Near-Field Sturgeon Monitoring for the New NY Bridge at Tappan Zee

Quarterly Report
July 1 – September 30, 2014

Prepared by
AKRF, Inc.
7250 Parkway Drive, Suite 210
Hanover, MD 21076

for

New York State Thruway Authority

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1.0 SUMMARY

During the monitoring period from July 1 through September 30, 2014, a total of [redacted] acoustic-tagged sturgeon and [redacted] striped bass were present within the near-field array in the vicinity of the Tappan Zee Bridge. Of these, 25 were shortnose sturgeon (10 tagged by DEC and 15 tagged by NYSTA). There were [redacted] Atlantic sturgeon detected during this period (27 NYSTA, [redacted]). Relative to sturgeon monitoring during the second quarter of 2014, there were fewer acoustic-tagged sturgeon detected during this most recent quarter. Detections of shortnose sturgeon were relatively high during July (n=25 sturgeon) but decreased during August (n=12) and September (n=8). Detections of Atlantic sturgeon declined from July ([redacted]) into August ([redacted]) but increased again in September ([redacted]).

Nearly half of all detections of shortnose sturgeon (44%) were from north of the Tappan Zee Bridge along the western side of the river; shortnose sturgeon were detected less frequently and in similarly low abundance elsewhere in the array (9 to 13%). From July to September, the frequency of detections in the northwestern portion of the array increased and detections in other areas of the array decreased, suggesting that shortnose sturgeon were leaving the channel and eastern shallows, but remaining in the western shallows north of the Bridge. Unlike shortnose sturgeon, the area of highest concentration for Atlantic sturgeon was in the main channel (85% of all detections), where sturgeon exhibited upstream and downstream movement through the near-field receiver array. Atlantic sturgeon in the channel were detected more frequently south of the Tappan Zee Bridge (59%) compared to north of the Bridge (26%); this was true in July and August, but in September Atlantic sturgeon were detected with similar frequency in the channel and the western shallows south of the Bridge as juvenile Atlantic sturgeon were more frequently detected in the shallows.

Each Atlantic sturgeon spent, on average, less than a day in the array (i.e., 8 to 10 hours, on average) as they transited the monitoring area. In contrast, shortnose sturgeon spent more time in the monitoring area (i.e., 2 to 4 days, on average). For shortnose sturgeon, residence time averaged approximately 4 days in July and August and decreased to 2 days in September. Residence time for Atlantic sturgeon was consistently low among months during the third quarter. Further analysis is currently being conducted to assess the presence, residence time, and movement of acoustic-tagged sturgeon during dredging and impact pile driving, in order to better understand their response to these construction activities.

2.0 INTRODUCTION

This quarterly report for the Near-Field Sturgeon Monitoring program summarizes all available information collected via the near-field array of acoustic receivers deployed in the vicinity of Authorized Activities at the Tappan Zee Bridge during the time period from July 1

through September 30, 2014. The purpose of the near-field sturgeon monitoring is to detect the presence, residence time, and movement of acoustic-tagged Atlantic and shortnose sturgeon within the vicinity of the Tappan Zee Bridge during construction of the New NY Bridge at Tappan Zee ("Project"). The information presented herein is reported as required by the National Marine Fisheries Service ("NMFS") and New York State Department of Environmental Conservation ("DEC").

2.1 PERMIT REQUIREMENTS

On September 23, 2014, NMFS issued a Biological Opinion ("NMFS BO") for the Tappan Zee Bridge Replacement Project (NER-2013-9592) in accordance with Section 7 of the Endangered Species Act of 1973, as amended. The NMFS BO assessed the potential impacts of the Project on ESA-listed Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*). This quarterly report has been developed in compliance with Reasonable and Prudent Measure ("RPM") #6 of the NMFS BO, which states that:

> *FHWA must continue to implement a program to monitor impacts to sturgeon resulting from pile installation for permanent piles four feet or more in diameter throughout the duration of pile driving operations.*

Term and Condition #11 of the BO further requires that:

> *To implement RPM#6, FHWA must ensure acoustic telemetry equipment continues to be utilized to monitor for the presence, residence time and movement of tagged Atlantic and shortnose sturgeon in the project area during installation of permanent piles, 4-feet or greater in diameter. FHWA must design a monitoring plan that would ensure the detection of any acoustically tagged shortnose or Atlantic sturgeon in the action area. FHWA must ensure all occurrences of tagged sturgeon in the project area are recorded and reported to NMFS to the extent that detected tags can be identified as shortnose or Atlantic sturgeon. Information collected from any stationary receivers must be downloaded at least every 60 days, unless there are weather or safety concerns in which case downloads must be made as soon as practicable after the relief of the weather or safety concern. Preliminary reports containing information on the number of tagged sturgeon detected must be provided to NMFS on a regular basis, but no less frequently than every 60 days. If reports cannot be provided on that frequency, FHWA must provide an explanation to NMFS within the 60-day period and provide the report as soon as possible. On a quarterly basis, FHWA must provide NMFS a report that summarizes the presence, residence time, and movement of tagged Atlantic and shortnose sturgeon for the 90 day period. The quarterly report must be provided within 30 days of the end of the 90 day period.*

> *The report must also include the number of tags that could not be identified to species and document the steps that FHWA took to attempt to identify the species identification (e.g., contact the tag manufacturer). This term and condition does not require FHWA to tag any sturgeon with telemetry tags.*

Similar sturgeon monitoring requirements are outlined in Condition 40 of the Final DEC Permit (DEC ID 3-9903-00043/00012) issued on March 25, 2013, which states:

> *As soon as possible, but no more than 60 days after the effective date of this Permit, and before starting installation of permanent piles four feet or more in diameter the Permittee must submit to the Department a plan for monitoring the movement of shortnose and Atlantic sturgeon in the vicinity of the Tappan Zee Bridge.*

On December 9, 2013, FHWA finalized the Sturgeon Acoustic Telemetry Monitoring Plan ("Plan") through consultation with DEC and NMFS. The area of the Hudson River to be monitored was referenced in the DEC Permit as "the vicinity of the Tappan Zee Bridge" and "the vicinity of any Authorized Activities" and in the Plan as "the vicinity of the Authorized Activity." In the Plan, this area ("the vicinity of the Tappan Zee Bridge") was defined as being within 1,000 feet of pile driving in waters deeper than 6 feet (mean low water). This area encompasses the zone in which behavioral effects from pile driving are anticipated for sturgeon based on the NMFS 2013 Biological Opinion (i.e., the 150 dB rms SPL isopleth) and extends 61 meters (m; 200 feet [ft]) beyond this isopleth. It is important to note that the detection range of the near-field array exceeds the vicinity of the Authorized Activity. Therefore, some of the detection data presented in this quarterly report are from sturgeon occurring just outside of the monitoring array.

The Plan[1] defines the monitoring objectives, extent of the survey area (Figure 1 in the Plan), details of the monitoring array, results of range testing, and data-collection methods used to conduct the near-field sturgeon monitoring summarized in this quarterly report. The measures established by the Plan were utilized during monitoring to determine 1) sturgeon presence, 2) residence time, 3) position within the array, and 4) movement within the array. The 29 Vemco receivers that currently comprise the near-field array were configured to allow the two dimensional (2-D) positioning of acoustic-tagged sturgeon within the vicinity of the Authorized Activity defined by DEC.

[1] AKRF, Inc. Sturgeon Acoustic Telemetry Monitoring Plan for the Tappan Zee Hudson River Crossing, Revision 3. Submitted to NMFS on June 30, 2014.

As required by Term and Condition #11 of the NMFS BO, and outlined in the Plan, this quarterly report summarizes the presence, residence time, and movement of acoustic-tagged sturgeon detected in the near-field receiver array during the most recent 90-day monitoring period. The approved configuration of the monitoring stations that comprise the near-field array (Figure 1 in the Plan) was in place in October 2013. Based on stationary range testing using sync-tag detections, it was determined that Stations 7, 10, and 32 were unnecessary for sturgeon positioning and were therefore decommissioned as discussed with DEC. Several stations were not retrieved during one or more of the three receiver downloads conducted for this third quarter. Therefore, this report includes data from the 26 of 29 stations that were downloaded during the third quarter.

3.0 METHODS

3.1 DATA DOWNLOADS

Data summarized in this quarterly report span the period from July 1 through September 30, 2014. During this quarter, receivers deployed at 26 monitoring stations were downloaded; Stations 6, 12 and 14 could not be retrieved. Stations 7, 10, and 32 were previously decommissioned. Locations of receiver stations at the beginning of this quarter's monitoring period and other relevant information is shown in Table 1.

All monitoring stations contain Vemco sync tags, and one station contains a temperature tag for use in the Vemco Positioning System ("VPS") analysis. Sync tags were used to maintain internal clock synchrony among Vemco receivers within the array, which is necessary to accurately position sturgeon.

Data downloads for this quarter were performed beginning on: 1) July 2nd, 2) August 21st, and 3) October 28, 2014.

4.0 RESULTS

4.1 STURGEON PRESENCE

Presence is defined for the purpose of this monitoring effort as the detection of an individual acoustic-tagged sturgeon within the near-field array independent of the time that the sturgeon spends in the array. Consistent with the manufacturer-recommended use of the Vemco receiver technology, the False Detection Analysis (FDA) tool was used in Vemco's VUE software to remove likely false detections prior to reporting.

Relative to the second quarter of 2014, there were fewer acoustic-tagged sturgeon present in the near-field monitoring array. A total of [redacted] unique tag codes were detected in the near-field array during the monitoring period summarized in this quarterly report. Of these, 10

were acoustic-tagged shortnose sturgeon that were tagged by DEC and 15 tagged by NYSTA. There were also [redacted] Atlantic sturgeon detected during this period (27 NYSTA, [redacted]). In addition to acoustic-tagged sturgeon, there [redacted] striped bass detected in the array that was tagged by the Delaware Department of Natural Resources (DNREC). [redacted] acoustic-tagged fish can not be reported to species, but the tag identification codes have been submitted to Vemco for communication to the tag owner.

Sturgeon were present in the near-field array throughout this three-month monitoring period. As shown in Table 2, detections of shortnose sturgeon were relatively high during July but decreased during August and September. Detections of Atlantic sturgeon declined from July into August but increased again in September when the number of uniquely tagged Atlantic sturgeon was the highest observed during the third quarter.

4.2 RESIDENCE TIME

Residency is defined here as the amount of time spent by individual acoustic-tagged sturgeon within the near-field monitoring array. A sturgeon was considered resident within the array from the time it was first detected to the time it was last detected. If the timespan between subsequent detections was greater than 30 minutes, then the fish was deemed to have left the array. The 30-minute timespan was established via Vemco's VUE software using variable intervals to determine the most appropriate timeframe based on tag-detection intervals.

The total amount of time (in hours) that tagged sturgeon were resident within the array during each month is summarized in Tables 3 and 4 below. Residence time for Atlantic sturgeon averaged 8 to 11 hours for an individual sturgeon and was similar among months during July and August. In September, average residence time decreased compared to previous months and the number of sturgeon increased, suggesting that Atlantic sturgeon were emigrating from the Tappan Zee area of the river in September. Residence times for Atlantic sturgeon were generally low compared to shortnose sturgeon and reflected the transient nature of sub-adult and Atlantic sturgeon in the river. In contrast, residence time for shortnose sturgeon averaged approximately 4 days during July and August, reflecting the more localized spatial distribution and long-term residency of individual shortnose sturgeon. Residence time by shortnose sturgeon decreased to approximately 2 days during September; this shorter residence time may indicate the onset of seasonal changes in the spatial distribution of shortnose sturgeon as water temperatures began to cool and sturgeon begin preparing for the migration to overwintering areas.

Table 1
Locations and deployment times for acoustic receivers within the near-field monitoring array at the Tappan Zee Bridge

Station	Latitude	Longitude	GPS Date	GPS time	Vemco Serial #	Sync Tag[c]	Temperature Tag	Lotek Serial #
St01	41.07455199	-73.90986331	2-Jul-14	5:00:10 PM	122371	65006	--	--
St02	41.07513805	-73.89884178	3-Jul-14	5:44:52 PM	123574	65011	--	--
St03	41.06640561	-73.91092261	2-Jul-14	5:32:07 PM	122373	65008	--	--
St04	41.06652124	-73.89950328	3-Jul-14	3:47:08 PM	122888	65010	--	--
St05	41.07042226	-73.89959279	3-Jul-14	12:13:24 PM	123573	65002	--	--
St06[a]	41.07478475	-73.88832534	7-May-14	6:37:04 PM	122892	65014	--	265126
St07[b]	Decommissioned				122887	65012	--	265127
St08	41.07282934	-73.87284229	2-Jul-14	2:14:50 PM	122890	65013	--	--
St09	41.06982982	-73.89236860	3-Jul-14	12:05:53 PM	123571	26742	--	--
St10[b]	Decommissioned				122894	65003	--	265121
St11	41.06681142	-73.87337026	2-Jul-14	2:42:35 PM	122889	65015	--	265119
St12	41.0765121	-73.8846951	24-Sep-14	3:29:18 PM	124816	26131	--	--
St13	41.07563824	-73.88068305	17-Jul-14	4:41:13 PM	122885	65017	--	--
St14[a]	41.07290109	-73.88536384	10-Mar-14	7:50:17 PM	122886	65019	13339	--
St15	41.07316495	-73.88195040	17-Jul-14	5:50:54 PM	122883	65018	--	--
St16	41.07347843	-73.87897390	17-Jul-14	3:52:23 PM	122879	65020	--	--
St17	41.06905178	-73.88755278	11-Jul-14	1:04:34 PM	122881	65021	--	--
St18	41.06947570	-73.88389542	11-Jul-14	2:49:14 PM	122880	65022	--	--
St19	41.06828006	-73.87867492	11-Jul-14	5:57:25 PM	122876	65023	--	--
St20	41.06605081	-73.88040075	11-Jul-14	3:30:34 PM	123572	65005	13338[d]	--
St21	41.06679332	-73.88489873	11-Jul-14	2:07:44 PM	122877	65004	--	--
St22	41.06559861	-73.87711287	17-Jul-14	3:25:32 PM	122878	65007	--	--
St23	41.07454775	-73.91320769	2-Jul-14	4:44:45 PM	122871	65024	--	--
St24	41.07366267	-73.90505000	2-Jul-14	6:08:48 PM	124817	26744	--	--
St25	41.06897890	-73.90559684	3-Jul-14	3:17:47 PM	122875	65026	--	--
St26	41.06833613	-73.89630927	3-Jul-14	4:00:29 PM	122873	65025	--	--
St27	41.07567235	-73.91236841	2-Jul-14	4:31:40 PM	123565	26747	--	--
St28	41.07062978	-73.91368092	3-Jul-14	10:26:25 PM	123568	26743	--	--
St29	41.07025798	-73.90928602	3-Jul-14	10:59:46 PM	123566	26746	--	--
St30	41.07033430	-73.91381337	3-Jul-14	10:16:41 PM	123567	26741	--	--
St31	41.06993749	-73.90964117	3-Jul-14	10:08:58 PM	123569	26739	--	--
St32[b]	Decommissioned				123570	26745	--	--

Notes: [a]Stations were not retrieved during the August data download.
[b]Stations 7, 10, and 32 were determined to be unnecessary for sturgeon positioning based on stationary range testing using sync-tag detections and were decommissioned as discussed with DEC.
[c]The prefix for sync tag codes is "A69-1601-" and the prefix for temperature tags is "A69-9002-"
[d]The temperature tag at Station 20 was lost on October 20, 2013 and has not yet been replaced.

Table 2
Monthly detections of acoustic-tagged fish within the near-field monitoring array

Species	Month (2014)		
	Jul	Aug	Sep
Atlantic sturgeon	[redacted]	[redacted]	[redacted]
Shortnose sturgeon	25	12	8
Striped bass	1	1	1
Unconfirmed IDs	[redacted]	[redacted]	[redacted]

Notes: Values represent the number of unique tag codes detected for each species and month.

Table 3
Residence time of Atlantic sturgeon within the near-field monitoring array

Month (2014)	Minimum (hours)	Maximum (hours)	Mean (hours)	N
July	[redacted]	[redacted]	[redacted]	[redacted]
August	[redacted]	[redacted]	[redacted]	[redacted]
September	[redacted]	[redacted]	[redacted]	[redacted]

Table 4
Residence time of shortnose sturgeon within the near-field monitoring array

Month (2014)	Minimum (hours)	Maximum (hours)	Mean (hours)	N
July	2.0	502.9	96.8	25
August	0.6	583.6	101.2	12
September	0.8	205.7	62.8	8

Appendix A contains monthly graphical depictions of presence and residence time by tagged sturgeon detected within the array. These figures indicate that most sturgeon entered and left the array multiple times during the monitoring period.

4.3 STURGEON POSITION

The position of an acoustic-tagged sturgeon can be defined generally in terms of its location relative to a single receiver (i.e., within detection range of a receiver) or with greater certainty through a two-dimensional ("2-D") positioning technique known as trilateration in which the position of the sturgeon within the near-field array is estimated using simultaneous detections from at least three receivers.

The locations of receivers within the near-field array were selected to allow for the fine-scale positioning of acoustic-tagged sturgeon. Due to ongoing data-sharing negotiations with researchers who have tagged sturgeon that have been detected in the near-field array, the analysis of fine-scale sturgeon positions during this quarterly reporting period is limited to sturgeon tagged by [redacted] and detected during the time period from July through September.

Vemco recently completed the positioning analysis for detection data collected through August 26, 2014. The results of this analysis, which includes sturgeon detections for near-field monitoring conducted from March 20 through August 26, 2014 are currently being summarized by the Thruway Authority in a supplementary report and will be submitted to DEC and FHWA by December 19, 2014.

In the absence of fine-scale positioning information, coarse spatial positioning of acoustic-tagged sturgeon was determined based on the location of the receiver(s) that recorded the detections and the detection range for the receiver(s). In order to summarize sturgeon positions on a coarse scale, the near-field array was sub-divided into six regions. These regions encompassed the areas north and south of the existing Tappan Zee Bridge, which were further sub-divided into the areas west of the navigation channel (West), within the navigation channel (Channel), and to the east of the navigation channel (East).

Sturgeon were detected throughout the monitoring array during the reporting period, as shown in Table 5 and Table 6. Appendix B includes a series of monthly tables that provide the percentage of detections recorded by receivers in each region. Generally, shortnose sturgeon were more frequently detected to the north of the existing bridge and, in particular, in the western shallows (Table 5). Throughout the rest of the near-field array, shortnose sturgeon were detected with equally low frequency in the channel, along the eastern shallows, and in the western shallows south of the bridge. Between July and September, the percentage of shortnose sturgeon detected in the northwestern shallows increased relative to other areas in the array (Appendix B).

Atlantic sturgeon were detected most frequently in the channel and specifically to the south of the existing bridge (Table 6). They were infrequently detected outside the deeper waters of the navigation channel, although the percentage of Atlantic sturgeon in the eastern and western shallows south of the bridge increased in September (Appendix B) as a result of relatively greater detections of juvenile Atlantic sturgeon as sub-adult and adult Atlantic sturgeon began emigrating downstream from the near-field array.

Table 5
Percentage of shortnose sturgeon detections within coarsely defined regions of the near-field monitoring array between July 1 and September 30, 2014

Shortnose Sturgeon	West	Channel	East	Grand Total
North	**43.9%**	11.0%	11.7%	66.6%
South	11.6%	9.1%	**12.7%**	33.4%
Grand Total	**55.5%**	20.1%	24.4%	100%

Table 6
Percentage of Atlantic sturgeon detections within coarsely defined regions of the near-field monitoring array between July 1 and September 30, 2014

Atlantic Sturgeon	West	Channel	East	Grand Total
North	[redacted]	[redacted]	[redacted]	[redacted]
South	[redacted]	[redacted]	[redacted]	[redacted]
Grand Total	[redacted]	[redacted]	[redacted]	[redacted]

4.4 MOVEMENT

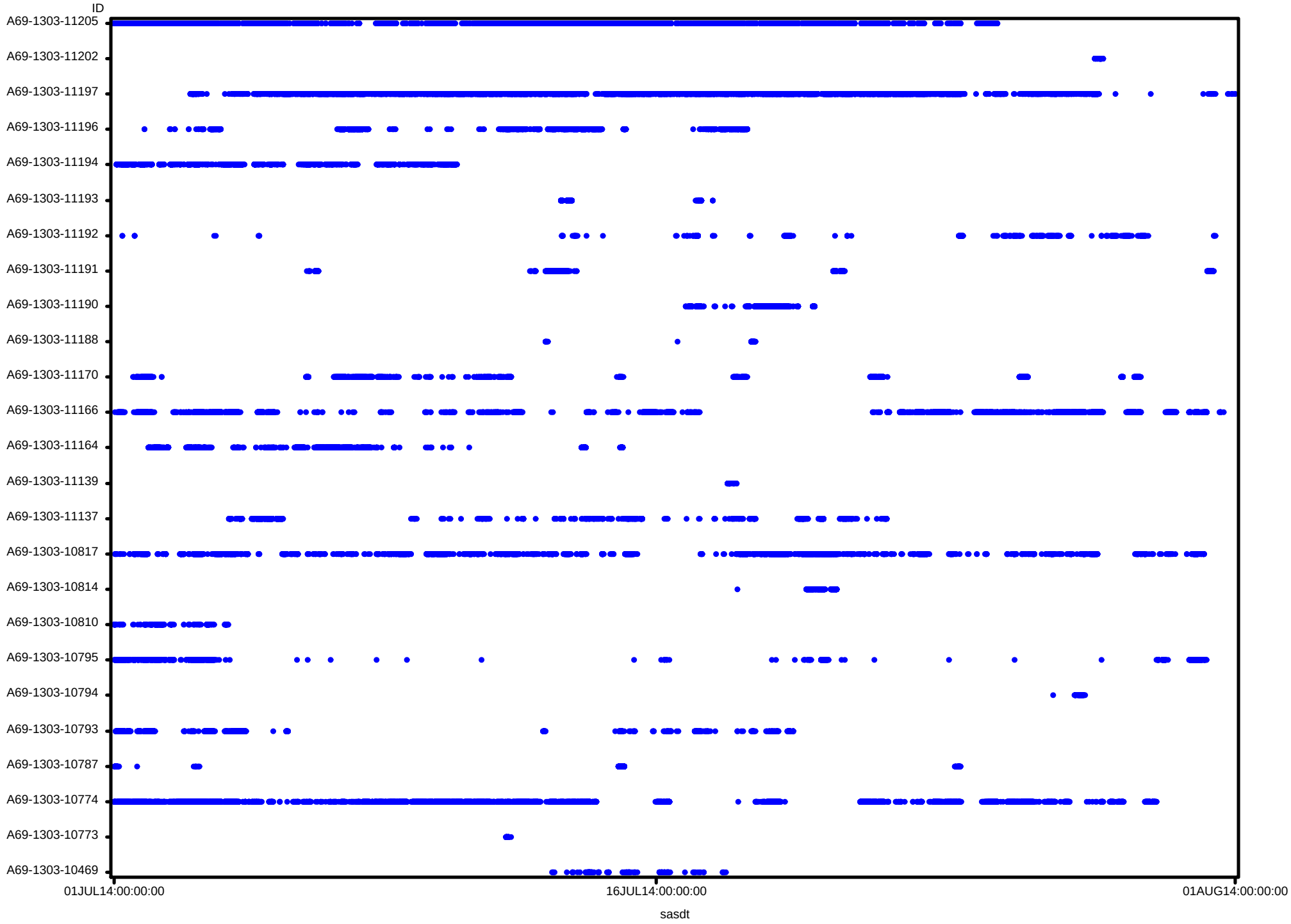
As discussed above, the results of the VPS positioning analyses for much of the data covered by this quarterly report have recently been received from Vemco by the Thruway Authority. A full discussion of movement will be developed as part of the sturgeon positioning report to be submitted to the DEC and FHWA by December 19, 2014.

✶

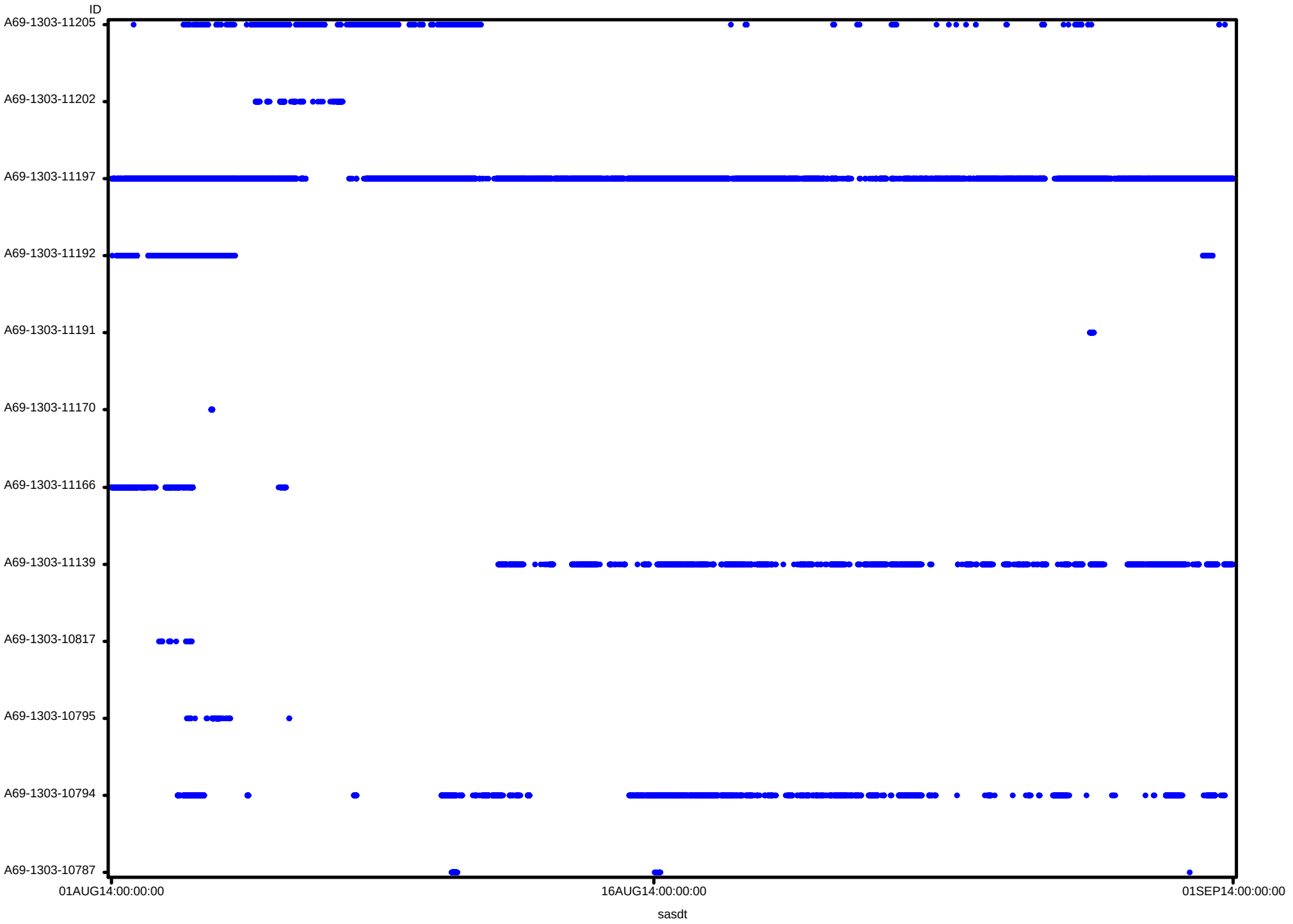
Appendix A

Sturgeon Presence and Residence within the Near-Field Monitoring Array

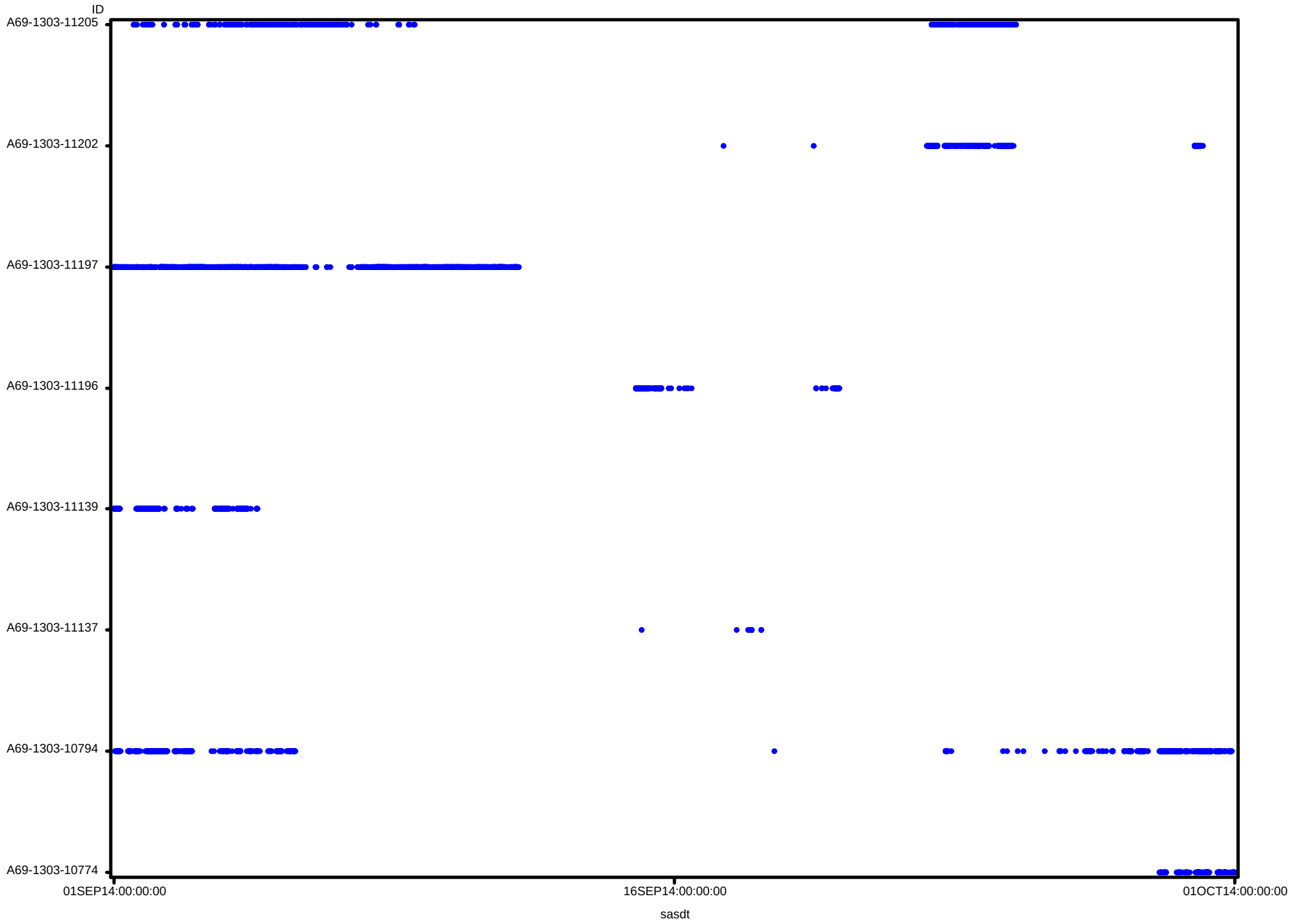
July - Shortnose Sturgeon - Vemco



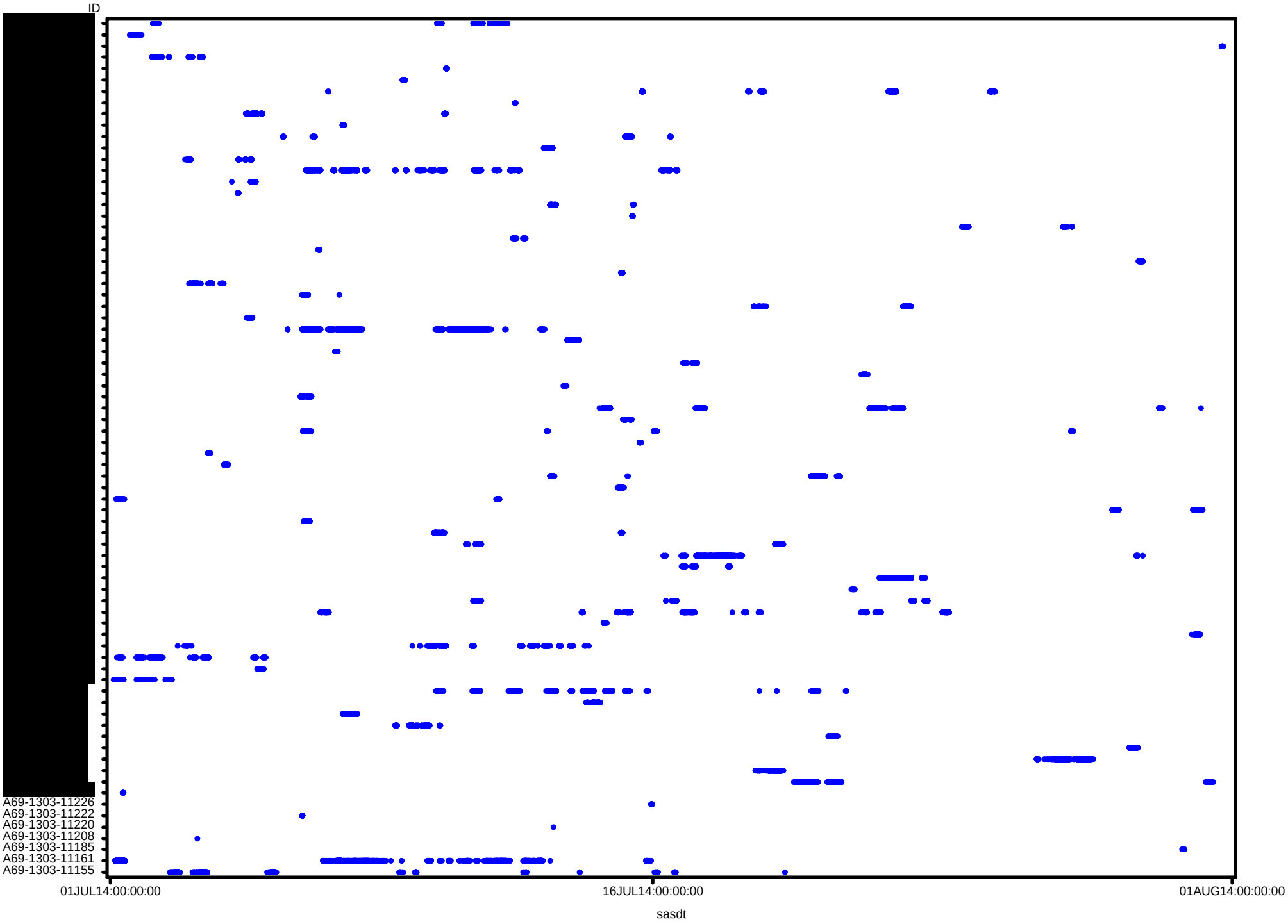
August - Shortnose Sturgeon - Vemco



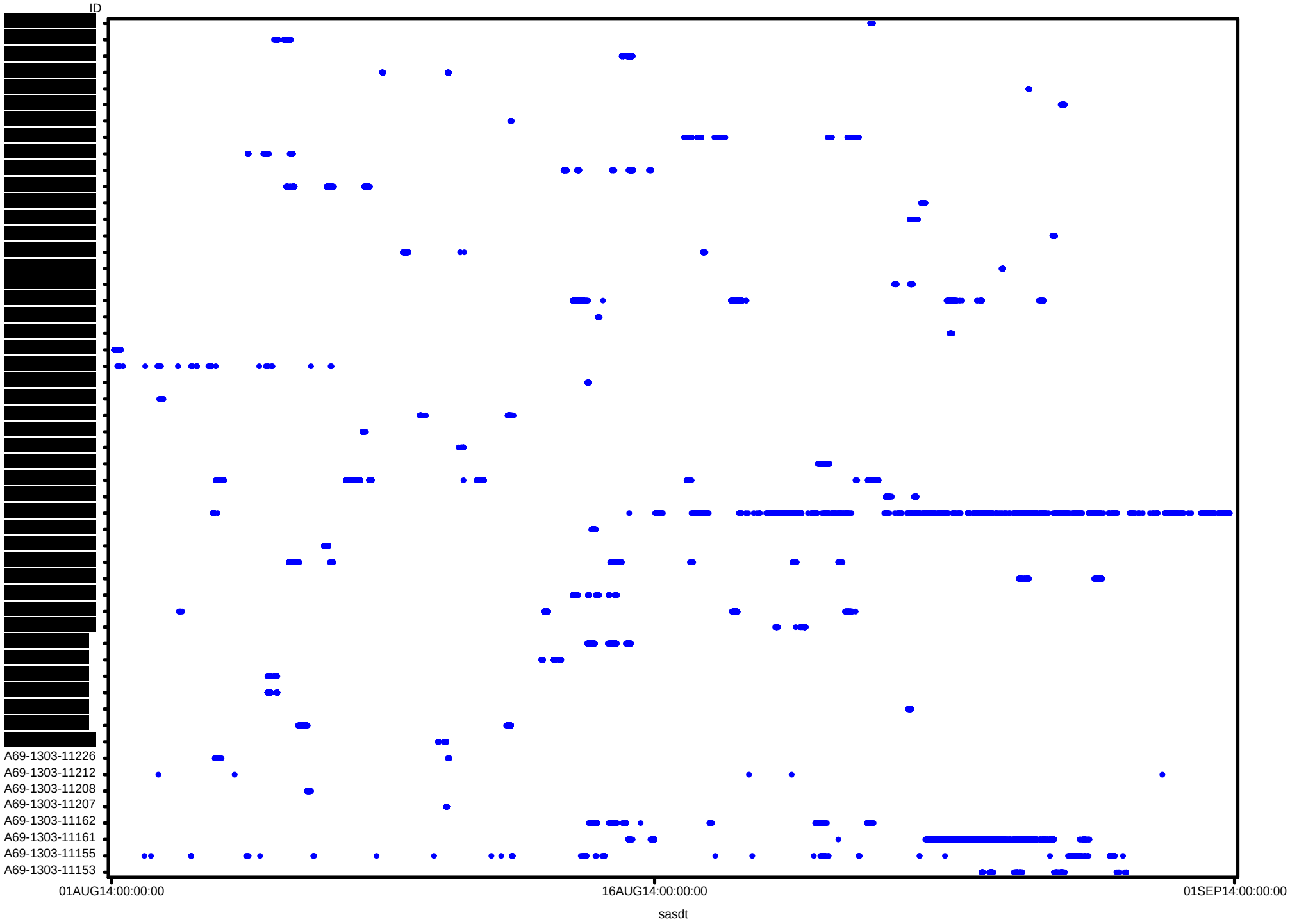
September - Shortnose Sturgeon - Vemco



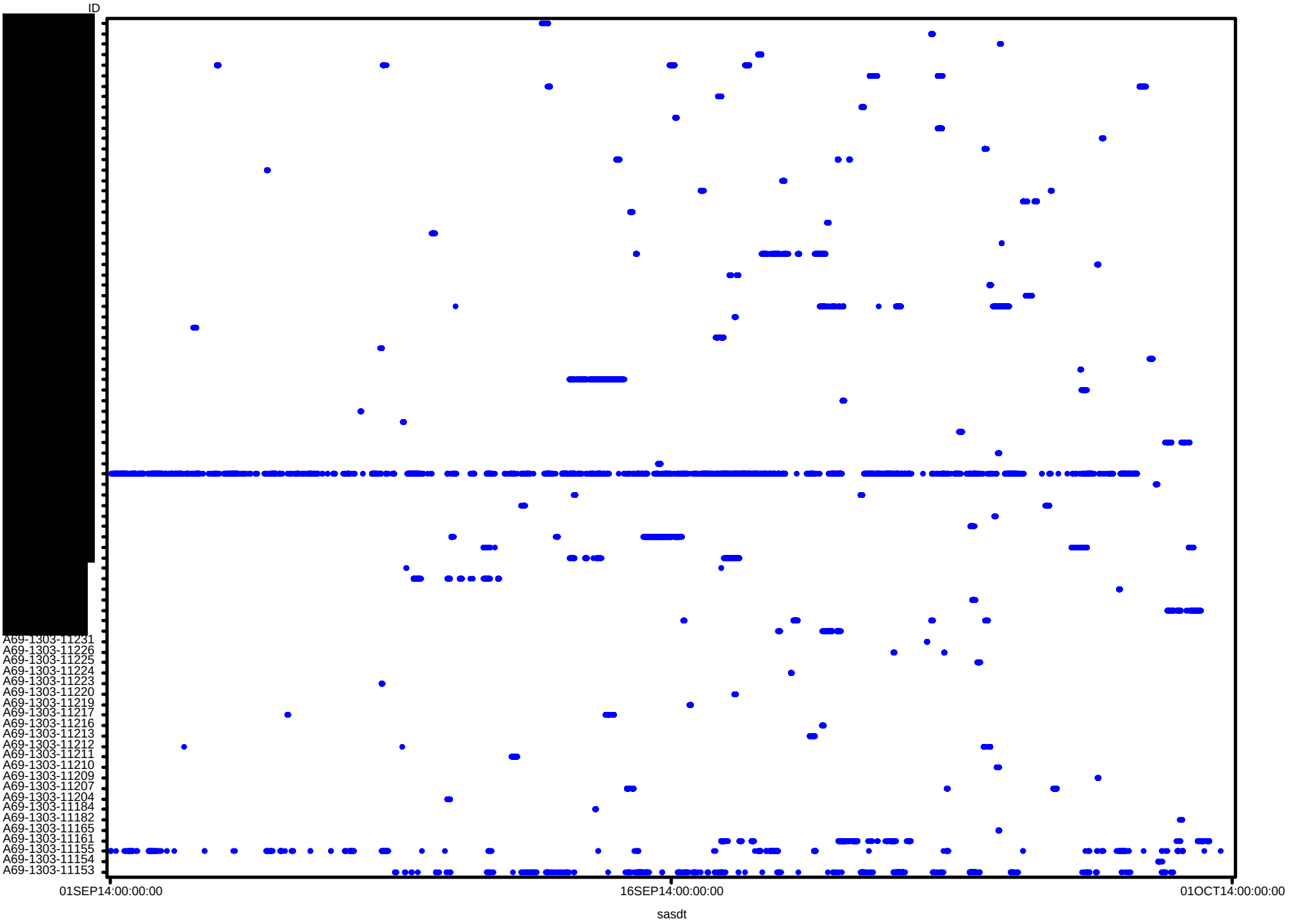
July - Atlantic sturgeon - Vemco



August - Atlantic sturgeon - Vemco



September - Atlantic sturgeon - Vemco



Appendix B

Sturgeon Position within the Near-Field Monitoring Array

July 2014 -- VEMCO Data

Percent of Total Detections by Species and Receiver Location
Shortnose Sturgeon

Receiver Location	West	Channel	East	Total
North	33.8%	11.5%	16.6%	61.9%
South	16.1%	11.5%	10.5%	38.1%
Total	**49.9%**	**23.0%**	**27.1%**	**100.0%**

Species Detection by Station during the Month of July

Species	Stations																														
	West																	Channel												East		
	1	2	3	4	5	9	10	23	24	25	26	27	28	29	30	31	32	6	12	13	14	15	16	17	18	19	20	21	22	7	8	11
Shortnose	961	1	399	254	981	765	.	4698	6568	454	630	6483	3605	1183	3740	5399	.	.	.	3938	.	1812	2571	1346	713	1347	1898	1185	1824	.	12028	7635

August 2014 -- VEMCO Data

Percent of Total Detections by Species and Receiver Location

Shortnose Sturgeon

Receiver Location	West	Channel	East	Total
North	56.2%	12.1%	5.3%	73.6%
South	3.2%	5.8%	17.4%	26.4%
Total	**59.4%**	**17.9%**	**22.7%**	**100.0%**

Species Detection by Station during the Month of August

Species	Stations																														
	West																	Channel												East		
	1	2	3	4	5	9	10	23	24	25	26	27	28	29	30	31	32	6	12	13	14	15	16	17	18	19	20	21	22	7	8	11
Shortnose	616	.	30	234	316	304	.	136	5294	67	30	829	4473	7771	79	369	.	.	.	1849	.	917	1428	255	133	435	391	267	527	.	1840	6004

September 2014 -- VEMCO Data

Percent of Total Detections by Species and Receiver Location
Shortnose Sturgeon

Receiver Location	West	Channel	East	Total
North	70.1%	5.1%	0.0%	75.2%
South	8.5%	4.4%	11.9%	24.8%
Total	**78.6%**	**9.5%**	**11.9%**	**100.0%**

Species Detection by Station during the Month of September

Species	Stations																														
	West																	Channel												East		
	1	2	3	4	5	9	10	23	24	25	26	27	28	29	30	31	32	6	12	13	14	15	16	17	18	19	20	21	22	7	8	11
Shortnose	19	.	398	10	1422	236	.	.	3808	64	.	2	584	2329	96	183	.	.	153	.	.	241	197	312	.	.	.	.	206	.	.	1383

July 2014 -- VEMCO Data

Percent of Total Detections by Species and Receiver Location
Atlantic Sturgeon

Receiver Location	West	Channel	East	Total
North	1.3%	27.2%	1.1%	29.6%
South	2.2%	65.7%	2.5%	70.4%
Total	**3.5%**	**92.9%**	**3.6%**	**100.0%**

Species Detection by Station during the Month of July

Species	Stations																														
	West																	Channel												East		
	1	2	3	4	5	9	10	23	24	25	26	27	28	29	30	31	32	6	12	13	14	15	16	17	18	19	20	21	22	7	8	11
Atlantic	6	.	5	103	214	389	.	2	140	10	112	11	64	31	58	139	.	.	.	3816	.	3417	2928	2213	3400	4167	5724	3783	5267	.	414	956

August 2014 -- VEMCO Data

Percent of Total Detections by Species and Receiver Location

Atlantic Sturgeon

Receiver Location	West	Channel	East	Total
North	1.1%	23.5%	0.8%	25.4%
South	5.4%	65.4%	3.8%	74.6%
Total	**6.5%**	**88.9%**	**4.6%**	**100.0%**

Species Detection by Station during the Month of August

Species	Stations																														
	West																	Channel												East		
	1	2	3	4	5	9	10	23	24	25	26	27	28	29	30	31	32	6	12	13	14	15	16	17	18	19	20	21	22	7	8	11
Atlantic	0	.	341	16	120	477	.	6	68	9	8	1	37	9	61	291	.	.	.	1444	.	1884	1864	1124	972	3547	3928	1452	3431	.	171	838

September 2014 -- VEMCO Data

Percent of Total Detections by Species and Receiver Location
Atlantic Sturgeon

Receiver Location	West	Channel	East	Total
North	3.3%	25.5%	0.0%	28.8%
South	31.3%	30.2%	9.7%	71.2%
Total	**34.6%**	**55.7%**	**9.7%**	**100.0%**

Species Detection by Station during the Month of September

Species	Stations																														
	West																	Channel												East		
	1	2	3	4	5	9	10	23	24	25	26	27	28	29	30	31	32	6	12	13	14	15	16	17	18	19	20	21	22	7	8	11
Atlantic	0	.	1797	102	142	1151	.	.	270	75	.	0	34	11	238	1012	.	.	219	.	.	1700	1646	1302	.	.	.	.	2919	.	.	1352