

## Monthly Pile Driving Summary and Underwater Noise Monitoring Results

**Pile Driving Period: December 25, 2016 – January 21, 2017**

DOC Reference: TA\_FHWA\_03187\_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 0.09 sturgeon, which is less than the 0.52 sturgeon that was anticipated based on Table 10 of the 2017 NMFS Biological Opinion (NMFS BO)<sup>1</sup>.

### Introduction:

As required under the NMFS BO, dated January 4, 2017, Reasonable & Prudent Measure #1 and Term & Conditions #1, underwater noise resulting from the installation of a representative number of piles during each group of piles remaining for 2017 and 2018 must be monitored. The following is a summary of the installation and underwater noise monitoring of permanent piles for the time period from December 25, 2016 through January 21, 2017.

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

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<sup>1</sup> This is the first monthly report to include impact pile driving conducted since the issuance of the active Biological Opinion on January 4, 2017.

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 10 of the NMFS BO to ensure that sturgeon take is not being exceeded. Sturgeon take summarized in Table 10 applies to both shortnose and Atlantic sturgeon (i.e., it is anticipated that 3 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] piles at the Rockland North Trestle.

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

During the monthly period from December 25, 2016 through January 21, 2017, [REDACTED] piles were driven. All of these were [REDACTED] driven at the Rockland North Trestle. These [REDACTED] piles correspond to the scheduled pile-driving for the Rockland North Trestle during 2017 in Table 10.

#### *Anticipated Sturgeon Take from Table 10 of the NMFS BO*

For the purposes of tracking take associated with the subset of piles from the groups of piles shown in Table 10<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 10 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 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 0.043 sturgeon per pile for the Rockland North Trestle.

Based on these values:

- the anticipated take from Table 10 for the [REDACTED] piles driven at the Rockland North Trestle from December 25, 2016 through January 21, 2017, was 0.52 sturgeon, which was calculated as:  
0.043 sturgeon per pile multiplied by [REDACTED] piles.
- the cumulative take associated with the [REDACTED] piles from Table 10 of the January 2017 NMFS BO driven thus far is the sum of the anticipated take values for all [REDACTED] piles, or 0.52 sturgeon.

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

Following the same method used to estimate incidental sturgeon take for Table 10, the product of pile driving time, number of gill nets to span the width of the 206 dB isopleth, and sturgeon

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<sup>1</sup> Anticipated take was calculated in Table 10 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.

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 Trestle, pile-driving times ranged from 0.12 to 0.27 hours to install and averaged 0.19 hours per pile, which slightly exceeded the anticipated duration of 0.17 hours per pile reported in Table 10 of the NMFS BO. No underwater noise monitoring was conducted by TZC/JASCO/NYSTA during pile driving at the Rockland North Trestle. The Calculated Sturgeon Take for this reporting period was below the Anticipated Sturgeon Take from Table 10 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 December 25, 2016 through January 21, 2017, which also represents the cumulative incidental take since the incidental take was reduced from 6 sturgeon to 3 sturgeon (as shown in Table 10 of the January 2017 NMFS BO), was calculated as 0.09 sturgeon, which is less than the estimate of 0.52 sturgeon for the same [REDACTED] piles listed in Table 10.

During installation of the Rockland North temporary trestle, the size of the 206-dB peak SPL isopleth was estimated to be 148 feet, which exceeded the anticipated isopleth diameter of 100 feet. The total duration of impact pile driving for all piles driven during this reporting period was 2.23 hours, slightly more than the anticipated duration of 2.04 hours for these piles. The combination of drive times and maximum peak isopleth sizes measured to date for the Rockland trestle piles is slightly greater than those reported in Table 10 of the NMFS BO. However, the number of sturgeon potentially affected by pile driving noise for these piles is not likely to be greater than what was estimated in Table 10 of the January 2017 BO. Because of the conservatism used to estimate the anticipated sturgeon take in Table 10 (i.e., rounding 0.30 sturgeon to 1 sturgeon), the calculated sturgeon take did not exceed the anticipated take despite the slightly longer than anticipated duration of pile driving and the larger than anticipated isopleth size. The number of sturgeon potentially affected by pile driving was still less than or equal to 1 sturgeon. 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: 12/25/2017 to 01/21/2017

Date	Year	Week		Net Impact Pile Driving Duration (hrs/pile)	Pile driving time from Table 10 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
1/17/2017	2017	3		0.20	0.17	Not measured	148	1.18	0.033	0.0078
1/17/2017	2017	3		0.27	0.17	Not measured	148	1.18	0.033	0.0105
1/17/2017	2017	3		0.27	0.17	Not measured	148	1.18	0.033	0.0105
1/17/2017	2017	3		0.17	0.17	Not measured	148	1.18	0.033	0.0066
1/18/2017	2017	3		0.15	0.17	Not measured	148	1.18	0.033	0.0059
1/18/2017	2017	3		0.13	0.17	Not measured	148	1.18	0.033	0.0051
1/18/2017	2017	3		0.15	0.17	Not measured	148	1.18	0.033	0.0059
1/18/2017	2017	3		0.12	0.17	Not measured	148	1.18	0.033	0.0047
1/18/2017	2017	3		0.12	0.17	Not measured	148	1.18	0.033	0.0047
1/19/2017	2017	3		0.23	0.17	Not measured	148	1.18	0.033	0.0090
1/19/2017	2017	3		0.20	0.17	Not measured	148	1.18	0.033	0.0078
1/19/2017	2017	3		0.22	0.17	Not measured	148	1.18	0.033	0.0086
<b>Monthly sturgeon take (Calculated based on pile-driving data/Anticipated from Table 10 of the January 2017 NMFS BO)</b>										<b>0.09/0.52</b>
<b>Cumulative sturgeon take to date (Calculated based on pile-driving data/Anticipated from Table 10 of the January 2017 NMFS BO)*</b>										<b>0.09/0.52</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). 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 E April 17, 2016 – May 09, 2016 and May 15, 2016 – June 11, 2016. Because the piles are also included in Table 8 of the June 2016 BO, the anticipated take for those piles was also included as part of the cumulative take estimate reported in the remaining monthly reports submitted after the issuance of the June 2016 BO and prior to the issuance of the January 2017 BO. With the issuance of the January 2017 BO, the exempted take was again reduced to 3 Atlantic sturgeon and 3 shortnose sturgeon in order to reflect the anticipated incidental take for the remaining piles that will be installed in 2017 and 2018. To allow tracking of incidental take with respect to Table 10 of the January 2017 BO, the cumulative take reported in the table above will be with reference to the exempted incidental take of 3 sturgeon.