Completion Report

for

Sturgeon Gillnet Study (EA-133F-12-RQ-0697)

Year Three, the Influence of Sink Gillnet Profile on Bycatch of Atlantic Sturgeon in the Mid-Atlantic Monkfish Fishery

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Summary

In 2012, five Distinct Population Segments of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) were listed under the Endangered Species Act. A preceding Status Review concluded that bycatch in sink-gillnets was a significant hurdle to Atlantic sturgeon recovery. Over three field seasons (2010-2012), we worked collaboratively with commercial harvesters to modify sink gillnet configurations to reduce Atlantic sturgeon bycatch while still achieving adequate catches of monkfish (*Lophius americanus*) and winter skate (*Leucoraja ocellata*), which were the primary target species. In 2010, we fished paired replicates of gillnets (12 meshes x 12 in (30.5 cm) stretch) with and without tie-downs, and, although Atlantic sturgeon bycatch did not differ significantly, target species catches were reduced in nets without tie-downs. In 2011, we subjected two different tie-down configurations: standard (12 meshes with 48 in (1.2 m) tie-downs) and low profile (six meshes with 24 in (0.6 m) tie-downs) to the same experimental protocol. Bycatch of Atlantic sturgeon and landings of targeted species were both significantly reduced in the low profile tie-down gillnets. During 2012 we compared another low profile net configuration (eight meshes tied-down to two) which reduced Atlantic sturgeon bycatch with minimal impact on the landings of targeted species. Our findings suggest that the use of tie-downs is important for maintaining adequate catches of target species, and that certain tie-down configurations can reduce Atlantic sturgeon bycatch. Additionally, experimental testing of gear developed by harvesters allows for the identification of gear configurations that both address conservation objectives and are realistic for use in commercial harvest. This model of collaborative research may prove useful in the recovery of other imperiled sturgeons.

Background

Globally, sturgeons (family Acipenseridae) have suffered dramatic population declines with 85% of species at risk of extinction according to the findings of a recent IUCN report. As such, the IUCN noted that sturgeon were more critically endangered than any other species group on their Red List (IUCN 2010). The Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*), which ranges from the St. Johns River, Florida (Vladykov and Greeley 1963) north to the Hamilton Inlet, Labrador, Canada (Backus 1951), typifies this pattern. The Delaware River currently supports fewer than 300 spawning individuals (ASSRT 2007); representing < 0.1% of the historical abundance of what was once the largest population (Secor and Waldman 1999) of Atlantic sturgeon.

In 1990, the Atlantic States Marine Fisheries Commission (ASMFC) created a Fishery Management Plan (FMP) for Atlantic sturgeon with a goal of restoring a fishable population that could sustain annual removals equal to 10% of historic landings (Taub 1990). Shortly thereafter, the FMP was followed with an amendment implementing a coast-wide moratorium on harvest of Atlantic sturgeon (ASMFC, 1998). In 2005, the Atlantic Sturgeon Status Review Team (ASSRT) was created to determine if protection was warranted under the Endangered Species Act. The ASSRT published its findings in 2007, identifying five Distinct Population Segments (DPSs), which were distinctly separated by their biological traits and genetic composition, occupied unique ecological settings, and would create a large gap in the species' range if extirpated (ASSRT 2007).

On February 6, 2012 NMFS published a notice in the Federal Register proposing to list four of the Atlantic sturgeon DPSs, including the New York Bight and Chesapeake Bay DPSs, as endangered, and the Gulf of Maine DPS as threatened (U.S. Office of the Federal Register

2012a, U.S. Office of the Federal Register 2012b). On April 6, 2012, the final ruling to list five Distinct Population Segments (DPSs) of Atlantic sturgeon under the Endangered Species Act became effective. The decision to list Atlantic sturgeon was based on a number of factors including degradation and loss of habitat, vessel strikes, and bycatch in commercial fisheries.

Atlantic sturgeons are anadromous, spending much of their life in the marine environment. In both the Status Review and FMP documents there are calls for more directed research on the marine phase of Atlantic sturgeon life history, which has been underrepresented in the scientific literature (Stein et al. 2004a). The general lack of biological information causes problems for fisheries professionals working within the confines of state jurisdictional boundaries, and it is especially problematic for Atlantic sturgeon as they are known to suffer from interactions with coastal marine fisheries, including gillnets (Stein et al. 2004b, ASMFC 2007).

The use of gillnets to capture fish dates back over 3,000 years, although relatively recent advances in technology including synthetic materials and hydraulic haulers have led to increased use of this methodology (Potter and Pawson 1991, He 2006a). Unfortunately our understanding of the mechanisms influencing bycatch in gillnets has lagged behind technological advances in the fishing industry, leading to increased concerns over the incidental take of birds, fishes, and mammals (He and Pol 2010). In the mid-Atlantic and northeast U.S., monkfish (*Lophius americanus*) support a lucrative commercial fishery out to the edge of the continental shelf. Monkfish are targeted primarily with trawls in the northern management area and sink-gillnets in the mid-Atlantic. The sink-gillnets employed in the monkfish fishery have been identified as a significant source of bycatch mortality for Atlantic sturgeon during the marine phase of their life history (Stein et al. 2004b, ASMFC 2007). As such, it is believed that changes in fishing practices in the monkfish fishery may have the potential to decrease the bycatch of Atlantic sturgeon. Unfortunately, data on potential bycatch reduction approaches in the monkfish gillnet fishery (e.g. net profile and tie-downs) are lacking, although mesh size, tie downs, and soak times are thought to be mitigating factors in Atlantic sturgeon bycatch mortality, which ranged from 14% (ASMFC 2007) to 22% (Stein et al. 2004) over the period 1989 to 2006 .

Objectives

The objectives of the study were as follows: 1) compare the bycatch rates of Atlantic sturgeon encountered in both control and experimental gillnets in NMFS Statistical Area 615; 2) compare the catch rates of the target species (monkfish and winter skate) in each gillnet configuration; and 3) record the bycatch of other NMFS regulated or protected species.

Methods

Field Studies: Through cooperative agreements with participating commercial harvesters, we examined catch rates of targeted species (e.g. monkfish and winter skate (*Leucoraja ocellata*)) and bycatch of Atlantic sturgeon for two gillnet configurations fished in a paired replicate design. We utilized NMFS supplied gillnets which were 300 ft (91.4 m) in length and consisted of two configurations that varied in vertical profile. The control nets were comprised of 12 meshes x 12 in (30.5 cm) stretch mesh with four 48 in (1.2 m) mesh tie-downs spaced 24 ft (7.3 m) apart on alternating corks on the float line. The lower profile treatment nets were constructed of 8 meshes x 12 in (30.5 cm) stretch mesh with 24 in (0.6 m) tie-downs spaced every 12 ft (3.65 m) apart, which corresponded to the location of corks in the float line. Panels were constructed using Chatham green webbing (0.90mm) with a 0.50 hanging ratio, 0.375 in

(9.5 mm) poly float line that contained five spliced 1,100 lb (500 kg) weak links per panel, and a 75 lb (34.1 kg) leadline (75 lb (34.1kg)/600 ft (182.8 m) spool). Each vessel deployed 40 panels of gillnet configured in 10 panel strings totaling 3,000 ft (914 m). Each string comprised either control (standard profile) or treatment (low profile) nets. Cooperating monkfish harvesters fished the strings of gillnets as paired replicates, with the pair including both the control and treatment gillnets strings set in a similar location, at a similar depth, and fished for a similar amount of time. A total of 120 hauls of 60 replicates were completed, with hauls split evenly between vessels, and the set sequence for net strings randomly selected at the start of the study. A copy of the haul schedule was kept on board each vessel and confirmed by the vessel master and NMFS trained observer.

Two monkfish fishing vessels (F/V Dana Christine and F/V Traveller II) employed normal gillnetting operations with soak times dependent upon fishing and weather conditions. Sampling operations took place in November and December of 2012 off the coast of New Jersey in waters that historically supported commercial monkfish operations (Statistical Area 615) (Figure 1) and where the vessel captains believed they would encounter Atlantic sturgeon. In the event of snags or tears, gillnet panels were repaired on site. Both fishing vessels operated in the same general vicinity, fishing inshore waters less than 100 m in depth. Effort was standardized to net days, which were defined as ten 100 yard (91.4 m) panels fished for a 24h period.

Fishing operations were monitored by NMFS trained observers (MRAG Americas) who recorded total weight and length measurements for all monkfish and other commercially landed species. In instances where the number of individuals per net string exceeded 100, a sub-sample (n=100) was randomly selected, and the total weight recorded. Atlantic sturgeon brought aboard the vessel were measured, weighed, a small tissue sample was recovered, and, in the case of mortalities, the pectoral girdles were removed for future age and growth studies. Atlantic sturgeon were scanned for the presence of a passive integrated transponder (PIT) tag. If no PIT tag was found in live individuals, a 12 mm 134.2 kHz PIT tag was implanted on the left side at the base of the dorsal fin and the fish were immediately released at the site of capture. In these instances the disposition (i.e., live vs. mortality) was recorded as was the vertical and horizontal location of the sturgeon capture in the net panel. In the case of the low profile nets vertical location in the net panel was often impossible to ascertain as the entire profile of the net was frequently bunched together.

If an Atlantic sturgeon carcass was salvageable (i.e. not mostly consumed or falling apart from scavenger foraging) it was brought ashore, outfitted with a tail tag, and placed in a commercial freezer at Viking Village Inc. (Barnegat Light, NJ). The carcasses were transferred to Burris Logistics (Harrington, DE), where they were individually wrapped in plastic and stored in a commercial freezer. At a later date, an announcement will be sent to sturgeon researchers with appropriate NOAA-NMFS permits and the carcasses will be made available for additional tissue sampling. The carcasses will then be placed back in storage for later use in a planned project to examine reporting rate of Atlantic sturgeon vessel strike mortalities in the Delaware River (pending funding from NOAA-NMFS-Species Recoveries Grants to States (Section 6)).

Original data sheets (available upon request) were signed by both the vessel captain and fishery observer and then scanned to ensure quick data entry and to provide a secure back up of the data. Data sheets were then entered into a relational database for generation of tables to facilitate report writing and statistical analyses. All statistical analyses were conducted with JMP Version 10.0 (2013) using a paired comparison to test for differences in soak times and catch rates between gear types. We examined the role of soak times and Atlantic sturgeon size (FL) in influencing status (live/dead) at the time of capture through a logistic regression model for the current sampling season and all (2010-2012) seasons combined. Catch-per-unit-effort (CPUE) was defined as weight (kg) landed per net day per 1000 yards of net, except for Atlantic sturgeon where numbers encountered were utilized. Statistical significance was inferred at $p \leq 0.05$.

Results and Discussion

All field sampling was conducted in NMFS Statistical Area 615 (Figure 1) and was initiated on Nov. 26, 2012 by the commercial fishing vessels F/V Dana Christine and F/V Traveller II. Operations were concluded on Dec. 18, 2011 at the completion of 120 net hauls (Table 1). Soak times for control gillnets averaged 32.06 hours (range = 21.1-74.2h), while the soak times for the lower profile treatment gillnets averaged 32.16 hours (range = 20.0-75.0h). There was no significant difference in the duration of soak time of control and treatment gillnets based on a paired comparison t-test (p = 0.9677).

A total of 16 identified species (12 fishes and four invertebrates) were encountered in the course of sampling, totaling 11,951 kg (Table 2). The vast majority of landings (79.7%) were of monkfish (5,004 kg) and winter skate (4521 kg). The next species of importance as measured by weight was Atlantic sturgeon with an estimated total weight of 1,000kg. After Atlantic sturgeon, there was a marked drop in total landings to little skate (*Raja erinacea*) (579 kg) and spiny dogfish (*Squalus acanthias*) (433 kg). Discards of regulated species (e.g. monkfish, winter skate, and spiny dogfish) were limited by market conditions and quotas. During the course of this work, no marine mammals were caught in either control or treatment nets.

In total, 35 adult and juvenile Atlantic sturgeon with a mean size of 149.4 cm FL (range = 102-181 cm) were encountered during the course of the project (Figure 2). Although Atlantic sturgeon in the control gillnets were larger (151.1 cm FL) than those captured in the low profile gillnets (146.8 cm FL), it did not appear that sturgeon length was significantly influenced by gear type (p= .4872). Capture rates of Atlantic sturgeon did not differ significantly (p = 0.3577) by gillnet type, with 21 (60.0%) captured in control gillnets and the remaining 14 (40.0%) captured in the lower profile treatment nets. A retrospective power analysis determined that the probability of rejecting the null hypothesis when the null hypothesis was false was 0.1189. The results of the power analysis suggest that our ability detect a difference when one existed may have been influenced by the low sample size of Atlantic sturgeon. We were able to attain length measurements on a total of 32 Atlantic sturgeon, the vast majority (93.8%) of which were above the minimum size of maturity (130 cm FL) for Atlantic sturgeon (Van Eenennaam et al. 1996) (Table 3). We were unable to measure the remaining individuals because three of them either escaped from gillnets as the gear was being hauled from the water or fell out and sank prior to being hauled on board. Of the 21 Atlantic sturgeon captured in the control nets; we were able to assess the vertical placement of 20 in the net: 70% of sturgeon were entangled in the top half of the net with the remaining individuals located in the bottom. In the instances when we could accurately determine the vertical placement of Atlantic sturgeon in the low profile treatment nets we found a similar pattern with 62% of individuals entangled in the top half of the net. It should be noted that our ability to accurately assess the entanglement position of Atlantic sturgeon in the low profile treatment nets may be diminished by the tendency of the entire net collapsing on the sturgeon. Although sample sizes are limited, these results appear to indicate Atlantic sturgeon catch rates are lowest at the bottom of the net. Sturgeons are traditionally referred to as benthic cruisers (Findeis 1997) though there is a growing body of evidence to suggest that they commonly are in the water column (Sulak et al. 2002, Erickson and Hightower 2007). Although we did not detect a significant difference in Atlantic sturgeon capture rates between net types, the decreased capture rates of sturgeon in the low profile nets coupled with the entanglement of sturgeon in the upper portions of both nets suggests that Atlantic sturgeon may be higher off the bottom than previously thought.

The disposition of Atlantic sturgeon was almost equally split between live (17) and dead (18) encounters during this study. Of the 21 Atlantic sturgeon encountered in the control gillnets, 10 were alive and 11 were dead. The 14 Atlantic sturgeon encountered in the treatment gillnet configuration were equally split between live and dead sturgeon. Due to low capture rates, we pooled across gillnet treatment types to examine the influence of soak time on Atlantic sturgeon disposition (i.e. live/dead) upon landing. The results of a logistic regression analysis of pooled Atlantic sturgeon encounters by soak time indicated that mortality rate was not significantly correlated with soak time ($p = 0.8862$) (Figure 3). Although it is intuitive that soak time could play a role in mediating survival risk in entangled individuals, the difficulty in assigning the actual timing of entanglement for individuals leads to much uncertainty, which can be further compounded when dealing with small sample sizes. In an attempt to further examine this relationship, we pooled the results of our 2012 sampling season with data collected in 2010 ($n=23$) and 2011 ($n=37$) to develop a more robust examination of the role that soak time plays in Atlantic sturgeon bycatch mortality rates. The results of this pooled analysis, which incorporated 95 events, suggests that Atlantic sturgeon mortality rate increased significantly ($p=.0343$) with soak time (Figure 4). These pooled results add to the growing body of evidence which suggests that the soak time of anchored gillnets may be positively correlated with mortality risk, especially in cases where soak times exceed 24h (Stein et al. 2004b, ASMFC 2007). In the present study, Atlantic sturgeon mortality rates increased marginally between 24-48h, and

Atlantic sturgeon encounters in longer soak times were limited to two dead individuals encountered after approximately 72h. Our pooled results indicated that Atlantic sturgeon mortality rates increased from approximately 54% at 24h to 65% at 48h, 76% at 72h, and reached 84% with a soak time of 96h.

Through our sampling efforts, a total of 800 monkfish weighing 5,004 kg of were landed (Table 2). Slightly more than half (52.3%) of monkfish were landed in control nets. In total, monkfish landings in the treatment gear (2,389 kg) were 4.5% lower than landings in control gear (2,615 kg). Catch rates of monkfish (CPUE) were not significantly different between the gear types ($p = 0.3274$). The mean size of monkfish landed in the control gillnets was 71.7 cm TL (median = 72cm TL) while the mean size of monkfish landed in the lower profile treatments (71.5 cm TL) (median = 72cm TL) was slightly, although not significantly ($p = 0.7171$), smaller (Figure 5).

A total of 947 Winter skate were landed, representing the second most dominant species by weight (4521 kg); catch rates did not vary significantly ($p = 0.4212$) by gear type, but the majority (53.5%) of landings were in the control gillnets. Lengths of winter skate landed in the control gillnets (mean = 84.4 cm TL) were significantly smaller ($p = 0.0230$) than those landed in the lower profile treatment nets (mean = 85.5cm TL) (Figure 6). Spiny dogfish, which represented the species with the lowest landings (433 kg) still considered commercially viable, were landed at significantly ($p < 0.0001$) lower rates (30.7%) in the low profile treatment nets compared to the control gear (69.3%). We documented no significant difference ($p = .3365$) in the lengths of dogfish landed in the control gear (mean = 85.9 cm TL) and those landed in the low profile treatment nets (mean = 85.1 cm TL) (Figure 7).

Through this study we have provided insights that although not significant, suggest that decreasing the profile of sink gillnets may reduce the capture rates of critically imperiled Atlantic sturgeon. Although the new net configuration did not significantly reduce Atlantic sturgeon encounters, it still provided landings of targeted species (i.e. monkfish and winter skate) at levels close to the control configuration while reducing sturgeon encounter rates by 20%. It should be noted that although our findings suggest that the lower profile nets may reduce the encounter rates of Atlantic sturgeon they represent a point estimate with correspondingly high levels of uncertainty. We recommend that additional controlled studies be conducted to expand the scope of our findings. Our results provide hope that through continued modification and testing we can increase the levels of monkfish landed in the low profile treatment gillnets in ways that would result in landings similar to those in traditional control nets. The use of modified net profiles has been examined in other systems (He 2006b) with mixed success, nevertheless providing hope for a technological solution to the issue surrounding Atlantic sturgeon bycatch in large mesh sink gillnets (ASMFC 2007). At the conclusion of the present study, both vessel captains suggest that continued refinement of the sink gillnets should focus on altering the mesh size and or twine configuration in an attempt to develop a conservation engineering approach that will both further Atlantic sturgeon conservation and recovery efforts and retain the economic viability of the existing commercial fishery.

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Table 1: Sample locations (decimal degrees) and haul information for F.Vs. Dana Christine and Traveller II.

Haul Number	Pair	Vessel Name	Gear Type	Set Date	Set Latitude Start	Set Longitude Start	Set Latitude End	Set Latitude End	Haul Date	Haul Latitude Start	Haul Longitude Start	Haul Latitude End	Haul Longitude End	Soak Time (hours)	Depth (m)
1	T01	Traveller II	Treatment	26-Nov-12	39.8333	-73.9003	39.8333	-73.9000	27-Nov-12	39.8169	-73.9002	39.8169	73.9000	23.5	23.8
2	T01	Traveller II	Control	26-Nov-12	39.8334	-73.9169	39.8334	-73.9167	27-Nov-12	39.8334	-73.9169	39.8334	-73.9167	24.9	23.8
3	T02	Traveller II	Treatment	26-Nov-12	39.8334	-73.9500	39.8334	-73.9500	27-Nov-12	39.8334	-73.9500	39.8334	-73.9335	25.3	21.9
4	T02	Traveller II	Control	26-Nov-12	39.8334	-73.9503	39.8334	-73.9500	27-Nov-12	39.8334	-73.9503	39.8334	-73.9501	26.6	21.9
5	D01	Dana Christine	Control	26-Nov-12	39.8764	-73.8964	39.8764	-73.9100	27-Nov-12	39.8668	-73.9002	39.8668	-73.8836	23.5	25.6
6	D01	Dana Christine	Treatment	26-Nov-12	39.8794	-73.9097	39.8789	-73.9225	27-Nov-12	39.8669	73.9168	39.8669	-73.9002	24.3	25.6
7	D02	Dana Christine	Treatment	26-Nov-12	39.8794	-73.9097	39.8789	-73.9225	27-Nov-12	39.8669	-73.9168	39.8669	-73.9002	25.0	25.6
8	D02	Dana Christine	Control	26-Nov-12	39.8781	-73.9358	39.8769	-73.9489	27-Nov-12	39.8767	-73.9483	39.8783	-73.9367	25.5	25.6
9	T03	Traveller II	Control	27-Nov-12	39.8400	-73.9567	39.8383	-73.9667	29-Nov-12	39.8400	-73.9533	39.8383	-73.9650	46.1	21.9
10	T03	Traveller II	Treatment	27-Nov-12	39.8383	-73.9417	39.8383	-73.9533	29-Nov-12	39.8383	-73.9400	39.8383	-73.9517	47.5	23.8
11	T04	Traveller II	Treatment	27-Nov-12	39.8317	-73.9033	39.8317	-73.9033	29-Nov-12	39.8317	-73.9000	39.8317	-73.9133	49.8	23.8
12	T04	Traveller II	Control	27-Nov-12	39.8367	-73.9200	39.8350	-73.9317	29-Nov-12	39.8350	-73.9183	39.8350	-73.9300	50.0	25.6
13	D03	Dana Christine	Treatment	27-Nov-12	39.8750	-73.9350	39.8767	-73.9250	29-Nov-12	39.8767	-73.9350	39.8767	-73.9350	44.6	25.6
14	D03	Dana Christine	Control	27-Nov-12	39.8783	-73.9367	39.8767	-73.9483	29-Nov-12	39.8783	-73.9350	39.8767	-73.9483	45.7	23.8
15	D04	Dana Christine	Control	27-Nov-12	39.8668	-73.8836	39.8668	-73.9002	29-Nov-12	39.8668	-73.8836	39.8668	-73.9001	48.5	25.6
16	D04	Dana Christine	Treatment	27-Nov-12	39.8800	-73.9117	39.8783	-73.9250	29-Nov-12	39.8800	-73.9100	39.8800	-73.9217	49.5	25.6
17	D05	Dana Christine	Control	29-Nov-12	39.8800	-73.9100	39.8800	-73.9233	30-Nov-12	39.8783	-73.9100	39.8800	-73.9217	21.8	25.6
18	D05	Dana Christine	Treatment	29-Nov-12	39.7867	-73.9100	39.8767	-73.8950	30-Nov-12	39.8767	-73.8967	39.8767	-73.9083	23.2	25.6
19	D06	Dana Christine	Control	29-Nov-12	39.8767	-73.9350	39.8767	-73.9217	30-Nov-12	39.8767	-73.9233	39.8767	-73.9350	25.8	25.6
20	D06	Dana Christine	Treatment	29-Nov-12	39.8783	-73.9367	39.8767	-73.9483	30-Nov-12	39.8783	-73.9350	39.8783	-73.9467	26.1	21.9
21	T05	Traveller II	Control	29-Nov-12	39.8400	-73.9650	39.8383	-73.9650	30-Nov-12	39.8400	-73.9533	39.8383	-73.9650	23.7	21.9
22	T05	Traveller II	Treatment	29-Nov-12	39.8383	-73.9517	39.8383	-73.9400	30-Nov-12	39.8383	-73.9400	39.8393	-73.9500	23.6	23.8
23	T06	Traveller II	Control	29-Nov-12	39.8350	-73.9283	39.8350	-73.9167	30-Nov-12	39.8367	-73.9167	39.8350	-73.9300	22.5	25.6
24	T06	Traveller II	Treatment	29-Nov-12	39.8317	-73.9133	39.8300	-73.9133	30-Nov-12	39.8317	-73.9017	39.8317	-73.9133	25.2	23.8
25	D07	Dana Christine	Control	30-Nov-12	39.8800	-73.9100	39.8800	-73.9217	02-Dec-12	39.8783	-73.9217	39.8783	-73.9100	44.8	25.6
26	D07	Dana Christine	Treatment	30-Nov-12	39.8668	-73.9001	39.8668	-73.8836	02-Dec-12	39.8668	-73.9002	39.8668	-73.8836	46.0	25.6
27	D08	Dana Christine	Treatment	30-Nov-12	39.8668	-73.9334	39.8668	-73.9168	02-Dec-12	39.8668	-73.9168	39.8668	-73.9334	45.4	25.6
28	D08	Dana Christine	Control	30-Nov-12	39.8669	-73.9334	39.8669	-73.9336	02-Dec-12	39.8669	-73.9336	39.8668	-73.9336	45.8	23.8
29	T07	Traveller II	Treatment	29-Nov-12	39.8334	-73.9002	39.8333	-73.9002	02-Dec-12	39.8169	-73.9002	39.8169	-73.9000	74.1	23.8
30	T07	Traveller II	Control	29-Nov-12	39.8334	-73.9169	39.8334	-73.9167	02-Dec-12	39.8334	-73.9169	39.8334	-73.9167	71.6	23.8

Table 1 continued: Sample locations (decimal degrees) and haul information for F.Vs. Dana Christine and Traveller II.

Haul Number	Pair	Vessel Name	Gear Type	Set Date	Set Latitude Start	Set Longitude Start	Set Latitude End	Set Latitude End	Haul Date	Haul Latitude Start	Haul Longitude Start	Haul Latitude End	Haul Longitude End	Soak Time (hours)	Depth (m)
31	T08	Traveller II	Control	29-Nov-12	39.8668	-73.9502	39.8334	-73.9500	02-Dec-12	39.8334	-73.9503	39.8334	-73.9501	74.2	23.8
32	T08	Traveller II	Treatment	29-Nov-12	39.8334	-73.9500	39.8334	-73.9334	02-Dec-12	39.8334	-73.9334	39.8334	-73.9500	75.0	23.8
33	T09	Traveller II	Treatment	02-Dec-12	39.8334	-73.9500	39.8334	-73.9334	03-Dec-12	39.8334	-73.9334	39.8334	-73.9500	20.0	23.8
34	T09	Traveller II	Control	02-Dec-12	39.8334	-73.9501	39.8334	-73.9667	03-Dec-12	39.8334	-73.9501	39.8334	-73.9667	21.6	21.9
35	T10	Traveller II	Treatment	02-Dec-12	39.8169	-73.9000	39.8169	-73.9000	03-Dec-12	39.8333	-73.9000	39.8169	-73.9002	24.9	25.6
36	T10	Traveller II	Control	02-Dec-12	39.8334	-73.9167	39.8334	-73.9169	03-Dec-12	39.8334	-73.9167	39.8334	-73.9169	24.7	25.6
37	D09	Dana Christine	Control	02-Dec-12	39.8669	-73.9002	39.8669	-73.9168	03-Dec-12	39.8669	-73.9002	39.8669	-73.9168	22.0	25.6
38	D09	Dana Christine	Treatment	02-Dec-12	39.8668	-73.8836	39.8668	-73.9002	03-Dec-12	39.8668	-73.8836	39.8668	-73.9001	23.0	25.6
39	D10	Dana Christine	Treatment	02-Dec-12	39.8668	-73.9336	39.8668	-73.9168	03-Dec-12	39.8668	-73.9168	39.8668	-73.9334	21.9	25.6
40	D10	Dana Christine	Control	02-Dec-12	39.8668	-73.9336	39.8669	-73.9334	03-Dec-12	39.8668	-73.9334	39.8668	-73.9336	22.7	23.8
41	D11	Dana Christine	Control	03-Dec-12	39.8669	-73.9001	39.8669	-73.9167	03-Dec-12	39.8669	-73.9167	39.8669	-73.9001	22.2	25.6
42	D11	Dana Christine	Treatment	03-Dec-12	39.9502	-73.8835	39.8668	-73.9001	04-Dec-12	39.8668	-73.9001	39.8668	-73.8835	23.0	25.6
43	D12	Dana Christine	Treatment	03-Dec-12	39.8668	-73.9333	39.8668	-73.9168	04-Dec-12	39.8668	-73.9334	39.8668	-73.9168	22.2	23.8
44	D12	Dana Christine	Control	03-Dec-12	39.8669	-73.9335	39.8669	-73.9169	04-Dec-12	39.8669	-73.9335	39.8669	-73.9333	22.3	25.6
45	T11	Traveller II	Control	03-Dec-12	39.8334	-73.9000	39.8334	-73.8834	04-Dec-12	39.8334	-73.9000	39.8334	-73.8834	22.9	23.8
46	T11	Traveller II	Treatment	03-Dec-12	39.8169	-73.9002	39.8169	-73.9000	04-Dec-12	39.8169	-73.9002	39.8169	-73.9000	23.1	23.8
47	T12	Traveller II	Treatment	03-Dec-12	39.8334	-73.9500	39.8334	-73.9334	04-Dec-12	39.8334	-73.9501	39.8334	-73.9334	25.6	21.9
48	T12	Traveller II	Control	03-Dec-12	39.8334	-73.9169	39.8333	-73.9167	04-Dec-12	39.8333	-73.9333	39.8333	-73.9167	23.5	23.8
49	T13	Traveller II	Control	04-Dec-12	39.8334	-73.8834	39.8333	-73.9000	05-Dec-12	39.8334	-73.8834	39.8333	-73.8836	21.9	25.6
50	T13	Traveller II	Treatment	04-Dec-12	39.8169	-73.9000	39.8169	-73.9003	05-Dec-12	39.8169	-73.9000	39.8169	-73.9002	21.9	23.8
51	T14	Traveller II	Treatment	04-Dec-12	39.8334	-73.9334	39.8334	-73.9501	05-Dec-12	39.8333	-73.9334	39.8334	-73.9500	21.9	23.8
52	T14	Traveller II	Control	04-Dec-12	39.8333	-73.9167	39.8333	-73.9169	05-Dec-12	39.8333	-73.9167	39.8333	-73.9169	22.0	23.8
53	D13	Dana Christine	Treatment	04-Dec-12	39.8668	-73.8835	39.8668	-73.9001	05-Dec-12	39.8668	-73.8835	39.8668	-73.9001	23.6	25.6
54	D13	Dana Christine	Control	04-Dec-12	39.8669	-73.9001	39.8669	-73.9167	05-Dec-12	39.8669	-73.9001	39.8669	-73.9167	23.5	25.6
55	D14	Dana Christine	Treatment	04-Dec-12	39.8668	-73.8668	39.8668	-73.9168	05-Dec-12	39.8668	-73.9168	39.8668	-73.9333	23.7	25.6
56	D14	Dana Christine	Control	04-Dec-12	39.8669	-73.9333	39.8669	-73.9333	05-Dec-12	39.8669	-73.9169	39.8669	-73.9335	23.3	23.8
57	T15	Traveller II	Control	05-Dec-12	39.8333	-73.9169	39.8333	-73.9167	07-Dec-12	39.8169	-73.9169	39.8333	-73.9167	44.8	23.8
58	T15	Traveller II	Treatment	05-Dec-12	39.8169	-73.9336	39.8169	-73.9336	07-Dec-12	39.8169	-73.9336	39.8169	-73.9334	46.3	21.9
59	T16	Traveller II	Treatment	05-Dec-12	39.8169	-73.9002	39.8169	-73.9000	07-Dec-12	39.8169	-73.9003	39.8169	-73.7501	48.0	23.8
60	T16	Traveller II	Control	05-Dec-12	39.8333	-73.8836	39.8333	-73.8834	07-Dec-12	39.8333	-73.9000	39.8333	-73.8834	49.4	23.8

Table 1 continued: Sample locations (decimal degrees) and haul information for F.Vs. Dana Christine and Traveller II.

Haul Number	Pair	Vessel Name	Gear Type	Set Date	Set Latitude Start	Set Longitude Start	Set Latitude End	Set Latitude End	Haul Date	Haul Latitude Start	Haul Longitude Start	Haul Latitude End	Haul Longitude End	Soak Time (hours)	Depth (m)
61	D15	Dana Christine	Treatment	05-Dec-12	39.8668	-73.9001	39.8668	-73.8835	07-Dec-12	39.8668	-73.8835	39.8668	-73.9001	46.3	23.8
62	D15	Dana Christine	Control	05-Dec-12	39.8669	-73.9167	39.8669	-73.9001	07-Dec-12	39.8669	-73.9001	39.8669	-73.8833	47.1	25.6
63	D16	Dana Christine	Treatment	05-Dec-12	39.8668	-73.9333	39.8668	-73.9333	07-Dec-12	39.8668	-73.9168	39.8668	-73.9333	46.3	25.6
64	D16	Dana Christine	Control	05-Dec-12	39.8669	-73.9333	39.8835	-73.9336	07-Dec-12	39.8669	-73.9333	39.8669	-73.9335	46.8	23.8
65	D17	Dana Christine	Control	07-Dec-12	39.5335	-73.8833	39.8669	-73.9001	08-Dec-12	39.8669	-73.9001	39.8669	-73.9167	22.9	23.8
66	D17	Dana Christine	Treatment	07-Dec-12	39.8668	-73.9001	39.8668	-73.8835	08-Dec-12	39.8668	-73.8835	39.8668	-73.9001	23.3	23.8
67	D18	Dana Christine	Control	07-Dec-12	39.8669	-73.9335	39.8669	-73.9169	08-Dec-12	39.8669	-73.8333	39.8669	-73.9335	22.7	25.6
68	D18	Dana Christine	Treatment	07-Dec-12	39.8668	-73.9333	39.8668	-73.9168	08-Dec-12	39.8668	-73.9168	39.8668	-73.9333	23.1	25.6
69	T17	Traveller II	Control	07-Dec-12	39.8333	-73.9167	39.8333	-73.9333	08-Dec-12	39.8333	-73.9167	39.8333	-73.9169	24.5	23.8
70	T17	Traveller II	Treatment	07-Dec-12	39.8169	-73.9334	39.8169	-73.9336	08-Dec-12	39.8169	-73.9334	39.8169	-73.9336	24.3	23.8
71	T18	Traveller II	Control	07-Dec-12	39.8333	-73.8834	39.8334	-73.9000	08-Dec-12	39.8333	-73.8834	39.8334	-73.8836	23.5	25.6
72	T18	Traveller II	Treatment	07-Dec-12	39.8169	-73.9001	39.8169	-73.9003	08-Dec-12	39.8169	-73.9000	39.8169	-73.9002	25.0	23.8
73	D19	Dana Christine	Treatment	08-Dec-12	39.8668	-73.9001	39.8668	-73.8835	09-Dec-12	39.8668	-73.9001	39.8668	-73.8835	23.7	25.6
74	D19	Dana Christine	Control	08-Dec-12	39.8669	-73.9001	39.8669	-73.9169	09-Dec-12	39.8669	-73.9001	39.8669	-73.9167	22.9	25.6
75	D20	Dana Christine	Control	08-Dec-12	39.8669	-73.9335	39.8669	-73.9333	09-Dec-12	39.8669	-73.9333	39.8669	-73.9335	21.9	23.8
76	D20	Dana Christine	Treatment	08-Dec-12	39.8668	-73.9333	39.8668	-73.9168	09-Dec-12	39.8668	-73.9334	39.8668	-73.9168	22.6	23.8
77	T19	Traveller II	Treatment	08-Dec-12	39.8333	-73.8834	39.8333	-73.8668	09-Dec-12	39.8169	-73.8668	39.8333	-73.8833	21.3	25.6
78	T19	Traveller II	Control	08-Dec-12	39.8334	-73.8836	39.8334	-73.8834	09-Dec-12	39.8333	-73.9000	39.8334	-73.8834	21.1	23.8
79	T20	Traveller II	Treatment	08-Dec-12	39.8169	-73.9002	39.8169	-73.9000	09-Dec-12	39.8169	-73.9000	39.8169	-73.9002	20.5	23.8
80	T20	Traveller II	Control	08-Dec-12	39.8333	-73.9169	39.8334	-73.9167	09-Dec-12	39.8334	-73.9167	39.8333	-73.9167	23.6	23.8
81	D21	Dana Christine	Control	11-Dec-12					12-Dec-12	39.8669	-73.9167	39.9002	-73.9001	23.0	25.6
82	D21	Dana Christine	Treatment	11-Dec-12					12-Dec-12	39.8668	-73.9001	39.8668	-73.8835	23.9	25.6
83	D22	Dana Christine	Control	11-Dec-12					12-Dec-12	39.8669	-73.9333	39.8668	-73.9336	24.3	21.9
84	D22	Dana Christine	Treatment	11-Dec-12					12-Dec-12	39.8668	-73.9333	39.8668	-73.9167	24.9	23.8
85	T21	Traveller II	Control	11-Dec-12	39.8334	-73.9502	39.8334	-73.9336	12-Dec-12	39.8334	-73.9502	39.8334	-73.9336	23.3	23.8
86	T21	Traveller II	Treatment	11-Dec-12	39.8334	-73.9335	39.8334	-73.9169	12-Dec-12	39.8334	-73.9335	39.8334	-73.9169	23.9	21.9
87	T22	Traveller II	Treatment	11-Dec-12	39.8169	-73.9001	39.8169	-73.8836	12-Dec-12	39.8169	-73.9002	39.8169	-73.8836	24.0	21.9
88	T22	Traveller II	Control	11-Dec-12	39.8334	-73.9168	39.8334	-73.9002	12-Dec-12	39.8333	-73.9168	39.8169	-73.9003	24.9	23.8
89	D23	Dana Christine	Control	12-Dec-12	39.8669	-73.9001	39.8669	-73.9167	14-Dec-12	39.8669	-73.9001	39.8669	-73.9167	46.6	25.6
90	D23	Dana Christine	Treatment	12-Dec-12	39.8668	-73.8835	39.8668	-73.9001	14-Dec-12	39.8668	-73.8835	39.8668	-73.9001	47.6	25.6

Table 1 continued: Sample locations (decimal degrees) and haul information for F.Vs. Dana Christine and Traveller II.

Haul Number	Pair	Vessel Name	Gear Type	Set Date	Set Latitude Start	Set Longitude Start	Set Latitude End	Set Latitude End	Haul Date	Haul Latitude Start	Haul Longitude Start	Haul Latitude End	Haul Longitude End	Soak Time (hours)	Depth (m)
91	D24	Dana Christine	Treatment	12-Dec-12	39.8668	-73.9168	39.8668	-73.9333	14-Dec-12	39.8668	-73.9167	39.8668	-73.9333	46.9	25.6
92	D24	Dana Christine	Control	12-Dec-12	39.8669	-73.9333	39.8669	-73.9335	14-Dec-12	39.8669	-73.9169	39.8669	-73.9335	47.3	23.8
93	T23	Traveller II	Control	12-Dec-12	39.8169	-73.9003	39.8333	-73.9168	14-Dec-12	39.8333	-73.9002	39.8333	-73.9168	43.9	23.8
94	T23	Traveller II	Treatment	12-Dec-12	39.8169	-73.8836	39.8169	-73.9002	14-Dec-12	39.8169	-73.8836	39.8169	-73.9001	45.4	25.6
95	T24	Traveller II	Treatment	12-Dec-12	39.8334	-73.9169	39.8334	-73.9335	14-Dec-12	39.8334	-73.9169	39.8334	-73.9335	46.9	23.8
96	T24	Traveller II	Control	12-Dec-12	39.8334	-73.9336	39.8334	-73.9502	14-Dec-12	39.8334	-73.9336	39.8334	-73.9502	48.3	23.8
97	T25	Traveller II	Control	14-Dec-12	39.8334	-73.8833	39.8334	-73.8667	15-Dec-12	39.8334	-73.8667	39.8334	-73.8669	21.6	25.6
98	T25	Traveller II	Treatment	14-Dec-12	39.8334	-73.8836	39.8334	-73.8833	15-Dec-12	39.8334	-73.8836	39.8334	-73.8834	21.2	25.6
99	T26	Traveller II	Control	14-Dec-12	39.8333	-73.9168	39.8334	-73.9002	15-Dec-12	39.8334	-73.9168	39.8334	-73.9002	26.0	25.6
100	T26	Traveller II	Treatment	14-Dec-12	39.8169	-73.9001	39.8333	-73.8835	15-Dec-12	39.8169	-73.9001	39.8333	-73.8836	26.0	23.8
101	D25	Dana Christine	Treatment	14-Dec-12	39.8668	-73.9001	39.8668	-73.8835	15-Dec-12	39.8668	-73.8835	39.8668	-73.9001	23.6	25.6
102	D25	Dana Christine	Control	14-Dec-12	39.8669	-73.9001	39.7502	-73.9167	15-Dec-12	39.8669	-73.9001	39.8669	-73.9167	23.8	25.6
103	D26	Dana Christine	Treatment	14-Dec-12	39.8668	-73.9334	39.8668	-73.9168	15-Dec-12	39.8668	-73.9334	39.8668	-73.9168	23.1	23.8
104	D26	Dana Christine	Control	14-Dec-12	39.8669	-73.9335	39.8669	-73.9169	15-Dec-12	39.8668	-73.9335	39.8668	-73.9333	23.9	21.9
105	D27	Dana Christine	Control	15-Dec-12	39.8669	-73.9167	39.8669	-73.9001	16-Dec-12	39.8669	-73.9167	39.8669	-73.9001	23.2	25.6
106	D27	Dana Christine	Treatment	15-Dec-12	39.8668	-73.9001	39.8668	-73.8835	16-Dec-12	39.8668	-73.9001	39.8668	-73.8835	23.7	25.6
107	D28	Dana Christine	Control	15-Dec-12	39.8668	-73.9333	39.8668	-73.9335	16-Dec-12	39.8668	-73.9335	39.8669	-73.9168	23.2	21.9
108	D28	Dana Christine	Treatment	15-Dec-12	39.8668	-73.9333	39.8668	-73.9167	16-Dec-12	39.8668	-73.9333	39.8668	-73.9168	23.6	25.6
109	T27	Traveller II	Control	15-Dec-12	39.8334	-73.8667	39.8334	-73.8833	16-Dec-12	39.8334	-73.8669	39.8334	-73.8667	22.6	25.6
110	T27	Traveller II	Treatment	15-Dec-12	39.8334	-73.8834	39.8334	-73.8836	16-Dec-12	39.8334	-73.8836	39.8334	-73.8834	22.6	25.6
111	T28	Traveller II	Treatment	15-Dec-12	39.8333	-73.8836	39.8169	-73.9001	16-Dec-12	39.8169	-73.9001	39.8333	-73.8836	21.7	23.8
112	T28	Traveller II	Control	15-Dec-12	39.8334	-73.9002	39.8334	-73.9168	16-Dec-12	39.8334	-73.9168	39.8334	-73.9002	23.1	25.6
113	D29	Dana Christine	Treatment	16-Dec-12	39.8668	-73.8835	39.8668	-73.9001	18-Dec-12	39.8668	-73.9001	39.8668	-73.9335	45.5	25.6
114	D29	Dana Christine	Control	16-Dec-12	39.8669	-73.9001	39.8669	-73.9167	18-Dec-12	39.8669	-73.9001	39.8669	-73.9167	46.0	25.6
115	D30	Dana Christine	Treatment	16-Dec-12	39.8668	-73.9168	39.8668	-73.9334	18-Dec-12	39.8668	-73.9168	39.8668	-73.9333	45.3	25.6
116	D30	Dana Christine	Control	16-Dec-12	39.8669	-73.9333	39.8669	-73.9335	18-Dec-12	39.8669	-73.9333	39.8669	-73.9335	45.8	23.8
117	T29	Traveller II	Treatment	16-Dec-12	39.8334	-73.8834	39.8334	-73.8836	18-Dec-12	39.8334	-73.8833	39.8334	-73.8835	47.3	25.6
118	T29	Traveller II	Control	16-Dec-12	39.8334	-73.8667	39.8334	-73.8669	18-Dec-12	39.8334	-73.8667	39.8334	-73.9502	49.0	25.6
119	T30	Traveller II	Treatment	16-Dec-12	39.8333	-73.8836	39.8333	-73.9001	18-Dec-12	39.8333	-73.8836	39.8334	-73.9001	48.6	25.6
120	T30	Traveller II	Control	16-Dec-12	39.8334	-73.9002	39.8334	-73.9168	18-Dec-12	39.8333	-73.9002	39.8334	-73.9168	48.8	23.8

Table 2: Summary of catch weight (kg) for identified and weighed species by both vessel and gear type. Note: table does not include Atlantic sturgeon weights that were estimated visually when fish escaped near the vessel.

Vessel Name	Gear Type	American Lobster (kg)	Atlantic Sturgeon (kg)	Barndoor Skate (kg)	Bluefish (kg)	Clearnose Skate (kg)	Horseshoe Crab (kg)	Jonah Crab (kg)	Lady Crab (kg)	Little Skate (kg)	Monkfish (kg)	Rock Crab (kg)	Sea Robin (kg)	Smooth Dogfish (kg)	Spiny Dogfish (kg)	Summer Flounder (kg)	Winter Skate (kg)
Dana Christine	Control	2.0	306.6	20.5	18.6	4.2	91.9	0.0	0.0	214.1	1480.1	0.0	0.0	1.5	206.0	8.3	1493.7
Dana Christine	Treatment	0.9	132.9	0.0	5.0	7.6	97.7	0.0	0.1	152.3	1372.0	0.0	0.0	0.0	82.8	4.0	1224.5
Traveller II	Control	0.0	291.4	4.1	6.8	0.0	47.4	0.5	0.0	121.7	1135.3	0.6	0.2	0.0	94.4	2.4	923.9
Traveller II	Treatment	1.4	272.6	0.0	4.9	7.3	69.3	0.0	0.0	91.3	1016.7	0.0	0.0	0.0	50.2	2.3	878.7
Total by Treatment	*Control*	*2.0*	*598.0*	*24.6*	*25.4*	*4.2*	*139.4*	*0.5*	*0.0*	*335.8*	*2615.5*	*0.6*	*0.2*	*1.5*	*300.4*	*10.7*	*2417.6*
	Treatment	*2.3*	*405.5*	*0.0*	*9.9*	*14.8*	*166.9*	*0.0*	*0.1*	*243.6*	*2388.7*	*0.0*	*0.0*	*0.0*	*133.0*	*6.3*	*2103.2*
Grand Total		**4.2**	**1003.4**	**24.6**	**35.2**	**19.0**	**306.3**	**0.5**	**0.1**	**579.4**	**5004.2**	**0.6**	**0.2**	**1.5**	**433.4**	**16.9**	**4520.9**

Table 3: Summary of Atlantic sturgeon captures by haul number, with information on vessel, gear type, dates, soak times, weight, fork length, net number, and individual status. Missing values were not recorded due to escapement. Weights estimated by vessel captains in pounds prior to escapement are noted in weight estimated column after conversion to kilograms.

Haul Number	Vessel Name	Set Date	Haul Date	Soak Time	Gear Type	Sturgeon Status	Fork Length	Total Length	Weight kg	Weight Estimated
8	Dana Christine	26-Nov-12	27-Nov-12	25.5	Control	dead	163	184	39.0	no
9	Traveller II	27-Nov-12	29-Nov-12	46.1	Control	dead			29.5	yes
10	Traveller II	27-Nov-12	29-Nov-12	47.5	Treatment	alive			45.4	yes
14	Dana Christine	27-Nov-12	29-Nov-12	45.7	Control	alive	142	167	29.5	yes
15	Dana Christine	27-Nov-12	29-Nov-12	48.5	Control	dead	154	171	28.1	no
16	Dana Christine	27-Nov-12	29-Nov-12	49.5	Treatment	alive	155	170	27.2	yes
20	Dana Christine	29-Nov-12	30-Nov-12	26.1	Treatment	alive	147	158	22.7	yes
20	Dana Christine	29-Nov-12	30-Nov-12	26.1	Treatment	dead	165	186	34.0	no
22	Traveller II	29-Nov-12	30-Nov-12	23.6	Treatment	alive	157	179	40.8	yes
25	Dana Christine	30-Nov-12	02-Dec-12	44.8	Control	alive	147	165	24.9	yes
28	Dana Christine	30-Nov-12	02-Dec-12	45.8	Control	dead	168	185	37.2	no
29	Traveller II	29-Nov-12	02-Dec-12	74.1	Treatment	dead	102	113	7.3	no
31	Traveller II	29-Nov-12	02-Dec-12	74.2	Control	dead	154	184	31.7	yes
33	Traveller II	02-Dec-12	03-Dec-12	20	Treatment	dead	160	181	27.2	yes
36	Traveller II	02-Dec-12	03-Dec-12	24.7	Control	alive	138	164	27.2	yes
36	Traveller II	02-Dec-12	03-Dec-12	24.7	Control	alive	164	187	43.1	yes
36	Traveller II	02-Dec-12	03-Dec-12	24.7	Control	dead	164	193	31.7	yes
37	Dana Christine	02-Dec-12	03-Dec-12	22	Control	alive	165	181	29.5	yes
37	Dana Christine	02-Dec-12	03-Dec-12	22	Control	dead	177	191	39.9	no
38	Dana Christine	02-Dec-12	03-Dec-12	23	Treatment	dead	181	201	49.0	no
41	Dana Christine	03-Dec-12	03-Dec-12	22.2	Control	dead	152	165	30.4	no
45	Traveller II	03-Dec-12	04-Dec-12	22.9	Control	alive	147	166	34.0	yes
47	Traveller II	03-Dec-12	04-Dec-12	25.6	Treatment	dead	150	170	31.7	yes
48	Traveller II	03-Dec-12	04-Dec-12	23.5	Control	alive	141	157	22.7	yes
49	Traveller II	04-Dec-12	05-Dec-12	21.9	Control	dead	139	162	18.1	yes
56	Dana Christine	04-Dec-12	05-Dec-12	23.3	Control	dead	171	186	23.1	no
59	Traveller II	05-Dec-12	07-Dec-12	48	Treatment	alive	139	161	34.0	yes
62	Dana Christine	05-Dec-12	07-Dec-12	47.1	Control	alive	131	144	15.9	yes
72	Traveller II	07-Dec-12	08-Dec-12	25	Treatment	dead	139	162	34.0	yes

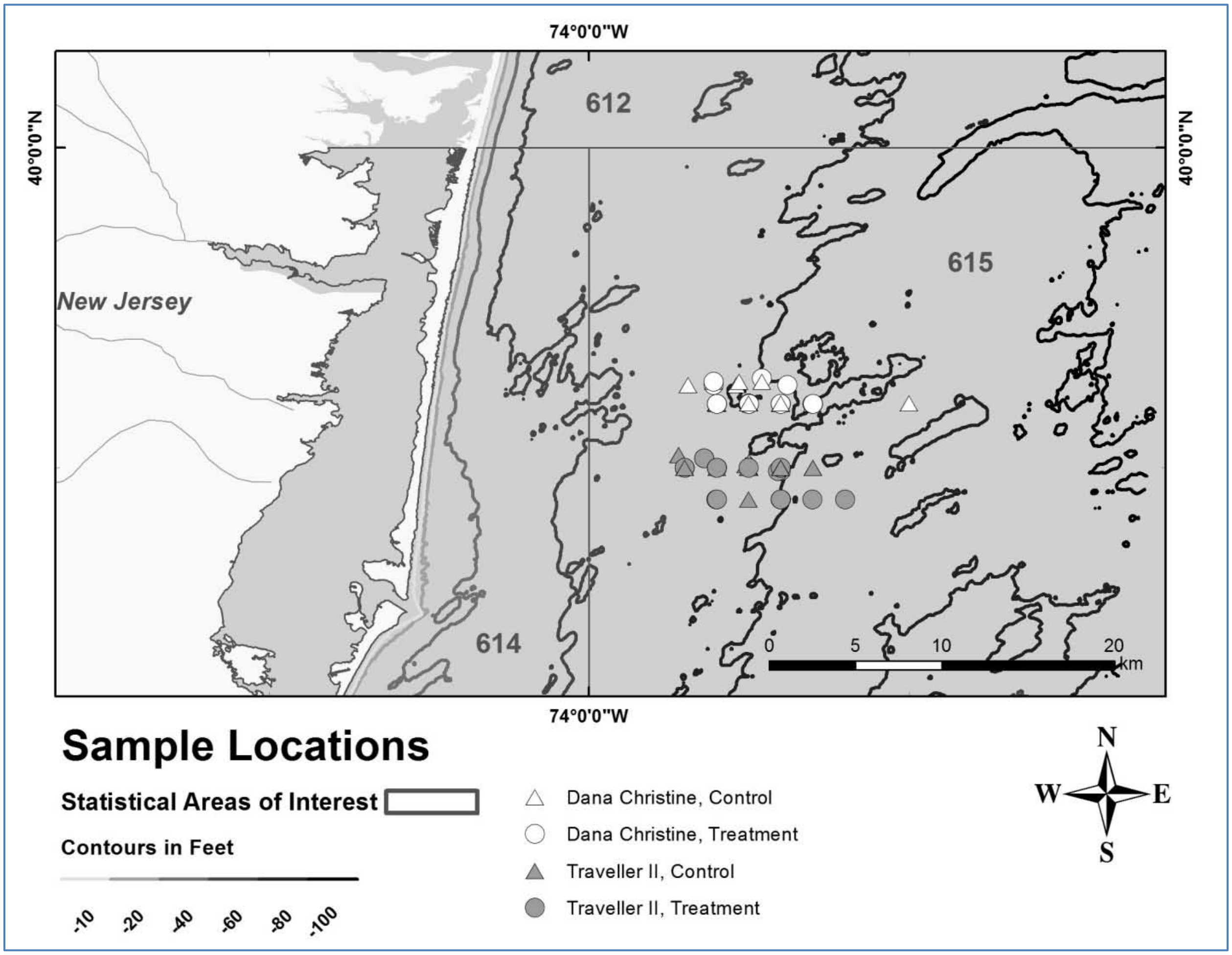

Figure 1: Location of gillnet sampling areas within NMFS Statistical Area 615 (inset) plotted by net type (triangle= control, circles = treatment) and vessel (white symbols = F/V Dana Christine, gray symbols = F/V Traveller II).

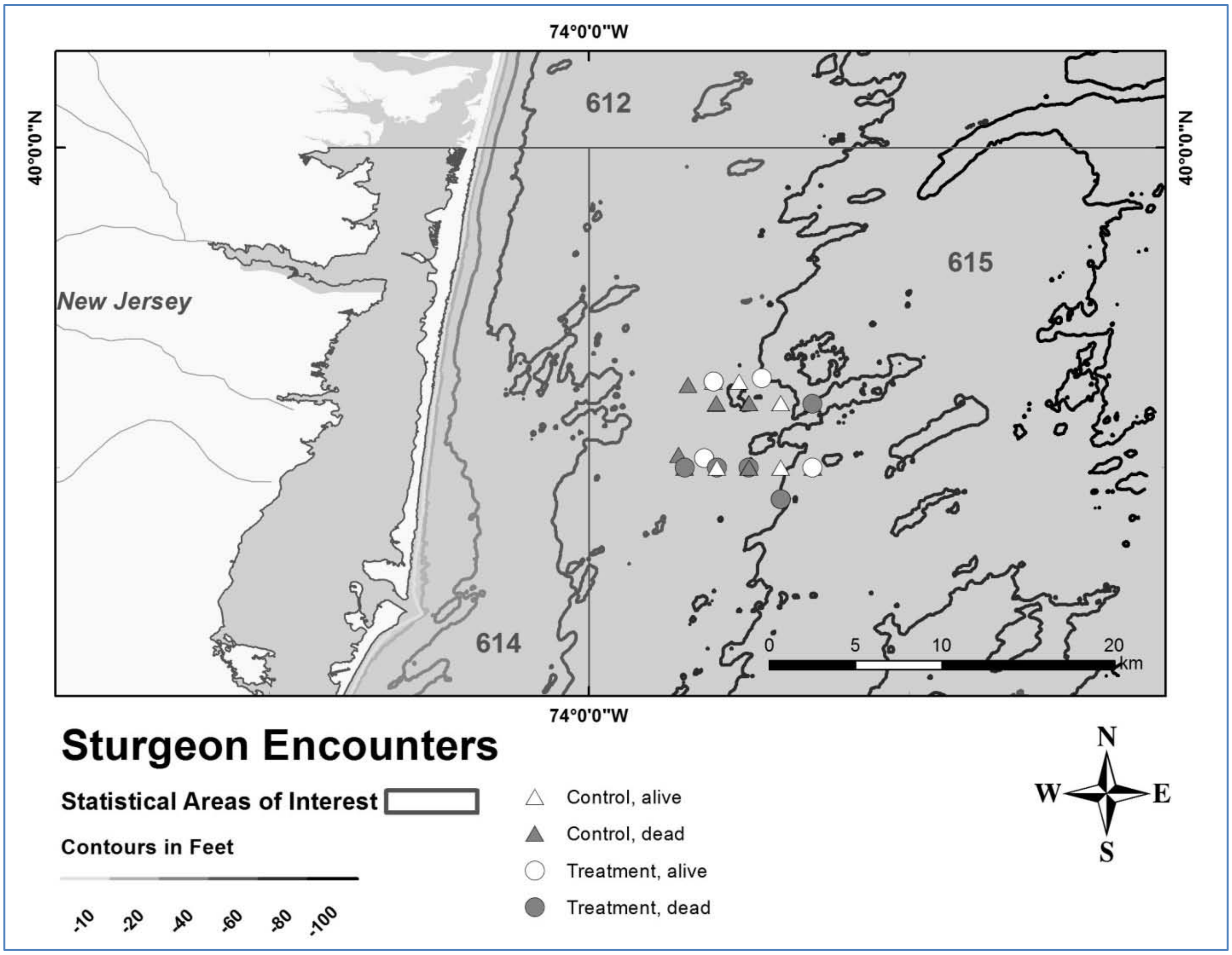

Figure 2: Location of Atlantic sturgeon encounters by mortality status (alive = white symbols; dead= gray symbols) and gear type (control = triangles; treatment= circles) within NMFS Statistical Area 615 during the 2012 field season.

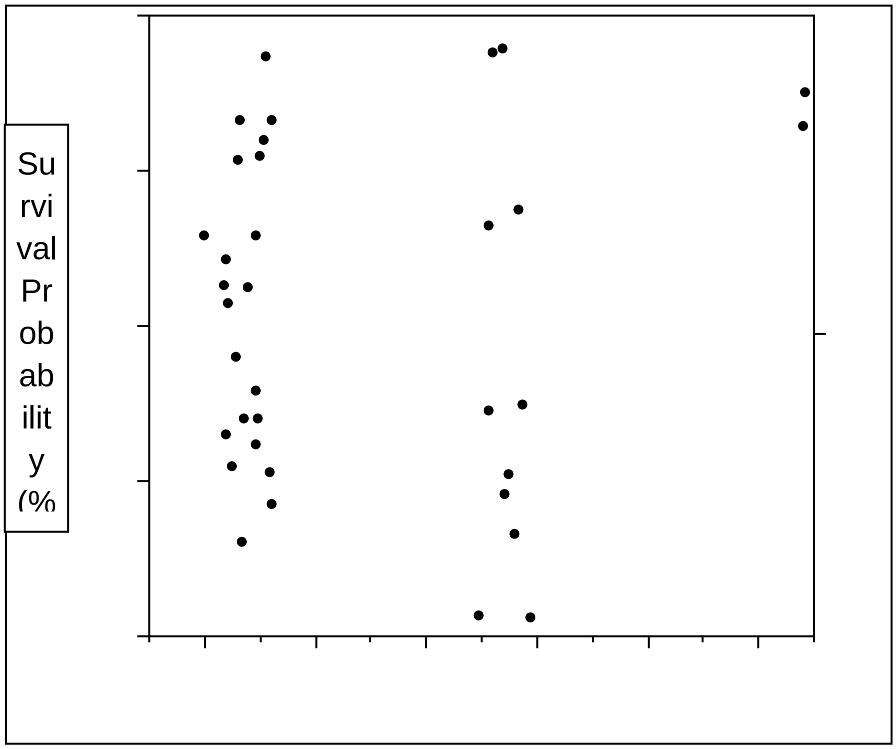

Figure 3: Results of logistic regression fit of Atlantic sturgeon survival probability by soak time for gillnet encounters in 2012. Points plotted above the solid line represent Atlantic sturgeon mortalities at the time of the encounter with the corresponding survival probability. At each soak time value, the probability scale for Atlantic sturgeon status is partitioned into probabilities for live/dead categories. The probabilities are measured as the vertical distance along the Y axis.

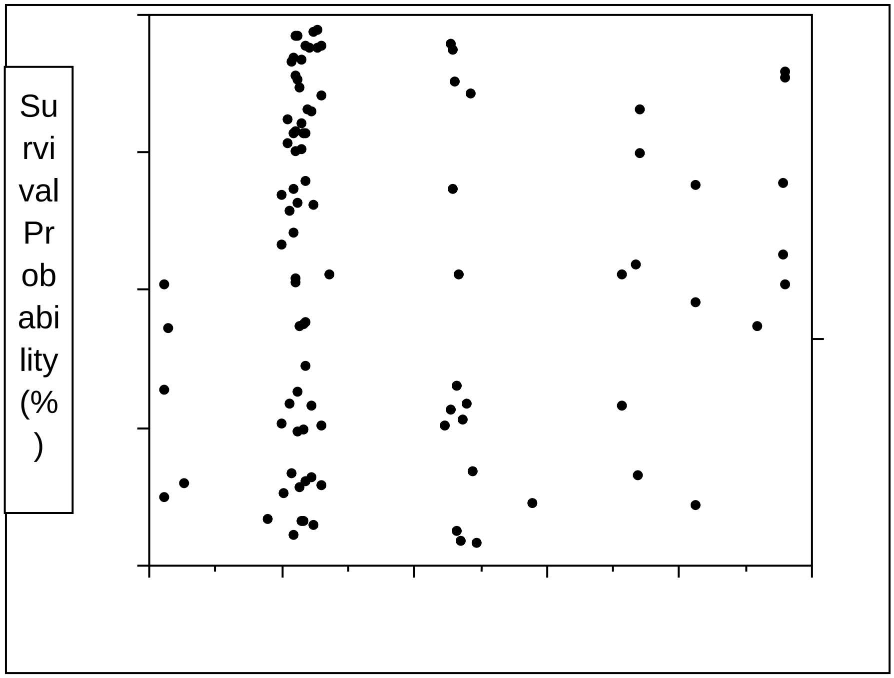

Figure 4: Figure 3: Results of logistic regression fit of Atlantic sturgeon survival probability by soak time for combined gillnet encounters in 2010-2012. Points plotted above the solid line represent Atlantic sturgeon mortalities at the time of the encounter with the corresponding survival probability. At each soak time value, the probability scale for Atlantic sturgeon status is partitioned into probabilities for live/dead categories. The probabilities are measured as the vertical distance along the Y axis.

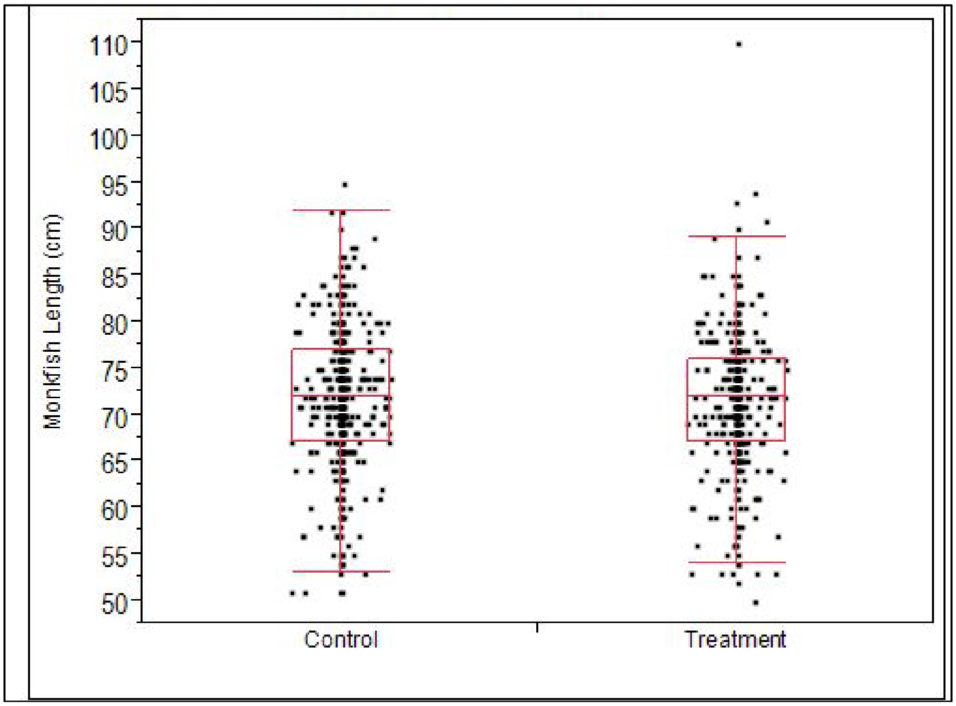

Figure 5: Length (cm) of monkfish landed by gillnet configuration. Box plots represent median and 25-75th percentiles.

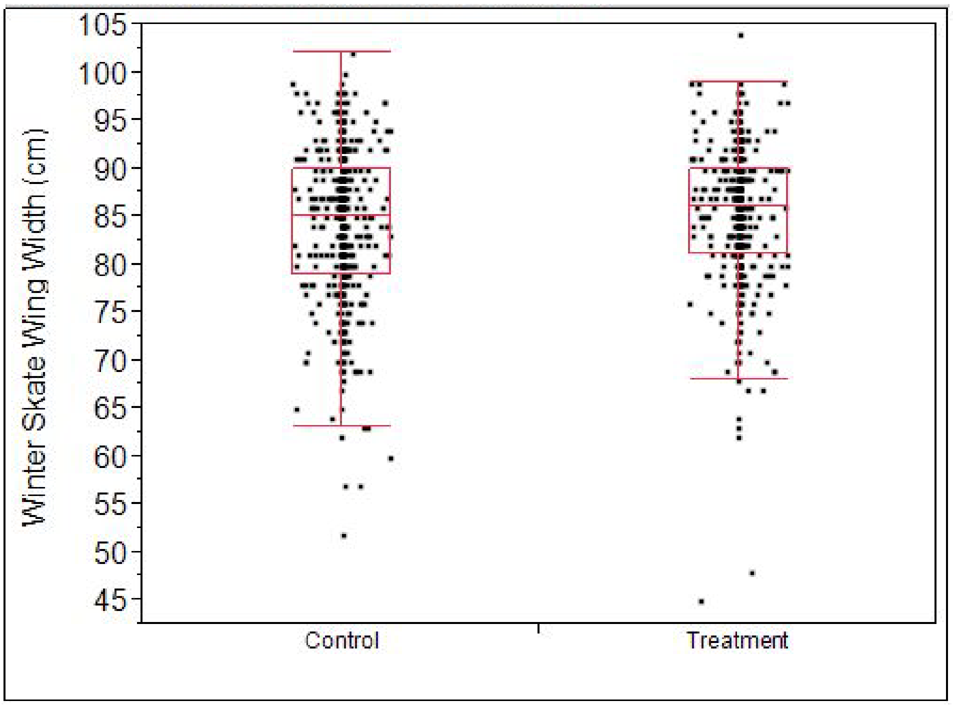

Figure 6: Width (cm) of winter skate landed by gillnet configuration. Box plots represent median and 25-75th percentiles.

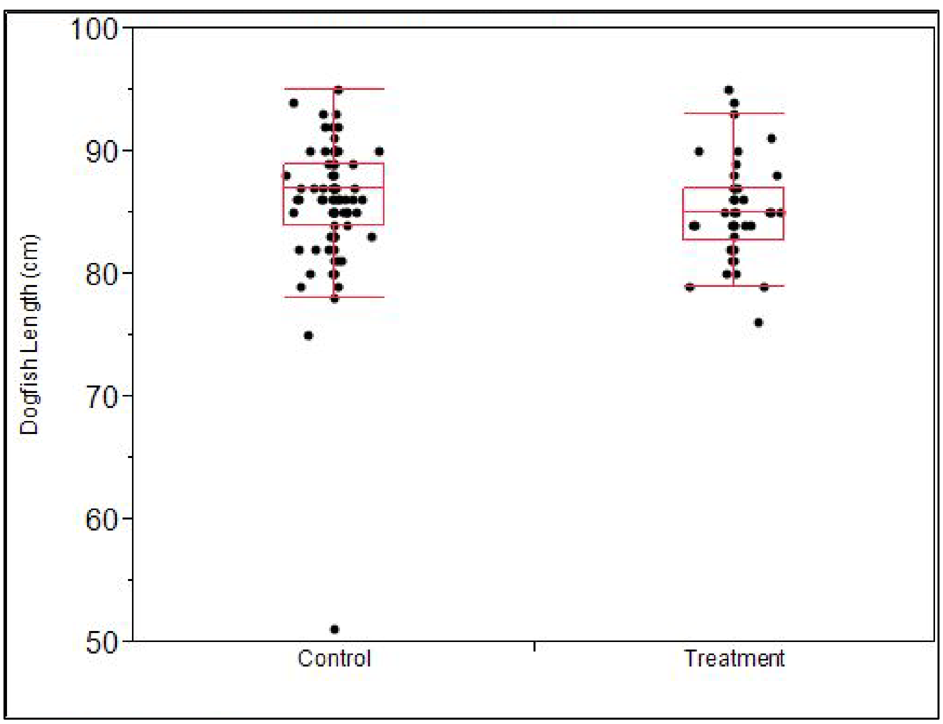

Figure 7: Length (cm) of spiny dogfish landed by gillnet configuration. Box plots represent median and 25-75th percentiles.