Project Summary

1. **Organization Title:** Delaware State University
2. **Principal Investigators:** Dewayne Fox – DSU**;** Edward Hale-University of Delaware**;** Kevin Wark- Endeavor Fisheries; **Cooperating Investigators:** Jason Didden, MAFMC; Henry Milliken, NMFS-NOAA; Lynn Lankshear, NMFS-NOAA.
3. **Address, Telephone Number and Email Address for Principal Investigators**
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   K. Wark- Endeavor Fisheries, 8 West 8th, Barnegat Light, NJ 08006. 609-290-8577 (kevinwark@comcast.net)
4. **Areas of Interest:** 1-b.- Developing technologies, gear modifications, and/or improved fishing practices in commercial fisheries to reduce bycatch on Atlantic Sturgeon in the mid-Atlantic sink gillnet fishery
5. **Project Title: Bycatch reduction of modified large mesh sink-gillnets in the Atlantic Monkfish Fishery**
6. **Project Objectives** We will address three objectives **1**- Compare bycatch rates of Atlantic Sturgeon in two net configurations; **2**- Compare catch rates of target species (Monkfish, Spiny Dogfish, and Winter Skate) for each net configuration; **3**- Assess harvester feedback of modified net performance.
7. **Summary of Work to be Completed**
   We will compare catch rates of target species (e.g. Monkfish Spiny Dogfish, and Winter Skate) as well as self-reported encounter rates of Atlantic Sturgeon in both industry standard and experimental gillnets fished in the large mesh sink-gillnet Monkfish fishery. Our trials will be done under "real world" conditions with eight commercial partners ranging from MA to VA. At the conclusion of field trials, we will work with industry partners to evaluate overall net performance at both landing targeted species and reducing bycatch of Atlantic Sturgeon and other incidentally landed species. Findings generated through this study will help inform NOAA-NMFS on the potential for modifications in gillnet design as a term condition to meet their regulatory mandates under the Endangered Species Act. Specifically, our efforts will feed directly into the proposed GARFO SFD Atlantic Sturgeon working group that, if implemented, would review all available information on sturgeon bycatch in the federal large gillnet mesh fisheries. This proposed working group would be tasked with developing an action plan to reduce bycatch of Atlantic Sturgeon by 2024.

8- Budget Information

Total Federal Funds Requested- $233,676; Months 1-12 Funding Request- $157,714, Months 13-18 Funding Request- $75,962

1. Identification of problem- Gillnets have been used to successfully capture fish for well over three millennia although recent technological advances in materials (e.g. synthetic materials) coupled with powered haulers have increased their use (Potter and Pawson 1991, He 2006). Unfortunately, our understanding of the mechanisms influencing bycatch in gillnets has lagged behind technological advances within the fishing industry, leading to increased concerns over the incidental take of imperiled species (He and Pol 2010).

In the mid-Atlantic and northeast U.S., Monkfish (*Lophius americanus*) support a lucrative commercial fishery 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 (southern management area). This Monkfish gillnet fishery developed as an extension of the coastal intercept fishery targeting Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) in the mid-1980s. Briefly, harvesters noticed the presence of "slime" (i.e. mucous) marks in anchored nets which were indicative of Monkfish encounters (Kevin Wark, Endeavor Fisheries Inc. pers. comm.) although catch rates were very low. The harvesters noted that a twist in the net or the the capture of an Atlantic Sturgeon led to small areas of relaxed netting. It was in these regions that Monkfish encounter rates were maximized and our co-PI Kevin Wark is largely credited with the decision to tie down his nets to increase landings of Monkfish in the late 1980s. At the time, ex-vessel prices for Monkfish were several times their current value when corrected for inflation. This change in fishing practices coupled with a relatively untapped and high value resource led to the rapid expansion of the Monkfish fishery in the 1990s. At the same time, concerns were growing over the status of Atlantic Sturgeon resulting in a fishery moratorium (ASMFC 1998). Unfortunately, the burgeoning Monkish fishery led to high levels of observed Atlantic Sturgeon bycatch (Stein et al. 2004, ASMFC 2007) which when coupled with other threats ultimately led

to Atlantic Sturgeon being listed under the Endangered Species Act (ESA) (NOAA-NMFS 2012).

Gillnets are generally selective and several studies, while limited in scope, suggest gillnet configuration plays an important role in the retention of Atlantic Sturgeon (Trencia et al. 2002, Sweka et al 2007, Fox et al. 2011, Fox et al. 2012, Fox et al. 2013, Fox et al. 2018, Hager et al. 2021). The listing of Atlantic Sturgeon under the Endangered Species Act has increased the regulatory burden on NOAA-NMFS to reduce bycatch and bycatch associated mortality in the Monkfish fishery. As outlined in the recently released draft Biological Opinion for 10 federal fisheries including the Monkfish Fishery**,** Gear Research is considered a Reasonable and Prudent Measure for NOAA-NMFS under Section nine of the ESA (NOAA-NMFS 2021). The accompanying draft Terms and Conditions note that investigations on gillnet modifications to reduce Atlantic Sturgeon are required along with a provision the GARFO SFD to convene an Atlantic Sturgeon working group that, if implemented, would review all available information on sturgeon bycatch in the federal large gillnet mesh fisheries. This proposed working group would be tasked with developing an action plan to reduce bycatch of Atlantic Sturgeon by 2024. Our study, which is scheduled to conclude in the spring of 2023, would be uniquely positioned to provide a large-scale test of the performance of modified large-mesh sink gillnets in the Monkfish fishery coupled with user feedback for integration into needed management action.

This proposal builds off four years of gillnet field trials in NJ and NY that took place prior to and shortly after the ESA listing of Atlantic Sturgeon (Fox et al. 2011, Fox et al. 2012, Fox et al. 2013, Fox et al. 2018). Our collaboration between academia, an industry leader, a MAFMC management specialist, and NOAA-NMFS scientists allowed for an iterative approach for modifying net configuration (e.g. presence of tie-downs, net height, mesh size, twine diameter) to arrive at a net design that shows much promise. This final net configuration was

compared to an industry standard net and the results were very promising with the modified net reducing bycaught Atlantic Sturgeon by a ratio of 4.2:1. At the same time landings of Monkfish in control nets were significantly greater (albeit slightly) in NY while there was no difference in net performance in NJ. Landings of Spiny Dogfish and Winter Skate did not vary by gear type in either NY or NJ, suggesting the experimental nets show much promise as a conservation tool as outlined under the Terms and Conditions listed in recently released draft batched Biological Opinion for the Monkfish fishery (NOAA-NMFS 2021).

NOAA-NMFS has not published the Atlantic Sturgeon Recovery Plan so the extent of required conservation measures is currently unknown. That said, given the magnitude of bycatch in large-mesh sink gillnet (Stein et al. 2004, ASMFC 2007) and other marine fisheries (Dunton et al. 2015), it is likely that there will be proposed changes to fishing practices to reduce sturgeon bycatch. Through our collaborative project we will address priority areas #1b of the 2021 BREP program, specifically through large-scale industry led trials of modified large mesh sink-gillnets to reduce bycatch of Atlantic Sturgeon while still landing commercially viable levels of Monkfish.

2- Project Objectives: The overarching goal of this study is to assess catch rates of target species as well as bycatch of Atlantic Sturgeon in industry standard vs. modified sink-gillnets in the mid-Atlantic Monkfish fishery. The larger goal can be broken out into components of the project as listed below.

1- Compare bycatch rates of Atlantic Sturgeon between industry standard and modified gillnet configurations;

2- Compare the catch rates of the target species (Monkfish, Spiny Dogfish, and Winter Skate) for each net configuration;

3- Assess harvester feedback of modified net performance to gauge potential behavioral modification for adoption by both agency and industry to foster sustainability in the Monkfish fishery while simultaneously enhancing conservation and recovery of Atlantic Sturgeon;

Central to our projects' success is industry collaboration as we will be working with eight industry partners ranging from MA to VA who will provide field trials of our modified gillnets in real world conditions. We are asking that each partner provide a minimum of 10 trips (80 total), although we are cautiously optimistic that our modified nets will prove worthwhile and warrant additional trips made by our partners. We will be reliant on our partners to provide metrics of net performance except in instances where they have been randomly selected to carry an observer through the Northeast Fishery Observer Program (NEFOP). As a result of our described fishery dependent sampling, the selection of cooperators is central to the project's success. We are confident that with our industry connections we can identify harvesters that value our efforts and will work with us on our common goal of improving fishery performance. We will be providing log books for our partners to record general parameters on overall net performance which will include configuration of nets (number/string length/net location), soak time, performance (general number and total landings of target and non-target species, haulability, and durability), as well as numbers of self-reported Atlantic Sturgeon encounters by gear type. We will use landing tickets and data sheets to estimate landings and catch rates by gear type and in instances where our partners are selected to carry a NEFOP observer we will seek the trip data upon completion of a data waiver form. Finally, we analyze relative net performance and the potential acceptance of the experimental gear type using an anonymous social survey of our participating cooperative fishers.

3- Project Narrative- Our collaboration between industry leaders in the Monkfish fishery (K. Wark) plus members of the management (Didden, Lankshear, and Milliken) and research (Fox, and Hale) communities will allow us to assess the impact of modified low-profile sink-gillnets on the landings of Monkfish as well the bycatch and incidental mortality of Atlantic Sturgeon in a scientifically sound manner.

Sink-gillnet trials- These trials will be done under "real world" conditions and will begin in the spring 2022 southern fishery in VA with two participants. The port of Chincoteague, VA supports a small spring fishery which has largely disappeared in more northern ports as a result of market conditions and regulations. In the fall of 2022 we will initiate the second round of trials with six additional partners in ports ranging between MD and MA. We anticipate that this second cohort of collaborators may fish into the early winter of 2023 before they complete their fishing season. This broad scale approach at industry collaboration builds upon our past efforts where we conducted a limited number of iterative trials in the NY Bight (Fox et al. 2011, Fox et al. 2012, Fox et al. 2013, Fox et al. 2018). As is inherent to seasonal fisheries and limited funding opportunities, our efforts took several years before arriving at a net configuration that we felt was ready for moving from the prototype phase serving as a broader, real world examination. Our proposal represents a powerful examination in a new gear modification, that will complete the evaluation process and truly represents a logical step required to gain industry acceptance of potential regulatory changes to help reduce fisheries bycatch mortality as noted in the ESA listing decision.

Upon notification of funding we will initiate the procurement process to secure a total of 200 large-mesh sink-gillnets for use in this project. Our conversations with the net manufacturer (Hercules SLR US Inc., New Bedford, MA) suggest that it will take 4-5 months from the placement of the order to delivery of nets given current market shortages and shipping issues.

Given the importance of these modified nets to our overall study design our sampling program is built around their availability and fishing seasons which necessitates the 18-month duration of this project.

Each member of our group of eight cooperating Monkfish harvesters will be provided with 25 modified gillnets which they can keep after the completion of this study. In addition to these nets, we will provide a stipend to each collaborator as part of an agreement to use our nets as part of their standing fishing practices for a minimum of 10 targeted Monkfish trips. It should be noted that based on industry feedback from our initial trials in NY and NJ using a similar net design (Fox et al. 2018) that we are confident many if not all, partners will continue using the provided nets for the duration of their fishing season.

A minimum of 80 Monkfish trips are planned, during which two net configurations will be fished fished in a replicated pair design. As is the nature of most fisheries, the specific gear types can vary slightly by region/participant although in the Monkfish fishery while the generalized industry standard sink-gillnet is constructed with 12-inch mesh, 0.90 mm twine, 12 panels in height net with 4 ft tie downs spaced out at 24 ft. intervals that are 300’ in length and hung on a 0.50 hanging ratio. The modified project nets will be similar in length and hanging ratio but are shorter (8 panels in height), a comprised of larger mesh (13-inch), smaller twine (0.81mm), have more tie downs (every 12 ft), and shorter tie downs (2.5 ft). Through the previously described iterative process, our modified nets were designed to maximize Monkfish landings. The reduced vertical profile nature of the net coupled with larger mesh and finer twine allowed Atlantic Sturgeon to avoid being captured either by passing above (height), through (mesh size), or breaking out (twine size) of the net. Individual net panels are tied together in varying lengths generally ranging from eight panels in regions of higher currents (e.g. NY and MA) to 12 panels in regions where conditions are more moderate. Individual panel length will be

left to our collaborators but we are asking that they fish our modified net in a paired fashion so that it is of the same length and the same general vicinity. We anticipate that each partner will fish up to two replicates (control vs. modified) depending on general fishing conditions. Our partners will also be asked to ensure that nets are maintained and tears or damage that could affect the performance of the gear will be repaired or replaced prior to each set of the gear.

As part of a cooperative agreement, our industry partners will be required to provide data on net performance. We will design easy to complete data sheets that will be created through consultation with our partners and provided prior to the start of the project. We anticipate that at a minimum our partners will provide us with the set/haul dates, net location, depth, water temperature, net configuration (i.e. configuration of control net, string number, and string length), self-reported encounters with protected resources including Atlantic Sturgeon, an estimate on the relative percent yield of experimental gear vs. standard nets, total landings per trip per species, and generalized comments on how the net is fishing (e.g. tendency to "roll up" or accumulate detritus "get trashed up").

We will also be asking our industry partners to sign a Data Waiver Form with the NOAA-NMFS Fisheries Monitoring and Observing Branch. If our partners are selected to carry an observer as part of the NEFOP, upon completion of the waiver we will be granted access to data collected by NOAA-NMFS trained observers allowing for a more detailed examination of the catch. These observer data will be used to ground-truth and correct for variance in self-reported landings. Based on these findings, and only if necessary, we can potentially explore correction factors to standardize self-reported data with observer documented findings.

In addition to a pair-wise comparison between experimental and industry standard nets of catch of Monkfish, Spiny Dogfish and Winter Skate, bycatch of Atlantic Sturgeon, we will attempt to model species specific catch and bycatch using a negative binomial or zero-inflated

negative binomial generalized additive model, with harvester, date, relative location, set number and temperature included as explanatory covariates. Additionally, prior to the start of the study we will work with our industry partners to construct a survey to be completed at the conclusion of the project to assess perceived net performance (including catch rate, and avoidance of bycatch), as well as relative inclination to use the net for future activities. In this way, we will be able to quantitatively assess Monkfish, Spiny Dogfish, Winter Skate catch, and bycatch of unwanted species including Atlantic Sturgeon, and the relative acceptance of a potential change in regulations. These data streams will serve NOAA-NMFS as they move forward with considerations for regulatory changes to federally managed fisheries as mandated under the ESA. Our findings will play an important role as the agency works on the recently initiated Atlantic Sturgeon Recovery Planning Process where management recommendations may include gear modification to minimize bycatch of this endangered species by 2024.

4- Permitting- Following submission of the proposal, D. Fox will begin the application process to the NOAA-NMFS for an exempted fishing permit (EFP) under the Magnuson Stevens Fisheries Conservation and Management Act to authorize the conservation engineering aspect of the work and the incidental capture of any protected species (e.g. Atlantic Sturgeon). An EFP would also be required for this research proposal since the successful completion of the project would require use of fishing gear configurations not expressly allowed under current fishing regulations (i.e., proposed twine size and compliance with the Harbor Porpoise Take Reduction Plan (NOAA-NMFS 1998). Finally, social surveys of perceived net performance will be designed, completed and reviewed by the University of Delaware's Institutional Review Board to ensure that the harvester responses are adequately, and safely collected within the first six months of the project award period.

5- Benefits/Expected Results- Our collaborative proposal will provide NOAA-NMFS with a

robust field trial of a promising, modified net design that may ultimately be considered as a Term and Condition to help mitigate Atlantic Sturgeon bycatch as outlined in the recent Draft Biological Opinion for the federal Monkfish Fishery (NOAA-NMFS 2021). This project is not an academic exercise, instead it is aimed at assisting NOAA-NMFS with meeting their regulatory burden under the ESA through the use of a cooperative research approach integrating industry participation and soliciting stakeholder feedback. As outlined in the project and budget narratives our proposal is a truly collaborative approach between the fishing industry, academic, and agency scientists. This approach allows for incorporation of hard-earned knowledge from industry partners into science and management which can ultimately lead into increased buy-in by the industry to proposed regulatory changes (Johnson and van Densen 2007). The recently completed stock assessment conducted by the ASMFC (2017) noted that bycatch mortality in the Monkfish fishery remains a primary threat to the recovery of Atlantic Sturgeon which critically needs to be reduced to increase abundance. Our proposal directly addresses this issue which is a priority research item listed in the research initiatives needed by the stock assessment sub-committee.

6- Need for Governmental Financial Assistance- Although Atlantic Sturgeon are managed by the ASMFC, state resource agencies have not been able to adequately fund the work required for their conservation and recovery under the ESA. Due to the almost exclusive history of commercial harvest, Atlantic Sturgeon studies are not eligible for funding under the typical umbrella program of Federal Aid in Sportfish Restoration that many other important species are funded through. Without directed federal financial assistance to help reduce bycatch in federally managed fisheries, the recovery of Atlantic Sturgeon may be impeded. When coupled with other impediments including the life history of this species (Gross et al. 2002) state and local governments will experience the increased regulatory burden associated with the ESA listing for

decades if not longer. Following the initial listing of the species in 2012, funding resources have largely dried up leaving state resource agencies struggling in their conservation efforts. This BREP RFA offers a unique opportunity to combine a variety of research efforts over a broad geographical range that would otherwise be impossible to accomplish during the same time frame.

7- Federal, State, and Local Government Activities- We are not aware of any potential impacts/interactions between the work proposed herein and existing federal, state, and or local government activities.

8- Project Management- D. Fox will work directly with our industry liaison **K. Wark** to ensure the modified gillnets are built to specifications and delivered to project partners. Co-PIs **D. Fox**, **E. Hale**, industry liaison **K. Wark** and NOAA-NMFS Cooperator **H. Milliken**, and MAFMC Cooperator **J. Didden** will collaborate with industry contacts and colleagues to identify suitable participants. At this point we have already identified the vast majority of participants and have received verbal willingness to participate in out project if funded. Co-PIs **D. Fox** and **E. Hale** will work with NOAA-NMFS Cooperator **L. Lankshear** (Atlantic Sturgeon Recovery Coordinator) to secure the necessary permits and or authorizations to conduct the study as proposed. **D. Fox** will be responsible for hiring the DSU student employee and will actively seek external funding to support a graduate student to assist with this project. Co-PIs **D. Fox** and **E. Hale** will work with our fisheries liaison **K. Wark** and network partners to design data input forms as well as the project completion survey. Captain **K. Wark** will serve as our primary point of contact with industry partners on issues of logistics and project activities. He will help coordinate ride-along trips for Co-PIs **D. Fox** and **E. Hale** to foster industry engagement and buy-in. **D. Fox** will be the primary supervisor for the DSU student employee(s) and will supervise data entry and data base development with **E. Hale**. The analysis of interpretation

will be led by **E. Hale** with assistance from **D. Fox** who will share their finding with other members of the team. We anticipate that **J. Didden**, **H. Milliken**, and **L. Lankshear** will be active participants in the interpretation of results and offer suggestions on how the findings can be incorporated into management and policy recommendations. **D. Fox** and **E. Hale** will take the lead in writing interim and final reports and subsequent manuscript(s) that are derived from this work with assistance from **J. Didden**, **L. Lankshear**, and **H. Milliken**. **J. Didden** along with **D**. **Fox**, and **E. Hale** will also convey the findings of this report through presentations at regional management councils. **E. Hale** will lead outreach and education efforts through his role as a Sea Grant Advisory Agent.

9- Results from Prior NOAA/NMFS Support- information on previous NOAA-NMFS funded projects is provided in Table 2.

10- Project Impacts- The products and services developed through this proposal will be conveyed to the fisheries and management communities through presentations at regional management councils, relevant advisory panels (e.g. Monkfish and Spiny Dogfish APs), interested parties/sub-committees (e.g. ASMFC Sturgeon Technical Committee), as well as presentations at both NOAA-NMFS regional offices and or headquarters if requested. In addition to these oral presentations we plan to work with industry publications (e.g. National Fisherman and Commercial Fishing News) to inform them of our project to generate broader interest, based on past experience which has demonstrated great value in both disseminating results and fostering inclusivity in the industry application of our results.

11- Education and Outreach- We will generate a series of extension products and presentations to help communicate results as broadly as possible. First, we will generate at least one scientific publication that summarizes the significant findings of this applied research to help inform managers across state, regional and federal management agencies. This publication will serve as

the culmination of previously funded iterative gear modification studies. As CO-PI D. Fox will hire at least one undergraduate student and if external funding sources can be secured will recruit a graduate student to participate in this project. D. Fox has been successful at recruiting and graduating undergraduate and graduate students from underrepresented groups at DSU which was founded in 1891 as a Historically Black College and University. The funds provided through this program will be leveraged on the DSU campus to provide additional support to participating students. We will develop and post information on this topic to the Delaware Sea Grant web page, and social media accounts in order to foster a broader distribution of results through the use of text, picture and "15 Second Science" video formats. Dr. Fox will use this project in DSU's "Freshman Seminar" to engage 30-40 predominately minority STEM students and facilitate engagement for students with Sea Grant and other internship and academic opportunities. In order to further communicate these results to state, regional, and federal management entities, we will provide presentations of our findings to the Monkfish Advisory Panel of the New England Fishery Management Council, the Atlantic States Marine Fisheries Commission Atlantic Sturgeon Technical Committee, and the Delaware Tidal Finfish Advisory Council. Finally, we would welcome the opportunity to present these findings to the NOAA-NMFS GARFO or NEFSC staff in either a seminar or webinar format.

12- Evaluation of Project

Objective 1: We will collect information on bycatch rates of incidentally encountered Atlantic Sturgeon in two sink-gillnet configurations. Upon doing so we will employ the appropriate statistical models to examine the influence of gear type on bycatch rates of Atlantic Sturgeon as well as documented mortality rates (live/dead) at the time of capture. Prior to deploying the gear proposed in this project we will have to secure the required permissions as outlined previously.

Objective 2: The examination and analysis of the species captured within the control and experimental will allow us examine how gear type influences the quantity (i.e. CPUE) and quality (i.e. size/weight) of targeted specie as well as documenting how the two gear types perform under normal fishing operations. We will also be able to assess overall net performance which will incorporate information from the vessel captains/observers on noted differences in the fouling rate and or the bycatch of other non-market species (e.g. Horseshoe Crabs).

Objective 3: Assess harvester feedback of modified net performance to gauge potential for adoption by both agency and industry to foster sustainability in the Monkfish fishery and promote conservation and recovery of Atlantic Sturgeon. Our exit surveys will be coupled with interviews at the conclusion of this project to gather unfiltered feedback from our industry partners on the general net performance ranging from ease of hauling, maintenance, durability, and most important catchability. This survey will be will be designed, completed and reviewed by the University of Delaware's Institutional Review Board within six months of the project start date.

13-Data Management/Data Sharing- Our industry partners will be asked to return completed datasheets to Delaware State University (either by scanning and emailing or mail) where all field sheets will be scanned and converted to .pdf files for storage and accessibility, if required. Once received, data will be entered into a relational MS Access database by the DSU student employee under the supervision of Co-PI D. Fox. Data reports will be exported with all physical data parameters (net type, water quality, timing, geographic locations, etc.) and available biological parameters (lengths, weights, species, etc.) for encountered species. These raw data reports and sampling summaries will be made available to individuals upon request after all data has been entered and error checked. Upon development of our merged dataset will be provided to

NOAA-NMFS, the ASMFC, and both the New England and Mid-Atlantic Fisheries Management Councils for use in policy and management decisions.

Table 1- Milestone to be attained in each project month.

Project Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Month and Year	Aug 14	Sep 14	Oct 14	Nov 14	Dec 14	Jan 14	Feb 14	Mar 15	Apr 15	May 15	Jun 15	Jul 15	Aug 15	Sep 15	Oct 15	Nov 15	Dec 15
Goals	Order acoustic tags. Finalize application to regional offices for required permits. ‘ Develop contract agreement with vessel captains Contact regional offices on permit issues, build gillnets	build gillnets	Finalize observer schedule	Field trials Data entry	Field trials Data entry	Field trials Data entry	Data entry Model constr.	Tag loss study in DE Data entry Model constr.	Tag loss study in DE Data entry Model constr.	Tag loss study in DE Data entry Model constr.	VR-2w retrieval Data entry Model constr.	VR-2w retrieval Data entry Model constr.	VR-2w retrieval Data entry Model constr.	VR-2w retrieval Data entry	VR-2w retrieval Analysis Final Report Prep.	VR-2w retrieval Analysis	Submit Final Report Provide Data as Requested

Table 2- Results from prior NOAA/NMFS support in past five years

Table 2- Results from prior NOAA/NMFS support for past five years

NOAA Award #	Amount	Recipient	Project Title	Summary	Publications	Data and or research products
NA16NMF4720357	$219,270	DSU	Examination of Atlantic Sturgeon Vessel Strikes in the Delaware River Estuary	Developed empirical estimates of Atlantic Sturgeon vessel strikes in the Delaware River Estuary. This will be done through a combination of carcass reporting and release of Atlantic Sturgeon carcasses.	Publication in progress- target Journal Canadian Journal of Fisheries and Aquatic Sciences. Targeted submission date July 1st.	Provide estimates of Atlantic Sturgeon carcass reporting rates as well as data from carcass drift studies for the Delaware River Estuary.
NA16NMF4720359	$44,735	DSU	Hydroacoustic assessment of anchor scarring in Atlantic Sturgeon staging/spawning areas of the Hudson River	Examine vessel scarring in the Hyde Park Anchorage, Hudson River, NY and adjacent areas to explore potential impacts on sturgeon critical habitats.	Draft Publication completed-under internal review- target Journal Marine Ecology Progress Series. Targeted submission date June 1st.	High-resolution side-scan sonar files will be provided to NOAA-NMFS-OPR at the completion of the project as well as detailed habitat maps.

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