

## Monthly Pile Driving Summary and Underwater Noise Monitoring Results

**Pile Driving Period: September 04, 2016 – October 01, 2016**

DOC Reference: TA\_FHWA\_03169\_RPT\_ENV



### 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 vessel-based sturgeon monitoring conducted downstream of the piles being driven.

Based on an analysis using both empirical and modeled data, 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 underwater area that experienced noise levels higher than a level that could potentially result in recoverable injury to the sturgeon (206 dB re 1  $\mu$ Pa peak sound pressure level); 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 by exposure to underwater noise from pile driving, as shown in the table 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 table below, the sturgeon take for this reporting period was 0.22 sturgeon, which is less than the 0.65 sturgeon that was anticipated based on Table 8 of the 2016 NMFS Biological Opinion (NMFS BO).

### Introduction:

As required under the NMFS BO, dated June 20, 2016, Reasonable & Prudent Measure #1 and Term & Conditions #1, underwater noise resulting from pile installation must be monitored. The following is a summary of the installation and underwater noise monitoring of permanent piles for the time period from August 7 through September 3, 2016.

As required under this condition, an estimate of sturgeon take for piles driven during the most recent monthly 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 conservatively assumed to be equivalent to the largest isopleth measured for piles driven at the same pier (or other representative piles at nearby piers). The take estimate has been compared to that listed for the same piles in Table 8 of the NMFS BO to ensure that sturgeon take is not being exceeded. Sturgeon take summarized in Table 8 applies to both shortnose and Atlantic sturgeon (i.e., it is

anticipated that 6 of each species will be exposed to underwater noise equal to 206 dB re 1 $\mu$  Pa SPL<sub>peak</sub> during pile driving).

This monthly report summarizes pile-driving activities for [REDACTED] production piles [REDACTED] at the Rockland North Trestle.

### **Pile Installation and Underwater Noise Monitoring:**

During the monthly period from September 4 through October 1, 2016, [REDACTED] piles were driven. All of these were [REDACTED] piles driven at [REDACTED] the Rockland North temporary trestle (bents 46 through 49). These [REDACTED] piles correspond to the scheduled pile-driving for week 24, week 35, and weeks 38-43 of 2016, respectively, in Table 8.

#### *Anticipated Sturgeon Take from Table 8 of the NMFS BO*

For the purposes of tracking take associated with the subset of piles from the groups of piles shown in Table 8<sup>1</sup> (i.e., Anticipated Sturgeon Take), total take for each time period was divided by the number of piles scheduled to be driven during the time period.

To calculate anticipated sturgeon take per pile from Table 8 for the [REDACTED] piles driven at the Rockland North trestle during this reporting period, the anticipated take of 1 sturgeon for the group containing piles at the Rockland North temporary trestle was divided by the [REDACTED] anticipated piles for this group and multiplied by the [REDACTED] piles actually driven during the reporting period. The result was an estimate of 0.014 sturgeon per pile for the Rockland North temporary trestle. The same calculation was used to calculate the anticipated sturgeon take per pile from Table 8 for the [REDACTED] piles driven [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED].

Based on these values:

- the anticipated take from Table 8 for the [REDACTED] piles driven [REDACTED] [REDACTED] from September 4 through October 1, was 0.173 sturgeon, which was calculated as:  
0.012 sturgeon per pile multiplied by [REDACTED] piles.
- the anticipated take from Table 8 for the [REDACTED] piles driven at the Rockland North trestle from September 4 through October 1, was 0.141 sturgeon, which was calculated as:  
0.014 sturgeon per pile multiplied by [REDACTED] piles.
- the anticipated take from Table 8 for the [REDACTED] piles driven [REDACTED] [REDACTED] from September 4 through October 1, was 0.333 sturgeon, which was calculated as:  
0.042 sturgeon per pile multiplied by [REDACTED] piles.
- the cumulative take associated with the [REDACTED] piles driven from Table 8 of the June 2016 NMFS BO, including piles at [REDACTED] [REDACTED] the Rockland North Trestles, is the sum of the anticipated take values for all [REDACTED] piles, or 0.65 sturgeon.

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<sup>1</sup> Anticipated take was calculated in Table 8 of the NMFS BO 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.

### *Calculated Sturgeon Take for this reporting period*

Following the same method used to estimate incidental sturgeon take for Table 8, 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 piles driven during this reporting period (i.e., Calculated Sturgeon Take). For previous piles that have been monitored for underwater noise, the diameter of the 206 dB peak SPL isopleth was estimated based on the maximum peak SPL recorded during pile driving. For the unmonitored piles, the maximum recorded isopleth diameters was assigned based on noise monitoring from the test pile program or from noise monitoring of piles at each pier. Actual pile driving times for each of the piles were used in the calculations.

Impact pile driving has been completed for [REDACTED] production piles; none were driven during this reporting period.

For the [REDACTED] piles driven at the Rockland North temporary trestle, pile-driving times ranged from 0.10 to 0.30 hours to install and averaged 0.20 hours, which exceeded the anticipated duration of 0.17 hours reported in Table 8 of the NMFS BO. For the [REDACTED] piles driven [REDACTED] pile-driving times ranged from 0.08 to 0.27 hours to install and averaged 0.16 hours, which was less than the anticipated duration of 0.33 hours reported in Table 8 of the NMFS BO. For the [REDACTED] piles driven [REDACTED], pile-driving times ranged from 0.27 to 0.38 hours to install and averaged 0.32 hours, which was less than the anticipated duration of 0.33 hours reported in Table 8 of the NMFS BO.

Underwater noise monitoring was conducted by NYSTA during pile driving [REDACTED]. The results of the noise monitoring was used to estimate the size of the 206-dB SPL<sub>peak</sub> isopleth for the monitored piles; for unmonitored piles, the average of the maximum SPL<sub>peak</sub> for monitored piles at each pier/trestle was used to calculate isopleth size. The Calculated Sturgeon Take for this reporting period was below the Anticipated Sturgeon Take from Table 8 of the NMFS BO.

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

- the incidental sturgeon take for the [REDACTED] piles driven during the monthly period from September 4 through October 1, 2016 was calculated as 0.22 sturgeon, which is less than the estimate of 0.65 sturgeon for the same [REDACTED] piles listed in Table 8,
- the cumulative incidental take for the [REDACTED] piles<sup>1</sup> driven as anticipated in Table 8 of the June 2016 NMFS BO was calculated as 0.79 sturgeon, which is less than the anticipated take of 3.08 sturgeon for the same [REDACTED] piles in Table 8.

During the installation of [REDACTED] piles [REDACTED], the size of the 206-dB peak SPL isopleth was estimated to be 89 feet, which is less than the anticipated isopleth diameter of 100 feet indicated in Table 8 of the NMFS BO. During installation of [REDACTED] piles at [REDACTED] the

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<sup>1</sup> The [REDACTED] piles driven [REDACTED] were driven prior to the issuance of the June 2016 BO and were therefore included in previous monthly reports (April 17, 2016 – May 09, 2016 and May 15, 2016 – June 11, 2016) as part of the monthly and cumulative anticipated take calculations. Because those piles are also included in Table 8 of the June 2016 BO, the anticipated take for those piles will also be included as part of the cumulative take estimates reported in future monthly reports. The incidental take associated [REDACTED] has therefore essentially been “counted twice.”

Rockland North temporary trestle, the size of the 206-dB peak SPL isopleth was estimated to be 115 feet and 148 feet, respectively, which exceeded the anticipated isopleth diameter of 100 feet. The duration of impact pile driving for piles driven [REDACTED] [REDACTED] was up to 50% less than anticipated in Table 8 of the NMFS BO, while the duration for piles at the Rockland trestle was slightly longer than anticipated. Overall though, the total duration for all piles driven during this reporting period was 7.8 hours, which was less than the anticipated duration of 9.6 hours for these piles. Therefore, despite the larger than anticipated isopleth sizes for some of the piles, the overall shorter duration of impact pile driving resulted in a total duration of impact pile driving that was less than anticipated and, as a result, an incidental take that was less than anticipated in Table 8 of the NMFS BO. In addition, the conservatism applied to estimating sturgeon take in the NMFS BO (i.e., rounding up from 0.05 to the nearest 1 sturgeon) resulted in a total observed sturgeon take for all piles that was less than the anticipated take for piles driven during the current reporting period. Therefore, incidental take for sturgeon was not exceeded during the most recent monthly reporting period for pile driving, nor has the cumulative sturgeon take been exceeded for all piles driven to date.

Report Period: 9/4/2016 to 10/1/2016

Date	Year	Wee			Net Impact Pile Driving Duration (hrs/pile)	Pile driving time from Table 8 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
8/26/2016	2016	35			0.12	0.33	Not measured	115	0.92	0.033	0.0021
9/8/2016	2016	37			0.32	0.33	72	93	0.74	0.033	0.0078
9/8/2016	2016	37			0.38	0.33	80	93	0.74	0.033	0.0093
9/8/2016	2016	37			0.3	0.33	65	80	0.64	0.033	0.0064
9/8/2016	2016	37			0.27	0.33	Not measured	89	0.71	0.033	0.0063
9/8/2016	2016	37			0.35	0.33	Not measured	89	0.71	0.033	0.0082
9/8/2016	2016	37			0.35	0.33	Not measured	89	0.71	0.033	0.0082
9/8/2016	2016	37			0.3	0.33	Not measured	89	0.71	0.033	0.0070
9/8/2016	2016	37			0.35	0.33	Not measured	89	0.71	0.033	0.0082
9/8/2016	2016	37			0.33	0.33	Not measured	89	0.71	0.033	0.0078
9/9/2016	2016	37			0.28	0.33	Not measured	89	0.71	0.033	0.0066
9/9/2016	2016	37			0.28	0.33	Not measured	89	0.71	0.033	0.0066
9/9/2016	2016	37			0.28	0.33	Not measured	89	0.71	0.033	0.0066
9/9/2016	2016	37			0.32	0.33	Not measured	89	0.71	0.033	0.0075
9/9/2016	2016	37			0.37	0.33	Not measured	89	0.71	0.033	0.0087
9/15/2016	2016	38			0.1	0.17	Not measured	148	1.18	0.033	0.0039
9/15/2016	2016	38			0.23	0.17	Not measured	148	1.18	0.033	0.0090
9/15/2016	2016	38			0.15	0.17	Not measured	148	1.18	0.033	0.0059
9/15/2016	2016	38			0.2	0.17	Not measured	148	1.18	0.033	0.0078
9/15/2016	2016	38			0.23	0.17	Not measured	148	1.18	0.033	0.0090
9/15/2016	2016	38			0.2	0.17	Not measured	148	1.18	0.033	0.0078
9/15/2016	2016	38			0.15	0.17	Not measured	148	1.18	0.033	0.0059
9/22/2016	2016	39			0.22	0.17	Not measured	148	1.18	0.033	0.0086
9/22/2016	2016	39			0.3	0.17	Not measured	148	1.18	0.033	0.0117
9/22/2016	2016	39			0.22	0.17	Not measured	148	1.18	0.033	0.0086
9/29/2016	2016	40			0.08	0.33	Not measured	115	0.92	0.033	0.0024
9/29/2016	2016	40			0.15	0.33	Not measured	115	0.92	0.033	0.0045
9/29/2016	2016	40			0.12	0.33	Not measured	115	0.92	0.033	0.0036
9/29/2016	2016	40			0.27	0.33	Not measured	115	0.92	0.033	0.0061

Report Period: 9/4/2016 to 10/1/2016

Date	Year	Week		Net Impact Pile Driving Duration (hrs/pile)	Pile driving time from Table 8 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
9/29/2016	2016	40		0.2	0.33	Not measured	115	0.92	0.033	0.0061
9/29/2016	2016	40		0.12	0.33	Not measured	115	0.92	0.033	0.0036
9/29/2016	2016	40		0.23	0.33	Not measured	115	0.92	0.033	0.0070
<b>Monthly sturgeon take (Calculated based on pile-driving data/Anticipated from Table 8 of the September 2016 NMFS BO)</b>										<b>0.22/0.65</b>
<b>Cumulative sturgeon take to date (Calculated based on pile-driving data/Anticipated from Table 8 of the September 2016 NMFS BO)*</b>										<b>0.79/3.08</b>

\* As of the September 2014 NMFS BO, the exempted incidental take for sturgeon as a result of exposure to underwater noise during impact pile driving was 37 Atlantic sturgeon and 37 shortnose sturgeon. With the issuance of the June 2016 BO, the exempted take was reduced to 6 Atlantic sturgeon and 6 shortnose sturgeon in order to reflect the anticipated incidental take for the remaining piles that will be installed (i.e., the piles associated with the first 31 sturgeon had been driven, and the take accounted for, as of the issuance of the June 2016 BO). To allow tracking of incidental take with respect to Table 8 of the June 2016 BO, the cumulative take reported in the table above will be with reference to 6 sturgeon. Note that previous monthly reports submitted prior to the issuance of the June 2016 BO accounted for estimates of anticipated sturgeon take for piles driven [redacted] April 17, 2016 – May 09, 2016) and [redacted] May 15, 2016 – June 11, 2016. Because the piles [redacted] are also included in Table 8 of the June 2016 BO, the anticipated take for those piles will also be included as part of the cumulative take estimate reported in future monthly reports.