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To: Stefan Galvez, California Department of Transportation

From: Jason Minton

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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 10/26/2009

This memorandum provides preliminary results of bird predation monitoring conducted on October 26, 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 Data

On October 26, 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 18, 19, and 20. 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.

Driving Data

The monitors were on-site from 1003 to 1144 hours. The piles were driven from approximately 1000 to 1005 hours (pile #18), and 1146 to 1150 (pile #19). Pile #20 was driven at approximately 1430 hours, for 3 to 5 minutes. Table 1 shows the approximate period of the impact pile driving, and the occurrence of bird feeding/activity/predation when observed. The Delmag D 32-30 diesel impact hammer was used for approximately three to five minutes to install each pile.

Boat Status

The monitoring boat had engine difficulties which affected the ability of the monitors to observe the pile driving activity. The first several minutes of the first pile (#18) were not monitored, and the boat had to remain stationary during the remainder of the first and second piles (#18 & #19).

Usually the monitors move the boat in order to maintain a clear view of any bird congregations.

Before the third pile (#20) was driven, the boat had to be towed to the marina by the hydroacoustic monitoring boat. During the driving of pile number 20 bird predation was monitored incidentally by other GANDA staff on the pile driving barge.

Bird Predation Data

There was one confirmed observation of bird predation during the monitoring period. A single gull (presumably a western gull *Larus occidentalis*) was observed to skim the water during the driving of pile #20, and a small silver flash was observed in the bill. Two other gulls were observed to have landed on the water during the driving of pile #20, but foraging was not confirmed. Western gulls were observed to circle during all pile driving events of the day, but no other foraging events were observed. The inability of the monitors to move the boat, however, may have limited their ability to observe bird strikes. The number of circling birds, however, was observed to have been four (4) during pile #18, and thirteen (13) during pile #19. It is possible that a small number of bird strikes were not recorded during the driving of those piles, but the loose circling behavior of the gulls did not suggest an abundant availability of fish.

Fish Observations

During the driving of pile number 20 a single fish was observed from a distance, in the bill of a flying gull, but the species could not be identified.

Table 1. Pile driving periods for the SAS temporary access trestle on October 26, 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>October 26, 2009</i>						
18	1000*	1005	Y	N	0	Four gulls circling
19	1146	1150	Y	N	0	13 gulls circling
20	***	***	Y	Y	1	Gulls circling. Two gulls landed on water. One gull foraged on a small fish.

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

** The monitors could not monitor this event.

*** The monitors could not monitor this event, incidental observations were made by other GANDA staff on the pile driving barge.

Figure 1.

