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To: Stefan Galvez, California Department of Transportation

From: Jason Minton

Date: November 3, 2009

RE: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project – Self Anchored Suspension Span, T1 Temporary Access Trestle Pile Driving
Preliminary Results of Daily Bird Predation Monitoring for 11/02/2009

This memorandum provides preliminary results of bird predation monitoring conducted on November 2, 2009 during pile driving for the temporary access trestle. The monitoring was conducted in compliance with the requirements outlined in the Final Hydroacoustic Monitoring Plan for Driving of Temporary Access Trestle Piles for the Self-Anchored Suspension Span (October 2009).

Monitoring during pile driving has several goals:

- monitoring to confirm the presence or absence of bird predation as an indicator of fish mortality;
- observing the level of bird predation by quantifying the number of bird strikes per minute and the duration of the event; and
- identifying the species of fish affected.

Methods

The bird predation monitor was located on a boat in the immediate vicinity [within 200 meters (660 feet)] of the temporary access trestle pile driving located between Yerba Buena Island and Pier T1 (Figure 1). The monitor recorded birds' feeding activity on standardized data sheets throughout the monitoring period, including during the pile driving events and during the intervals between piles. If feeding was observed, one-minute counts of bird strikes were initiated. Those counts were repeated throughout the duration of the pile driving activity, as needed.

The monitor was prepared to identify the species and sizes of any impacted fish either through observation with binoculars, or by collecting specimens with a dip-net. The survey protocol required the observer to collect any green sturgeon or salmonids observed for transfer to NOAA-Fisheries. In addition, general bird activity and behavior during pile driving and throughout the day were noted and recorded.

Results

Pile Driving Data

On November 2, 2009, a total of three (3) steel pipe piles of 36-inch diameter were driven with the Delmag D 32-30 diesel impact hammer. The piles were identified from Figure 1 as pile numbers 7, 8, and 10. Pile number 10 was driven from 0821 to 0825 hours, pile number 8 was driven from 1358 to 1402 hours and again from 1405 to 1407 hours, and pile number 7 was driven from 1433 to 1436 hours. The total duration of active pile driving was approximately thirteen (13) minutes. Table 1 shows the approximate periods of the impact driving, and the occurrence of bird feeding/activity/predation when observed.

Pile driving occurred along the relatively shallow shoreline of Yerba Buena Island. An air bubble curtain sound attenuation system was used to reduce sound pressure and exposure levels during impact driving.

Bird Predation Data

The monitors were on-site from 0810 to 0845 hours, and again from 1330 to 1456 hours. There were observations of thirteen (13) bird strikes over the course of three 1-minute periods during the monitoring period.

During the driving of pile number 10, two (2) western gulls (*Larus occidentalis*) were observed to skim the water surface, which is interpreted as an indication of foraging on fish injured by pile driving. The total number of foraging events during pile number 10 was two (2). The fish were not observed directly due to the typical gull behavior of immediately ingesting small food items to avoid piracy by other gulls.

There was no foraging observed during the driving of pile number 8.

During the driving of pile number 7, western gulls were observed to forage a total of eleven (11) times over the course of two (2) minutes during the active pile driving. Monitoring continued for twenty (20) minutes following the end of pile driving, and no additional foraging events were observed. The fish were not observed directly, as described above for pile number 10.

Fish Observations

No dead or injured fish were observed due to the rapidity of foraging by the gulls. The occurrence of injured fish was inferred from gull behavior. Gulls skimmed the surface of the water and were presumed to have captured small injured fish.

Table 1. Pile driving periods for the SAS temporary access trestle on November 2, 2009. Bird

strikes are recorded per one-minute interval during impact pile driving, the interval between piles, and at least 20 minutes following the end of driving.

Pile #*	Pile Driving Duration		Air Bubble Curtain (Y/N)	Bird Predation Observed (Y/N)	Strikes per Count Interval	General Bird Activity/Behavior (Gull Numbers)
	Start Time	End Time				
<i>November 2, 2009</i>						
10	0821	0825	Y	Y	2	7 gulls circling and feeding
8	1358	1402	Y	N	0	No gulls circling
8	1405	1407	Y	N	0	11 gulls circling
7	1433	1436	Y	Y	6, 5	7 gulls circling and feeding

* Intervals between piles are recorded on separate rows if bird predation was observed.

Figure 1.

