 ft. (940 m)

* Includes harbor seal and northern elephant seal.

** Modeled ZOIs for these piles were not included in the MMMP. As proxies, the Level A ZOIs from the 2017 IHA were used, and the Level B ZOI for 36-inch pile (2018) was used.

Throughout the Monitoring Period, the MMO took an inclusive approach to recording take events; if there was any uncertainty regarding whether or not an individual mammal was within a ZOI (i.e., was potentially “harassed”), the individual was treated as being within the ZOI. Additionally, take events were measured at the level of individual animal per work day. In other words, if a harbor seal was logged as harassed, in theory that individual seal could be harassed multiple times on the same day and these would not be logged as separate events. In practice, while observers made efforts to identify and track the presence and movement of individual animals (generally harbor seals, based on unique color patterns on the pelage), a conservative approach was taken wherein harassment events on the same day were assumed to involve separate animals, unless the observers were fully confident that a repeat animal or animals were involved.

It should be noted that Bay waters directly south and southeast of Pier 14 were mapped as outside of the various ZOIs as shown in the MMMP, presumably due to the solid base/footing of the pier. As such, marine mammals observed exclusively in that area during a given bout of pile driving were not recorded as Level B harassments.

As specified in the IHA, a default minimum exclusion zone for all marine mammals during pile driving and other in-water activities was 10 meters (approximately 33 feet) at all times. Temporary shutdowns to pile driving or other activities were requested by the observer when an animal or animals were observed within or approaching this distance; driving remained halted until the subject animal(s) were observed to move outside of this zone, or no animals were observed within the zone for a minimum of 15 minutes after the shutdown was initiated.

Results and Discussion

Harbor seals were the primary marine mammal species observed during the Monitoring Period, with individuals recorded on nearly every day of observation. The vast majority of these seals were observed within 1,000 feet of the Project Area. Sea lions were less regularly observed, again with most individuals observed in inshore waters near or along the San Francisco waterfront. On October 9, 2018, one juvenile northern elephant seal (*Mirounga angustirostris*) was observed approximately 295 feet from the Project Area. No vibratory work was occurring at the time, and subsequent observations indicated that it left the area prior to work resuming.

Harbor porpoises were observed on two days during the Monitoring Period, i.e. October 8 and 9, 2018; no other cetacean species were observed. All porpoise observed were in open Bay waters between approximately 1,500 and 2,500 feet from the Project Area. The MMO noted very small cetaceans with short, relatively inconspicuous dorsal fins, and non-demonstrative behavior when the animals were visible at the water's surface. Harbor porpoises were observed either individually or in a group of 2 individuals when they were observed. No vibratory hammer driving was occurring at the time of the harbor porpoise observations.

Take Events

A summary of Level A and B events recorded by the observers during the Monitoring Period is provided in Table 2. There were no Level A harassments/takes, nor any other indicators of marine mammal injuries or harm as observed by the MMO. A total of 15 Level B takes for harbor seal were recorded, approximately 6% of the allowed amount as per the IHA. Approximately half of the Level B takes for harbor seal were perceived, and the remainder simply consisted of animals observed within the modelled ZOI. The greatest number of harbor seal Level B takes occurred on September 5, when two were recorded. The MMO also recorded four Level B takes for sea lions during the Monitoring Period, totaling less than 5% of the allowed amount.

Table 2. Summary of Recorded Marine Mammal Take Events

Species	Level A		Level B		
	Allowed	Recorded	Allowed	Perceived	Modelled
Harbor seal	63	0	236	8	7
N. elephant seal	0	0	26	0	0
California sea lion	14	0	286	3	1
Harbor porpoise	0	0	32	0	0

A summary of perceived Level B take events recorded during the 2018 Monitoring Period is as follows:

- On several instances a harbor seal was observed within the Level B take zone, both while vibratory driving was occurring and when it was not. In some of the cases, the seal was observed to submerge and then presumably retreat from the area in response to activities within the Project Area. These observations were conservatively recorded as perceived Level B takes.
- Three perceived harassment events were recorded for California sea lions based on similar criteria to that described for harbor seals above, with one exception described below.

No other clear reactions to work activities (including vibratory pile driving) were observed during the monitoring, including by the seals seen nearest the work equipment. The average distances of seals and sea lions from the Project Area did not appear to have any direct association with work activities, and animals appeared habituated to general human presence and elevated noise levels in the vicinity.

Pile Driving Shutdowns

On October 13, 2018 one adult sea lion was observed to haul out on the crane mat adjacent to a specific location where pile installation was pending. The animal's location was within the mandatory shutdown zone for active pile driving and other in-water work (33 feet [10 meters]), and thus the pile driving was postponed for purposes of Level A take avoidance. The sea lion remained present for over 15 minutes until it became necessary to move/adjust the mat's location, which was done slowly and cautiously as requested by the MMO. At that time the sea lion retreated into the water, and was subsequently observed swimming adjacent to Pier 14 approximately 65 feet from the pile driving location; the overall event was recorded as a perceived Level B take. An additional 15 minutes elapsed (with no re-observation of the sea lion) before pile driving. At no time during the observation did the sea lion appear injured or otherwise compromised.

Please contact me with any questions or if you would like additional information.

Sincerely,



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