

Monthly Pile Driving Summary and Underwater Noise Monitoring Results

Pile Driving Period: October 19, 2013 - December 16, 2013



Summary:

No sturgeon were observed to have been severely injured or killed as a result of underwater noise from pile driving during this reporting period. This conclusion was reached based on the results of sturgeon monitoring by observers on the barge and on a monitoring vessel downstream of the pile being driven.

Recoverable injuries caused by exposure to sub-lethal levels of underwater noise could not have been sustained by more than one sturgeon during this reporting period. This conclusion was reached by considering:

- the time required to drive each pile;
- the area that experienced noise levels higher than the level that could potentially result in recoverable injury to the sturgeon (206 dB); and
- the possible number of sturgeon that could have been in that area (number of gill nets x sturgeon encounter rate).

The potential number of sturgeon likely to have experienced recoverable injuries (described as “sturgeon take”) is reported as the probability of a fish being affected, as shown in the tables below. If the sturgeon take is listed as 1, then 1 sturgeon was potentially exposed to recoverable noise levels. If sturgeon take is less than 1, then it is less likely that 1 sturgeon was affected. As shown at the bottom right of the last table, the cumulative sturgeon take was 0.67 sturgeon (that is, less than 1 sturgeon) for this reporting period, which is less than the 1.68 sturgeon that were expected.

Introduction:

As required under the NMFS Biological Opinion, dated April 2013, (NMFS BO) Reasonable & Prudent Measure #4 and Term & Condition #9, the following is a summary of the installation and underwater noise monitoring of permanent piles [REDACTED] for the time period beginning October 19, 2013 through December 16, 2013.

As required under this condition, an estimate of sturgeon take for production piles driven during the most recent 30-day monitoring period is included. The sturgeon take estimate has been calculated using the times required to drive each pile (impact hammer only) and an estimate of the diameter of the 206 dB peak SPL isopleth, which has been measured for a representative number of the piles installed during this time period. This take estimate has been compared to that derived for the same listed in Table 9 of the NMFS BO to ensure that sturgeon take is not being exceeded.

Pile Installation and Underwater Noise Monitoring:

During the 30-day period from October 19 through November 16, 2013, [REDACTED] production piles were driven at Pier 31 and 2 piles at Pier 32, for a total [REDACTED]. During the

subsequent 30-day period from November 17 through December 16, 2013, [REDACTED] piles were driven at Pier 31 and [REDACTED] Pier 32, [REDACTED]. These piles correspond to the first two rows of 2013 in Table 9 of the NMFS BO, which indicate that [REDACTED] piles will be driven at Pier 31 and [REDACTED] piles at Pier 32 during the first few weeks of production pile driving; [REDACTED] piles in this group remain to be driven. In Table 9, the anticipated incidental take of sturgeon for these [REDACTED] piles is 6 sturgeon (rounded up from 5.28 sturgeon), which was calculated as the product of the number of piles, number of hours to drive a pile, number of gill nets to span the 206 dB peak SPL isopleth, and the sturgeon encounter rate of 0.033 sturgeon per net per hour.

To calculate anticipated sturgeon take per pile from Table 9, the anticipated take of 6 sturgeon was divided by the [REDACTED] piles in this grouping, which resulted in an estimate of 0.06 sturgeon per pile. Based on this value:

- the anticipated take from Table 9 for the [REDACTED] production piles driven from October 10 through November 16 would be 0.72 sturgeon (i.e., 0.06 sturgeon per pile multiplied by 12 piles),
- the anticipated take from Table 9 for [REDACTED] piles driven from November 17 through December 16 would be 0.96 sturgeon (i.e., 0.06 sturgeon per pile multiplied by 16 piles), and
- the cumulative take associated with the [REDACTED] production piles driven to date (as anticipated in Table 9 of the NMFS BO) is the sum of those values, or 1.68 sturgeon.

Following the same method used to estimate incidental sturgeon take for Table 9, the product of pile driving time, number of gill nets to span the width of the 206 dB isopleth, and sturgeon encounter rate of 0.033 sturgeon per net per hour was used to calculate sturgeon take for the [REDACTED] piles driven to date at Piers 31 and 32. For those piles that were monitored for underwater noise, the diameter of the 206 dB peak SPL isopleth was measured based on the maximum peak SPL recorded during pile driving. For the unmonitored piles, the maximum recorded isopleth diameter was assumed for each Pier (i.e., 200 feet for piles at Pier 31 and 60 feet for piles at Pier 32). Actual pile driving times for each of the 28 piles were used in the calculations.

With the exception of two of the [REDACTED] piles driven during the most recent time period, none of the piles exceeded the maximum allowable pile driving time of 1 hour per pile; pile driving time was 1.03 and 1.53 hours for two of the piles driven during the November 17 through December 16 time period. None of the [REDACTED] piles that were monitored for underwater noise exceeded the maximum allowable isopleth diameter of 200 feet.

Based on the recorded pile-driving times and isopleth widths:

- the incidental sturgeon take for the [REDACTED] piles driven during the 30-day period from October 19 through November 16 was calculated as 0.35 sturgeon, which is less than the estimate of 0.72 sturgeon for the same [REDACTED] piles listed in Table 9,

- the incidental take for the [REDACTED] piles driven during the 30-day period from November 17 through December [REDACTED] was calculated as 0.32 sturgeon, which is less than the estimate of 0.96 sturgeon for the same [REDACTED] piles listed in Table 9,
- the cumulative incidental take for all [REDACTED] production piles driven to date was calculated as 0.67 sturgeon, which is less than the anticipated take of 1.68 sturgeon for the same 28 piles in Table 9.

Therefore, incidental take was not exceeded during either of the 30-day periods of production pile driving, nor has cumulative sturgeon take been exceeded for all production piles driven to date. Despite the longer than anticipated drive times for piles [REDACTED] at Pier 31, sturgeon take for that 30-day period was not exceeded because of the shorter than expected drive times for the other piles driven during that time period.

Report Period: 10/19/2013 to 11/16/2013

Date	Year	Week		Net Impact Pile Driving Duration (hrs/pile)	Pile Driving Time from Table 9 of the NMFS BO (hrs/pile)	Average width of isopleth for 206-dB peak SPL (feet)	Maximum width of isopleth for 206-dB peak SPL (feet)	Number of gill nets to span the 206-dB peak SPL isopleth	Sturgeon encounter rate (fish/net/hour)	Sturgeon take
10/19/2013	2013	42		0.47	1.00	Not measured	200	1.6	0.033	0.025
10/19/2013	2013	42		0.57	1.00	Not measured	200	1.6	0.033	0.030
11/7/2013	2013	45		0.17	1.00	Not measured	60	0.5	0.033	0.003
11/7/2013	2013	45		0.53	1.00	Not measured	60	0.5	0.033	0.008
11/8/2013	2013	45		0.82	1.00	Not measured	200	1.6	0.033	0.043
11/8/2013	2013	45		0.77	1.00	Not measured	200	1.6	0.033	0.041
11/12/2013	2013	46		0.68	1.00	Not measured	200	1.6	0.033	0.036
11/12/2013	2013	46		0.65	1.00	Not measured	200	1.6	0.033	0.034
11/12/2013	2013	46		0.57	1.00	Not measured	200	1.6	0.033	0.030
11/13/2013	2013	46		0.60	1.00	Not measured	200	1.6	0.033	0.032
11/13/2013	2013	46		0.68	1.00	Not measured	200	1.6	0.033	0.036
11/13/2013	2013	46		0.68	1.00	Not measured	200	1.6	0.033	0.036
Monthly sturgeon take (Calculated based on pile-driving data/Anticipated from Table 9 of the NMFS BO)										0.35/0.60
Cumulative sturgeon take to date (Calculated based on pile-driving data/Anticipated from Table 9 of the NMFS BO)										0.35/0.60

Report Period: 11/17/2013 to 12/16/2013

Date	Year	Week	Net Impact Pile Driving Duration (hrs/pile)	Pile Driving Time from Table 9 of the NMFS BO (hrs/pile)	Average width of isopleth for 206-dB peak SPL (feet)	Maximum width of isopleth for 206-dB peak SPL (feet)	Number of gill nets to span the 206-dB peak SPL isopleth	Sturgeon encounter rate (fish/net/hour)	Sturgeon take
11/26/2013	2013	48	0.65	1.00	88	125	1.0	0.033	0.021
11/26/2013	2013	48	0.77	1.00	70	126	1.0	0.033	0.026
11/26/2013	2013	48	0.75	1.00	70	100	0.8	0.033	0.020
11/29/2013	2013	48	0.62	1.00	16	32	0.3	0.033	0.005
11/29/2013	2013	48	0.68	1.00	82	130	1.0	0.033	0.023
11/29/2013	2013	48	1.53	1.00	90	200	1.6	0.033	0.081
11/30/2013	2013	48	0.47	1.00	6	60	0.5	0.033	0.007
11/30/2013	2013	48	0.38	1.00	15	20	0.2	0.033	0.002
11/30/2013	2013	48	0.42	1.00	Not measured	60	0.5	0.033	0.007
12/2/2013	2013	49	0.32	1.00	Not measured	60	0.5	0.033	0.005
12/2/2013	2013	49	0.40	1.00	Not measured	60	0.5	0.033	0.006
12/2/2013	2013	49	0.52	1.00	Not measured	60	0.5	0.033	0.008
12/2/2013	2013	49	0.52	1.00	Not measured	60	0.5	0.033	0.008
12/5/2013	2013	49	0.53	1.00	Not measured	60	0.5	0.033	0.008
12/6/2013	2013	49	0.67	1.00	Not measured	200	1.6	0.033	0.035
12/7/2013	2013	49	1.03	1.00	Not measured	200	1.6	0.033	0.054
Monthly sturgeon take (Calculated based on pile-driving data/Anticipated from Table 9 of the NMFS BO)									0.32/1.08
Cumulative sturgeon take to date (Calculated based on pile-driving data/Anticipated from Table 9 of the NMFS BO)									0.67/1.68