Atlantic States Marine Fisheries Commission

Sturgeon Management Board

February 6, 2014
11:00 – 11:45 a.m.
Alexandria, Virginia

Draft Agenda

The times listed are approximate; the order in which these items will be taken is subject to change; other items may be added as necessary.

1.	Welcome/Call to Order *(R. Allen)*	11:00 a.m.
2.	Board Consent • Approval of Agenda • Approval of Proceedings from May 2013	11:00 a.m.
3.	Public Comment	11:05 a.m.
4.	Consider Benchmark Stock Assessment Terms of Reference *(K. Drew)* **Action**	11:15 a.m.
5.	Consider 2013 FMP Review and State Compliance *(M. Waine)* **Action**	11:35 a.m.
6.	Review and Populate Advisory Panel Membership *(M. Waine)* **Action**	11:40 a.m.
7.	Other Business/Adjourn	11:45 a.m.

The meeting will be held at: the Crowne Plaza Hotel, 901 North Fairfax Street, Alexandria, Virginia • 703-683-6000

MEETING OVERVIEW

Atlantic Sturgeon Management Board Meeting
February 6, 2014
11:00 – 11:45 a.m.
Alexandria, Virginia

Chair: Russ Allen (Assumed 5/12)	Technical Committee Chair: Bill Post (SC)	Law Enforcement Committee Rep: Brannock/Meyer
Vice Chair: John Clark	Advisory Panel Chair: Vacant	Previous Board Meeting: May 2013
Voting Members: ME, NH, MA, RI, CT, NY, NJ, PA, DE, MD, VA, NC, SC, GA, FL, D.C., PRFC, USFWS, NMFS (19 votes)		

2. Board Consent

- Approval of Agenda
- Approval of Proceedings from May 2013

3. Public Comment – At the beginning of the meeting, public comment will be taken on items not on the agenda. Individuals that wish to speak at this time must sign-in at the beginning of the meeting. For agenda items that have already gone out for public hearing and/or have had a public comment period that has closed, the Board Chair may determine that additional public comment will not provide additional information. In this circumstance, the Chair will not allow additional public comment on an issue. For agenda items that the public has not had a chance to provide input, the Board Chair may allow limited opportunity for comment. The Board Chair has the discretion to limit the number of speakers and/or the length of each comment.

4. Consider Benchmark Stock Assessment Terms of Reference (11:15 –11:35 p.m.) Action

Background

- The Technical Committee drafted terms of reference for the upcoming benchmark stock assessment for review by the Sturgeon Board (**Briefing CD)**.

Presentations

- Review stock assessment terms of reference by K. Drew

Board Action for Consideration

- Approve stock assessment terms of reference

5. 2013 Fishery Management Plan Review (11:35 – 11:40 a.m.) Action

Background

- State compliance reports are due October 1st (**Briefing CD)**
- The Plan Review Team reviewed each state report and compiled the annual FMP Review **(Supplemental Material)**

Presentations

- Overview of the FMP Report by M. Waine

Board Actions for consideration

- Approve 2013 FMP Review and State Compliance

6. Review and Populate Advisory Panel Membership (11:40 – 11:45 a.m.)
Background • John Pedrick, a recreational fisherman from Pennsylvania, has been nominated to the Sturgeon Advisory Panel (**Briefing CD)**.
Presentations • Advisory Panel Nomination by M. Waine

7. Other Business/Adjourn

DRAFT PROCEEDINGS OF THE

ATLANTIC STATES MARINE FISHERIES COMMISSION

STURGEON MANAGEMENT BOARD

Crowne Plaza Hotel - Old Town
Alexandria, Virginia
May 23, 2013

These minutes are draft and subject to approval by the Sturgeon Management Board.
The Board will review the minutes during its next meeting.

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ATTENDANCE

Board Members

Terry Stockwell, ME, proxy for P. Keliher (AA)
Douglas Grout, NH (AA)
Dennis Abbott, NH, proxy for Sen. Watters (LA)
Jocelyn Cary, MA, proxy for Rep. Peake (LA)
Paul Diodati, MA (AA)
Bill Adler, MA (GA)
Mark Gibson, RI, proxy for R. Ballou (AA)
Dave Simpson, CT (AA)
Pat Augustine, NY (GA)
Jim Gilmore, NY (AA)
Russ Allen, NJ, proxy for D. Chanda (AA)
Tom Fote, NJ (GA)
Adam Nowalsky, NJ, proxy for Rep. Vereb (LA)
Leroy Young, PA, proxy for J. Arway (AA)
Mitchell Feigenbaum, PA, proxy for Rep. Vereb (LA)
Roy Miller, DE (GA)
John Clark, DE, proxy for D. Saveikis (AA)
Tom O'Connell, MD (AA)
Bill Goldsborough, MD (GA)
Jack Travelstead, VA (AA)
Kyle Schick, VA, proxy for Sen. Stuart (LA)
Bill Cole, NC (GA)
Louis Daniel, NC (AA)
Malcolm Rhodes, SC (GA)
Ross Self, SC, proxy for R. Boyles (AA)
Patrick Geer, GA, proxy for Rep. Burns (LA)
Spud Woodward, GA (AA)
Jim Estes, FL, proxy for J. McCawley (AA)
Ellen Cosby, PRFC
Bill Archambault, USFWS
John Bullard, NMFS

(AA = Administrative Appointee; GA = Governor Appointee; LA = Legislative Appointee)

Ex-Officio Members

Dewayne Fox, Technical Committee Chair

Staff

Robert Beal
Mike Waine
Toni Kerns
Kate Taylor
Jeff Kipp

Guests

Kim Damon-Randall, NERO
Anthony Rios, Ofc. of Sen. Boyle, NY
Angela Somma, NMFS
Kelly Place, VA
Kelly Denit, NMFS
Steve Meyers, NMFS
Bob Ross, NMFS

The Sturgeon Management Board of the Atlantic States Marine Fisheries Commission convened in the Presidential Ballroom of the Crowne Plaza Hotel Old Town, Alexandria, Virginia, May 23, 2013, and was called to order at 9:05 o'clock a.m. by Chairman Russ Allen.

CALL TO ORDER

CHAIRMAN RUSS ALLEN: Good morning, everybody. Welcome to the Atlantic Sturgeon Board.

APPROVAL OF AGENDA

First up is the approval of the agenda. If anybody has any changes, please make them now. If not, we will consider the agenda approved.

APPROVAL OF PROCEEDINGS

Also, approval of the proceedings from the February 9, 2013 meeting. Does anybody have any changes or comments on that? Seeing none; we will consider this approved.

PUBLIC COMMENT

At this point we will open it up to public comment for anything not on the agenda. Is there anybody out there who wanted to speak? I'm not seeing anybody. First up today is John Bullard, who is going to talk about NOAA Fisheries Sturgeon Draft Biological Opinion and Population Estimate Analysis. Kim is going to take care of that, I believe, so we will just hand it over to Kim.

NOAA FISHERIES STURGEON DRAFT BIOLOGICAL OPINION AND POPULATION ESTIMATE ANALYSIS

MS. KIM DAMON-RANDALL: I'm Kim Damon-Randall. I'm from the Protected Resources Division of the National Marine Fisheries Service's Northeast Regional Office. I'm going to give you an update on Atlantic sturgeon. I'm going to give you brief background just to make sure everybody is on the same page. I'm going to update the information that is newly available for Atlantic sturgeon. I'm going to give you an overview of the draft batched fisheries biological opinion that was just released on Monday and then talk about some next steps. Just as a brief background, and I'm sure all of you are aware that in February of 2012 five distinct population segments of Atlantic sturgeon were listed, and that listing became effective in April.

Incidental catch in commercial fisheries was determined to be one of the primary threats in both of the listing rules that were published. In April of 2012 all incidental catch became illegal unless it was covered by a Section 7 Incidental Take Statement or a Section 10 Permit. We entered into a formal Section 7 Consultation on the fisheries in the northeast that are known to interact with Atlantic sturgeon.

Our Northeast Fisheries Science Center performed a bycatch analysis which was completed in April of 2011, which identified the fisheries and the gear types that have been observed to interact with Atlantic sturgeon. They incidental catch in sink gill net gear and otter trawl gear. When they went to try to attribute that incidental catch by fishery, there wasn't enough data to do so, so it wasn't possible to determine which specific fishery that takes occur.

At that point we determined that for the consultation, instead of doing the consultation on an FMP-by-FMP basis, we would batch the consultation together. The batch consultation includes groundfish, monkfish, dogfish, skate, squid/mackerel/butterfish, bluefish and summer flounder/scup/black sea bass.

When we do a Section 7 Consultation, we have to perform a jeopardy analysis. The jeopardy analysis examines the future with and without the action under consideration to determine if the proposed action is likely to appreciably reduce the species likelihood of survival and recovery. The effects analysis for sturgeon, we had to determine

the effect of the seven fisheries as they currently operate on each distinct population segment of Atlantic sturgeon.

We also have to estimate the number of Atlantic sturgeon that are likely to be captured, injured or killed or taken by DPS and determine if that annual loss is likely to appreciably reduce the likelihood of survival and recovery of the species. The standard for a Section 7 is to use the best available information.

Originally we did not have any comprehensive population estimates for Atlantic sturgeon. We had estimates of mature adults in two spawning rivers but no comprehensive estimates. At the time biological opinion was initiated in February 2012, we had significant concern regarding possibly recommending major changes to the fisheries without the data to support that need.

We started working with our Northeast Fisheries Science Center to see if there was a way to calculate an ocean abundance estimate. In April of this year the Northeast Fisheries Science Center completed a new method for estimating the ocean population, and this is the first time that this has been done.

Their method is known as the Atlantic Sturgeon Population Index, or ASPI. It is based on the fishery bycatch estimates that they did in 2011, data from the U.S. Fish and Wildlife Service's tagging database, which is a long-standing tagging database for Atlantic sturgeon and also estimates of life history parameters that are available for Atlantic sturgeon in the literature.

The ASPI is a risk analysis model and the inputs include encounter rate and mortality rate. The estimates that they get from the ASPI method are only ocean abundance estimates and only in the area sampled by the Northeast Fisheries Observer Program. Their current estimates range from 165,000 to a little over 744,000 with a mean of 417,934.

The methodology was internally peer reviewed by people within NMFS, their stock assessment biologists and also modelers. It will also be reviewed and considered hopefully by the Atlantic Sturgeon Stock Assessment Committee. The science center also calculated a swept-area biomass estimate from the Northeast Area Monitoring and Assessment Program, or NEAMAP Survey.

The NEAMAP is a trawl survey that samples coastal areas from Cape Cod to Cape Hatteras, and it samples in nearshore waters out to about 18.3 meters, so a good geographic representation of area occupied by Atlantic sturgeon in the ocean. The data are available for the fall 2007 to present and spring of 2008 to present.

Atlantic sturgeon are frequently sampled in the NEAMAP Survey. However, the net efficiency of sturgeon capture in the survey is not currently known. If you use a 50 percent catchability and the catchability is the product of the probability of capture given encounter and net efficiency and the fraction of the population within the sampling areas; so if you use a 50 percent net efficiency or catchability, the ocean estimate of Atlantic sturgeon is approximately 67,776.

This is the estimate that was used in the biological opinion. If you've read the biological opinion, we determined that this was a valid minimum estimate for the ocean population size. We know it is not a complete sampling of the affected area, but it does represent a significant portion of the action area for the fisheries that we're looking at in the biological opinion, and there are higher rates of encounter of Atlantic sturgeon in the survey.

Additionally, this methodology relies on a lot fewer assumptions than the ASPI method. It is a direct result of empirical Atlantic sturgeon captures in a survey, so we did determine that this was the most valid conservative estimate to use in the biological opinion. Just as an overview of what the biological opinion says, it indicates that the fisheries that are involved in the consultation may adversely affect but are not likely to jeopardize any of the listed species in the

Northeast Region, including the five Atlantic sturgeon DPSs.

There are incidental take statements for sea turtles, and they're listed here just for those of you that are interested in sea turtles and for Atlantic sturgeon. If people are interested, I can go into detail on how the Atlantic sturgeon take estimates are calculated. It is obvious for each of the five different DPSs there is an estimate of take for both gill net and bottom otter trawl gear.

I can go back to this after if people have questions on it. We also have an incidental take statement for Atlantic salmon, and it is basically one salmon every three years in gill net gear with one mortality every three years and one annually in bottom trawl gear with a lethal occurring every two years.

The anticipated level of incidental take of Atlantic sturgeon and Atlantic salmon for the recreational components of the seven fisheries could not be estimated at this time. The incidental take statement also includes four reasonable and prudent measures, or RPMs, and then implementing terms and conditions of the RPMs.

RPMs with their implementing terms and conditions are designed to minimize and monitor the impact of incidental take that might occur that might otherwise result from the proposed actions. Specifically, the RPMs and terms and conditions in this biological opinion ensure that NMFS monitors the impacts of the proposed actions in a way that allows us to detect, identify and report all interactions of the ESA listed species.

We have to ensure that any sturgeon, salmon or sea turtles that are taken are handled in a way as to minimize stress to the animal and increase its survival rate. NMFS also has to continue to investigate and implement gear modifications that are used in the fisheries to reduce incidental takes of the listed species and also the severity of the interactions that occur.

NMFS must also continue to review the available information to determine whether or not there are areas or conditions within the action area in which listed species are more likely to be taken. NMFS must also ensure that the monitoring and reporting of ESA listed species interactions allows us to detect any adverse effects such as serious injury or mortality, detect whether the anticipated level of take has been met or has been exceeded and also collect data from individual encounters.

The biological opinion is posted on our website. We had some issues with our website on Monday, so it actually went out to ASMFC and the councils by e-mail and then was actually posted on Tuesday. It is currently available at the website up on the screen. It is available for review for 60 days.

Comments that are submitted will go to our Sustainable Fisheries Division for consideration. Comments can be submitted to the e-mail address that is listed there, which is also available on the website. SFD will then provide any substantive comments to the Protected Resources Division for consideration in the final biological opinion. PRD will revise the biological opinion as necessary and finalize it for signature, and this is expected to be signed in the fall of this year.

NMFS is also continuing to work with the states on Section 10 applications to address takes in state waters. The Section 10 permit was issued in December to Georgia for takes of shortnose and Atlantic sturgeon in the commercial shad fishery. NMFS recently sent a draft of an implementing agreement to North Carolina for monitoring and adaptive management.

We're close to having a complete application and we will start processing it soon. The new estimates that I mentioned for ocean will be reviewed and considered for inclusion in the ASMFC benchmark assessment, which is I believe still expected to be completed in 2014 or possibly early 2015.

The results of the stock assessment will help to determine if a new ESA status review is necessary. If a new ESA status review is initiated, NMFS intends to draw heavily on the work of the Stock Assessment Committee and focus just on those areas that are necessary to inform the information gaps to help inform a listing determination. This would be a similar process to what has been undertaken for river herring if you're familiar with that process. That's it.

CHAIRMAN ALLEN: Thank you, Kim, very nice job on that. I'll open it up to questions for Kim starting with Bill Adler.

MR. WILLIAM A. ADLER: In one of your slides you had an estimated ocean estimate of somewhere between 165,000 to upwards of 700,000. That is the estimate of how many sturgeons are swimming around in the ocean, I think.

If that is the case, what is the level they should be at that would say, okay, they're okay? Do they have an estimate of what that number should be if those are the numbers they think they are now?

MS. DAMON-RANDALL: That is a good question. We have not initiated recovery planning at this point. We will be doing so soon. When we do the recovery plan, that is when you come up with hopefully that magic number of what a recovered population looks like. We do know that these estimates are still vastly reduced from what the historic highs were, but we don't know exactly what the number needs to be for it to be recovered.

MR. ADLER: Okay, because that looks like a pretty good number to me, enough fish out there.

MR. JOHN CLARK: Kim, the estimate, if I read the ASPI Report correctly, that number is based on the tag work, the one that is up there right now?

MS. DAMON-RANDALL: Yes.

MR. CLARK: Okay, and they then tried to truth that with NEAMAP estimate, also, so that they – if I recall in the report, it said that the catchability estimate, to get numbers that were similar from the NEAMAP was down around 6 percent to 12 percent; yet in the NEAMAP estimate that you are using in the biological opinion it was 50 percent catchability. I was just curious as to how they decided on these numbers to use for catchability.

MS. DAMON-RANDALL: In their paper they present a range of catchability estimates. They did say that in order for it to be consistent with the ASPI method the range would be lower than that 50 percent catchability. The catchability is, again, the net efficiency, so how many of the fish that are in the area are actually going to be caught by the net and what fraction of the population is in the area to be caught. We feel like it is a higher estimate than just the 6 percent because that NEAMAP Survey does sample a really well-known geographic area that sturgeon occupy at a time when they're actually moving through that area in the spring and in the fall.

MR. CLARK: Do they have any plans to see if they can get a better verification of that like with sensors on the trawls or anything like that to look at that?

MS. DAMON-RANDALL: Specifically for the NEAMAP?

MR. CLARK: Yes.

MS. DAMON-RANDALL: Not that I know of, no.

MR. MITCHELL FEIGENBAUM: I'm wondering how the numbers that you're estimating in this newest work compare with the numbers that were used when NMFS supported or decided to list the species. I think the board members got a letter from at least one concerned citizen indicating that the new population estimates are magnitudes

higher than what were originally used. How do you respond to that?

MS. DAMON-RANDALL: We did not actually have estimates at the time of the listing. We had two partial estimates of spawning adults; one for the Hudson River, which was 867 spawning adults, a total of 867; and one for the Altamaha River, which were 343 spawning adults per year. That is all we had. We didn't have any comprehensive population estimates. The listing actually really focuses on the threats to the species and the magnitude of those threats and how those threats are going to continue to act on the species in the future.

MR. CLARK: Kim, I was just wondering if the estimates will have any influence on the level of monitoring you will be expecting under like a Section 10 Permit if a higher population would mean that you could have a little more leeway or just hypothetically speaking there.

MS. DAMON-RANDALL: I think the estimates will definitely be used in the Section 10 applications in the process of reviewing what needs to be done, but I'm not exactly sure how that would translate to what type of observer coverage would be needed.

MR. ROY MILLER: Thank you for this report, Kim. Of the estimate of 417,934, I thought I noticed some percentages in my quick through the report approaching 49 percent for the Mid-Atlantic by population; so is it a safe assumption that perhaps nearly half of the estimate might be Mid-Atlantic Bight Atlantic Sturgeon; is that a fair conclusion?

MS. DAMON-RANDALL: This estimate, again, is for the ocean population that is sampled by the Northeast Fisheries Observer Program, so that is the Gulf of Maine down to Cape Hatteras. It doesn't include fish from the rivers and it doesn't include that originate in Canadian waters or south of Cape Hatteras.

There are fish from those southern DPSs that are up in the areas that the NEFOP samples, so they are represented to some degree in these estimates. You did see the percentages. The percentages are based on a genetic mixed stock analysis that was done for the Northeast Fisheries Observer Program samples. They took what was sampled.

It is 173 fish from the Northeast Fisheries Observer Program and they did a genetic analysis on that and those against the referenced populations that they have, which is over 744 fish, and determined which DPS they originated from. Those genetic percentages are based on that mixed stock analysis; so that 49 percent that you're referencing is of that mixed stock that is in the ocean, 49 percent of the fish that have been documented in the NEFOP originated from the New York Bight DPS. You could say that approximately about half of those fish would be New York Bight DPS fish.

MR. JAMES GILMORE: Kim, that was helpful. It answered a bunch of questions I had. However, you focused in on the commercial fisheries and the conflicts which we have in New York like any other state. The one thing you didn't go into was an issue particularly in New York is other development and research programs.

In New York we have two very important programs. We have our research on the Hudson, which we essentially have a take permit under. We also have a high-priority project, a bridge over the Hudson River. Your program decided to combine those into one, which was a problem for us because we think we're going to exceed that.

Unfortunately, we had to live with it based upon the original listing. Now that we see a lot more fish, we're thinking that number should be higher because we're going to hit a wall with this. What is going to happen is if the number of fish we're seeing in the Hudson River is true, we're going to exceed that take pretty quickly and then we're going to be in conflict with whether we're building a bridge or if we're doing more research.

We need to resolve this before I guess rest of this is all – you know, based upon the

schedule you have up there, we're not going to get it done until 2014 and 2015, and we're probably going to hit that issue beforehand. It is just a simple request. You don't have to answer this now, but my staff has been having difficulty. We need to sit down with you guys and get this resolved quickly. We're still working on the data so we need to ratchet this up quite a bit if we're going to resolve it before we get into a problem area. Thank you.

MS. DAMON-RANDALL: Would it be okay if I asked a clarifying question? For the Tappan Zee Bridge, which I'm thinking is what you're referring to, we did a Section 7 Consultation on that and that is completely separate. There is nothing else that is part of that consultation except for the Tappan Zee Project. I wasn't sure what things we mixed that you're referring to.

MR. GILMORE: My staff has told me that between the Tappan Zee Bridge Project and our research permit we get one take that is under one permit. They're not separate and that was the concern we had from Day One. If that is incorrect, then maybe that is part of the resolution. I think the numbers, even if they're separate permits, are still going to be problematic because we're going to have to shut one of those projects. I understand that your program is as interested in the data as we are in terms of sturgeon rebuilding. Again, we seem to have a problem and we need to resolve that before the longer term. Thank you.

MS. DAMON-RANDALL: That is in correct; they are two totally separate consultations, but the take estimates are relatively low, if I remember correctly.

MR. PATRICK AUGUSTINE: As a result of this report and the question that Mitchell asked, I got the answer I wanted to hear, but we will now have enough data to move forward with looking at a delisting in the 12, 18, 24 months or is there more data forthcoming? I know this is the beginning of an assessment, but I might have missed the next step. What is the next step of moving forward from your part?

MS. DAMON-RANDALL: The next step is definitely for the bycatch analysis that goes into the ASPI model and any other new data, the genetic analysis that I was referencing, to all be encapsulated in the stock assessment and have the stock assessment go forward. If the stock assessment shows that there are numbers that are out there that are high, we would evaluate whether or not we need to initiate a new status review. We would already have that stock assessment to build off of, so we wouldn't have to start that whole process again in a status review. We would just take what we need from that stock assessment and then fill in any holes that we need for a listing determination.

MR. AUGUSTINE: Thank you, that is a great help; because when we look back and review how the other – well, how the action was taken in the first place, we all felt it was a slam dunk and the data was lacking at that point in time. However, you have a job to and we have a job to do, and our job is to prevent our fisheries from being shut down and not having adequate data. It looks like we're moving in the right direction, so thank you for your effort.

MR. ADAM NOWALSKY: I see two sets of numbers in two consecutive slides. One, we have this ASPI model, which provides a mean estimate of 417,000 ocean sturgeon based on the NEFOP, and then the next slide was another ocean abundance estimate, if I understand correctly, of 67,000.

If I heard you correctly, I heard you say that it was your believe that the NEAMAP was the number that you're currently moving forward with as the minimum estimate of sturgeon. If I'm hearing that correctly, that says to me that while we see this slide of an estimated abundance on the ocean of 165,000 to 744,000 with a mean of 450,000, that sounds great and gives us all cause to say this is good news, but then in the next statement I heard you say that you're moving forward with the assumption that the minimum estimate is really 67,000 fish. Is that correct right now that you're moving

with the estimate of 67,000 and not 417,000, and would that opinion not change until the stock assessment work is done?

MS. DAMON-RANDALL: In the biological opinion we did use the NEAMAP estimate, the 67,000 estimate because we felt like that relies on the fewest assumptions. There are a lot of assumptions that go into the ASPI model, so this is a direct result of the NEAMAP Study. There are less assumptions that go into it, so we felt like it was a better conservative estimate to use.

In Section 7 you're supposed to err on the side of the species, so we used that number as a valid minimum estimate. If we were to use that bigger number, it wouldn't change the outcome of the consultation. It is a no jeopardy option, so it wouldn't change the outcome of the biological opinion in any way.

MR. FEIGENBAUM: Can you just elaborate on that last point for one of us newbies? I don't know what that means. There is a no jeopardy opinion; can you explain what that means?

MS. DAMON-RANDALL: If we had concluded that it was jeopardy, we would have had to propose reasonable and prudent alternatives that modify the fisheries in some way to get that take number down to where it is no longer appreciably reducing the survival and recovery of the species. Those would have been much significant changes to the fisheries that the fishermen would have had to have implemented.

We would have obviously given them some time to implement them, but it could have been things like closed areas, significant gear modifications, things to get the numbers down to where it no longer results in jeopardy. Because it was a no jeopardy opinion, there are no reasonable and prudent alternatives in the biological opinion. The reasonable and prudent measures that implement the terms and conditions of the incidental take statement are all things that the National Marine Fisheries Service has to do.

MS. ELLEN COSBY: Are there any restocking efforts being permitted at this time?

MS. DAMON-RANDALL: No.

MR. THOMAS FOTE: I'm trying to figure out what the reliability of NEAMAP is in sampling sturgeon. I know that we have run into this problem over the years with using the winter trawl survey and the spring survey. It doesn't do a good job on scup, it doesn't do a good job on black sea bass and those other species that we have to extrapolate.

Plus, over the last 30 years you have changed boats to do this numerous times, and we basically had to recalibrate for those switching boats, sizes and nets and the way the speed in which the boat control and the areas you can cover. I have serious questions when we use NEAMAP to basically – I equate it sometimes to MRFSS. It gives us a trend.

It shows us certain things that are going on, but to try to really use it as an exact estimate of stocks of what is going on has been problematic, especially when we look at like bluefish and a number of species because it was really, if I remember right, designed to halibut over years and it does a good job on bottom fish and fish that are laying on the bottom.

When I look at a 50 percent catchability, it sends up a red flag in my mind after watching what is going on with this for 22 years. I'm trying to figure out we come with a 50 percent catchability rate on this because when I'm looking at 12 percent here and 5 percent here and all of a sudden we start deciding in the middle of this 50 percent. It waves red flags in my estimation.

CHAIRMAN ALLEN: I'm going to throw this out to the board at this point to get back to the draft biological opinion and whether or not this board would like to comment on that during the comment period. We could draft up a letter and send it to NMFS. I don't know if anybody has an interest in that. Louis.

DR. LOUIS DANIEL: I had a few questions first. I mean this is what we told you a year and a half ago. I'm glad it has borne out the way that it has, but it blows my mind that we're still waiting and waiting and waiting. We're going to be developing incidental take permits. We have been doing a lot of observing in North Carolina in inside waters.

I agree with Tom on the trawl survey. I think your numbers are way low, but it is not unexpected. It doesn't seem like now that any of the fisheries under the no jeopardy decision are going to have any problems, concerns, worries; everybody is cheering. Inside waters where the states are going to have to pay a lot of money, we still have to continue moving in that mode.

My question would be is if you had this information before you listed them as endangered, which you should have, would you have listed them as endangered? That is my first question. My second question would be what does the word "appreciably" mean in NMFS' opinion? Why is the National Marine Fisheries Service only looking at north of Hatteras? That makes no sense to me. This is a big issue for the entire east coast, and all this effort is going into the northeast.

That seems irresponsible to me to be coming here with a presentation to the Atlantic States Marine Fisheries Commission and nobody seems to care about what is happening south of Hatteras. I care, so those are my primary questions. Then how does the no jeopardy opinion impact us in the states? I'm assuming that these 67,000 fish are adults; is that correct?

MS. DAMON-RANDALL: No, it is a combination of sub-adults and adults.

DR. DANIEL: So sub-adults and adults and everything we're seeing in inside waters are juvenile; so can I assume there is no jeopardy in my fisheries in inside waters in North Carolina and can I stop observing sturgeon now, and can I go ahead and let my General Assembly know that I don't need the one million dollars that I've asked for to provide an observer program? Those are my big questions.

MS. DAMON-RANDALL: For Question Number 1, I don't know if we had had this information at the time of the listing if they would have been listed as endangered. That is why this needs to go through the stock assessment process and then we need to determine whether or not we need to initiate a status review.

There has been an independent review done of ASPI methodology by Elizabeth Babcock, who is a University of Miami professor, that supports the methodology but she did indicate that there were a couple of errors in the formulas, which does change the number or the range of the estimates. Those are all things that I think need to be part of the stock assessment process so at the end of the stock assessment we have a really good valid number that we can look at whether or not the species is threatened or endangered.

We are committed to doing that. We're committed to working with ASMFC and the stock assessment committee on the stock assessment to ensure that is done. That was Issue Number 1. Now, your second question, "appreciably", there is a lot of interpretation in that. It is not clearly defined, but it means that the action that you're consulting on is going to have some effect on the trajectory of the species, some visible effect.

The jeopardy opinion doesn't necessarily impact the states directly. It is obviously on the federal fisheries, but the information that was used in the jeopardy opinion can be used for some to the state fisheries, especially those that are in the estuarine areas, but it doesn't directly impact the states. It doesn't mean that you don't have to go forward with your Section 10 permits and get coverage for those state fisheries. It is just applicable to the federal fisheries that were part of the consultation.

No information south of Hatteras; the ASPI methodology and the NEAMAP Survey are based on surveys that take place in the northeast. The ASPI relies on the Northeast Fisheries Observer Program data. There is not a similar observer program dataset for Atlantic sturgeon south of Cape Hatteras, so that is why when the science center did their methodology, they relied on the Northeast Fisheries Observer Program data.

There isn't a similar dataset available, and we were asking them to develop an estimate for the area that we're doing our action on, and most of the action area for the seven fisheries is within the northeast regional office boundaries from Maine to Hatteras.

DR. DANIEL: Well, there is SEAMAP, which is the sister program to NEAMAP that is far more lengthy in its time series that surveys the area south of Hatteras. It seems to me at least what you have said here is that the NEAMAP Survey is the primary driver for your estimate and not the observer stuff.

There is a SEAMAP Program that is far more lengthy in its time series than NEAMAP, so that doesn't make any sense to me. I think there needs to be – when this stuff is presented, it needs to be handled coastwide. I don't know about what Florida, Georgia and South Carolina are doing. I know they have minimal fisheries in inside waters that will interact with Atlantic sturgeon.

North Carolina has the bulls eye on its back, and you guys need to be helping us in this issue. I'm calling up to NMFS and asking – you know, we're trying to get an incidental take permit put together. If it is anything like turtles, it is going to be two years before we get anything in place. Meanwhile, I'm out observing in the areas where the sturgeon occur and trying to collect the information to first refute the endangered listing, which may or may not do me any good, but also to have good information to submit an ITP.

At the same time I'm getting creamed at home for trying to put together an observer program to support these ITPs, and I have no sense whether or not I'm going to need it or not in a year or 16 months or whatever the delay is for you to make a decision on the status. It seems to be just delay, delay, delay when this is having huge financial impacts on the states that we can't afford right now, and it is going to be a waste of time.

It is all juvenile fish that we're seeing in inside waters; yet these fisheries have been poorly represented by the NEAMAP Survey, in my estimation, because of the limited depths that are fished. The catchability I think is extremely high. I think we're putting precaution on top precaution on top of precaution all the time, and it is killing us. Please, please help us in the states, give us some direction on what to do about these incidental takes of these juvenile fish that are going to cost us millions of dollars while you take your time to make a decision on whether or not you did the right thing in the original listing, which we all know now you didn't do the right thing in the listing decision.

They are not endangered species, so please get off the stance and make a decision, please. Otherwise, I need help and you guys need to tell me what I need to do to get these permits in place so that I avoid a lawsuit from an NGO group that wants gill nets out of the water in North Carolina.

MR. JOHN BULLARD: I think my first week on the job in August I was here when I got to meet someone who has become a good friend, Louis Daniel. My recollection was he talked to me probably a little bit about sturgeon. What I wanted to do – and I talked a little bit about this yesterday – was to try and find out what I should be paying attention to.

I had heard something about a groundfish crisis in the northeast, but I wanted to know what else should be on my front burner. At that meeting in the first week it became clear that sturgeon was something that needed to on the front burner. The message I got from

Louis and from many fishermen was that we needed to pay attention to sturgeon.

And as I represented I think at that meeting and as I've said before, this has the makings of a good news story in that this is a historic fish whose population is rebuilding, and that is the good news part of it. In places where we are seeing important fish species being depleted, when you see an important fish stock rebuilding, you should rejoice.

But, in this rebuilding with an endangered species listing, there is an exposure. To fishermen there is an exposure to anyone who puts a net in the water, anyone who wants to build a bridge, anyone there is exposure and that is all of us. This is a front-burner problem; that is the message I got loud and clear from ASMFC and from an awful lot of fishermen.

Many people said to me, representing NOAA Fisheries, that the decision we made – many people said, "You have made this decision 20 years ago, but you shouldn't have made this decision when you made it because the stock is coming back. We see sturgeon all over the place and we encounter them."

The worry I took back with me after that first meeting last August was that there are innocent bystanders that we have to look out for while we do the due diligence of looking at the facts. As I said to you, Louis, back then in August, I said we're going to follow the facts; and if the facts bear this out, we're not going to be on opposite side of this.

We will chase down the facts and if the facts bear it out, we will work this problem to the ground and we will be on the same side. People accused us of hasty decisions and precipitous action in listing something without enough information, too quickly. I don't think we did that but people accused us of that. I think that this step that Kim has laid out is an important step, and I think it is a step that helps get us out of a problem that exposes an awful lot of people to liability, but it is just one step.

It is frustrating because, as Louis has expressed, there are costs in the Section 10s. This costs you a lot of money to prepare the Section 10s. There is an awful lot of work involved. The observers are an awful lot of work in strained budgets. That is one of the things that we talked about yesterday afternoon, budgets under a lot of pressure.

I'm hearing you and the message I'm getting from you is that we need to keep this on the front burner. It stays on the front burner. What I want to say is that we need to do this; we need to proceed as we have laid out and not try and eliminate steps or jump the gun. The stock assessment that has been in the works by ASMFC is a very important step. We need to go ahead with that. That is a very important step.

This draft opinion that Kim has laid out is out for comment. We have already gotten comments that challenge some of the numbers. Adam pointed out the disparity between the NEAMAP and the computer model estimates. We get other comments and they may poke some holes in this, so that is why you put things out for comments, to test the numbers.

I'm sure there is lots of interest, who knows, there will be lawsuits. There have been before and I'm sure there will be again. This has all got to be tested in the public arena, so we will go forward. But what Kim has laid out, this draft opinion, is all I think a very important step. It is a significant step forward.

When the draft opinion becomes whatever it is that is not a draft, the final opinion, that will be another significant step forward. It has, as Kim said, more application to federal waters than state waters, but the information is useful for the states in the Section 10s, which yours is in, right, Louis, I think. Are we reviewing it?

DR. DANIEL: Not yet.

MR. BULLARD: Angie, can you talk about that? As I have said before, those are all very important in terms of the liability, and so we're working with you on that. Do you want to address that, Angie?

MS. ANGELA SINAMON: I'm Angela Sinamon; I'm Chief of the Endangered Species Division for NOAA Fisheries at Headquarters. We have been working with the state of North Carolina on the Section 10 application. My staff has been working with Louis's staff. We have been designing the conservation program that is a requirement of a Section 10 Permit and an implementing agreement with the state.

We sent a draft back and we expect to hear back from North Carolina at the end of this month. We do intend to issue that Section 10 Permit for Atlantic sturgeon at the same time that we issue the Section 10 Permit for turtles, which is the fall of 2013. In our discussions with North Carolina and in developing the conservation plan, we are not anticipating any additional or new observer requirements beyond what the state is already doing to observe for turtles.

I also wanted to respond briefly to the comment from New York. I do know that there was a research permit that was issued for trawling around the Tappan Zee Bridge pre-construction studies and that the state has some other research permits. If the state is concerned about exceeding the amount of take that is allotted in those permits, they can certainly work with my office with a permit modification. We have just done that with Entergy on the Hudson for their trawls and have significantly increased the amount of Atlantic sturgeon that they're allowed to catch in their trawl research.

MR. GILMORE: Actually Angela just answered the question because that was essentially where I was going is that – I mean, there are two issues going here, whether we needed to apply for permits, which is more of the bigger issues, but the ones that are existing right now is there a chance to adjust those numbers because that – again, I think we need to do our jobs here and that is to resolve this, and I hope to God we don't get into court because that's really not the place we need to go. We need to get this thing fixed at this body working with the feds and getting a resolution so we can work through this thing. Thank you.

MR. MARK GIBSON: As a state that does not have a Section 10 application in and has not done much work on one, I'm trying to do risk analysis here, and I'm not doing a very good job of it. I'm sure my colleagues from Rhode Island in the back are trying to do the same thing. I need to hear more about what the exposure risk is and what the urgency is for states to initiate this Section 10 process because if I have to go back and there is a great urgency and a great exposure and potential for great harm and redirect staff, I can't go ask anybody for a million dollars.

I can't ask for that for endangered humans never mind fish. I'd get laughed out the door. We will have to really deconstruct some of our programs to redirect staff and funding to do this. I'm not coming away from this with a clear sense of how much risk and exposure the states have, and I would like to hear some more about that. I don't know whether John or Kim can answer that question.

MS. SINAMON: Could you repeat the question; I'm not sure I understand the actual question.

MR. GIBSON: The bottom line is how much exposure and risk do states have that have not initiated this process and what should my sense of urgency be? This biological opinion looks more favorable than what I have seen before. I'm not coming away from this with a sense of what level of urgency I ought to have when I get back home.

MS. SINAMON: Well, any take of a listed species that is not permitted through Section 10 or exempted through Section 7, there is some liability. The Endangered Species Act does allow any individual or any third party

to take legal action for unexempted or unpermitted takes. The National Marine Fisheries Service also has enforcement capabilities.

As you I'm sure have noticed, we have not exercised our prosecutorial discretion. We're instead trying to work with the states to bring them in for Section 10 Permits. There is, of course, liability that third parties may bring a take case, but our approach is trying to get the states to work with us.

We understand you're under constraints, but we are also responsible for trying to recover listed species, so we really would like to work with the states to develop conservation programs and get any take that is not currently authorized permitted through either Section 10 or all of the federal fisheries covered under Section 7 Consultations.

CHAIRMAN ALLEN: All right, Louis.

DR. DANIEL: I'm excited to hear that from Protected Resources about the permits being issued at the same time as turtles. That is awesome news! That I did not know so I have to say thank you for that. John, it is a huge issue for us and I want to work with you, too. I just am very nervous about this whole process.

I think that it is very important for us to have our technical committee weigh on the biological opinion – that is our technical expertise – and address some of these questions that we have raised. Is 50 percent catchability a reasonable number? Is the SEAMAP data available and does that provide any information and could that simply be put into this model to get an estimate of the southern population? I think those are important.

The thing that really worries me, though – and then I will shut up, Mr. Chairman – and I'm going to go ahead and put it out there and there are going to be some groans, but I'm going to put it out there. We're going to do a stock assessment. We're going to get a result. What does it need to be? What if we have fish that are in worse condition than sturgeon? Then what do you do?

We're going to base this huge decision on the results of a stock assessment that we know is going to have a lot of uncertainty associated with it, and that is going to have huge implications. It ain't just making the mistake on whether to go up on a size limit or whether to decrease a trip limit or whether to adjust the quota.

It is whether or not we remain a threatened or endangered species or not on this stock assessment and that should worry everybody. If that is what we're waiting on, then I think we're going to really be in some big trouble because then that is going to set the precedent. If you're below 10 percent SPR, it is an endangered species now, so think about that as we move forward.

CHAIRMAN ALLEN: Good points, Louis. I think based on what you suggested maybe we could have the technical committee have a conference call at some point here in the next month and develop a letter to send as comments for the batch opinion based on what they came up with, and I think that would be a good idea. If the board thinks that is a good idea, I think that is the way we should move forward. If I don't see any objection with that, I think that is how we will task the technical committee to do this. Kyle, you had your hand up?

MR. KYLE SCHICK: Yes, I'm just trying to get my – I've just got a little marine in rural Virginia. We have a listing here and now we have the study that gives us an idea of what we have got in the ocean. We didn't have this information when it was listed. We don't know what we need to get unlisted. It seems like we have got the middle, but we don't have each end.

It is very frustrating for me. If I ran a business like that, I wouldn't get a loan at a bank and I wouldn't get insurance from an insurance company. I'm not questioning I guess the effort that everybody puts into this

from all sides of this room. It is enormous and I know everybody has the best interest of the fish, and that is what the goal is.

The goal is to get this fish stock replenished, but I don't see where we're going to get this done. We're caught in paperwork and doing this and words like "appreciable", which are subjective and not quantitative; at what point in time does this board and our states get a number that we know to work towards. How do we get there? I know that this is part of the process, but it seems like to me that in the future – and I don't know if this is the right time to talk about this – in the future we should have this type of information before the listing comes.

We should know we need to get to X level of biomass before somebody says that this is an endangered species; not after. It seems like to me that this document here is going to work against us because now we know we have all these fish. Well, we have to show an appreciable increase, a visible increase which is not quantitative, but we already have that from the listing. I don't know how anybody can satisfy my frustration with this until it is delisted. That is the goal. I know that is the goal for everybody, from the federal side and the states' side. I don't know if there is an answer to that. It is just I had to say it before my head exploded.

CHAIRMAN ALLEN: We share your pain. Are there any other questions for Kim? If not, we're going to move on to consider FMP review and state compliance, and I will hand it over to Kate.

FMP REVIEW AND STATE COMPLIANCE

MS. KATE TAYLOR: The plan review team met to review the compliance reports submitted in 2012 for the 2011 fishing year. The status of the fishery, as you know, there has been a complete moratorium since 1997 in state waters with the EEZ harvest prohibited in 1998. This will remain in effect until the stocks exhibit a minimum of 20 protected year classes of spawning females.

In 2011 a total of 429 Atlantic sturgeon were reported as bycaught in various fisheries along the Atlantic Coast. The majority occurred in the Delaware River Gill Net Fishery and the South Carolina Winyah Bay American Shad Gill Net Fishery; although in both of these instances there were no mortalities reported.

There were eight mortalities of Atlantic sturgeon reported in the Rhode Island anchored gill net fishery, and that is of the nine that were caught that year, which is up from two the previous year. There are underreporting concerns in all fisheries that were reporting Atlantic sturgeon. Additionally, for the board's consideration, in 2011 there were 21 Atlantic sturgeon carcasses reported from the Delaware Estuary of which 17 had external injuries that were most likely the result of being struck by a ship propeller.

An additional adult-sized male Atlantic sturgeon carcass with signs of vessel strikes was reported in the Nanticoke River as well. We have just gone through most of the status of the stock, but I would like to point out that a new benchmark assessment has been initiated. We're expecting that assessment to be completed by the end of 2014 with peer review in very early 2015.

Some ongoing research that was highlighted in the compliance reports; there is work being done by Connecticut, New York, Delaware and New Jersey on sturgeons in the Mid-Atlantic Region. The Virginia Institute of Marine Science also was conducting work on reducing sturgeon interactions in the Striped Bass Anchored Gill Net Fishery.

That research found that the use of the raised footlines often aided in reduced Atlantic sturgeon bycatch while not greatly affecting the striped bass catch. Additionally, North Carolina DMF, South Carolina DNR, the University of Georgia, and North Carolina State University were conducting research on the research and management of

endangered and threatened species in the southeast.

Another one to point out is that in 2011 the University of Georgia completed its tenth year of an ongoing study focusing on Atlantic sturgeon populations in the Altamaha River. That ongoing research has seen that the total juvenile biomass reached its highest point in the time series in 2011 for age one and age two fish.

Some habitat highlights reported in the compliance reports is that one dam was removed on the Penobscot River in 2012 in Maine and another one is scheduled for removal on that river this year. There is ongoing consultation with New York DEC on a proposed high-voltage power transmission line in the Hudson River.

In 2011 the Virginia Commonwealth University and partners constructed two Atlantic sturgeon spawning reefs in the tidal James River in 2010 and in 2011. The FMP states that states are required to submit information on the result of bycatch monitoring, any independent monitoring results, status of habit and information on any aquaculture operations in the compliance reports.

The PRT finds that all states are in compliance with the FMP, but the PRT does recommend that states further improve understanding of critical habitat utilization and population estimates of Atlantic sturgeon will hopefully also be aided in the stock assessment and to specify when no Atlantic sturgeon are encountered gear that typically encounter sturgeon; to continue to educate fishing communities on the identification techniques to distinguish shortnose and Atlantic sturgeon; and also to expand programs to estimate sturgeon bycatch in their fisheries. Thank you, Mr. Chairman.

CHAIRMAN ALLEN: Are there any questions for Kate? Louis.

DR. DANIEL: A question I guess maybe to Mark through the Chair. You asked the question about your vulnerability. Since September we have seen 24 sturgeon in our Gill Net Observer Program, so that is new information that could go into next year's report, and we will have that information available. We very, very rarely see one dead. I don't think we've had one out of twenty-four are dead. I think it said that eight of the nine in Rhode Island were dead. That surprises me. Do you know why?

MR. GIBSON: They have been in the water for a while; they have been in the net for a while. That is the only explanation I would have.

DR. DANIEL: So there are no attendance requirements or no minimum soak times or anything in Rhode Island?

MR. GIBSON: I believe we do have those. I can't tell you what they are.

DR. DANIEL: It just surprises me that you've got eight out of nine; that is a high percentage that is unusual, at least from what we see in North Carolina where water temperatures are generally higher. Anyway, it is just a point of information.

CHAIRMAN ALLEN: That may have occurred through sea lice or something like that while the net is sitting in the water. That happens a lot in New Jersey, also, especially in the monkfish fishery, so I'm not sure. Pat.

MR. AUGUSTINE: Mr. Chairman, before I make a motion, on your recommendations, Kate, what do we expect to do on it or just an awareness issue? There are some key things in there, but are we expecting states to just take that upon themselves or are we as ASMFC going to generate any other communication tools?

There are things on there that – improve understanding of critical habitat; how do we do that? I don't need an answer, but they're recommendations and I just think we need to know how we're going to go about addressing those, if we are going to address them other than just giving the board an

awareness that these are things we should be looking at. I don't know if you need to respond to it. **If not, I'd like to make a motion, Mr. Chairman, that we approve the 2012 FMP Review and State Compliance as presented today.**

CHAIRMAN ALLEN: Second by Bill Cole. Is there any objection to that motion? Seeing none; **the motion is approved.** Is there anything else anybody wants to discuss on sturgeon while we're here? Bob.

OTHER BUSINESS

EXECUTIVE DIRECTOR ROBERT E. BEAL: Since this is the last coast-wide board, I just wanted to ask the commissioners to help me in thanking someone and give them best wishes. Melissa Paine is in the back of the room and she has been with the commission for seven years and has worked on a lot of projects in the science department and has done a great job for us.

Obviously, Melissa looks a little different than the last time we all saw her; and once the baby is born, Melissa is going to move on from the commission and not be here. This will be her last face-to-face meeting with all of us. I just wanted to ask you guys to help me thank Melissa for the great time and wish her and Chris all the best of luck.

ADJOURNMENT

CHAIRMAN ALLEN: With that, if there is no objection, we will consider this the end of the Sturgeon Board Meeting.

(Whereupon, the meeting was adjourned at 10:10 o'clock a.m., May 23, 2013.)

Objective Statement

The objectives of this assessment are to gather the best available data on Atlantic sturgeon in order to develop meaningful biological reference points and assess the status of the stock against those reference points at a scale that is most appropriate for the biology and management of the species.

Terms of Reference for Atlantic Sturgeon Stock Assessment

1. Define population structure based on available genetic and tagging data. If alternative population structures are used in models (e.g., DPS, coastwide, river system), justify use of each population structure.

2. Characterize the precision and reliability of fishery-dependent and fishery-independent data, including tagging data, that are used in the assessment, including the following but not limited to:
    a. Provide descriptions of each data source (e.g., geographic location, sampling methodology, and potential explanation of anomalous data).
    b. Describe calculation and standardization (if performed) of abundance indices and other statistics including measures of uncertainty.
    c. Discuss trends and associated estimates of uncertainty (e.g., standard errors).
    d. Justify inclusion or elimination of available data sources.
    e. Discuss the effects of data strengths and weaknesses (e.g., temporal and spatial scale, gear selectivities, aging consistency, and sample size) on model inputs and outputs.

3. Develop biological reference points for Atlantic sturgeon populations.

4. Review existing estimates of Atlantic sturgeon bycatch (retained and discarded) and, if possible, develop a time-series of bycatch in monitored fisheries, and discuss the assumptions and applicability of such estimates to reference points.

5. If possible, develop models to estimate population parameters (e.g., F or Z, biomass, and abundance) and analyze model performance and stability.

6. State assumptions made for models and for calculations of indices and other statistics. Explain the likely effects of assumption violations on synthesis of input data and model outputs.

7. Where possible, assess stock status based on biological characteristics, including not but not limited to:
    a. Trends in age and size structure
    b. Trends in temporal indicators of abundance

8. Characterize uncertainty of model estimates and biological or empirical reference points.

9. Recommend stock status as related to reference points (if available). For example:
    a. Is the stock below the biomass threshold?
    b. Is mortality above the threshold?
    c. Is the index above or below a reference index value?

10. Other potential scientific issues:
    a. Compare reference points derived in this assessment with what is known about the general life history of the population unit. Explain any inconsistencies.

11. Develop detailed short and long-term prioritized lists of recommendations for future research, data collection, and assessment methodology. Highlight improvements to be made by next benchmark review.

12. Recommend timing of next benchmark assessment and intermediate updates, if necessary, relative to biology and current management of the species.

Terms of Reference for External Peer Review of Atlantic Sturgeon Stock Assessments

1. Evaluate appropriateness of population structure(s) defined in the assessment.

2. Evaluate the adequacy, appropriateness, application of the data used, and the justification for inclusion or elimination of available data sources. Evaluate the methods used to calculate indices and other statistics and associated measures of dispersion.

3. Evaluate the estimates of bycatch of Atlantic sturgeon and the methods used to develop them.

4. Evaluate the methods and models used to estimate population parameters (e.g., F, Z, biomass, relative abundance) and biological reference points, including but not limited to:

    a. Evaluate the choice and justification of the preferred model(s) or method(s) of calculation (i.e., was the most appropriate model or method chosen given available data and life history of the species?).
    b. If multiple models were considered, evaluate the analysts' explanation of any differences in results.
    c. If appropriate, evaluate model parameterization and specification (e.g., choice of CVs, effective sample sizes, likelihood weighting schemes, calculation/specification of M, stock-recruitment relationship, choice of time-varying parameters, plus group treatment).
    d. Evaluate the diagnostic analyses performed, including but not limited to:
        i. Sensitivity analyses to determine stability of estimates and potential consequences of major model assumptions
        ii. Retrospective analysis

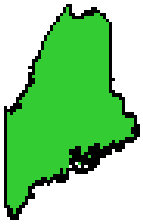
5. Evaluate the methods used to characterize uncertainty in estimated parameters. Ensure that the implications of uncertainty in technical conclusions are clearly stated.

6. Evaluate recommended estimates of stock biomass, abundance (relative or absolute), mortality, and the choice of reference points from the assessment for use in management, if possible, or, if appropriate, recommend changes or specify alternative estimation methods.

7. Evaluate stock status determination from the assessment, or, if appropriate, recommend changes or specify alternative methods/measures.

8. Review the research, data collection, and assessment methodology recommendations and make any additional recommendations warranted. Clearly prioritize the activities needed to inform and maintain the current assessment, and provide recommendations to improve the reliability of future assessments.

STATE OF MAINE



2012 ATLANTIC STURGEON COMPLIANCE REPORT TO THE ATLANTIC STATES MARINE FISHERIES COMMISSION

Prepared by:
Gail S. Wippelhauser
October 9, 2013

Amendment 1 to the ASMFC Interstate Fisheries Management Plan for Atlantic Sturgeon, approved by the ASMFC in June 1998, requires all Atlantic coast jurisdictions to submit Annual Compliance Reports addressing the issues outlined in Section 5.1.2 of the FMP.

Bycatch monitoring for Atlantic sturgeon in other fisheries

The State of Maine has no active program to monitor bycatch of Atlantic sturgeon in Maine waters. MDMR queried the National Marine Fisheries Service Fishery Observer database for the period 1991 through 2012 for Statistical Areas 511, 512, and 513. However, all Atlantic sturgeon bycatch occurred in Statistical Area 513. The results of this year's query should supersede data provided in previous years, which may have contained some errors. For example, 2003 data appeared to be entered twice in last year's data.

A total of 1,355.1 pounds of Atlantic sturgeon or sturgeon bycatch was reported for the years 1991-2012 (Appendix 1). Bycatch was greatest in 2000, and was relatively high from 1991-1994 (Figure 1). For all years combined, bycatch was greatest in November and July (Figure 2). Sturgeon were taken by gillnet (915 pounds), otter trawl (395 pounds) and purse seine (45 pounds).

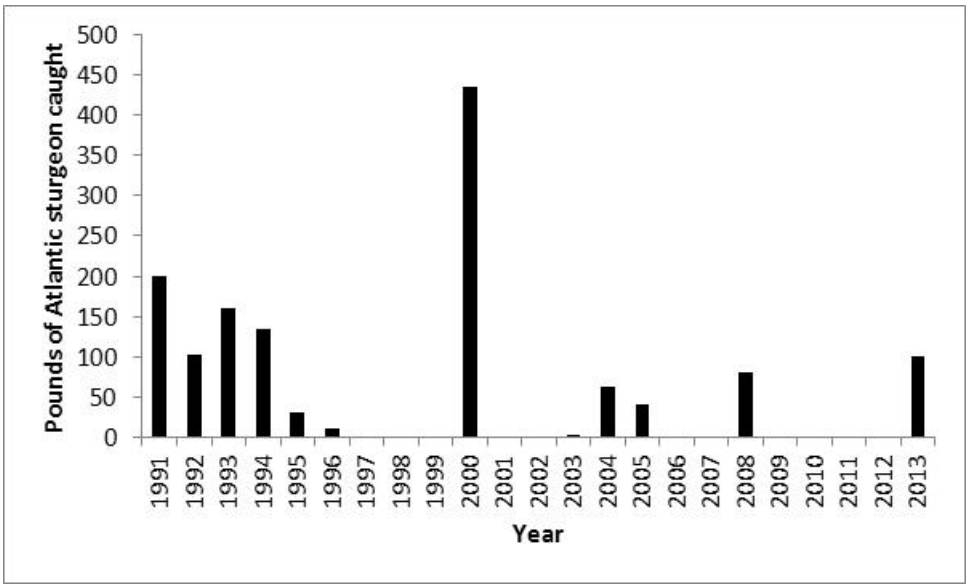


Figure 1. Atlantic sturgeon bycatch in Statistical Area 513 by year.

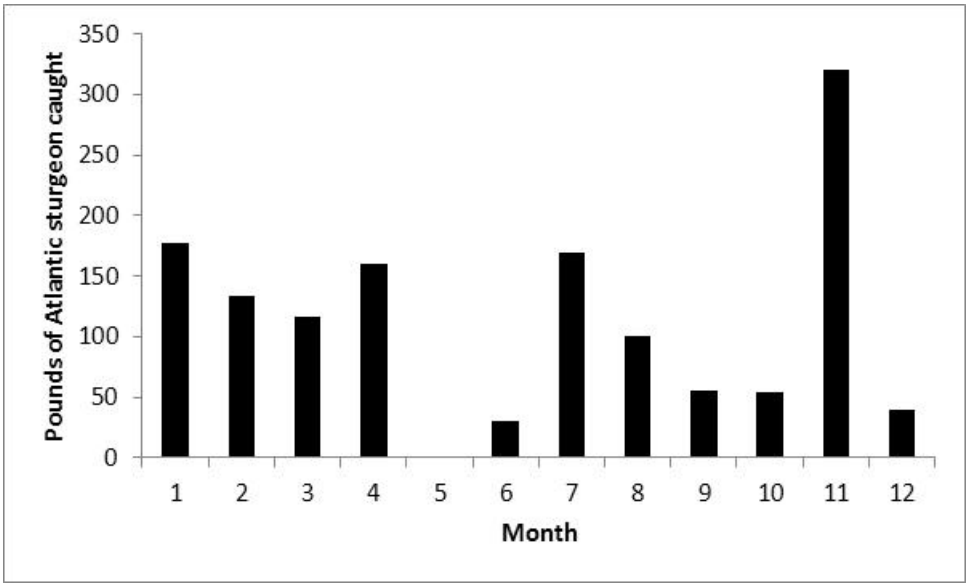


Figure 2. Atlantic sturgeon bycatch in Statistical Area 513 by month.

Monitoring results

1. Completed studies

Studies conducted by the Maine Department of Marine Resources (MDMR) between 1977 and 2000 to estimate the abundance of adult shortnose sturgeon in the Kennebec System (Kennebec, Androscoggin, and Sheepscot rivers) incidentally captured Atlantic sturgeon. Catch-per-unit-effort (CPUE) for Atlantic sturgeon during the 1998-2000 study was much greater than CPUE during the 1977-1981 study (Table 1). Similar sampling gear (a 90-meter multifilament experimental sinking gill net, 2.4m deep, with three panels of 15.2cm, 17.8cm, and 20.3cm stretch mesh) was used in both studies, but set time in the first study generally was longer (24 hours) than in the second study (3½ - 4 hours). To compare the two time periods a standard net day was defined as a 90m net fished for 24 hours, and the total annual catch was divided by the total net days. Atlantic sturgeon less than 130cm (TL) were arbitrarily classified as sub-adults and those over 130cm as adults.

Table 1. CPUE of subadult Atlantic sturgeon in the Kennebec System, Maine.

Year	Number of net days	Total catch	CPUE
1977	38.00	7	0.18
1978	46.00	3	0.07
1979	40.00	25	0.63
1980	34.00	16	0.47
1981	26.00	4	0.15
1989	8.45	122	14.44
1999	13.42	56	4.17
2000	27.82	103	3.70

2. Ongoing studies

Researchers at MDMR (G. Wippelhauser), University of Maine (UMaine; G. Zydlewski, M. Kinnison), University of New England (UNE; J. Sulikowski), and U.S. Geological Survey (USGS: M. Kieffer) have been studying Atlantic sturgeon in multiple river systems in the Gulf of Maine for as many as eight years. Objectives of these studies are to identify critical habitat, estimate population sizes, examine the connectivity and demographic correspondence among sturgeon stocks in the Gulf of Maine, determine migration routes, identify river of origin of individual fish, and study feeding habits. The researchers use similar methodology (gill netting, acoustic telemetry, PIT-tagging, biological sampling), and each group maintains an acoustic array in a particular river system: MDMR in the Kennebec System, UMaine in the Penobscot River, UNE in the Saco River, and USGS in the Merrimack River.

Results

To date, 571 Atlantic sturgeon have been caught, 487 have been PIT–tagged, and 146 have been tagged with an acoustic transmitter (Table 2). At the start of 2013, 103 acoustic tags were active.

Between 2009 and 2011, 39 Atlantic sturgeon ranging from 1,520-1,990-mm TL or in spawning condition (ripe males releasing milt) were caught in June and July at a previously identified spawning area in the Upper Kennebec Estuary and two putative, historical spawning areas (Kennebec River and Androscoggin estuary). Twenty-seven fish, including five ripe males, were caught in the Upper Kennebec Estuary between rkm 70 and rkm 74; four, including one ripe male, were caught in the Kennebec River at rkm 75; and eight, including one ripe male, were caught in the Androscoggin Estuary near receiver rkm 30 (Figure 1). Two of the latter, including the ripe male, had been caught in the Saco Estuary in 2010 and PIT tagged. Twenty nine of the 39 captured fish were tagged with an external acoustic transmitter. Thirteen Atlantic sturgeon that were tagged in the Upper Kennebec Estuary remained in the area for 1.6-37.3 d, two spent time in both the Upper Kennebec Estuary (3.9-20.4 d) and the Kennebec River (3.3-6.3 d at rkm 87), and one moved downstream within a day . Two fish tagged in the Androscoggin Estuary remained in the area for 9.1-19.1 d, and one dropped downstream within a day.

Between 2010 and 2012, two of 43 (5%) Atlantic sturgeon tagged in the Penobscot River between 2007 and 2012, six of 46 (13%) tagged in the Saco River between 2009 and 2012, and two of 17 (12%) tagged in the Merrimack River between 2009 and 2010 were detected at a known or putative spawning area in the Kennebec System in June and July. Six individuals went to a known spawning site in the Upper Kennebec Estuary, two spent time in the Upper Kennebec Estuary and the Kennebec River, and two went to the Androscoggin Estuary.

Spawning was confirmed in the Kennebec River and Upper Kennebec Estuary by the capture of two larvae at rkm 75, one measuring 15-mm TL on July 11 and one measuring 10-mm TL on July 12. One 15-mm TL larva was caught on July 11 at rkm 72. Bottom water temperature was 23-24ºC when the larvae were caught. Species identification of two of the larvae (one was released alive) was confirmed by mitochondrial DNA (Wirgin pers. comm.).

Non-spawning Atlantic sturgeon were widely distributed throughout the Kennebec System from mid-March to the end of November. Twenty Atlantic sturgeon caught and tagged in Merrymeeting Bay in 2011 and 2012 spent 9.2-85.3 d either in Merrymeeting Bay or in Merrymeeting Bay and the Upper Kennebec Estuary. Twenty-six Atlantic sturgeon tagged in the Penobscot, 14 tagged in the Saco, and six tagged in the Merrimack entered the Kennebec System between 2007 and 2012 and spent up to 151 d in the Lower Kennebec Estuary and/or Merrymeeting Bay. Four of these fish ventured farther upstream for a few hours, and just one spent 5-6 d in the Upper

Kennebec Estuary. Fish tagged in other river systems entered the Kennebec in March (n=2), April (n=6), May (n=14), June (n=8), July (n=5), August (n=6), September (n=6) and October (n=8). Sagadahoc Bay, located near the mouth of the Lower Kennebec Estuary (Figure 1) also may be important habitat. Twelve Atlantic sturgeon were captured in 2011 in a 90-m net in one hour, resulting in the highest CPUE for any site in the Kennebec System.

Eight Atlantic sturgeon tagged in the Kennebec System were detected from late summer through late winter by receivers attached to NERACOOS buoys in the Gulf of Maine (Figure 2). Two were detected southwest of the Kennebec System (one each at buoy A and B) and six to the northeast (one at buoy E, one at F, and four at I). Detections occurred at buoy A on Dec 28, at B on March 3, at E on January 1, at F on October 10, and at I on August 8, September 8, October 12, and November 24. Depths were 65 and 62 m at buoys A and B and 100-110 m at buoys E, F, and I.

Table 2. Number of Atlantic sturgeon caught and tagged by river system 2006-2012.

River system	Disposition	2006	2007	2008	2009	2010	2011	2012	Total
Penobscot	Caught	7	28	14	28	41	15	33	166
	PIT tagged	5	28	14	27	35	12	31	152
	Acoustic tagged	4	5	10	11	8	5	0	43
Kennebec	Caught				8	11	37	62	118
	PIT tagged				3	11	36	58	108
	Acoustic tagged				5	8	11	16	40
Saco	Caught			16	33	55	96	68	268
	PIT tagged			0	33	53	68	54	208
	Acoustic tagged			0	21	19	3	3	46
Merrimack	Caught				9	10			19
	PIT tagged				9	10			19
	Acoustic tagged				7	10			17

Figure 1. Location of major ecological zones, stationary acoustic receivers (filled circles and river kilometer [rkm]), and dams (black bars) in the Kennebec System, Maine. Sagadahoc Bay is indicated by a black star.

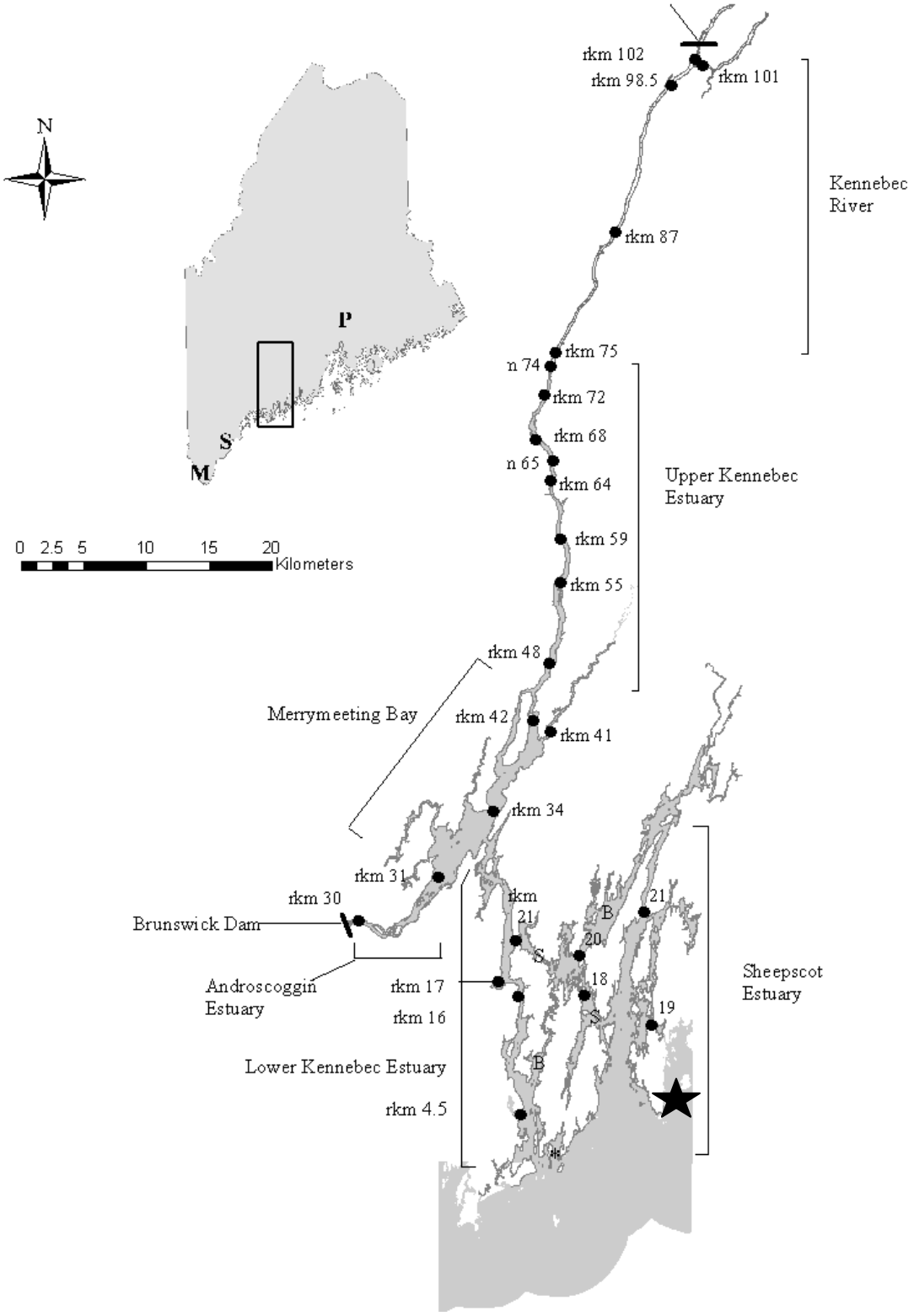
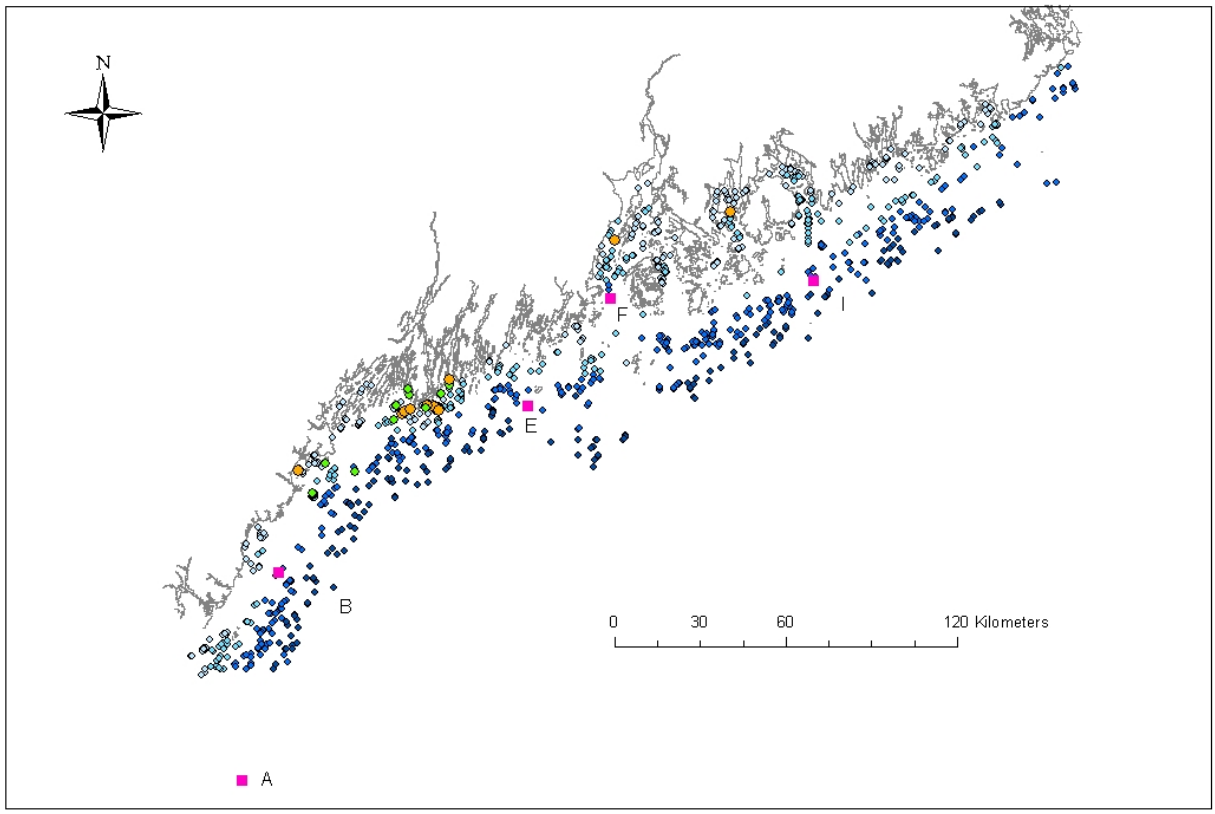


Figure 2. Maine coastline and locations of NERACOOS buoys A, B, E, F, and I (fuschia squares), trawl locations negative for Atlantic sturgeon (blue squares), positive for Atlantic sturgeon in spring (green circles) and positive in fall (orange circles).



4. In the fall of 2000, Maine (ME) and New Hampshire (NH) initiated an inshore groundfish trawl survey that is conducted in the spring and fall to provide a fisheries independent assessment of living resources inside states' coastal waters. The ME-NH Inshore Trawl Survey is stratified-random survey with a fixed component. The area sampled includes five longitudinal regions based on oceanographic, geologic, and biologic features and four depth strata (5-20, 21-35, 36-55, and >56 fathoms or 9.1-36.6, 38.4-64.0, 65.8-100.6, and >102.4 m). The deepest depth stratum was added in the spring 2003. The survey extends offshore to approximately the 12-mile limit. A total of 115 stations is selected for sampling during each survey. Gear consists of a modified shrimp net with a two-inch mesh in the wings with a one-half inch mesh liner in the cod end. Foot and head ropes are 50 and 70 feet respectively, with six-inch rubber cookies.

Although fishing effort has been similar in each of the regions, the majority of Atlantic sturgeon have been captured in Region 2 near the mouth of the Kennebec River (Table

3). Atlantic sturgeon are caught more often in fall (39) than in spring (13) and in the shallowest water (45 in stratum 1, 6 in stratum 2, 1 in stratum 3). In the fall of 2011, an Atlantic sturgeon was captured in Region 4 for the first time.

Table 3: Fishing effort and number of Atlantic sturgeon captured by region, season, and year in the ME/NH Inshore Groundfish Trawl Survey.

	Region 1		Region 2		Region 3		Region 4		Region 5	
	Catch	Effort	Catch	Effort	Catch	Effort	Catch	Effort	Catch	Effort
2000 Fall	0	14	4	16	0	14	0	17	0	17
2001 Spring	0	21	0	23	0	22	0	22	0	23
2001 Fall	0	18	15	18	0	15	0	18	0	6
2002 Spring	0	19	2	20	0	18	0	18	0	19
2002 Fall	0	15	10	17	0	17	0	14	0	18
2003 Spring	1	20	1	21	0	20	0	20	0	20
2003 Fall	0	16	0	15	0	12	0	18	0	17
2004 Spring	0	22	0	23	0	19	0	20	0	19
2004 Fall	0	18	1	20	0	16	0	17	0	16
2005 Spring	0	20	1	22	0	20	0	21	0	21
2005 Fall	0	12	0	14	0	13	0	12	0	3
2006 Spring	2	25	0	22	0	21	0	23	0	18
2006 Fall	0	22	1	18	0	21	0	16	0	8
2007 Spring	0	24	2	21	0	22	0	21	0	20
2007 Fall	0	21	0	18	0	18	0	18	0	12
2008 Spring	0	25	0	21	0	21	0	22	0	23
2008 Fall	1	17	1	17	0	18	0	15	0	12
2009 Spring	0	24	1	23	0	22	0	21	0	22
2009 Fall	0	20	1	19	1	18	0	21	0	14
2010 Spring	0	23	0	24	0	24	0	25	0	21
2010 Fall	0	17	2	21	0	19	0	15	0	13
2011 Spring	0	24	1	24	0	23	0	23	0	22
2011 Fall	0	22	0	15	0	13	1	18	0	16
2012 Spring	0	24	2	23	0	24	0	24	0	24
2012 Fall	0	23	1	20	0	18	0	21	0	17
Total	4	506	46	495	1	468	1	480	0	421

Habitat status

Atkins (1887) reported that Atlantic sturgeon historically were able to ascend the Kennebec River to Taconic Falls at river kilometer (rkm) 102, but the population declined after Edwards Dam was constructed at the head-of-tide (rkm 74) in 1837. In 1999, Edwards Dam was decommissioned and removed, thus allowing sturgeon to access approximately 27 km of spawning and nursery habitat for the first time in 162 years. MDMR's telemetry studies demonstrate that Atlantic sturgeon use this newly available habitat for spawning.

In the Penobscot River, Atlantic sturgeon are thought to have ascended historically to the falls upon which the Milford Project Dam is located. Three barriers, Great Works Dam constructed just after 1830 at rkm 59, Veazie Dam constructed in 1833 at rkm 47, and Bangor Water Works Dam constructed in 1874 at rkm 42 blocked sturgeon from nearly 20 km of historical habitat for 121 years. Bangor Water Works Dam was removed in 1995, Great Works Dam was removed in the summer of 2012, and Veazie dam is currently being removed.

Aquaculture operations

No Atlantic sturgeon aquaculture operations were authorized during the past year.

APPENDIX 1.

Year	MNTH	NEGEAR	GEARNM	TARGSPEC1	OBDBS_OBSPEC_1_COMNAME	AREA	NESPP4	OBDBS_OBSPEC_COMNAME	HAILWT	Round	WGTTYPE
1991	4	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	10	0	0
1991	7	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	19	0	0
1991	7	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	7	0	0
1991	7	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	15	0	0
1991	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	11	0	0
1991	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	13	0	0
1991	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	10	0	0
1991	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	12	0	0
1991	9	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	45	0	0
1991	10	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	19	0	0
1991	12	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	40	0	0
1992	3	058	TRAWL,OTTER,BOTTOM,SHRIMP	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	45	0	0
1992	7	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	20	0	0
1992	7	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	28	0	0
1992	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	9	0	0
1993	3	058	TRAWL,OTTER,BOTTOM,SHRIMP	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	10	2	0
1993	4	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	150	2	0
1994	2	058	TRAWL,OTTER,BOTTOM,SHRIMP	5260	FISH, NK	513	4211	STURGEON, NK	1	2	0
1994	2	058	TRAWL,OTTER,BOTTOM,SHRIMP	5260	FISH, NK	513	4211	STURGEON, NK	1	2	0
1994	2	058	TRAWL,OTTER,BOTTOM,SHRIMP	5260	FISH, NK	513	4211	STURGEON, NK	1	2	0
1994	3	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5260	FISH, NK	513	4200	STURGEON, ATLANTIC	31	2	0
1994	11	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5240	GROUNDFISH, NK	513	4200	STURGEON, ATLANTIC	70	2	2
1994	6	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	0818	COD, ATLANTIC	513	4200	STURGEON, ATLANTIC	30	2	2
1995	7	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	1260	FLOUNDER, NK	513	4211	STURGEON, NK	30	2	2
1996	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	3521	DOGFISH, SPINY	513	4200	STURGEON, ATLANTIC	11	2	1
2000	1	050	TRAWL,OTTER,BOTTOM,FISH	0818	COD, ATLANTIC	513	4211	STURGEON, NK	100	2	2
2000	7	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5240	GROUNDFISH, NK	513	4200	STURGEON, ATLANTIC	50	2	2
2000	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	0124	MONKFISH (GOOSEFISH)	513	4211	STURGEON, NK	35	2	2
2000	8	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	0124	MONKFISH (GOOSEFISH)	513	4200	STURGEON, ATLANTIC		0	
2000	11	100	GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	0818	COD, ATLANTIC	513	4211	STURGEON, NK	250	2	2
2003	2	058	TRAWL,OTTER,BOTTOM,SHRIMP	7360	SHRIMP, PANDALID (NORTHERN)	513	4211	STURGEON, NK	0.1	2	2
2004	1	058	TRAWL,OTTER,BOTTOM,SHRIMP	7360	SHRIMP, PANDALID (NORTHERN)	513	4200	STURGEON, ATLANTIC	27	2	2
2004	10	121	PURSE SEINE, HERRING	1685	HERRING, ATLANTIC	513	4200	STURGEON, ATLANTIC	35	2	2
2005	3	058	TRAWL,OTTER,BOTTOM,SHRIMP	7360	SHRIMP, PANDALID (NORTHERN)	513	4200	STURGEON, ATLANTIC	30	2	1
2005	9	121	PURSE SEINE, HERRING	1685	HERRING, ATLANTIC	513	4200	STURGEON, ATLANTIC	10	2	2
2008	2	058	TRAWL,OTTER,BOTTOM,SHRIMP	7350	SHRIMP, NK	513	4200	STURGEON, ATLANTIC	45	2	1
2008	2	058	TRAWL,OTTER,BOTTOM,SHRIMP	7350	SHRIMP, NK	513	4200	STURGEON, ATLANTIC	35	2	1
2013	1	050	TRAWL,OTTER,BOTTOM,FISH	2695	POLLOCK	513	4200	STURGEON, ATLANTIC	50	2	2
2013	2	058	TRAWL,OTTER,BOTTOM,SHRIMP	7360	SHRIMP, PANDALID (NORTHERN)	513	4211	STURGEON, NK	50	2	2

State of New Hampshire
Annual Compliance Report
for Atlantic Sturgeon - 2012

The following report is submitted as a compliance requirement under Amendment 1 to the Atlantic States Marine Fisheries Commission's Interstate Fisheries Management Plan for Atlantic Sturgeon.

I. Results of By-catch Monitoring for Atlantic Sturgeon in Other Fisheries

The following sources of information were examined for evidence of by-catch of Atlantic sturgeon in other fisheries in New Hampshire during 2012: law enforcement observations, mandatory logbook reports from Coastal Netters permittees*, National Marine Fisheries Service (NMFS) sea sampling for trips originating in New Hampshire, and two fisheries independent surveys conducted in New Hampshire (June to November estuarine seine survey and springtime monitoring of 6 coastal fishways). During 2012, no sturgeons were reported or observed from any of these information sources.

* Permit required to take finfish by seine, net, weir, pot, or trap from coastal and estuarine waters in New Hampshire.

II. Monitoring Results (tagging, five-year juvenile abundance index studies)

The State of New Hampshire has no known reproducing Atlantic sturgeon populations within its jurisdiction, so it is not required to monitor juvenile abundance under the plan. The State cooperates with the National Marine Fisheries Service and US Fish and Wildlife Service tagging program by reporting any tagged Atlantic sturgeon we become aware of. The US Geological Survey reported one tagged Atlantic sturgeon and one tagged shortnose sturgeon were recorded by receivers in Great Bay.

III. Habitat Status

Numerous fisheries independent surveys have been conducted in New Hampshire estuarine waters during the past 25 years, including one directed at determining the distribution and abundance of shortnose sturgeon (*Acipenser brevirostrum*). During this time period, the various surveys have encountered only one sub-adult Atlantic sturgeon (June 1981, Oyster River). Also during this period, fisheries dependent data indicated roughly 1,500 lbs. or less of sturgeon landed each year in New Hampshire prior to the implementation of a moratorium on sturgeon landings in 1991. Most of these sturgeons were harvested in the EEZ. From this it has been concluded that there is currently no evidence that Atlantic sturgeon have used New Hampshire estuaries and coastal rivers as spawning and nursery habitat in recent times.

However, many of the habitat conservation measures outlined in Section 4.1 of Amendment 1 to the Atlantic Sturgeon FMP are addressed as a part of the State's work in managing and restoring other anadromous and marine finfish species. These include:

1. Providing written comments concerning fish and wildlife to the State's Department of Environmental Services Water Division who are responsible for reviewing and approving aquatic alteration projects in the State.

2. The New Hampshire Fish and Game Department is represented on the State's Site Evaluation Committee for Power Plants, which must approve all proposed power plants.

3. The State has established (by administrative rule) a dredge window of November 15 to March 15 for dredge and fill projects.

4. The New Hampshire Fish and Game Department regularly works with the US Fish and Wildlife Service and the National Marine Fisheries Service to have Federal Energy Regulatory Commission require appropriate flows and migration routes for anadromous fish species at all coastal hydroelectric operations.

IV. **Aquaculture Operations**

There currently are no aquaculture operations for sturgeons in New Hampshire.

ATLANTIC STATES MARINE FISHERIES COMMISSION
ANNUAL ATLANTIC STURGEON COMPLIANCE REPORT
Reporting Period: October 1, 2012 – September 30, 2013

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October 2013

I. Introduction

The following is the annual compliance report submitted for the Commonwealth of Massachusetts by the Massachusetts Division of Marine Fisheries (*MarineFisheries*) as required by Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon, Section 5.1.2. *This report covers the time period October 1, 2012 through September 30, 2013.*

Massachusetts has no known reproducing populations of Atlantic sturgeon. Regulations have been implemented that prohibit the taking and/or possession of Atlantic sturgeon (Code of Massachusetts Regulations 322 6.16; see Attachment 1). There were no changes in regulations or management of Atlantic sturgeon in Massachusetts during the reporting period.

As outlined in Amendment 1, this compliance report addresses the following: Bycatch monitoring, Monitoring results, Habitat status and Aquaculture operations.

II. Request for *de minimis* status

Not applicable.

III. Previous calendar year's fishery and management program

a. Activity and results of fishery dependent monitoring

MarineFisheries monitors Atlantic sturgeon bycatch in our coastal fisheries through our Fisheries Dependent Investigations project by means of at-sea observers. Fisheries covered include (a) pot fisheries for lobster, sea bass, and scup, (b) trawl fisheries for squid, whiting, and groundfish, (c) hook-fisheries for cod, spiny dogfish, and scup, and (d) gillnet fisheries for groundfish and spiny dogfish. With the exception of the lobster pot sampling, most sea sampling trips are conducted on an ad hoc basis, typically in response to immediate management concerns. No Atlantic sturgeon were observed by *MarineFisheries* observers during the reporting period.

Most at-sea observations of gillnet and trawl fisheries in Massachusetts are conducted by the National Marine Fisheries Service (NMFS) observer program. ASMFC is advised to consult the NMFS observer database for documentation of bycatch of Atlantic sturgeon in gillnet and trawl fisheries in Massachusetts waters.

MarineFisheries received two reports of Atlantic sturgeon bycatch in recreational fisheries from October 1, 2012 to September 30, 2013. The first reported Atlantic sturgeon was captured on June 3rd, 2013 by an angler targeting striped bass in the lower Merrimack River. The second reported Atlantic sturgeon was captured on approximately August 11th, 2013 by an angler targeting striped bass in the lower Merrimack River. Both Atlantic sturgeon were released unharmed.

b. Activity and results of fishery independent monitoring

The Resource Assessment Project of *MarineFisheries* conducts a fisheries independent trawl survey biannually in spring and fall throughout Massachusetts territorial waters. No Atlantic sturgeon were caught during 2013. The last and only capture of Atlantic sturgeon in this survey occurred in 1986.

MarineFisheries currently maintains an array of acoustic telemetry receivers in coastal waters. Although *MarineFisheries* does not place transmitters on Atlantic sturgeon, receivers often pick up individuals that have been equipped with transmitters by researchers and other resource agencies. During the reporting period, 11 individual sturgeon were detected a total of 264 times in state waters. Several receivers were located adjacent to state waters in federal waters and on those receivers 7 individual sturgeon were detected 145 times. An extensive 32 receiver array was deployed east of Cape Ann in mid-June 2013 and was hauled the first week of October. Data for this array has not been processed, but it is an area where historically sturgeon have been detected transiting through and it is anticipated more animals were detected during this time period. Specific information about each individual should be requested directly from the entity who tagged and individual Atlantic sturgeon.

On October 7th, 2012, *MarineFisheries* received a report that multiple sturgeon breached the water in the Merrimack River, near Plum Island, Massachusetts. The report indicated that dozens of individual breaches were observed and that most fish were between 3 and 4 feet long. Given this report, the observed size of the fish, and previous reports of Atlantic sturgeon in the area, *MarineFisheries* suspects that the breaching sturgeon were probably Atlantic sturgeon.

No Atlantic sturgeon were observed during the spring and fall 2013 fish lifting activities at the Essex Dam hydroelectric facility on the Merrimack River in Lawrence, Massachusetts. Fish lift activities began on April 15th and continued through September 16th. Lifts were conducted hourly (8am-4pm) from April 15 through July 12th. Lifts were conducted two times per day from July 13th through September 15th. Lifts were conducted four times per day from September 16th through September 30th. In the 30 year history of lift operation, no Atlantic sturgeon have been observed to utilize the fish lift.

c. Copy of regulations that were in effect, including a reference to specific compliance criteria as mandated in the FMP

During the reporting period, Atlantic sturgeon were managed under the Code of Massachusetts Regulations 322CMR 6.16, which states:

6.16: Atlantic Sturgeon Prohibition

(1) Definition. Atlantic Sturgeon means that species of fish known as *Acipenser oxyrhyncus*

(2) Purpose. Massachusetts needs to comply with the Atlantic States Marine Fisheries Commission Atlantic Sturgeon Management Plan that requests states to adopt either an elimination of all sturgeon harvest or a minimum size of seven feet. Since there is no directed fishery for sturgeon in Massachusetts and the state has already declared the sturgeon

an endangered species, a prohibition on the landing and possession of sturgeon is appropriate. Now, both the Atlantic sturgeon and the endangered short-nosed sturgeon cannot be landed or possessed.

(3) Prohibition. It is prohibited and unlawful for any person to land or possess any Atlantic sturgeon.

This regulation meets the requirements of Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon, which closed all commercial Atlantic sturgeon fisheries within the United States.

d. Harvest broken down by commercial, recreational, and non-harvest losses

See Section III.a.

e. Review of progress in implementing habitat recommendations

To enhance protection of Atlantic sturgeon, *MarineFisheries* continues to provide comments for all Army Corps of Engineers, Massachusetts Department of Environmental Protection, and FERC permit applications regarding projects that may impact water quality and fish habitat. During FERC relicensing evaluations, *MarineFisheries* works with the USFWS and the NMFS to provide appropriate recommendations concerning habitat, adequate flow, and fish passage for Atlantic sturgeon. On case-by-case basis, local, state, and federal permitting agencies are provided with resource recommendations, which include appropriate work windows and environmental safeguards for Atlantic sturgeon. During the 2012-2013 reporting period, *Marine Fisheries* provided commentary on Atlantic sturgeon for 14 different projects located in four different geographic areas.

IV. Planned management programs for the current calendar year

a. Summarize regulations that will be in effect

See Section III.c.

b. Summarize monitoring programs that will be performed

MarineFisheries intends to continue fishery dependent (see Section III.a) and fishery independent (see Section III.b.) monitoring of Atlantic sturgeon. Further, *MarineFisheries* may pursue Federal funding to perform further monitoring, and potentially, remediation, of Atlantic sturgeon interactions that occur within the waters of the Commonwealth.

c. Highlight any changes from previous year

MarineFisheries does not plan any changes to the previous year's monitoring program.

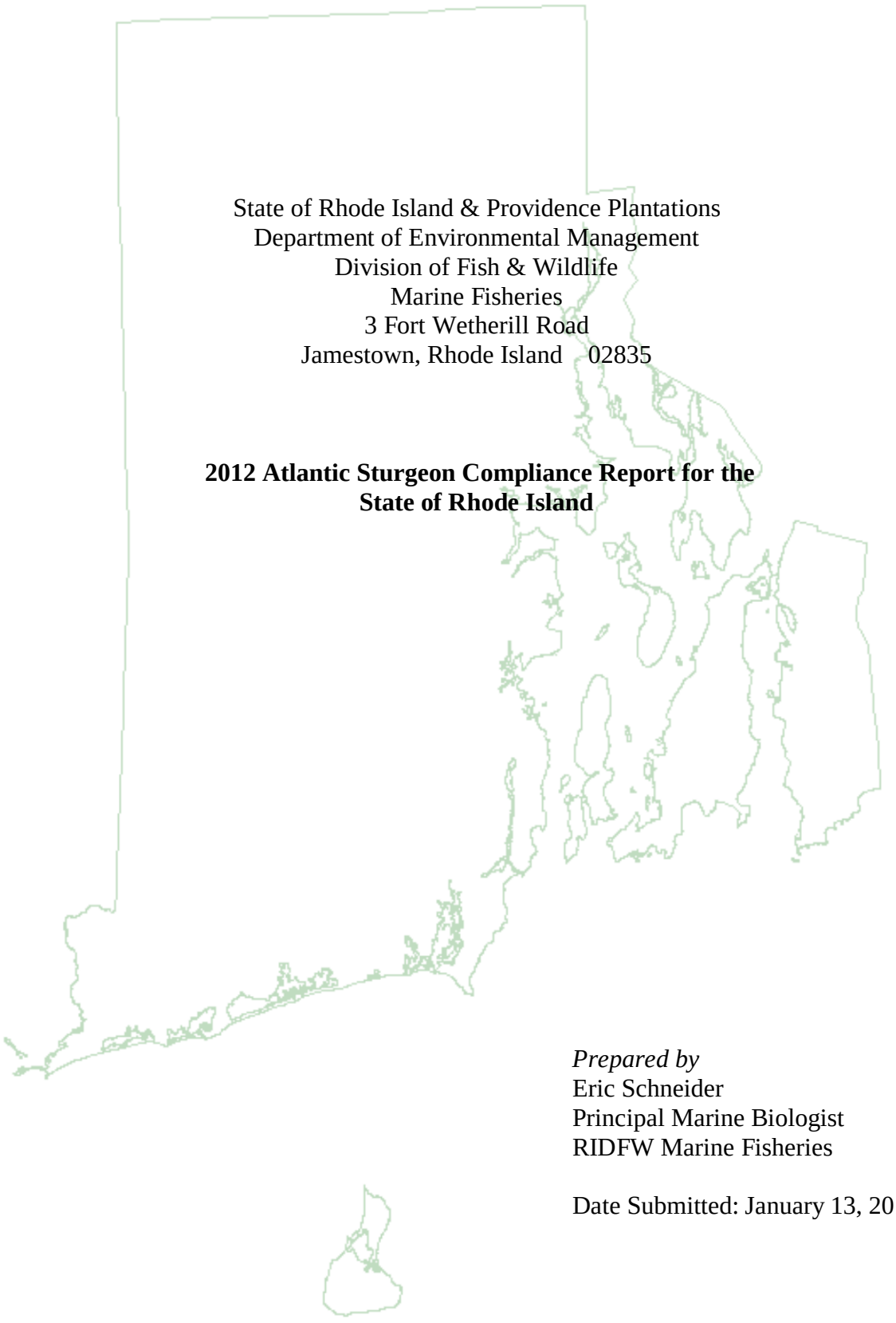
V. Plan specific requirements

The results of bycatch and scientific monitoring are given in sections III a and b. Information regarding habitat status is given in section III e.

There are no Atlantic sturgeon aquaculture facilities in Massachusetts, nor are any proposed at this time. Under the authority of Massachusetts General Laws Chapter 130, Section 17B, permits are required for aquacultural enterprises. The director may issue aquaculture permits under such terms and conditions as he may impose. The Massachusetts Office of Coastal Zone Management along with the Massachusetts Department of Agricultural Resources, and the Massachusetts Department of Environmental Protection developed a white paper, which serves as the mariculture policy document.

State of Rhode Island & Providence Plantations
Department of Environmental Management
Division of Fish & Wildlife
Marine Fisheries
3 Fort Wetherill Road
Jamestown, Rhode Island 02835

2012 Atlantic Sturgeon Compliance Report for the State of Rhode Island



Prepared by
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Date Submitted: January 13, 2014

Rhode Island Atlantic Sturgeon Compliance Report for the 2012 Fishing Year

I. Bycatch Monitoring

Data collected by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) Northeast Fishery Observer Program (NEFOP) and the At-Sea Monitoring Program (ASM) shows that 15 Atlantic sturgeon were captured in NOAA Fisheries Statistical Reporting Areas 537, 538, 539, 611, and 613 during 2012 (Table 1); however, none of these captures occurred in RI State waters. Although this is the ninth time in the 20 year time series that no bycatch has been observed in state waters, it does not imply that bycatch does not occur in state waters.

As part of RI's Incidental Take Permit (ITP) application under Section 10(a)1(b) of the Endangered species act, RI intends to use a modeling approach similar to that which will be used in the 2014 ASMFC Atlantic Sturgeon Stock Assessment (pending) to estimate state-water bycatch so that future interactions can be minimized if not avoided.

II. Monitoring

No Atlantic sturgeon were caught during routine fish surveys this year by Rhode Island Fish and Wildlife. Since 1979, 42 stations (26 in Narragansett Bay, 10 in Block Island Sound, and 6 in RI Sound) have routinely been sampled each year, by trawl, in the spring and fall. In addition, 13 stations have routinely been monitored by trawl in Narragansett Bay, each month throughout the year, since 1990. Since 1979 only two Atlantic sturgeon have been collected, an 86 cm specimen was caught in Narragansett Bay off Barren Ledge in May 1997 and a 130 cm sturgeon weighing 9.7 kg was collected in RI Sound in Oct 2005.

III. Habitat Status

Overview:
Based on the shallow nature of the State's three largest river systems (i.e. Blackstone, Pawtuxet, and Pawcatuck Rivers) it is believed that no suitable Atlantic sturgeon spawning habitat has ever existed in RI. However, historically Atlantic sturgeon spawned in the Taunton River (Secor 2002, ASSRT 2007, NMFS 2013), which although located in Massachusetts is connected to the ocean by Rhode Island waters (e.g. Mt. Hope Bay, Narragansett Bay, Sakonnet River). Despite evidence suggesting that spawning of Atlantic sturgeon has not occurred in the Taunton River in the last 15 years (NMFS 2013, ASSRT 2007), sturgeon that are spawned elsewhere continue to use habitats within the Taunton Rivers as part of their overall marine range (ASSRT 2007; Savoy 2007; Wirgin and King 2011).

Recommendations from Section III of Habitat Addendum IV to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon

Water Quality and Quantity

1) Maintain water quality and suitable habitat for all life stages of Atlantic sturgeon in all rivers with extant populations.

As noted above, we are not aware of Atlantic sturgeon currently or historically using river systems within RI state waters; however, sturgeon do enter and transit states waters during various times of the year. In RI the Department of Environmental Management (DEM) Office of Water Resources (OWR) administers several programs aimed to monitor, maintain, and improve water quality in freshwater and coastal rivers, as well as estuarine and marine waters (DEM OWR 2013).

2) Reduce non-point and point-source pollution in Atlantic sturgeon habitat areas.

As noted above, we are not aware of Atlantic sturgeon currently or historically using river systems within RI state waters; however, sturgeon do enter and transit states waters during various times of the year. In RI the DEM OWR administers several programs that control wastewater discharges, promote nonpoint source abatement, and reduce non-point and point-source pollution (DEM OWR 2013).

3) Implement agricultural, suburban, and urban best management practices to reduce sediment, toxicant, nutrient, and organic inputs into streams:

a. Utilize buffers along rivers and streams.
b. Restore hydrologic connectivity to wetlands.
c. Implement nonstructural stormwater management designs.

The RI DEM OWR Wetlands Program plays a pivotal role in controlling surface water runoff into rivers and streams via its permitting program and through education and outreach

4) Upgrade wastewater treatment plants, remove biological and organic nutrients from wastewater, and prevent introduction of new categories of contaminants. Upgrade current, and eliminate future permitting for, septic tanks in Atlantic sturgeon watersheds.

The RI DEM OWR Pollutant Discharge Elimination System (RIPDES) program administers the state's water pollution control strategy, which includes developing & enforcing permit limitations for municipal and industrial wastewaters, storm water, & combined sewer overflows discharged directly to the waters of the state, as well as industrial wastewaters discharged to municipally-owned treatment facilities (RIPDES 2013). The RIPDES program works closely with the Environmental Protection Agency (EPA) and other Divisions and programs in RI DEM to continually reduce the input of nutrients and other contaminants to the state's waters.

5) Reduce thermal effluents into rivers. On larger rivers, include a thermal zone of passage

or thermal discharge windows.

The RIPDES program also administers the state's water pollution control strategy, which includes developing & enforcing permit limitations for reducing thermal effluents into river. The RI F&W assists with permit review and evaluation for several major discharges.

6) Time water withdrawals, releases, and discharges to reduce impacts to migrating fish; screens should be used to reduce impacts when necessary (also see item 6 under Habitat Protection and Restoration). Time water releases and duration to increase reproductive/recruitment success for spawning fishes.

The RI DEM OWR authorizes water withdrawals under the authority of the Clean Water Act and the Freshwater Wetlands Act. Certain activities proposed in or near State waters require prior approval from the RIDEM Water Quality Certification (WQC) Program. RI F&W assists the RI WQC Program when evaluating potential impacts to fish and fish habitat from water withdrawals.

7) Use best management practices, such as Time of Year restrictions (also referred to as environmental windows, seasonal restrictions, or moratoria), whenever navigation dredging or dredged material disposal operations would occur in a given waterway occupied by Atlantic sturgeon.

RI F&W is directly involved in reviewing dredge applications and works closely with the RI WQC Program to evaluate and minimize potential impacts to fish and fish habitat from dredging or dredged material disposal operations.

Habitat Protection and Restoration

1) State marine fisheries agencies should identify habitat protection and restoration needs, and coordinate habitat restoration plans with other agencies. Agencies should coordinate with public, private, and non-profit organizations to obtain funding for plan implementation and monitoring.

The RI F&W Marine Fisheries Section Marine Habitat Program's goal is to: "*assess, protect, and restore critical marine habitat to support healthy marine ecosystems and stocks of recreationally and commercially important finfish*". More specifically, over the next 5-years RI F&W will identify, assess, and monitor sensitive and important marine habitat in Rhode Island waters in concert with developing a RI Marine Habitat Management and Restoration Plan. This work is a cooperative venture that will compliment RI's Incidental Take Permit (ITP) application.

2) Map critical/key habitats for Atlantic sturgeon using the literature, existing tracking data, and expert knowledge and use existing authorities to maximize the scrutiny given to projects likely to impact key habitats. Any project that would unavoidably alter critical/key habitat (e.g., dredging, filling) should be minimized to the extent possible. Time of Year restrictions should be used to minimize impacts from activities conducted

in areas where Atlantic sturgeon occur.

We expect to map critical/key habitats for Atlantic sturgeon during the 2014 fishing year as part of RI's Incidental Take Permit (ITP) application. RI F&W is directly involved in reviewing dredge applications and works closely with the RI WQC Program to evaluate and minimize potential impacts to fish and fish habitat from dredging or dredged material disposal operations. Any new information gained during the development of RI's Incidental Take Permit (ITP) application will be incorporated into the RI F&W dredge permit review process.

3) Map suitable, current, and historic Atlantic sturgeon habitat and prioritize for protection and restoration. Protection of critical/key habitat is the most beneficial conservation method for restoration of Atlantic sturgeon. The possibility of creating new spawning habitat in areas where hard substrate has been degraded should be investigated.

As noted above, we are not aware of Atlantic sturgeon currently or historically using river systems within RI state waters; however, sturgeon do enter and transit states waters during various times of the year and therefore we will map and prioritize such habit for protection.

4) Determine the effects of dredging on Atlantic sturgeon behavior, habitat, and migration.

Given the general lack of sturgeon in RI state waters, RI F&W does not intend to determine the effects of dredging on Atlantic sturgeon; however, we will consider any such information from the scientific literature in our dredge permit review process.

5) States should notify in writing the appropriate federal and state regulatory agencies of the locations of habitats used by Atlantic sturgeon. Regulatory agencies should be advised of the types of threats to sturgeon populations, and recommendations to avoid, minimize, or eliminate threats to current habitat quantity or quality.

RI F&W expects to address this during the 2014 fishing year as part of RI's Incidental Take Permit (ITP) application.

6) Each state encompassing and federal agencies regulating dams blocking Atlantic sturgeon spawning rivers and/or producer areas should develop water use and flow regime guidelines protective of sturgeon spawning and nursery areas to ensure the long-term health and sustainability of the stocks (also see item 6 under Water Quality and Quantity).

As noted above, we are not aware of Atlantic sturgeon currently or historically using river systems within RI state waters for spawning and thus, likely will not prioritize sturgeon passage above river hearing and America eel passage.

7) ASMFC should support state and federal designation of important habitats for Atlantic sturgeon spawning and nursery areas.

Similarly, RI F&W would likely support the state and federal designation of important habitats for Atlantic sturgeon spawning and nursery areas.

IV. Regulatory Changes

There were no regulatory changes during 2012. Regulations that were in place from January 1 through December 31, 2012 are as follows:

7.6 Minimum sizes, other species -- Except as specifically noted, no person shall possess or take any of the following species which are less than the following minimum size

ATLANTIC STURGEON: Commercial and Recreational - no possession

7.13Atlantic Sturgeon - Moratorium on Harvest
-- No harvest or possession of Atlantic Sturgeon will be permitted within the territorial waters of the State of Rhode Island until further notice.

V. Literature Cited

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(editors), Biology, management, and protection of North American sturgeon. American Fisheries Society Symposium 28, Bethesda, MD.

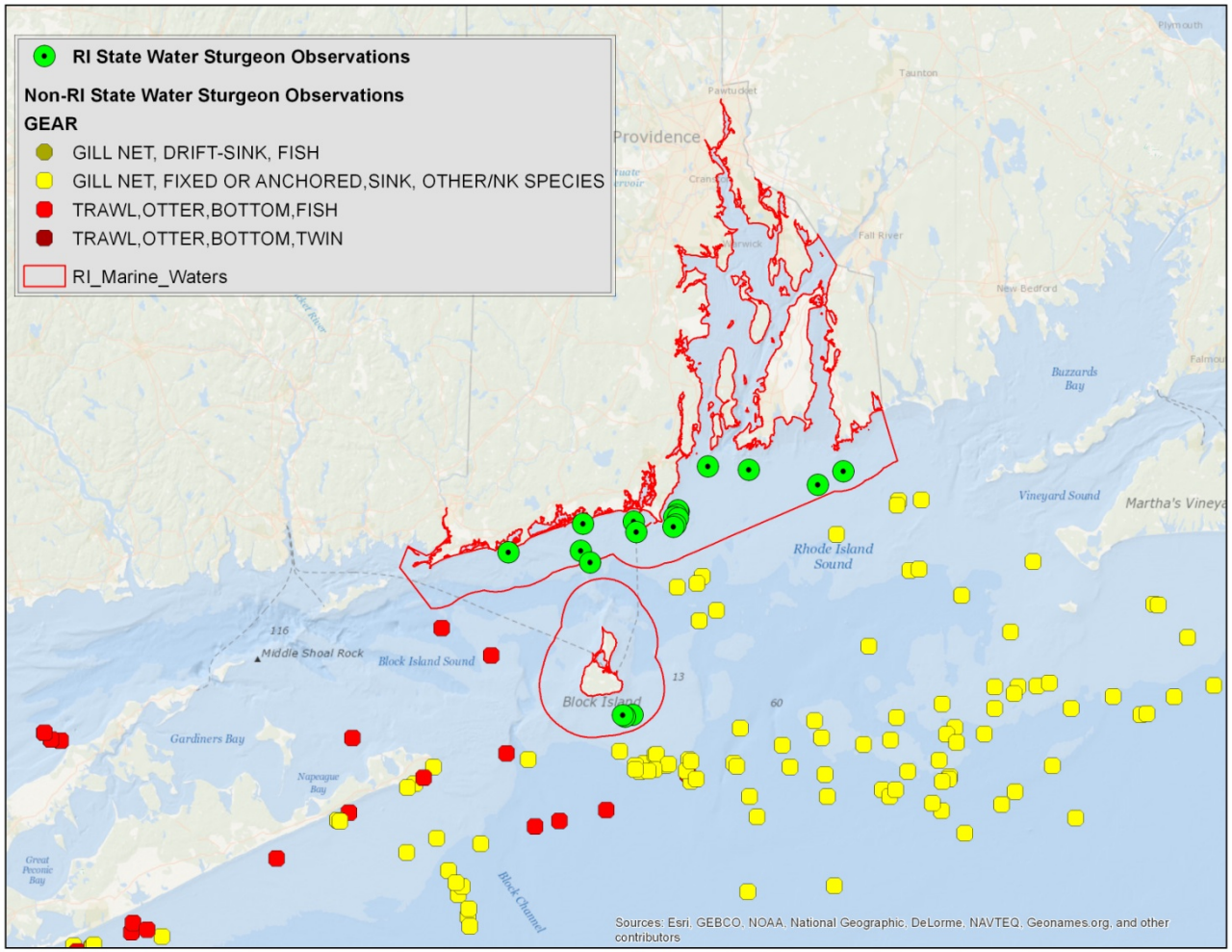
Wirgin, I. and T.L. King. 2011. Mixed stock analysis of Atlantic sturgeon from coastal locales and a non-spawning river. Presentation of the 2011 Sturgeon Workshop, Alexandria, VA, February 8-10.

Table 1. Atlantic Sturgeon bycatch from observed trips between 1994 and 2012 by NMFS Sea Sampling & Observer Program for Statistical Areas 537, 538, 539, 611, 613, including RI state waters. Lengths and weights represent data from all gear types and when available actual and estimated measurements are combined.

Year	Number Observed		Number of hauls	% of Total Observed Hauls with Sturgeon	% of Total Observed Hauls with Sturgeon in RI State Waters	Ranked % of Observed Hauls with Sturgeon	Fork Length (cm)	Weight (lb)
	Total	in RI State Waters						
1994	2	1	1,030	0.19%	0.10%	15	83	10-49
1995	7	1	1,720	0.41%	0.06%	10	84-128	10-47
1996	4	0	2,621	0.15%	0.00%	17	170	30-280
1997	3	0	1,702	0.18%	0.00%	16	122-183	35-60
1998	4	0	772	0.52%	0.00%	6	105-220	40-210
1999	5	0	875	0.57%	0.00%	4	80-180	5-150
2000	5	0	844	0.59%	0.00%	3	90-188	15-75
2001	8	2	781	1.02%	0.26%	1	125-225	40-120
2002	3	0	573	0.52%	0.00%	5	130-200	100-200
2003	3	0	1,430	0.21%	0.00%	14	90-183	50-150
2004	20	4	2,925	0.68%	0.14%	2	60-146	4-100
2005	14	1	3,435	0.41%	0.03%	9	60-183	5-150
2006	10	1	2,448	0.41%	0.04%	8	89-197	7-150
2007	10	3	1,947	0.51%	0.15%	7	63-213	10-150
2008	5	1	1,700	0.29%	0.06%	13	91-137	19-45
2009	9	0	2,324	0.39%	0.00%	11	70-169	20-100
2010	5	1	4,759	0.11%	0.02%	19	70-133	8-40
2011	17	1	5,058	0.34%	0.02%	12	90-187	10-240
2012	15	0	9,973	0.15%	0.00%	18	46-200	7-150
Total No.	149	16[1]	46,917					

[1] Note that 1 and 3 sturgeon were observed in 1992 and 1993, respectively, which are not shown in the table above. This results in a total of 20 Observed Sturgeon caught in RI State Waters since 1992.

Figure 1. Atlantic Sturgeon observed bycatch in RI State Waters between 1992 and 2012 as documented by the NMFS Sea Sampling & Observer Program and At-Sea Observer Program for Statistical Reporting Areas 537, 538, 539, 611, 613. Note that only a portion of the non-RI state water observed catches are shown.



Connecticut
Atlantic Sturgeon Compliance Report for 2012

Annual Compliance Report to the Atlantic States Marine Fisheries Commission

By Tom Savoy
Connecticut Department of Energy and Environmental Protection
Marine Fisheries Division

September 26, 2013

I. Introduction

Atlantic sturgeon are present seasonally in Connecticut waters. A State Wildlife Grant study to investigate the abundance and distribution of Atlantic sturgeon in Connecticut waters was conducted from 2006 through 2010. These directed efforts collected a total of 738 Atlantic sturgeon over the course of the study. Connecticut partnered with several other entities for a NMFS funded Section 6 study through the State of Delaware on 'Sturgeons in the mid-Atlantic region: a multi-state collaboration or research and conservation.' from 2010 through 2013.

Management: With the listing of Atlantic sturgeon from the New York Bight DPS as US Federally Endangered, State listing of Atlantic sturgeon in Connecticut was changed from State Threatened in freshwaters to state Endangered. Take and possession of both Atlantic and shortnose sturgeon is prohibited in Connecticut.

II. Request for *de minimis* – Not Applicable

III. Previous Calendar Year's Fishery and Management Program

a. Fishery dependent monitoring –Connecticut marine and inland waters are closed to all fishing for Atlantic sturgeon. Historic commercial landings of Atlantic sturgeon in Connecticut from 1989 to 1995 are presented in Table 1.

b. Fishery independent monitoring – Atlantic sturgeon are collected in the Department's annual Long Island Sound multi-species trawl survey (1984-2012). Results of these efforts are presented in Table 1, however, low catch rates for this rare species render the survey indices of abundance unreliable for monitoring trends in abundance. Atlantic sturgeon were also collected in the Connecticut River and in Long Island Sound during sturgeon research efforts (1988-2012). These efforts were variable over time, consequently the numbers of sturgeon collected should not be utilized as an index of abundance.

Connecticut participates in the U.S. Fish and Wildlife Service Coastwide cooperative tagging effort. All Atlantic sturgeon captured receive USF&WS t-bar tags and a PIT tag when possible and information is placed into the national database.

c. Copies of regulations in effect – See Appendix 1.

d. Harvest broken down by commercial and recreational and non-harvest losses- Commercial harvest of Atlantic sturgeon from the marine waters of the State has been prohibited by regulation since September 24, 1997. Estimates of non-harvest losses are not available.

e. Review of progress in implementing habitat recommendations. Not applicable.

IV Planned Management Programs for the Current Calendar Year – No change to the current management programs are planned.

a. Summarize regulations that will be in effect. The taking of sturgeon (Acipenser spp.) is prohibited in inland waters of the state. In Marine waters no person shall take, possess, sell, exchange or offer for sale or exchange any Atlantic or shortnose sturgeon.

b. Summarize monitoring programs that will be performed. See III d above. No changes from previous monitoring activities are planned.

c. Highlight any changes from the previous year. No changes.

V. Plan Specific Requirements

a. Bycatch monitoring - Taking of sturgeon both Atlantic and shortnose has been prohibited in inland waters since the mid-1980s. A total of 9 sturgeon were reported captured and released as bycatch in the Connecticut River shad gillnet fishery for April, May and June of 2012. Both speceis are known to be present in the area where shad fishing can occur. Mortality rates and true species composition are unknown but mortalities are thought to be rare since the nets are actively fished, have relatively short soak times and water temperatures are cool.

b. Review of Progress in implementing habitat recommendations - Threats to the habitat of Atlantic sturgeon in Connecticut are minimized through the regulatory processes that govern permitted activities. All proposed regulated activities are reviewed for possible impacts of the structures and/or activities on Atlantic sturgeon. Atlantic sturgeon have *Endangered Status* in the State and are thus afforded an extra level of protection, particularly in the Department's permitting process.

c. Aquaculture operations, status of regulations, disease-free certification - No aquaculture activities have been permitted in Connecticut for Atlantic sturgeon.

Table 1. The number of Atlantic sturgeon collected in the CT River and in directed research collections by year, commercial landings, reported bycatch in the American shad fishery, and annual catch in Long Island Sound from the CT Long Island Sound Trawl survey (LIST) with geometric means abundance indicies from the spring and fall.

YEAR	CT RIVER	Directed Collections	Landings (lbs)	Reported Bycatch	LIST	LISTS SPRING	LISTS FALL
1988	24				5	0.01	0.00
1989	6		1445[1]		13	0.01	0.02
1990	8		1585		8	0.01	0.02
1991	31	8	2205		3	0.01	0.01
1992	5		160[2]		30	0.03	0.08
1993	2		182		60	0.02	0.08
1994	2		310		60	0.03	0.06
1995	2		126		6	0.01	0.02
1996	2	59			3	0.01	0.01
1997	2				6	0.01	0.02
1998	1				17	0.05	0.02
1999	5				39	0.04	0.07
2000	3				7	0.02	0.03
2001	2	40			18	0.01	0.08
2002	12				17	0.05	0.05
2003	4				29	0.00	0.10
2004	1	48			8	0.00	0.04
2005	19	61		19	8	0.02	0.03
2006	13	64		21	20	0.05	0.10
2007	36	125		21	13	0.02	0.05
2008	11	174		50	7	0.01	0.06
2009	13	152		22	18	0.01	0.10
2010	58	88		17	1[4]	0.01	-
2011	44	91		16	5	0.02	0.02
2012	105	76		9	7	0.02	0.02

NS = Not Sampled

1. Prior to 1989, Atlantic sturgeon did not have a species code for CT Commercial Catch Reports.
2. Increase in Minimum length from 48” to 84”.
3. Spring and Fall indices do not reflect the total number of sturgeon caught, only those taken in regular survey were used for index values.
4. Mechanical problems prevented LISTs survey from being conducted after May 30th in 2010.

APPENDIX 1. Connecticut Regulations Regarding Atlantic Sturgeon

26-142a-8a. Species restrictions

(a) Blue Crabs. No person shall take or attempt to take any blue crabs in any waters of this state except by scoop or scap net, handline or manually operated and personally attended devices described below:

(b) Minimum Legal Length. No person shall possess any fish taken by any commercial fishing gear or for commercial purposes less than the lengths specified below measured from the tip of the snout to the end of the tail and, notwithstanding section 26-159a-4 of the Regulations of Connecticut State Agencies, no person shall buy, sell, offer for sale or possess in a place where fish are offered for sale, any of said species less than the minimum legal length stated herein.

(c) Sturgeon

(1) No person shall take, possess, sell, exchange, or offer for sale or exchange in Connecticut any Atlantic sturgeon (Acipenser oxyrinchus) or shortnose sturgeon (Acipenser brevirostrum).

(2) Any sturgeon taken contrary to the provisions of this subsection shall be immediately returned, without avoidable injury, to the waters from which it was taken.

Orig. 12/15/00

New York State's
Atlantic Sturgeon Annual Report for 2011 and 2012
to the
Atlantic States Marine Fisheries Commission

Prepared by:
Hudson River Fisheries Unit
Bureau of Marine Resources
New York State Department of Environmental Conservation

1. Bycatch Monitoring - Fishery dependent data

1.1. Hudson River Estuary

The American shad fishery was closed in 2010. Bycatch of juvenile Atlantic sturgeon no longer occurs (Table 1).

1.2 Atlantic Ocean and Long Island Sound

Data on ocean bycatch were not obtained for 2011-12. NYSDEC anticipates obtaining future bycatch data through the ACCSP bycatch module or by state funded sea sampling.

2. Monitoring results- Fishery independent data

2.1 Juvenile abundance

2.1.1 Methods

Hudson Generators Fall Shoals Survey

Fishery independent data on relative abundance of juvenile Atlantic sturgeon prior to emigration from the Hudson River Estuary have been collected annually by contractors to Hudson River power generators (HRG) and other researchers since 1974. The most extensive HRG time series of data were obtained by one-meter epibenthic sled in a weekly spring-summer ichthyoplankton survey and a bi-weekly three-meter beam trawl in a fall shoals survey (FSS). To calculate annual abundance indices from these data, we subset each data series to the time period of highest catches and most consistent sampling. Resulting data from the epibenthic sled and three-meter beam trawl were from May-July and July-October, respectively. Abundance indices were calculated as total catch/total samples. Data from the three-meter beam trawl appear to be more useful for tracking relative annual abundance of juveniles because the gear is larger and catches of sturgeon are higher in the beam trawl than in the epibenthic sled. Data reported for the HRG surveys are still draft, based on monthly field reports sent to the DEC.

This program suffered a major loss of data in 2012 as the HRG did not possess a NMFS endangered species permit when the Atlantic sturgeon were listed. HRG obtained their permit by late August. Bottom sampling with a beam trawl resumed in September; sampling was limited by water temperature and dissolved oxygen restrictions listed in the NMFS permit. We will examine the data in the future stock assessment as to how this affected the annual index from this survey.

NYSDEC Juvenile Relative Abundance Survey

Although the HRG data are extensive, the sample programs do not target Atlantic sturgeon. Therefore, NYSDEC conducted exploratory sampling by gill net in the spring and fall of 2000 to locate times and locations for optimal catches of juvenile sturgeon prior to age of emigration from the estuary. The USFWS Northeast Fisheries Center under contract to NYSDEC conducted seasonal (spring and fall) sampling from fall 2003 through fall 2005. Sampling focused on Newburgh (rkm 90-105) and Haverstraw (rkm 55-65) Bays. Resulting recommendations were to make at least 100 net sets in spring after water temperatures had risen above 4 C and to focus sampling in soft deep habitat of Haverstraw Bay (Sweka et al. 2007). NYSDEC has sampled annually since 2006 as recommended.

In all sampling, we used anchored gill nets of 7.6, 10.2, and 12.7 cm stretch mesh, 61 m long and 2.4 m deep. Nets were set perpendicular to shore and fished for approximately two hours through all tide stages. All sturgeon collected were measured for total length, fork length, weighed, and examined for previous marks. A small piece of flesh was taken from the dorsal fin of each fish for genetic analysis, stored in ethanol, and sent to a NOS Marine Forensic Lab in Charleston, South Carolina. Unmarked fish were tagged in the musculature under the dorsal fin with a Biomark PIT tag and in the base of the dorsal fin with an external Dart Tag in accordance with the Atlantic Coast Sturgeon Tagging Database requirements. These tags bear the legend of the USFWS toll free telephone number at the Maryland Fisheries Resources Office for the reporting of recapture information.

In addition, 15 juvenile Atlantic sturgeon were tagged with sonic tags during this survey to study their movement in comparison to co-occurring shortnose sturgeon, 15 of which were also tagged with sonic tags.

Work performed in the study was conducted under ESA section 10A1a permit 16436; effective on April 6, 2012. Atlantic sturgeon were tagged with internal sonic tags prior to the listing date.

New Jersey Trawl Survey

New Jersey Bureau of Marine Fisheries (NJBMF) conducts a finfish survey in near-shore coastal waters along the entire NJ ocean coastline, Sandy Hook to Cape May. Since 1988, NJBMF has sampled annually in January, April, June, August, and October. Samples were randomly taken within three depth strata (Byrne 1994). Highest and most consistent catches of Atlantic sturgeon come from strata inshore of the 20-m isobath and from the tip of Sandy Hook to Ashbury Park, NJ. We used the data from this region and depth to calculate an annual mean catch per trawl (Table 2).

2.1.2 Results

FSS beam trawl data indicates that an increase in abundance is occurring in the Hudson stock since the fishery closure in 1996. Beginning in 1997, the index has varied in a cyclic manner with peaks occurring approximately every five years (Table 2 and Figure 2). The 2012 index was the second highest value in the time series. As there was a gap in data collection for the first part of the survey in 2012 we subset the data to just September and October for comparison purposes. The same trend is evident.

The presence of young fish was verified by the length data; data include all months of the survey (July through November or December in most years). Mean total length was low when peak abundance occurred (Table 3, Figure 3). The length frequency suggests that most of the smaller fish (<300mm) grow quickly into the larger size range over a two year period. After three years, the number of fish from strong cohorts in trawl catches declines as fish grow to greater than 700 mm. This is most likely due to the ability of these large fish to avoid capture by the beam trawl, and / or a change in their distribution in the river.

Atlantic sturgeon taken by the NYSDEC juvenile gill net survey were generally larger than those taken by the FSS (Tables 3, 4, 5, Figure 4). Mean total length of captured varied among years: size increased from 2003 to 2006; declined slightly until 2008, then increased and remained stable to 2012 (Table 3, Figure 4). Mean total length patterns during spring sampling of the gill net survey track closely to those in the beam trawl survey, with a one to two year lag (Figure 5). This pattern illustrates the transition of fish availability from the beam trawl survey to the gill net survey. Although mean total length patterns show a relationship between the two surveys, it is still unclear whether CPUE indices will do the same. When we attempted to calculate the annual gill net survey index we found that survey catches are affected by varying environmental conditions (e.g. salinity, and salt front movement). We are working on standardizing the gill net survey index before meaningful comparisons can be made to the FSS index.

The FSS and gill net surveys complement each other. Because the FSS samples throughout the spawning and early life stage nursery areas, the first indication of year-class production shows up in this gear's data. However, because juvenile sturgeon grow quickly, the beam trawl tends to only sample them for one to two years (estimated Age-0 and Age-1). The gill net survey continues to sample and track the fish for an additional two to four years (Ages 2 to 3+), before they emigrate from the river. The combination of these studies allows for the identification of successful year classes, and documentation of their transition through the juvenile stage.

New Jersey trawl CPUE (Strata 12&13) increased since 2001 to levels observed in the early 1990s (Table 2). CPUE leveled off from 2006 to 2008, but then declined to the present. Fish captured in this gear are post-migrant sub-adults and tend to be larger than those captured in the Hudson River Estuary (Figure 4).

Data collection on sonic tagged fish is ongoing and will be summarized in future reports.

2.2 Adult Sampling

2.2.1 Methods

Spawning stock sampling

NYSDEC began to sample spawning Atlantic sturgeon in 2006. Effort varied among years dependent on staff and project funding. In 2006 through 2008, NYSDEC cooperated in a study with Erickson et al. (2011) where adult fish were tagged with pop-up satellite archival tags (PSAT) to identify ocean migration patterns. Sampling extended from April through June in the attempt to catch fish on their immigration and / or emigration to and from the spawning area. From 2009 to the present, NYSDEC has continued to conduct limited sampling on the spawning stock, usually three weeks during the month of June. The objective is to monitor size and sex composition of the spawning stock. Large mesh gill nets (25.4 cm to 45.7 cm stretch mesh) are set at or near slack tide in selected deepwater areas in upper Newburgh Bay, near Hyde Park, and Catskill NY. All fish are processed as described above for juvenile fish.

Work performed in the study was conducted under ESA section 10A1a permit 16436; effective on April 6, 2012.

Movement and Habitat Use

During the PSAT tagging study, we also tagged adult fish with sonic tags of 100d, 1.5-yr and 5-yr battery life. The objective of the sonic tag program was to identify specific Hudson River habitats used by adult Atlantic sturgeon by matching fish movement and location data with detailed bottom maps (see

http://www.dec.ny.gov/lands/33596.html). The long term 5-yr tags also allowed examination of annual rate of return for adult fish. The 2008 tagged fish are expected to return in 2013.

2.2.2. Results

In 2006 to 2008, 31 fish were tagged with a PSAT, 11 of which received 1-yr duration sonic tags and four with a 100-d tag. In addition, 27 adults were tagged with long term 5-yr sonic tags. From 2009 to the present, crews fished to obtain annual biological data on spawning fish. Catches were dominated by males in all years; females occurred sporadically. It is apparent from sampling that females tend to remain separate from the males, being much more elusive to catch. Fish increased slightly in size from 2006 to 2012 (Table 6).

Data from the sonic tag study are still being collected; 2013 is the final year for returning adult fish tagged with 5yr tags. All data will be summarized in a separate detailed report.

3. Tag recaptures

All tag release data for sturgeon tagged in the Hudson River are annually added to the coast-wide database maintained by the USFWS Maryland Fisheries Resource Office.

Wild fish: Since 1992, 1,563 juvenile/sub-adult and 454 adult wild Atlantic sturgeon have been tagged and released in the Hudson River (Table 7). Most in-river recaptures were from special studies conducted in the Hudson by Bain et al. (1998) in the 1990s, 2003-2005 by USFWS and since 2006 by NYSDEC. Most of the recaptures (Table 7) occurred within the Hudson River (311), followed by CT (36), NJ (21), DE (19) and Chesapeake Bay (17 in MD and 11 in VA). In the past, most fish moved south after leaving the Hudson River. Most recently a higher percentage of recaptures, outside of the Hudson, have come from CT and the Long Island Sound trawl survey (Table 7).

Hatchery fish: The first experimental hatchery release for the Hudson occurred in 1994 when approximately 4,925 age-zero fish were released, marked with CWT and a left pelvic fin clip. Many (210) recaptures occurred during a three year study on juvenile fish following release (Bain et al. 1999). These fish have also been caught widely on the coast from VA to CT. In 2009 and 2010, two fish returned as mature adults to the Hudson spawning areas near Hyde Park NY. It is anticipated that more of these fish will begin to return to the Hudson in coming years (Table 7). The six fish recaptured in 2011 were caught off Bethany Beach, DE.

In 2004, a second experimental release occurred when larger, age seven to ten, juveniles, of known Hudson parentage, were released back to the river. Several fish remained in the river for a short period of time as three recaptures occurred in 2004; one fish left and was caught in VA (Table 7). From 2005 to 2007, recaptures of these fish occurred from CT to NC; after 2007 no other recaptures have occurred.

Bycatch fisheries

Details of many potential commercial bycatch recaptures of Hudson River sturgeon in the coast-wide tag database were unclear because of inconsistent data reporting. This was especially true for the sample type recognized as “Reported to USFWS” a fishery dependent data category. Recapture gear is often missing and target species in commercial fisheries are indicated for a portion of these recaptures. We recommend that all recapture data be reviewed to fill the gaps, including follow-ups with the reporting person or agency to clarify missing data where possible.

Fisheries capturing Hudson River Atlantic sturgeon are spread out on the coast from RI to NC (Table 8). Independent sampling recapture reports have increased since 2007, concurrent with the few increased

research efforts focused on Atlantic sturgeon. There are far more commercial fisheries operating on the Atlantic coast yet fishery dependent reports are declining indicating the need for better monitoring (Table 9). Fishery dependent reports included pre-moratorium sturgeon fisheries along with monkfish then a variety of other fisheries targeting fluke, striped bass, weakfish, bluefish and blackfish. Anchored gill nets accounted for 37% of all the by-catch reports.

Although the ASMFC (2007) bycatch report focused on ocean bycatch of Atlantic sturgeon, the potential for bycatch remains high in estuarine and riverine fisheries. This is evidenced by the recaptures reported as bycatch in striped bass fisheries along the coast. This fishery is large, often occurs in rivers, and has the potential to capture juvenile sturgeon as they move among east coast estuaries. One hatchery juvenile released in the Hudson (#352040246) was caught three times within two weeks during the striped bass anchored gill net fishery in the Potomac River. Multiple recaptures, such as this, have the potential to add to mortality of the stock

4. Habitat Status

Locations of spawning and nursery areas within the Hudson River Estuary were summarized in ASMFC (1998). There are no known water quality problems within the reach of Estuary used by Atlantic sturgeon. DEC staff routinely comment on permit applications to prevent activities such as dredging during times and at locations that might harm overwintering concentrations of juvenile Atlantic sturgeon or spring spawning aggregations of adults

In 2010, a transmission cable company proposed to lay a high voltage (1000MW) power transmission line down 133 km of the length of the Hudson River from just above Saugerties (km 165) to the Harlem River (km 22) to Astoria, Queens, NY. Only Haverstraw Bay, a known over-wintering area for juvenile sturgeon will be bypassed. Negotiations are ongoing with the company to conduct habitat studies to examine possible effects of the cable and its magnetic field throughout the major spawning area.

5. Aquaculture

There are no aquaculture operations in NY State licensed or authorized to possess or raise Atlantic sturgeon.

6. Status of Regulations

Existing NY State regulations prohibit possession of Atlantic sturgeon. No changes have occurred since they were enacted in 1996.

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Table 1. Bycatch of juvenile Atlantic sturgeon in fishery dependent sampling of the American shad gill net fishery in the Hudson River Estuary.

	NYSDEC Fixed Gillnet Fishery Bycatch				Bycatch reported by gill net fishers	
Year	N-trips	Effort*	N-fish	c/f*100	Drift	Fixed
1974						
1975						
1976						
1977						
1978						
1979						
1980	14	1108.72	63	56.82		
1981	9	505.89	16	3.16		
1982	18	1583.46	69	4.36		
1983	17	1400.16	7	0.50		
1984	50	3562.18	31	0.87		
1985	42	2701.98	29	1.07		
1986	40	2472.25	9	0.36		
1987	42	5663.48	27	0.48		
1988	30	3619.29	28	0.77		
1989	8	650.90	2	0.31		
1990	23	2241.73	12	0.54		
1991	22	2323.34	6	0.26		
1992	32	3378.08	5	0.15		
1993	8	809.73	0	0.00		
1994	9	823.20	2	0.24		
1995	12	1589.52	1	0.06	0	14
1996	19	1793.75	0	0.00	6	2
1997	**23**	**1626.25**	**9**	**0.55**	**0**	**15**
1998	**17**	**814.32**	**0**	**0.00**	**0**	**13**
1999	**26**	**1010.79**	**7**	**0.69**	**0**	**8**
2000	**16**	**475.17**	**0**	**0.00**	**0**	**0**
2001	**23**	**413.08**	**2**	**0.48**	**0**	**9**
2002	**4**	**43.44**	**0**	**0.00**	**0**	**1**
2003	**1**	**19.25**	**0**	**0.00**	**0**	**0**
2004	**2**	**17.11**	**0**	**0.00**	**0**	**1**
2005	**1**	**3.02**	**0**	**0.00**	**0**	**1**
2006	**2**	**27.64**	**0**	**0.00**	**1**	**2**
2007	**3**	**3.33**	**0**	**0.00**	**0**	**1**
2008	**2**	**9.09**	**0**	**0.00**	**1**	**1**
2009	**0**	**0**	**0**	**0**	**0**	**0**
2010	**American shad fishery closed**					

BOLD = sturgeon fishery closure 1997 to present

* Effort - square-yard-hours*10^-3

Table 2. Incidental catch of juvenile Atlantic sturgeon in fishery independent sampling of the Hudson River Estuary and near-shore ocean. Two times series presented for the FSS survey (see text).

	Hudson River Power Generators Surveys									New Jersey* Ocean trawl		
	Epibenthic Sled			Fall Shoals Survery								
Year	N-hauls	N-fish	c/f*100	N-trawls	N-fish	c/f*100 Jul-Oct	N-trawls	N-fish	c/f*100 Sep-Oct	N-hauls	N-fish	c/f*10
1974	1138	47	4.13									
1975	661	38	5.75									
1976	984	16	1.63									
1977	1058	10	0.95									
1978	983	7	0.71									
1979	1036	14	1.35									
1980	829	5	0.60									
1981	788	4	0.51									
1982	733	5	0.68									
1983	768	9	1.17									
1984	812	19	2.34									
1985	845	8	0.95	1247	94	7.54	59	776	7.60			
1986	896	5	0.56	1302	160	12.29	87	818	10.64			
1987	884	12	1.36	1288	141	10.95	44	648	6.79			
1988	969	10	1.03	1277	117	9.16	40	649	6.16	10	1	1.00
1989	945	0	0.00	1271	52	4.09	20	638	3.13	25	23	9.20
1990	915	2	0.22	1265	6	0.47	2	628	0.32	20	6	3.00
1991	983	6	0.61	1269	10	0.79	4	635	0.63	22	13	5.91
1992	917	0	0.00	1263	11	0.87	6	633	0.95	23	21	9.13
1993	930	0	0.00	1258	7	0.56	4	744	0.54	21	8	3.81
1994	933	2	0.21	1262	16	1.27	9	677	1.33	20	0	0.00
1995	968	1	0.10	1271	15	1.18	9	643	1.40	20	4	2.00
1996	979	0	0.00	1214	8	0.66	4	607	0.66	20	2	1.00
1997	**963**	**0**	**0.00**	**1020**	**37**	**3.63**	**28**	**588**	**4.76**	**20**	12	6.00
1998	**937**	**2**	**0.21**	**1013**	**20**	**1.97**	**16**	**584**	**2.74**	**20**	0	0.00
1999	**922**	**1**	**0.11**	**969**	**16**	**1.65**	**12**	**511**	**2.35**	**20**	5	2.50
2000	**926**	**0**	**0.00**	**1003**	**4**	**0.40**	**2**	**472**	**0.42**	**20**	0	0.00
2001	**948**	**1**	**0.11**	**977**	**20**	**2.05**	**10**	**544**	**1.84**	**20**	0	0.00
2002	**972**	**1**	**0.10**	**1011**	**36**	**3.56**	**23**	**580**	**3.97**	**22**	1	0.45
2003	**948**	**1**	**0.11**	**1013**	**37**	**3.65**	**18**	**581**	**3.10**	**21**	7	3.33
2004	**928**	**2**	**0.22**	**1008**	**22**	**2.18**	**9**	**541**	**1.66**	**20**	13	6.50
2005	**912**	**0**	**0.00**	**1015**	**10**	**0.99**	**3**	**519**	**0.58**	**20**	10	5.00
2006	**932**	**0**	**0.00**	**1013**	**11**	**1.09**	**7**	**475**	**1.47**	**20**	22	11.00
2007	**880**	**1**	**0.11**	**1013**	**28**	**2.76**	**17**	**475**	**3.58**	**20**	14	7.00
2008	**948**	**1**	**0.11**	**1010**	**17**	**1.68**	**7**	**579**	**1.21**	**20**	18	9.00
2009	**948**	**5**	**0.53**	**1013**	**15**	**1.48**	**8**	**574**	**1.39**	**20**	8	4.00
2010	***948***	***3***	***0.32***	***930***	***19***	***2.04***	***11***	***396***	***2.77***	**20**	2	1.00
2011	***948***	***0***	***0.00***	***908***	***19***	***2.09***	***9***	***396***	***2.27***	**20**	0	0.00
2012	***948***	***1***	***0.11***	***476***	***48***	***10.09***	***48***	***476***	***10.09***			

Estimated and/or draft numbers for 2010 to 2012 for the HRG surveys, DEC not in possession of data to verify

* NJ data provided by NJ Div. of Marine Fisheries.

Table 3. Mean total length (mm) of juvenile Atlantic sturgeon caught by beam trawl in the Hudson River Generators Fall Shoals Survey (FSS), by gill net in the NYSDEC-USFWS juvenile abundance sampling in the Hudson River Estuary and by the New Jersey trawl survey off Sandy Hook.

	Fall Shoals Survey					NYSDEC Gill Net Survey					New Jersey Trawl				
Year	N	Max	Min	Mean TL	SD	N	Max	Min	Mean TL	SD	N	Max	Min	Mean TL	SD
1988											1	900	900	900.0	
1989	52	785	110	591.9	100.9						23	1230	700	923.0	123.5
1990	6	686	475	604.7	71.9						6	1330	800	1020.0	231.6
1991	10	865	149	332.5	242.7						13	1310	690	927.7	152.6
1992	11	695	102	487.4	187.8						21	1750	690	980.0	205.1
1993	7	985	147	588.9	254.0						8	1160	970	1055.0	65.9
1994	16	1175	119	329.6	261.9										
1995	15	605	280	420.0	87.5						4	1190	740	967.5	230.3
1996	8	615	85	358.8	219.5						2	750	720	735.0	21.2
1997	40	706	88	260.9	125.3						12	2150	590	950.8	437.0
1998	30	810	207	490.2	127.1										
1999	18	952	450	670.3	128.9						5	1270	880	986.0	166.4
2000	5	720	51	299.8	250.4										
2001	21	570	123	241.1	114.1										
2002	37	607	86	308.8	166.0						1	1040	1040	1040.0	
2003	39	732	134	463.6	126.2	121	905	415	587.9	85.1	7	1230	880	1072.9	116.6
2004	22	722	372	570.7	90.8	217	1230	436	646.5	103.3	13	1220	520	724.6	234.9
2005	12	805	292	649.3	134.3	253	1240	364	714.0	107.3	10	1140	660	843.0	136.1
2006	14	761	192	421.0	154.4	73	970	359	774.1	106.0	22	1080	700	880.0	107.1
2007	35	581	121	297.5	118.5	40	968	295	745.6	161.1	14	1110	830	958.6	93.1
2008	17	679	124	433.6	173.2	67	1125	314	599.8	161.6	18	1280	790	1061.7	131.7
2009	30	860	190	494.0	179.9	195	1025	306	629.2	101.2	8	1070	620	815.0	157.8
2010	19	840	375	547.9	139.5	201	1290	426	703.5	118.1	2	1490	1140	1315.0	247.5
2011	21	740	94	508.6	184.0	162	1114	430	668.7	138.6	0				
2012	60	1081	80	407.8	138.6	258	1228	291	697.8	153.5					

Table 4. Length frequency of juvenile Atlantic sturgeon collected by beam trawl in the Hudson River Power generators Fall Shoals Survey (all months).

TL-mm	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<=100								1	1			1		1									1	1
120	1			1		1																		
140						1			2				3	3	1				2	3				
160			2		1	1		1	1				2	3										
180			1						3				3	3					1					1
200			1			1		1	4				2	9	1			1	4		1			1
220			1						7	1		1	1	1				1	3					3
240			1	1		4		1	5			1	1	1	1			1	2		1			2
260			1			1			7				3					1	6	1	2		2	1
280						2	1		2	2			2						4		2		2	2
300						1				2		1					1		1	1	1			
320																					2		1	
340	1												1						1		1			
360							3								2									
380						1	2		1	1			1		3	1			2			1		1
400							2		1							1			1			2		4
420				1			1		3					1	8			1	3			1		16
440														1	3	1		1		1		1		12
460				1			2	1		2	1			1	4			2	1	1	1	1		8
480		1			1	1				4			1	5	1	1			1	2		2		3
500	1		1	2			1			1				3				2		4		1		1
520	7						1		1	2	1			1	2	1		3	1	2		2	1	1
540	2			1						1				1	1					4	4			
560	5				1		1			5	2			2	4	3				1	3		1	
580	3				1			1		4			1		1	3			1	1	1		4	
600	5	1						1	1	3	1					2	3		1	1	3			
620	9	2	1	1			1	1		1				1	1	3					3	2	5	
640	2										4				3	3								
660	4	1		1		1					1				1	1	2					3	1	1
680	7										1				1		1			2	2	1	1	
700	1	1		2	2												2							
720	2								1		1	1								1			1	
740	1										3				1	2					1		1	
760											1						1				1			1
780																		1						
800	1																							
820										1							2					1		
840																						1		
860																					1			
880			1																					
900																								
920																								
940																								
960											2													
980																								
1000					1																			
>1000						1																		1
TOTAL	52	6	10	11	7	16	15	8	40	30	18	5	21	37	39	22	12	14	35	25	30	19	21	60

Table 5. Length frequency of juvenile Atlantic sturgeon collected by gill net (NYSDEC-USFWS) in the lower Hudson River and by trawl in coastal ocean waters off Sandy Hook (Strata 12 &13 only), New Jersey.

	NYSDECgill net -Hudson River										New Jersey coastal ocean trawl																									
TL-mm	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	1988	1989	1990	1991	1992	1993	1995	1996	1997	1999	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<=100																														
120																														
140																														
160																														
180																														
200																														
220																														
240																														
260																														
280																														
300					1					1																				
320						1	2			3																				
340						1	1			1																				
360				1		1				6																				
380			1			1	1			4																				
400										7																				
420	1					3				5																				
440	3	2				4		1	3	3																				
460	4	3	1			2	2		2																					
480	4	5	1			4			4																					
500	7	7	1		2	3	4		10																					
520	10	8	1		1	3	5		7														2							
540	14	16	6	2	4		8	3	13	2													1							
560	8	13	2			2	18	5	11	1																				
580	10	8	8	2	1	6	21	24	5	3																				
600	8	7	8	2		6	26	14	5	4									1				2							
620	2	12	12		1	7	14	15	4	4																		1		
640	8	15	14	1		1	18	17	2	12													2							
660	13	17	17	1		4	13	4	12	14														1						
680	13	19	27		1	3	13	2	7	29									1											
700	6	21	19	3	3	1	7	9	13	30		1		1	1				1				2		1			1		
720	8	16	20	6		1	7	12	6	23		1						1	2					2	1			1		
740		18	27	4	1	1	7	18	8	17							1											1		
760		6	15	5	1	1	8	16	8	9		1		1				1							1					
780	1	5	15	7	4	2	5	13	4	10									1				1		3			1		
800		6	14	6	1	1	6	18	6	8			1	1			1		1				1	1			1			
820		6	9	7	4	1	2	9	8	11		1							1					1	1					
840		4	9	7	3		4	3	6	13		1	1		2										2	1	1			
860			10	8	2	1		3	6	8		1			2										2	1				
880		1	4	4	3	2		4		9		2	1		2					2		1		1	1	1				
900		1	2	1	1			3	4	6	1	3		3						1				2		3				
920	1		5	2	2	1		2	4	3		2			1									1	1	1				
940			1	2		1	1			4		1		2	3										1					
960				1	2	1		1		2		1		2	1										3	2	1	2		
980				1	2		1	2	1	2		1			1	1			1						2		2			
1000									1	1		2	1	1	1	2				1		1				1	2			
>1000		1	4			1	1	3	2	3	0	5	2	2	7	5	2	0	3	1	1	5	2	1	3	5	12	1	2	0
TOTAL	121	217	253	73	40	67	195	201	162	258	1	23	6	13	21	8	4	2	12	5	1	7	13	10	22	15	19	8	2	0

Table 6. Adult Atlantic sturgeon collected in the Hudson River Estuary, NY.

	Total length (m)			Weight (kg)			
Year	Number measured	Mean	SD	Number measured	Mean	SD	Total number caught
	Male						
2006	30	1.88	0.15	1	41		32
2007	21	1.86	0.16	0			21
2008	66	1.89	0.17	51	46.84	13.25	71
2009	42	1.91	0.15	41	51.10	10.85	46
2010	59	1.94	0.29	44	55.57	11.74	59
2011	28	1.93	0.12	28	45.43	12.34	29
2012	73	1.90	0.14	73	42.21	10.26	87
	Female						
2006	3	2.25	0.17	0			3
2007	3	2.21	0.12	0			3
2008	5	2.31	0.08	5	95.00	11.22	6
2009	0						0
2010	1	2.12		1	80.00		1
2011	1	2.51		1	114.00		1
2012	0						0
	All fish						
2006	36	1.88	0.26	1	41.00		45
2007	28	1.82	0.38	0			28
2008	79	1.89	0.27	59	50.07	19.46	110
2009	43	1.91	0.15	41	51.10	10.85	53
2010	60	1.94	0.29	45	56.11	12.16	67
2011	29	1.95	0.16	29	47.79	17.58	35
2012	73	1.90	0.14	73	42.21	10.26	123

Table 7. Release/recapture matrix of all tagged Atlantic sturgeon released in the Hudson River, NY, reported to the USFWS Coastal Cooperative Sturgeon Tagging Database (Updated to Dec 2011, 2012 recapture year not complete)

Juveniles and Sub-Adults																						
Wild Releases		Recapture Year																				
Year	N	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
1992	2																					0
1993	14		1	1	3	3	1															9
1994	4																					0
1995	31					1																1
1996	17					1	1															2
1997	3							1														1
1998	16								1					1								2
1999	1																					0
2000	73										2			1		1						4
2001	0																					0
2002	0																					0
2003	120													4	5	1	2	3	3	1		19
2004	209													5	3	1		1				10
2005	244														1	2	4	2	3			12
2006	71															1				1		2
2007	81																					0
2008	98																		4	4		8
2009	219																			4	1	5
2010	201																					0
2011	159																				2	2
Total	1563	0	1	1	3	5	2	1	1	0	2	0	0	11	9	6	6	6	10	10	3	77
Hatchery Releases*																						
1994	4925					16	89	105	4	1	3		1		1		4	4	5	1	6	240
2004	207													4	14	4	3					25

*USFWS-NEFC Lamar, 1994 age0, 2004 ages4-10

Table 7 Continued.

Adult fish																						
Wild Releases		Recapture Year																				
Year	N	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
1992	0																					0
1993	14			1	3																	4
1994	44			5	1		1	1											1	3		12
1995	35				3	1	2															6
1996	25					1		3														4
1997	29						2	1														3
1998	72							15														15
1999	0																					0
2000	0																					0
2001	0																					0
2002	0																					0
2003	0																					0
2004	0																					0
2005	0																					0
2006	34																	4	2	3		9
2007	25																			1		1
2008	64																	1	3			4
2009	36																		3	2	2	7
2010	49																			1		1
2011	27																				1	1
Total	454	0	0	6	7	2	5	20	0	0	0	0	0	0	0	0	0	5	9	10	3	67

Table 8. Recaptures, by state and water body, of tagged Atlantic sturgeon released in the Hudson River, NY, reported to the USFWS Coastal Cooperative Sturgeon Tagging Database (Updated to Dec 2011, 2012 recapture year not complete)

Capture State	Capture Waterbody	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
MA	Atlantic Ocean								1												1
RI	Block Island Sound														1						1
	Rhode Island Sound																		1		1
CT	Connecticut River																		2		2
	Long Island Sound				1			1						1	1	8	11	8	2		33
	Niantic Bay						1														1
NY	Atlantic Ocean					1	1		1						1	4			1		9
	Hudson River	4	4	6	18	91	129		1				10	8	1		6	13	14	6	311
NJ	Atlantic Ocean		3	1	3		1	2					2	1		3		1			17
	Delaware Bay													2							2
	Hudson River			1																	1
	Raritan Bay									1											1
DE	Atlantic Ocean												1					1	1	6	9
	Delaware Bay		1											2							3
	Delaware River			1		3				2				1							7
MD	Chesapeake Bay					2	1	1		1				5							10
	Choptank River													1							1
	Nanticoke River													1							1
	Pocomoke Sound											1									1
	Potomac River													1	3						4
VA	Atlantic Ocean			1		1		1	1	1											5
	Chesapeake Bay												1								1
	James River													1	2						3
	Potomac River												1		1						2
NC	Albemarle Sound													1							1
	Atlantic Ocean					1												1			2

Table 9. Fishery dependent recaptures by gear or target species of tagged Atlantic sturgeon released in the Hudson River, NY, reported to the USFWS Coastal Cooperative Sturgeon Tagging Database (Dec 2011).

	By Gear								By Target species										
Capture Year	Unknown	Anchored Gillnet	Drift Gillnet	Gillnet	Hook and Line	Pound Net	Trawl	Total	Unknown	Blackfish	Flounder	Fluke	Monkfish	Seabass	Shad	Striped Bass	Sturgeon	Weakfish/ Bluefish/ other	Total
1994		3		1				4	1								3		4
1995	1	3						4	2				1				1		4
1996	1	1		1			1	4	3				1						4
1997	1		1			2	1	5	3					1	1				5
1998		4	1				1	6	3			1	2						6
1999	1		2			1		4	3									1	4
2000		3			1			4	1				1			1		1	4
2001	1	1				1		3	2							1			3
2002								0											0
2003			1					1	1										1
2004	3	3					1	7	5		1							1	7
2005	13	1				2		16	16										16
2006		7						7	4		1					2			7
2007	1						1	2	2										2
2008								0											0
2009			1					1										1	1
2010				2				2		1		1							2
Total								70	46	1	2	2	5	1	1	4	4	4	70

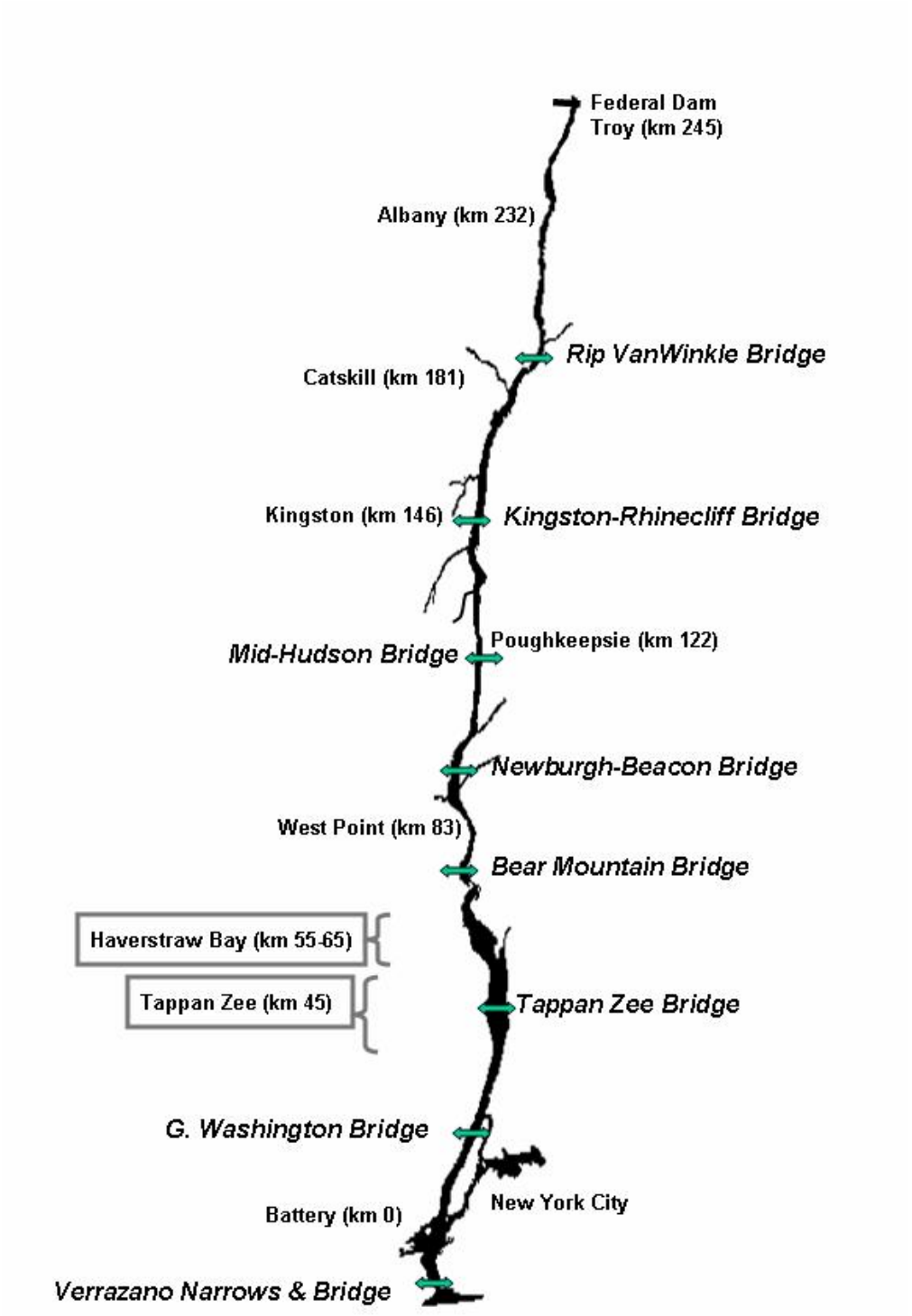

Figure 1. Hudson River Estuary

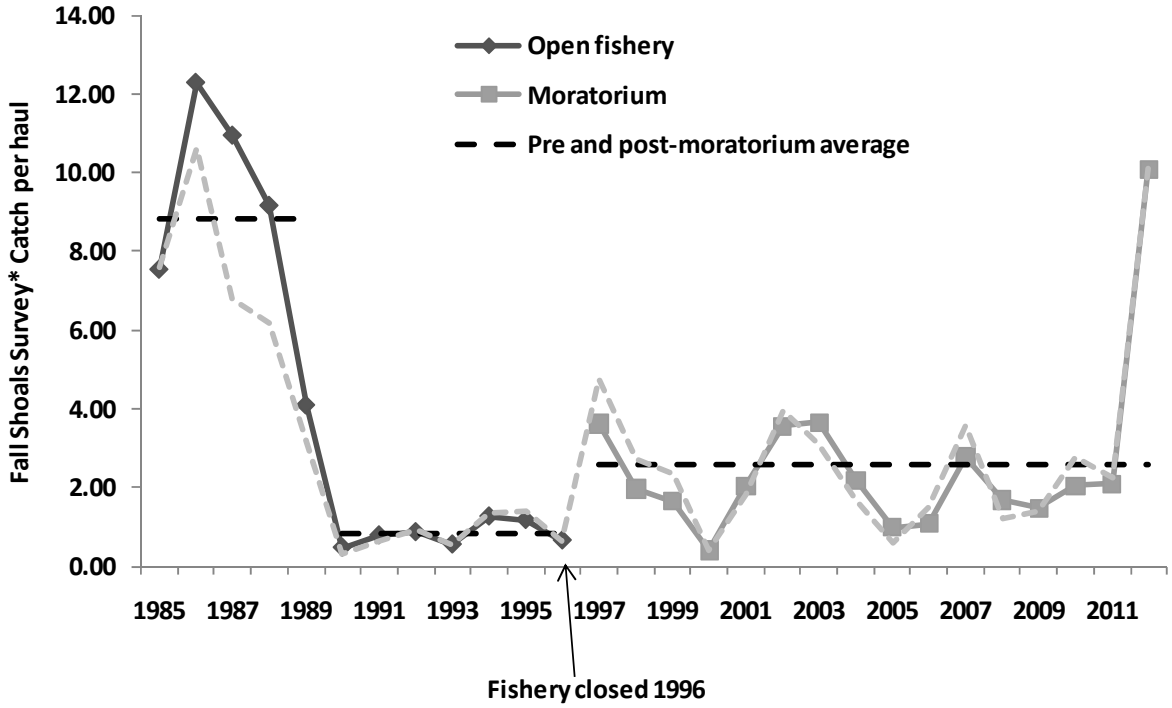

Figure 2. CPUE of juvenile Atlantic sturgeon collected by beam trawl in the Hudson River Power generators Fall Shoals Survey. Solid line= Jul-Oct index, dotted line = Sep Oct index; see text for explanation.

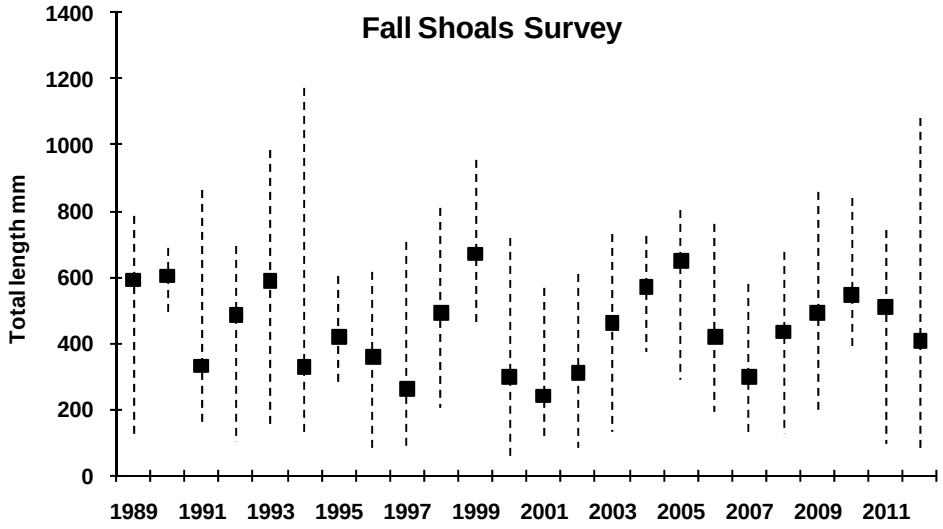

Figure 3. Mean total length (mm – with min-max bars) of juvenile Atlantic sturgeon collected by beam trawl in the Hudson River Power generators Fall Shoals Survey.

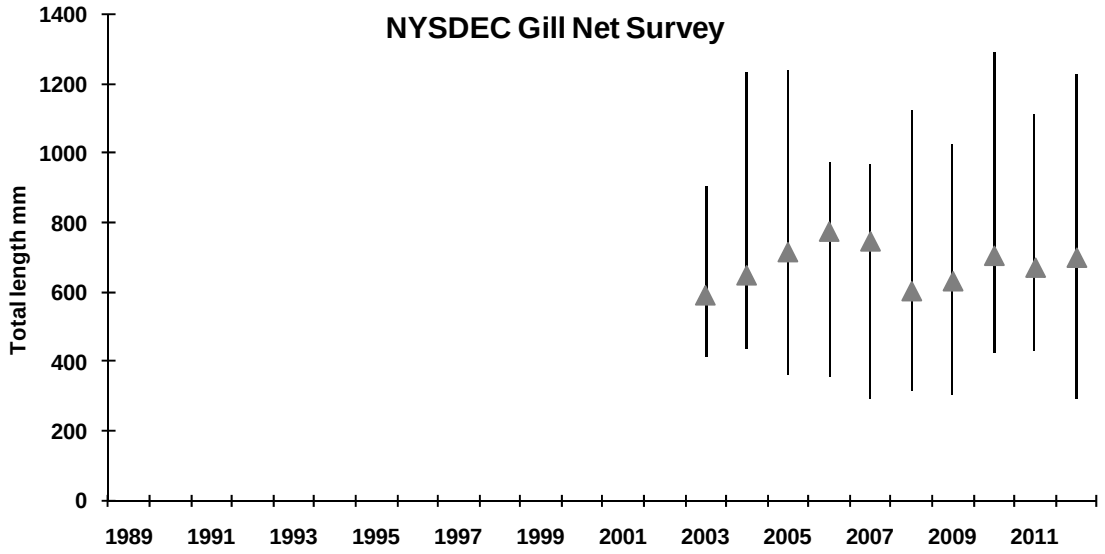

Figure 4. Mean total length (mm – with min-max bars) of juvenile Atlantic sturgeon collected by gill net in the Hudson River gill net survey.

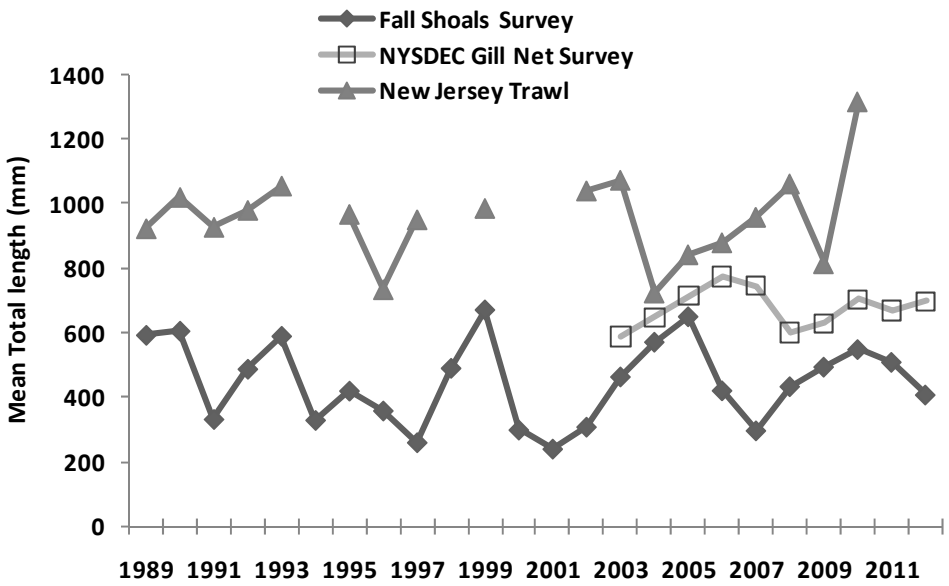

Figure 5. Mean total length (mm) of juvenile Atlantic sturgeon collected by beam trawl and gill net in the Hudson River, and a near shore ocean trawl in coastal New Jersey off Sandy Hook.

Annual Report - Atlantic Sturgeon
2012
Pennsylvania

Pennsylvania Fish and Boat Commission
September 18, 2013

Regulations:

Commercial: A commercial fishery does not exist in Pennsylvania.

Recreational: A "no open season" applies to sturgeon in the Delaware River and Estuary.

Overall: The Atlantic sturgeon is on the state list of endangered species. The catching, taking, killing, possessing, importing to or exporting from this Commonwealth, selling, offering for sale or purchasing, of Atlantic sturgeon, alive or dead, or any part thereof, without a special permit from the Executive Director is prohibited.

Monitoring:

Bycatch: None. Pennsylvania does not permit commercial fishing in the Delaware River and Estuary, nor were Atlantic sturgeon taken or observed by staff during sampling efforts for striped bass and American shad.

Other Monitoring: Vessel strike mortalities in Pennsylvania's portion of the Delaware Estuary have continued to be verified, tracked, and reported to the Atlantic States Marine Fisheries Commission and Atlantic Sturgeon Recovery Program of the National Marine Fisheries Service by the Delaware Division of Fish and Wildlife. Three vessel strike mortalities were verified by the Delaware Division of Fish and Wildlife in Pennsylvania's portion of the Delaware Estuary in 2012. The mortalities were reported from Essington, Pennsylvania and Croydon, Pennsylvania. Please see the State of Delaware's annual compliance report for additional details.

Habitat Issues:

No effort was directed at determining/restoring habitat. Agency personnel continued with a best-management practice approach in reviewing and commenting on applications for permits issued by other agencies (e.g., encroachments, Clean Water Act Section 316(b) variances).

Aquaculture:

The Atlantic sturgeon is on the state list of endangered species. Importation, possession, sale, etc. are unlawful without a special permit from the Executive Director. The Atlantic

sturgeon is not included on the list of species approved for commercial aquaculture operations as administered by the Pennsylvania Department of Agriculture.

The U.S. Fish and Wildlife Service (USFWS) Northeast Fishery Center at Lamar, Pennsylvania continues to hold a small number of wild Atlantic sturgeon (N = 5) as well as five year classes of hatchery-reared fish (N = 51) for use in research on domestic breeding. The hatchery-reared fish were produced from Hudson River brood stock collected from 1993 to 1998. In 2008, on-going laparoscopy examinations to determine sex and degree of maturity revealed a small number of males approaching reproductive maturity. In June 2008, injection of spawning hormones resulted in obtaining milt from two of these fish, representing the first documented milt production from a hatchery-reared Atlantic sturgeon. The University of Maryland is working with USFWS biologists regarding cryo-preservation and extending the viability of fresh milt of wild vs. hatchery-reared sturgeon. Laparoscopic examinations were performed on three of the largest female sturgeon in the spring of 2010, 2011, 2012, and 2013. The ovaries were found to be reproductively immature. It will likely be several years before any female sturgeon at Lamar will come into spawning condition. The USFWS received an Endangered Species Act Section 10(a)(1)(A) Permit for scientific research from the National Marine Fisheries Service on March 14, 2013.

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF FISH & WILDLIFE

ANNUAL STATE REPORT FOR ATLANTIC STURGEON: 2012

September 2013

Report By: Heather Corbett

Submitted to the Atlantic States Marine Fisheries Commission as a requirement to the Interstate Fishery Management Plan for Atlantic Sturgeon

The following addresses Section 5.1.2 of Addendum 1 to the ASMFC Fishery Management Plan (FMP) for Atlantic Sturgeon for an annual compliance report:

Results of By-catch Monitoring for Atlantic Sturgeon in Other Fisheries

Harvest reporting in the American shad gill net fishery was voluntary prior to new regulations that took effect in January 2000. Although shad fishers are required to report shad landings and effort, bycatch reporting of Atlantic sturgeon remains on a voluntary basis. According to logbooks collected from New Jersey commercial shad fishers there were 11 Atlantic sturgeon caught as bycatch during 2012 in Delaware Bay. All sturgeon were released alive at the time of tending the net.

Permit holders are not required to report Atlantic sturgeon interactions however, so this number may be an underestimate of the total interactions with commercial shad gill netters throughout the state. The accuracy of reported data is also unquantifiable without onboard observers. The data was extrapolated to the entire shad fishery for 2012, based on the number caught by cooperating fishers and effort data from all logbooks. Although the number of interactions is still considered an underestimate, the final reported estimate is 24 sturgeon caught (**Table 1**).

Monitoring Results

The Division's ocean trawl survey, dating back to 1989, has conducted five cruises per year consisting of approximately 39 tows of 20-minute duration per cruise. The survey extends from Sandy Hook to Cape May, NJ and offshore to the 90' isobath. Through 2012, 313 Atlantic sturgeon were caught by the trawl survey and all were released alive. Table 2 provides Atlantic sturgeon catch data from the Division's coastal trawl survey for 1989 through 2012 including number caught, mean catch per tow, mean length and size range for each year. There were three Atlantic sturgeon caught by the trawl survey during 2012 for an average of 0.016 per haul.

Table 3 provides Atlantic sturgeon caught during the Division's Delaware Bay American Shad and Striped Bass Tagging Program from 2000 to 2013. The Delaware Bay Striped Bass Tagging Program began in 1989 and American Shad Program was added in 1995. Sampling is conducted during February to May of each year. Only four Atlantic sturgeon were caught prior to 2000. There has been no significant change in effort during the sampling periods. Staff encountered no sturgeon during 2012 and two during 2013 sampling. Not all fish are brought aboard the sampling vessel, so a size range is not available for most years.

Since mark/recapture is not a mandatory provision of the Atlantic sturgeon FMP, New Jersey discontinued all tagging of Atlantic sturgeon beginning August 2002. Due to the increase in numbers of Atlantic sturgeon in recent years tagging efforts were resumed in 2009 during the Delaware Bay Striped Bass Tagging Program. No Atlantic sturgeon were caught or tagged during 2012 sampling.

As part of a multi-state collaborative effort, the Division partnered with several states/agencies to develop an effort to track migration patterns of Atlantic sturgeon in the Delaware Bay. The Division's portion of the project is to purchase, assemble, deploy and maintain acoustic receivers on the New Jersey side of the Delaware Bay. Eighteen receivers were individually deployed from March 30-May 3, 2012. Data were downloaded monthly from each receiver until all receivers were removed from the water on November 15, 2012. The receivers detected 141 Atlantic sturgeon. The project will continue for a minimum of two additional years.

On May 15, 2013, the Division launched a link on its website for reporting sturgeon interactions in New Jersey waters. The reporting form allows individuals to report information such as length, location, the presence of tags, photos, etc. from live or dead fish.

Habitat Status

The Division did not conduct studies directed at Atlantic sturgeon habitat identification during the report period.

Aquaculture Operations

The Division was not involved in any Atlantic sturgeon aquaculture operations during the report period.

Table 1. Sturgeon bycatch from the commercial shad fishery: 1999-2012

YEAR	# FISHERMEN	ALIVE	DEAD	TOTAL
1999	3	13	0	13
2000	14	143	1	144
2001	8	73	0	73
2002	9	60	3	63
2003	8	67	0	67
2004	12	147	0	147
2005	6	55	3	58
2006	6	64	10	74
2007	6	84	0	84
2008	4	46	0	46
2012	3	24	0	24
Total		785	17	802

Table 2. Catch data of Atlantic sturgeon caught during ocean trawl survey sampling in New Jersey's coastal waters: January 1989 – April 2013

Year	# Tows	# Caught	Mean/tow	Mean TL (cm)	Size range (cm)
1989	193	34	0.18	95.2	70-123
1990	171	15	0.09	117.7	80-196
1991	189	16	0.08	99.7	69-205
1992	191	25	0.13	97.7	69-175
1993	187	10	0.05	100.6	75-116
1994	186	0	0.00		-
1995	188	6	0.03	104.8	74-166
1996	189	3	0.02	86.7	72-113
1997	187	12	0.06	95.1	59-215
1998	188	1	0.01	71.0	71
1999	186	11	0.06	99.4	86-127
2000	186	1	0.01	72.0	72
2001	186	4	0.02	111.8	96-149
2002	188	5	0.03	127.4	104-144
2003	188	16	0.09	125.1	88-189
2004	187	23	0.12	110.5	52-202
2005	186	18	0.10	95.1	66-160
2006	186	35	0.19	106.8	68-248
2007	187	24	0.13	101.4	83-181
2008	186	26	0.14	110.2	79-258
2009	186	12	0.06	88.6	54-132
2010	186	10	0.05	138.3	112-179
2011	186	3	0.02	141.3	122-155
2012	186	3	0.02	166.7	155-156
2013*	69	1	0.01	79.0	79
Total	4,616	316	0.07	105.4	52-258

*preliminary numbers

Table 3. Atlantic sturgeon caught in Delaware Bay by gill net during New Jersey American shad and striped bass tagging study: 2000-2013

Year	Number	Size range (cm)
2000	6	69.3 – 83.6
2001	2	N/A
2002	0	
2003	2	104.9 – 175.3
2004	0	
2005	34	N/A
2006	4	N/A
2007	3	97.8 – 170.0
2008	0	
2009	1	76
2010	6	71.8 – 150.2
2011	1	205.0
2012	0	
2013	2	84.0 - 86.3
Total	61	69.3 – 205.0

State of Delaware Annual Compliance Report
for
Atlantic Sturgeon

Submitted to the Atlantic States Marine Fisheries Commission
Atlantic Sturgeon Plan Review Team

D. Raver, U.S. FWS

September 2013

Prepared by:
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Delaware Division of Fish and Wildlife
Department of Natural Resources and Environmental Control
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Smyrna, DE 19977

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Introduction

As mandated in the Atlantic States Marine Fisheries Commission (ASMFC) Interstate Fishery Management Plan for Atlantic sturgeon, this report summarizes the State of Delaware's activities regarding Atlantic sturgeon in 2012, including information on by-catch monitoring, ship strike mortalities, tagging and juvenile index of abundance studies, habitat status, and aquaculture operations.

Monitoring programs

Voluntary by-catch logbook program

The Delaware Division of Fish and Wildlife, hereafter referred to as the Division, used a voluntary logbook program to monitor the by-catch of Atlantic sturgeon in the spring gill net fishery in the Delaware River, Delaware Bay, and near-shore Atlantic Ocean from 1999-2011. This activity has been suspended and spring gillnetters were informed via a Division letter in February 2012.

This voluntary program saw a marked decrease in participation from a high of 30% in 2006 to a low of 7% in 2011 (Table 1). Due to the listing of Atlantic sturgeon effective April 2012 voluntary participation was expected to decline further and extrapolated estimates of sturgeon catch would be too imprecise to be useful.

The Division is preparing an Atlantic sturgeon Habitat Conservation plan and will resume monitoring in a different format which has yet to be finalized.

Ship strike mortalities

The Division as well as researchers at Delaware State University (DSU) receives reports of alleged ship strike mortalities each spring and fall. Beginning in 2009, the Division published a small advertisement in the Delaware Fishing Guide asking for carcasses to be reported via a phone number. The fishing guide is published in April, prior to the start of the carcass season and approximately 100,000 are distributed as a free publication at all in-state fishing license vendors and chambers of commerce. The carcass contact number was also added to a project pamphlet on the Division website and can be acquired on most commonly used search engines when the key words 'dead' 'sturgeon' 'Delaware' are used in combination. These advertisements and the common use of smart phones with the ability to quickly and easily search out information on the internet have increased the number of carcass reports from a mean of 8.2 (2005-2009) to a mean of 18.3 (2010-2012). Advertising has also encouraged prompter reporting which increases the

ability to ascertain cause of death. In 2005-2009 cause of death was determined to be unknown in 44% of carcasses and since 2010 unknown cause of death has dropped to 20%. The size range of sturgeon reported has ranged from 58 to 229 cm TL. Many of the sturgeon reported have exceeded the size of any sturgeon taken during directed gill net surveys conducted by the Division in the lower Delaware River, which have taken more than 2,000 sturgeon. However, the time of year sampled by the Division does not coincide with the historic spawning season that one would expect to capture adult Atlantic sturgeon. In addition, the mesh and twine size of gill nets used by the Division may be insufficient for capturing large adults. Fifty three percent of reported sturgeon are of adult size (>1500 mm TL) which is a much higher proportion than the number of adults in the population. This may indicate a reporting bias enthusiasm for larger carcasses, a longer persistence time in the environment for larger fish or an increased likelihood of propeller strike mortality based on body size (Dadswell and Rulifson 1994). An investigation into reporting rate such as the one conducted on the James River (Balazik et al. 2012) is needed to assess vessel strike mortality.

Although ship strikes are the likely cause of death for most individuals, the stage of decomposition often makes the cause of death difficult to discern. Most individuals have been severed through the torso region and scute damage is consistent with being struck by the propeller of a large ship whereas others have had crushed scutes consistent with being struck with a boat or ship hull (Figure 1). The Division has received several anecdotal reports regarding ship/boat strikes. For instance, a commercial crabber reported hitting an adult Atlantic sturgeon with his outboard motor propeller during late spring while moving through a shallow section of the lower Delaware River. In addition, a marine patrol officer encountered an adult-sized Atlantic sturgeon in the Delaware River that floated up behind a large ship navigating upstream in the Delaware River in May 2005. This sturgeon was bleeding and near death from an injury near the dorsal fin described as a probable propeller strike (T. Penuel, DE Division of Fish and Wildlife, pers. comm.).

The Division began tracking Atlantic sturgeon mortalities in 2005. Previous to tracking carcass information in 2005 it is estimated that from 4 to 8 carcasses have been reported each spring. All dead sturgeon reported are measured for total length (or length of portion found), scanned for internal and externals tags, sexed if possible, examined for injuries, documented with a photo, marked with spray paint and buried to eliminate double reporting. In addition, tissue samples are taken for genetic stock analysis and contaminant analysis depending on the stage of decomposition. The Division's Natural Heritage Program has also included Atlantic sturgeon logbooks in their shorebird training guide as part of their monitoring program along Delaware

Bay in the spring. The shorebird monitoring program covers a large area of Delaware Bay during the spring and typically reports several dead Atlantic sturgeon each year. In 2012, 18 Atlantic sturgeon carcasses were reported from the Delaware Estuary of which 18 had external injuries that were most likely the result of being struck by a vessel propeller or rudder (Table 2). Two shortnose sturgeon carcasses were also reported both of which had signs of vessel strike.

Tagging program

Atlantic sturgeon collected by the Division during directed sampling efforts were tagged with USFWS T-bar tags, passive integrated transponders (PIT) and 2 were selected for VEMCO V9 ultrasonic transmitter tags (Table 3). T-bar tags were inserted in the dorsal musculature just anterior to the dorsal fin. PIT tags were injected below the dorsal sinus in sturgeon >250 mm TL. If total length is < 400 mm, a PIT tag < 11.5 mm is used. Transmitters were surgically implanted near the midline on the ventral side of the fish anterior to the anal vent in sturgeon greater than 250 mm TL. Delaware State University tagged Atlantic sturgeon (n=208) (Table 3) in 2012 as part of their identification of critical habitat and interbasin exchange project. Environmental Research Consultants (ERC) Hal Brundage tagged juvenile Atlantic sturgeon (n= 33) in the Delaware River as part of their work. NEAMAP tagged Atlantic sturgeon (n=7) in coastal waters of Delaware. There were a total of 10 recapture events in 2012 including two sampling season events (Table 4). An additional 8 Atlantic sturgeon were recaptured from other studies. All tag release information was supplied to the U.S. Fish and Wildlife Service Annapolis, MD field office for inclusion in the tagging database.

Juvenile index of abundance

To assess the abundance of juvenile Atlantic sturgeon in the lower Delaware River, the Division has conducted directed gill net surveys using smaller mesh gill nets. Surveys were conducted in 1991-1998, 2001, 2004, 2007, 2008 and 2009-2012. Beginning in 2009, surveys focused on early stage juveniles, age 0, 1 and 2. Small mesh (51 and 75 mm stretch) gillnets were used exclusively so that early stage juveniles would be more vulnerable to the gear (McCord et al 2007).

Sampling effort was reduced due to budget and manpower restrictions in 2012. One young of the year sturgeon (262 mm TL) was captured in the Division's 2012 survey and another during ERC efforts (387 mm TL) (Table 5) indicating the presence of a detectable 2012 year class. A total of 3 juveniles were captured (CPUE = 0.3) which is the lowest CPUE since the juvenile sturgeon project began in 1991. Some of this may be attributed to active dredging during

the sampling season in the Marcus Hook anchorage that dispersed fish from their normal pattern. Effort was split between Marcus Hook anchorage and Cherry Island Flats in areas that have produced sturgeon in the past.

The Division has concluded its final year of funding to conduct a habitat and seasonal movements survey focused on early stage juvenile sturgeon (<500 mm TL). Discussions are ongoing to continue an age-0,1 population index survey in 2014.

Previously, Division surveys did not successfully capture young of the year sturgeon. It is unclear if this is due to gear, site selection, unsuccessful year classes or poor survival to recruitment in past surveys. Past surveys occasionally included a portion of small-mesh gillnet and were fished in the areas that produced young of the year in 2009 and 2011. However, early surveys in 1991, 1992, 1993, 1994, 1995 and 1996 focused on the Artificial Island site which has not produced young of the year data. Surveys from 1997 to 2008 included sampling sites where young of the year were caught in 2009, but no captures occurred. The Division's trawl survey captured three young of the year sturgeon (1989, 1990, 1993) in locations upriver of Artificial Island (Cherry Island Flats and the western side of Pea Patch Island) but were not able to be identified as Atlantic or shortnose sturgeon. If the trawl captures from 1989, 1990 and 1993 were Atlantic sturgeon, the gillnetting survey may have been focused in areas where capture was less likely. A commonality exists between 1989, 1990, 1993, 2009, and 2011 that conductivity (and its surrogate salinity) were well below average. The surveys after 1996 (1997, 1998, 2001, 2004, 2007, 2008) were years of above average salinity. Salinity may be a factor in producing successful year classes. Another water quality factor driving recruitment may be dissolved oxygen (DO) in the early summer when young of the year are most vulnerable (Kahn and Fisher 2012). A better understanding of environmental drivers of sturgeon recruitment and the tolerances of Atlantic sturgeon <60 days are needed to be able to effectively manage sturgeon populations in the Delaware Estuary.

The Division conducts two trawl surveys in the lower Delaware River and Delaware Bay which provide annual estimates of juvenile abundance for several important fish species. From 1990 to 2012, the trawl program has collected only 32 Atlantic sturgeon (Table 6), generally juveniles ranging in size from 700 to 1,500 mm TL. In 2012, 2 Atlantic sturgeon were collected in the large trawl and zero were collected in the small trawl. This follows the record year of 2011 when 9 sturgeon were captured. The record catch seems likely to be caused by an extremely wet year that pushed the freshwater zone downstream and temporarily distributed sturgeon into a much greater portion of the trawling stations lower in the Estuary. Considering the unusual

circumstances of 2011 there does not seem to be a clear trend of abundance in the Delaware Estuary.

Habitat status

Information on habitat of Atlantic sturgeon in the Delaware Estuary for all life stages remains limited. Division biologists conducted ultrasonic telemetry studies from 1996 to 1998 and 2007 to 2008 in an attempt to discern movement patterns and important summer habitats of late stage juvenile Atlantic sturgeon in the lower Delaware River (Fisher 2009). In 2009 -2011 telemetry studies focused on early stage river resident juveniles. In 2012 the habitat component of the project was eliminated for budgetary reasons.

Early stage juvenile habitat

The passive receiver array system maintained by the Division, DSU, New Jersey Department of Environmental Protection (NJDEP) and ERC is made up of over 70 receivers in various locations throughout the Delaware Bay, Delaware River, Chesapeake and Delaware Canal and the coast of Delaware and New Jersey. The array has produced information on seasonal individual movement and behavior patterns of juvenile sturgeons. Movements of the 3 tagged sturgeon from 2012 will be analyzed when funding is available.

Adult spawning habitat

During this time period a total of 213 adult Atlantic sturgeon were landed over 24 sampling days and 120 gillnet sets. All Atlantic sturgeon were processed using standardized protocols (NOAA-NMFS-Damon-Randall et al. 2010) which included PIT tagging, external tags, measurements, and collection of genetic samples. A total of 75 acoustic transmitters were implanted in a subsample of Atlantic sturgeon.

Spawning Site Identification

During the likely period of spawning in 2012 six adult Atlantic sturgeon deemed likely in spawning condition, from directed sampling efforts, were detected in the Delaware River. Two of the six were individuals that entered the Delaware River in 2009, 2010, and 2011 (DSU1052433 and DSU1052442) the other 4 fish were tagged in 2012 (DSU1122465, DSU1122466, DSU1122488, and DSU1122493). The River of Origin (ROO) has been determined for all Atlantic sturgeon captured in 2009-2010 sampling seasons, while the ROO for

Atlantic sturgeon captured in 2011 and 2012 has yet to be determined. Adult Atlantic sturgeon entered the Delaware River at a mean temperature of 16.3 °C and departed at a mean temperature of 23.1° C. Atlantic sturgeon # DSU1052433 (male, ROO Delaware) entered the river on April 22 (15.9 ^{o}C) and departed on May 23 (20.6 ^{o}C), Atlantic sturgeon # DSU1052442 (male, ROO Delaware) entered the river on April 17 (14.7 ^{o}C) and departed on June 6 (22.4 ^{o}C); both sturgeon were located in the same areas as detected in 2009-2011 entering as far upstream as river kilometer (rkm) 129 and 135 respectively. Atlantic sturgeon # DSU1122465 (male), entered the river on May 6 (16.3 ^{o}C) and departed on May 25 (21.9 ^{o}C) reaching Wilmington, DE (rkm 120). Atlantic sturgeon # DSU1122466 (male), entered the Delaware River on May 13 (17.6 ^{o}C) and departed on June 22 (25.9 ^{o}C) reaching a maximum upstream extent of rkm 176 (Bristol, PA). Atlantic sturgeon #DSU 1122493 (male), entered the Delaware River on May 6 (16.3°C) and departed on June 1 (24.2 °C) reaching Tinicum Island, PA (rkm 135). One female (DSU1122488) was detected in the Delaware River in 2012 and occupied areas of the river with suitable spawning habitat (i.e. flowing freshwater and hard bottom substrate (Sommerfield and Madson 2003, and Simpson 2008). When captured on April 9, 2012 this female was 208 cm FL and weighed 98 kg and had large black eggs visually estimated to be stage 5 (migratory nucleus; Van Eenennaam and Dorshov1998) that would be ready to spawn in the spring of 2012. Atlantic sturgeon #DSU1122488 entered the river on May 9 (17.2° C) and remained in the river for 9 days before leaving on May 29 (23.8 °C) traveling as far upstream as Chester, PA (rkm 130).

The movements of all six adult Atlantic sturgeon were monitored via passive telemetry in an attempt to ascertain if they were moving into areas similar to that of known spawning habitat in other rivers or areas previously identified as potential spawning areas, i.e. high freshwater flows and hard bottom (Sommerfield and Madson 2003, and Simpson 2008). The six adult Atlantic sturgeon spent the majority of time between rkm 110 and 135 with one male venturing as far up as rkm 176 for several weeks for exiting the river (Figure 2). The movement of these Atlantic sturgeon in relation to the location of the salt front during their riverine residency shows they occupied areas from the location of the salt front to 20km upstream of the salt front while in the Delaware River (Figure 3).

A single adult male Atlantic sturgeon (50 kg and 185cm FL) telemetered on May 1, 2011 that was determined to have gonads stage 6 (post spermiation: Van Eenennaam and Dorshov 1998) entered the Delaware River on July 23, 2012 (27.7 °C). The male remained in the river until September 19 when water temperatures fell below 23.5 °C and may be indicative of a fall spawn similar to what has been recently documented in the Roanoke (Flowers and Hightower in prep) and James Rivers (Balazik et al. 2012). The male Atlantic sturgeon advanced quickly

above Philadelphia (rkm 153) where it remained between there and Burlington, NJ (rkm 187) until departure.

Aquaculture operations

The Division does not sponsor any aquaculture programs for Atlantic sturgeon, but has cooperated with the neighboring State of Maryland in previous years by collecting low numbers of sub-adult Atlantic sturgeon from the lower Delaware River. These fish were transported to the Maryland hatchery complex for grow-out and will form part of the broodstock necessary to initiate Atlantic sturgeon restoration activities in the Chesapeake Bay upon reaching maturity. No sturgeon were collected for this program in 2012.

TABLE 1. Summary of Atlantic sturgeon by-catch reported in the spring (March-April) gill net fishery (striped bass, American shad, and weakfish) in the Delaware River, Delaware Bay, and near-shore Atlantic Ocean (ocean fishery closed January 1, 2005) from 1999-2011. Total by-catch was estimated using the catch rate of Atlantic sturgeon (fish/net yd. day) reported by commercial gill netters that submitted voluntary by-catch logbooks. This catch rate was expanded to the entire spring gill net fishery in the Delaware River and Bay using the total effort (net yd. days) in the fishery to estimate total sturgeon by-catch.

Location	Active gill netters	Logbooks submitted	Gill netter response	Gill netter effort (net yd. days)	Atlantic sturgeon reported	Total effort in spring gill net fishery (net yd. days)	Total estimated Atl. sturgeon bycatch
				1999			
Delaware Estuary	77[1]	8	18%	-	43	-	-
				2000			
Delaware River	10	4	40%	19,233	2	37,433	4
Delaware Bay	75	14	19%	133,885	51	511,215	195
Atlantic Ocean[2]	7	2	29%	29,695	6	185,245	37
Overall	92	20	22%	182,813	59	733,893	236
				2001			
Delaware River	9	1	11%	17,500	0	78,100	0
Delaware Bay	67	13	19%	145,459	30	583,039	120
Atlantic Ocean[2]	9	2	22%	48,500	11	135,140	31
Overall	85	16	19%	211,459	41	796,279	154
				2002			
Delaware River	7	2	29%	7,800	1	21,500	3
Delaware Bay	55	12	22%	165,625	14	457,740	39
Atlantic Ocean[2]	6	3	50%	62,100	16	114,300	29
Overall	68	19	28%	235,525	31	593,540	71
				2003			
Delaware River	9	0	0%	-	0	35,783	0
Delaware Bay	51	6	12%	26,730	8	259,747	78
Atlantic Ocean[2]	4	3	75%	53,900	7	85,300	11
Overall	64	9	14%	80,630	15	380,830	89
				2004			
Delaware River	10	2	20%	15,200	2	33,760	4
Delaware Bay	51	6	12%	98,800	38	392,457	151
Atlantic Ocean[2]	4	2	50%	28,600	25	60,800	53
Overall	65	10	15%	142,600	65	487,017	208
				2005			
Delaware River	6	2	33%	5,200	0	16,000	0

[1] Only 45 of the 77 active gillnetters were mailed by-catch logbooks.
[2] Included commercial gill net fishermen in Indian River and/or Rehoboth Bay.

Delaware Bay[2]	59	13	22%	202,090	29	566,093	81
Overall	65	15	23%	207,290	29	582,093	81

TABLE 1. (*continued*) Summary of Atlantic sturgeon by-catch reported in the spring (March-April) gill net fishery (striped bass, American shad, and weakfish) in the Delaware River, Delaware Bay, and near-shore Atlantic Ocean (ocean fishery closed January 1, 2005) from 1999-2011. Total by-catch was estimated using the catch rate of Atlantic sturgeon (fish/net yd. day) reported by commercial gill netters that submitted voluntary by-catch logbooks. This catch rate was expanded to the entire spring gill net fishery in the Delaware River and Bay using the total effort (net yd. days) in the fishery to estimate total sturgeon by-catch.

				2006			
Delaware River	6	1	17%	6,600	1	22,400	3
Delaware Bay[2]	55	17	31%	210,650	101	518,315	248
Overall	61	18	30%	217,250	102	540,715	251
				2007			
Delaware River	14	3	21%	10,500	4	33,085	13
Delaware Bay[2]	60	16	27%	134,985	118	405,870	355
Overall	74	19	26%	145,485	122	438,955	368
				2008			
Delaware River	10	1	10%	400	0	16,050	0
Delaware Bay[2]	50	9	18%	31,444	7	179,305	38
Overall	60	10	17%	31,844	7	195,355	38
				2009			
Delaware River	8	3	38%	3,900	1	13,250	3
Delaware Bay[2]	55	4	8%	4,120	4	171,935	167
Overall	63	7	11%	8,020	5	185,185	170
				2010			
Delaware River	7	1	14%	10,500	0	27,650	0
Delaware Bay[2]	49	6	13%	13,340	9	276,635	172
Overall	56	7	13%	23,840	9	304,285	115
				2011			
Delaware River	5	0	0%	0	0	11,900	0
Delaware Bay[2]	54	4	7%	7,960	5	231,040	145
Overall	59	4	7%	7,960	5	242,940	153

TABLE 2. Summary of Atlantic sturgeon mortalities (n=18) reported in the Delaware Estuary in 2012. Adults were classified as sturgeon likely exceeding 1500 mm TL. If a known salvage ID was assigned by NMFS it is included in the table.

Date	Location	Size	Sex	Injuries	NMFS salvage ID
5/3/2012	Essington, PA	Adult		Tail cut off	Aoo050012012DE
5/4/2012	Neshaminy SP, PA	Adult		Tail cut off	Aoo050022012DE
5/6/2012	Silver Run WMA, DE	Adult		Blunt force torso	Aoo050032012DE
5/15/2012	Dobbinsville, DE	Adult	Male	Blunt force torso, head, tail	Aoo050042012DE
5/19/2012	C+D Canal, DE	Adult		Head injury	
5/25/2012	C+D Canal, DE	Adult		Tail cut off	
5/28/2012	Sea Breeze, NJ	Adult		Tail cut off	
6/5/2012	Penns Grove, NJ	Adult		Lacerations tail and head	
7/24/2012	Pennsville, NJ	Adult		Blunt force torso	
7/29/2012	Augustine, DE	Juvenile		Tail cut off	
8/23/2012	Neshaminy Creek, PA	Adult		Head injury	
8/27/2012	New Castle, DE	Juvenile		Head injury	
9/22/2012	Missipillian Inlet, DE	Adult		Laceration torso	
9/26/2012	Elsinboro, NJ	Juvenile		Head injury	
10/3/2012	Oakwood Beach, NJ	Adult		Head and torso	
10/11/2012	Gloucester City, NJ	Adult		Tail cut off	
10/12/2012	Elsinboro, NJ	Juvenile		Head cut off	
11/5/2012	Cape Henlopen SP, DE	Adult	Female	Head	

TABLE 3. Atlantic sturgeon tagged with Delaware Division of Fish and Wildlife and USFWS T-bar tags or PIT tags in the lower Delaware River and Delaware Bay by the Division's Atlantic sturgeon juvenile survey, and Delaware State University in 2012.

Date	Location	TL (mm)	FL (mm)	WT (kg)	T-bar no.	PIT no.	Vemco ID
			DFW Atlantic sturgeon juvenile survey				
11/20/2012	Marcus Hook anchorage	262	228	0.105		985121018602377	
11/20/2012	Marcus Hook anchorage	549	478	0.670	45685	985121014382173	29700
11/20/2012	Marcus Hook anchorage	569	487	0.780	45686	985121014381957	29701

Delaware State University

Fish ID	Date	Fork Length (cm)	Total Length (cm)	Weight (kg)	Sex	Vemco ID	Recapture	Net ID
DSU AS 12 001	3/29/12	166	188	40	Female	Yes	no	2
DSU AS 12 002	3/29/12	152	170	36	Male	Yes	no	3
DSU AS 12 003	3/29/12	100	114	8.6	Unknown	Yes	no	4
DSU AS 12 004	3/29/12	172	199	48	Female	Yes	no	4
DSU AS 12 005	3/30/12	103	116	8.5	Unknown	Yes	no	5
DSU AS 12 006	3/30/12	122	141	16	Unknown	Yes	no	6
DSU AS 12 007	3/30/12	184	212	46	Female	No	no	10
DSU AS 12 008	3/30/12	160	180	37	Male	Yes	no	10
DSU AS 12 009	3/31/12	119	137	14	Unknown	Yes	no	13
DSU AS 12 010	4/1/12	106	120	7	Unknown	Yes	no	17
DSU AS 12 011	4/1/12	156	177	36	Unknown	Yes	Yes	19
DSU AS 12 012	4/1/12	134	151	22	Unknown	No	no	19
DSU AS 12 013	4/3/12	171	198	52	Female	Yes	no	23
DSU AS 12 014	4/3/12	152	175	35	Male	Yes	no	22
DSU AS 12 015	4/3/12	180	201	63	Male	Yes	no	24
DSU AS 12 016	4/3/12	143	166	28	Unknown	No	no	26
DSU AS 12 017	4/3/12	167	188	42	Male	Yes	no	26
DSU AS 12 018	4/3/12	179	203	54	Male	Yes	no	26
DSU AS 12 019	4/3/12	165	183	48	Male	Yes	no	27
DSU AS 12 020	4/3/12	133	145	18	Unknown	No	no	27
DSU AS 12 021	4/4/12	120	134	16	Unknown	Yes	no	30
DSU AS 12 022	4/4/12	176	204	52	Male	Yes	no	30

Fish ID	Date	Fork Length (cm)	Total Length (cm)	Weight (kg)	Sex	Vemco ID	Recapture	Net ID
DSU AS 12 023	4/4/12	139	158	25	Unknown	No	no	28
DSU AS 12 024	4/4/12	135	150	26	Unknown	No	no	28
DSU AS 12 025	4/4/12	130	150	20	Unknown	Yes	no	31
DSU AS 12 026	4/4/12	139	157	28	Unknown	No	no	31
DSU AS 12 027	4/4/12	112	132	12	Unknown	Yes	no	32
DSU AS 12 028	4/4/12	170	193	42	Male	Yes	no	32
DSU AS 12 029	4/4/12	149	170	32	Unknown	No	no	32
DSU AS 12 030	4/4/12	168	189	47	Male	Yes	no	32
DSU AS 12 031	4/4/12	160	185	42	Female	Yes	no	33
DSU AS 12 032	4/4/12	163	187	45	Male	Yes	no	33
DSU AS 12 033	4/4/12	205	228	76	Female	Yes	no	33
DSU AS 12 034	4/4/12	155	172	36	Unknown	No	no	33
DSU AS 12 035	4/4/12	162	180	40	Unknown	No	no	33
DSU AS 12 036	4/5/12	146	163	35	Unknown	No	no	35
DSU AS 12 037	4/5/12	97	112	6	Unknown	Yes	no	37
DSU AS 12 038	4/5/12	140	153	26	Unknown	No	no	37
DSU AS 12 039	4/5/12	168	193	41	Female	Yes	no	36
DSU AS 12 040	4/5/12	164	180	46	Female	Yes	no	36
DSU AS 12 041	4/5/12	151	169	34	Unknown	No	no	38
DSU AS 12 042	4/9/12	118	135	14	Unknown	No	no	40
DSU AS 12 043	4/9/12	121	142	14	Unknown	No	no	40
DSU AS 12 044	4/9/12	107	123	8	Unknown	No	no	40
DSU AS 12 045	4/9/12	158	182	41	Unknown	No	no	41
DSU AS 12 046	4/9/12	137	159	25	Unknown	No	no	41
DSU AS 12 047	4/9/12	206	228	80	Female	Yes	no	41
DSU AS 12 048	4/9/12	148	167		Unknown	No	no	43
DSU AS 12 049	4/9/12	114	126	10	Unknown	No	no	43
DSU AS 12 050	4/9/12	136	153	23	Unknown	No	no	43
DSU AS 12 051	4/9/12	133	149	17	Unknown	No	no	43
DSU AS 12 052	4/9/12	158	178	36	Unknown	No	no	42
DSU AS 12 053	4/9/12	174	192	49	Unknown	No	no	42
DSU AS 12 054	4/9/12	139	157		Unknown	No	no	42
DSU AS 12 055	4/9/12	178	194	52	Unknown	No	no	42
DSU AS 12 056	4/9/12	162	182	40	Unknown	No	no	42
DSU AS 12 057	4/9/12	156	176	34	Unknown	No	no	42
DSU AS 12 058	4/9/12	151	171	32	Unknown	No	no	42
DSU AS 12 059	4/9/12	99	111	5	Unknown	Yes	no	43
DSU AS 12 060	4/9/12	209	227	80	Unknown	Yes	no	42
DSU AS 12 061	4/9/12	183	205	57	Unknown	Yes	no	42

Fish ID	Date	Fork Length (cm)	Total Length (cm)	Weight (kg)	Sex	Vemco ID	Recapture	Net ID
DSU AS 12 062	4/9/12	208	233	98	Female	Yes	no	44
DSU AS 12 063	4/9/12	131	146	22	Unknown	No	no	44
DSU AS 12 064	4/9/12	141	162	28	Unknown	No	no	44
DSU AS 12 065	4/9/12	151	171	28	Unknown	No	no	44
DSU AS 12 066	4/9/12	170	195	45	Unknown	No	no	44
DSU AS 12 067	4/10/12	170	190	50	Male	Yes	no	45
DSU AS 12 068	4/10/12	148	162	28	Unknown	No	no	45
DSU AS 12 069	4/10/12	148	164	30	Unknown	No	no	45
DSU AS 12 070	4/10/12	139	156	26	Unknown	No	no	45
DSU AS 12 071	4/10/12	152	182	34	Unknown	No	no	45
DSU AS 12 072	4/10/12	139	155	25	Unknown	No	no	47
DSU AS 12 073	4/10/12	144	163	32	Unknown	No	no	47
DSU AS 12 074	4/10/12	143	156	25	Unknown	No	no	47
DSU AS 12 075	4/10/12	137	160	28	Unknown	No	no	48
DSU AS 12 076	4/10/12	175	197	52	Male	Yes	no	49
DSU AS 12 077	4/11/12	190	218	62	Male	Yes	no	50
DSU AS 12 078	4/11/12	113	128	12	Unknown	No	no	54
DSU AS 12 079	4/11/12	131	150	19	Unknown	Yes	no	54
DSU AS 12 080	4/11/12	142	159	21	Unknown	No	no	54
DSU AS 12 081	4/11/12	135	147	20	Unknown	No	no	54
DSU AS 12 082	4/11/12	115	131	12	Unknown	Yes	no	54
DSU AS 12 083	4/11/12	176	207	49	Female	Yes	no	53
DSU AS 12 084	4/11/12	179	195	56	Male	Yes	no	53
DSU AS 12 085	4/11/12	129	150	24	Unknown	Yes	no	53
DSU AS 12 086	4/11/12	129	149	23	Unknown	No	yes	53
DSU AS 12 087	4/11/12	145	160	34	Unknown	No	no	53
DSU AS 12 088	4/11/12	179	203	51	Unknown	No	no	53
DSU AS 12 089	4/11/12	168	187	42	Unknown	No	no	53
DSU AS 12 090	4/11/12	153	174	40	Unknown	No	no	53
DSU AS 12 091	4/11/12	161	182	38	Unknown	No	no	55
DSU AS 12 092	4/12/12	163	186	43	Male	Yes	no	58
DSU AS 12 093	4/12/12	150	170	36	Unknown	No	no	58
DSU AS 12 094	4/12/12	145	160	25	Unknown	No	no	56
DSU AS 12 095	4/12/12	150	170	34	Unknown	No	no	56
DSU AS 12 096	4/13/12	124	141	17	Unknown	Yes	no	63
DSU AS 12 097	4/13/12	172	193	60	Male	Yes	no	62
DSU AS 12 098	4/13/12	135	155	27	Unknown	No	no	62
DSU AS 12 099	4/13/12	148	175	32	Unknown	No	no	62

Fish ID	Date	Fork Length (cm)	Total Length (cm)	Weight (kg)	Sex	Vemco ID	Recapture	Net ID
DSU AS 12 100	4/13/12	92	105	5	Unknown	Yes	no	64
DSU AS 12 101	4/13/12	105	121	10	Unknown	Yes	no	64
DSU AS 12 102	4/13/12	181	211	64	Female	Yes	no	65
DSU AS 12 103	4/14/12	123	140	19	Unknown	Yes	yes	69
DSU AS 12 104	4/14/12	135	150	25	Unknown	No	no	69
DSU AS 12 105	4/14/12	202	225	80	Female	Yes	no	67
DSU AS 12 106	4/14/12	150	169	31	Unknown	No	no	67
DSU AS 12 107	4/14/12	180	206	62	Male	Yes	no	68
DSU AS 12 108	4/14/12	115	123	16	Unknown	Yes	yes	71
DSU AS 12 109	4/14/12	190	211	66	Male	Yes	no	72
DSU AS 12 110	4/14/12	142	156	34	Unknown	No	no	72
DSU AS 12 111	4/17/12	127	150	22	Unknown	No	no	73
DSU AS 12 112	4/17/12	172	193	47	Unknown	Yes	no	73
DSU AS 12 113	4/17/12	128	145	19	Unknown	No	no	74
DSU AS 12 114	4/17/12	127	144	18	Unknown	No	no	74
DSU AS 12 115	4/17/12	139	151	27	Unknown	No	no	74
DSU AS 12 116	4/17/12	147	164	35	Unknown	No	no	74
DSU AS 12 117	4/17/12	166	191	41	Unknown	No	no	74
DSU AS 12 118	4/17/12	161	183	41	Unknown	No	no	74
DSU AS 12 119	4/17/12	177	200	52	Unknown	No	no	74
DSU AS 12 120	4/17/12	123	136	15	Unknown	Yes	no	74
DSU AS 12 121	4/17/12	170	191	51	Male	Yes	no	74
DSU AS 12 122	4/17/12	178	193	57	Male	Yes	no	74
DSU AS 12 123	4/17/12	150	167	32	Unknown	No	no	75
DSU AS 12 124	4/17/12	110	123	11	Unknown	Yes	no	75
DSU AS 12 125	4/17/12	110	125	13	Unknown	Yes	no	75
DSU AS 12 126	4/17/12	109	120	10	Unknown	Yes	no	75
DSU AS 12 127	4/17/12	170	188	61	Unknown	Yes	no	76
DSU AS 12 128	4/17/12	151	170	35	Unknown	No	no	76
DSU AS 12 129	4/17/12	140	154	26	Unknown	No	no	76
DSU AS 12 130	4/17/12	141	160	29	Unknown	No	no	76
DSU AS 12 131	4/17/12	154	174		Unknown	No	no	76
DSU AS 12 132	4/17/12	153	170		Unknown	No	no	76
DSU AS 12 133	4/18/12	122	141	17	Unknown	Yes	yes	78
DSU AS 12 134	4/18/12	130	150	18	Unknown	No	no	78
DSU AS 12 135	4/18/12	208	230	91	Female	Yes	no	79
DSU AS 12 136	4/18/12	125	144	20	Unknown	Yes	no	79
DSU AS 12 137	4/18/12	154	172	34	Unknown	No	no	79
DSU AS 12 138	4/18/12	143	164	25	Unknown	No	no	79

Fish ID	Date	Fork Length (cm)	Total Length (cm)	Weight (kg)	Sex	Vemco ID	Recapture	Net ID
DSU AS 12 139	4/18/12	151	171	35	Unknown	No	no	79
DSU AS 12 140	4/18/12	163	181	46	Unknown	No	no	79
DSU AS 12 141	4/18/12	139	157	32	Unknown	No	no	80
DSU AS 12 142	4/18/12	188	214	64	Female	Yes	no	81
DSU AS 12 143	4/18/12	171	201	51	Female	Yes	no	81
DSU AS 12 144	4/18/12	105	119	7	Unknown	No	no	81
DSU AS 12 145	4/18/12	150	165	31	Unknown	No	no	81
DSU AS 12 146	4/18/12	148	167	30	Unknown	No	no	81
DSU AS 12 147	4/18/12	141	156	31	Unknown	No	no	81
DSU AS 12 148	4/18/12	147	164	29	Unknown	No	no	81
DSU AS 12 149	4/18/12	140	160	30	Unknown	No	no	81
DSU AS 12 150	4/18/12	144	162	29	Unknown	No	no	81
DSU AS 12 151	4/18/12	140	156	25	Unknown	No	no	81
DSU AS 12 152	4/19/12	134	158	23	Unknown	No	no	84
DSU AS 12 153	4/19/12	176	197	55	Male	Yes	no	85
DSU AS 12 154	4/19/12	165	193	36	Unknown	No	no	85
DSU AS 12 155	4/19/12	159	172	31	Unknown	No	no	85
DSU AS 12 156	4/20/12	204	229	73	Female	Yes	no	86
DSU AS 12 157	4/20/12	174	203	61	Female	Yes	no	87
DSU AS 12 158	4/20/12	148	172	40	Unknown	No	no	87
DSU AS 12 159	4/20/12	149	170	34	Unknown	No	no	87
DSU AS 12 160	4/20/12	142	161	31	Unknown	No	no	89
DSU AS 12 161	4/20/12	180	202	57	Unknown	No	no	90
DSU AS 12 162	4/20/12	236	261	118	Female	Yes	no	90
DSU AS 12 163	4/21/12	115	134	15	Unknown	No	no	93
DSU AS 12 164	4/21/12	124	142	18	Unknown	No	no	93
DSU AS 12 165	4/21/12	110	126	11	Unknown	No	no	93
DSU AS 12 166	4/21/12	123	139	19	Unknown	No	no	91
DSU AS 12 167	4/21/12	154	174	40	Unknown	No	no	91
DSU AS 12 168	4/21/12	159	180	40	Unknown	No	no	92
DSU AS 12 169	4/21/12	152	173	33	Unknown	No	no	92
DSU AS 12 170	4/21/12	162	186	42	Unknown	No	no	92
DSU AS 12 171	4/21/12	173	200	50	Unknown	No	no	95
DSU AS 12 172	4/21/12	177	204	60	Male	Yes	no	95
DSU AS 12 173	4/21/12	151	169	33	Unknown	No	no	94
DSU AS 12 174	4/21/12	155	180	37	Unknown	No	no	94
DSU AS 12 175	4/25/12	168	192	55	Female	Yes	no	97
DSU AS 12 176	4/25/12	134	155	29	Unknown	No	no	97

Fish ID	Date	Fork Length (cm)	Total Length (cm)	Weight (kg)	Sex	Vemco ID	Recapture	Net ID
DSU AS 12 177	4/25/12	139	155	29	Unknown	No	no	97
DSU AS 12 178	4/25/12	145	162	29	Unknown	No	no	97
DSU AS 12 179	4/25/12	156	176	32	Unknown	No	no	99
DSU AS 12 180	4/25/12	137	158	27	Unknown	No	yes	99
DSU AS 12 181	4/25/12	141	161	30	Unknown	No	no	99
DSU AS 12 182	4/25/12	182	200	59	Unknown	No	no	100
DSU AS 12 183	4/25/12	159	184	37	Unknown	No	no	100
DSU AS 12 184	4/26/12	149	166	36	Unknown	No	no	101
DSU AS 12 185	4/26/12	152	169	32	Unknown	No	no	103
DSU AS 12 186	4/26/12	197	217	75	Female	Yes	no	104
DSU AS 12 187	4/26/12	173	198	47	Unknown	No	no	104
DSU AS 12 188	4/27/12	150	173	35	Unknown	No	no	105
DSU AS 12 189	4/27/12	134	153	29	Unknown	No	no	105
DSU AS 12 190	4/27/12	168	197	47	Unknown	No	no	105
DSU AS 12 191	4/27/12	147	167	34	Unknown	No	no	105
DSU AS 12 192	4/27/12	164	187	43	Unknown	No	no	108
DSU AS 12 193	4/28/12	150	170	38	Unknown	No	no	109
DSU AS 12 194	4/28/12	154	172	40	Unknown	No	no	110
DSU AS 12 195	4/28/12	146	164	36	Unknown	No	no	110
DSU AS 12 196	4/28/12	122	139	20	Unknown	No	no	110
DSU AS 12 197	4/28/12	132	154	29	Unknown	No	no	112
DSU AS 12 198	4/28/12	132	152	30	Unknown	No	no	112
DSU AS 12 199	4/28/12	148	165	37	Unknown	No	no	112
DSU AS 12 200	4/28/12	159	184	45	Unknown	No	yes	113
DSU AS 12 201	4/28/12	146	168	33	Unknown	No	no	113
DSU AS 12 202	4/29/12	184	204	54	Female	Yes	no	114
DSU AS 12 203	4/29/12	140	158	30	Unknown	No	no	115
DSU AS 12 204	4/29/12	115	134	20	Unknown	No	no	115
DSU AS 12 205	4/29/12	141	165	32	Unknown	No	yes	116
DSU AS 12 206	4/30/12	163	187	45	Unknown	Yes	no	119
DSU AS 12 207	4/30/12	126	145	28	Unknown	No	no	120
DSU AS 12 208	4/30/12	149	170	34	Unknown	Yes	no	120

TABLE 4. Summary of Atlantic sturgeon tagged in the lower Delaware River and Bay and near-shore Atlantic Ocean off Delaware from 1991 to 2012 and recaptured in 2012.

Date Released	Release TL (mm)	Release Location	Date Recaptured	Recapture TL (mm)	Recapture Gear	Target Species	Recapture Location	Disposition
4/26/2009	1500	Atlantic Ocean, Bethany Beach, DE	4/1/2012	1770	Anchor Gillnet	sturgeon	Atlantic Ocean, Bethany Beach, DE	Alive
10/27/2009	281	Delaware R., Marcus Hook Anchorage, DE	6/15/2012	860	Anchor Gillnet	sturgeon	Marcus Hook anchorage, DE	Alive
4/21/2011	1950	Atlantic Ocean, Bethany Beach, DE	10/15/2012	N/A	Hand	N/A	Saco R., UNE campus, NH	Alive
5/12/2011	1780	Atlantic Ocean, Bethany Beach, DE	6/7/2012	1797	Anchor Gillnet	sturgeon	Hudson R., Rogers Pt, NY	Alive
10/17/2011	280	Delaware R., Marcus Hook anchorage, DE	9/26/2012	535	Anchor Gillnet	sturgeon	Marcus Hook anchorage, DE	Alive
4/3/2012	1830	Atlantic Ocean, Bethany Beach, DE	6/12/2012	1829	Anchor gillnet	sturgeon	Rogers Point Hudson R. NY	Alive
4/10/2012	1640	Atlantic Ocean, Bethany Beach, DE	4/12/2012	1640	Anchor Gillnet	sturgeon	Atlantic Ocean, Bethany Beach, DE	Alive
4/13/2012	1050	Atlantic Ocean, Bethany Beach, DE	9/26/2012	1086	Anchor Gillnet	sturgeon	Marcus Hook anchorage, DE	Alive
4/17/2012	1910	Atlantic Ocean, Bethany Beach, DE	4/18/2012	1910	Anchor Gillnet	sturgeon	Atlantic Ocean, Bethany Beach, DE	Alive
4/28/2012	1720	Atlantic Ocean, Bethany Beach, DE	9/20/2012	1750	Anchor Gillnet	sturgeon	James R., Presquile NWR, VA	Alive

TABLE 5. Annual catch rates of juvenile Atlantic sturgeon taken in the lower Delaware River from 1991 to 2011 by the Delaware Division of Fish and Wildlife.

Year	No. Taken	Days Sampled	Net Hours	N/hr
1991	565	26	17.5	32.2
1992	501	26	29.5	17.0
1993	222	24	26.2	8.0
1994	220	26	21.6	10.2
1995	111	18	21.6	5.1
1996	43	14	17.5	2.5
1997	57	17	17.2	3.2
1998	14	13	10.3	1.4
2001	27	14	15.5	1.7
2004	31	21	19.1	1.6
2007	42	22	22.6	1.9
2008	9	11	11.3	0.8

[1]In 2008, additional sites at Marcus Hook (rkm 127) and Bombay Hook (rkm 63) were utilized. Marcus Hook sampling was based on anticipated summer site fidelity from the 2007 manual tracking results. Manual tracking of individuals prior to setting the net was also used to adjust the location and orientation of the net set to provide a gear efficiency advantage.

[2]Additional sites as well as exclusive use of small mesh (5.1 and 7.6 cm stretch) were utilized to target age-0,1,2 Atlantic sturgeon

Due to changes in sampling methods and locations the 2008 – 2011 CPUE below should be considered separately from the 1991-2008 CPUE above when drawing conclusions about Delaware Estuary juvenile population trends. The 2008 CPUE above only includes sampling days in similar locations with similar methods and can be used for trend comparison purposes with CPUE from 1991 to 2007.

Year	No. Taken	Days Sampled	Net Hours	N/hr
2008[1]	134	18	21.1	6.3
2009[2]	55	28	31.5	1.8
2010[2]	11	13	13.5	0.8
2011[2]	54	17	15.1	3.6
2012[2]	3	8	9.9	0.3

TABLE 6. Number of Atlantic sturgeon taken by the Delaware Division of Fish and Wildlife trawl survey in the lower Delaware River and Delaware Bay from 1990-2012.

Year	30-ft Trawl	16-ft Trawl
1990	3	1
1991	1	0
1992	0	0
1993	0	1
1994	1	0
1995	2	1
1996	3	0
1997	0	0
1998	0	0
1999	1	0
2000	2	0
2001	1	0
2002	0	0
2003	0	0
2004	0	0
2005	0	0
2006	1	1
2007	0	0
2008	1	0
2009	0	0
2010	0	1
2011	8	1
2012	2	0
Total	26	6

FIGURE 1. Adult sized sturgeon (2070 mm TL), recovered at Dobbinsville, DE on May 15th, 2012 (top panel). This carcass was fresh and 3 blunt force trauma injury sites that can be seen on the lateral side (panel lower left), the caudal peduncle (lower right) and the head. Autopsy revealed that the sturgeon was an adult male. Vessel strike was determined to be the likely cause of death.

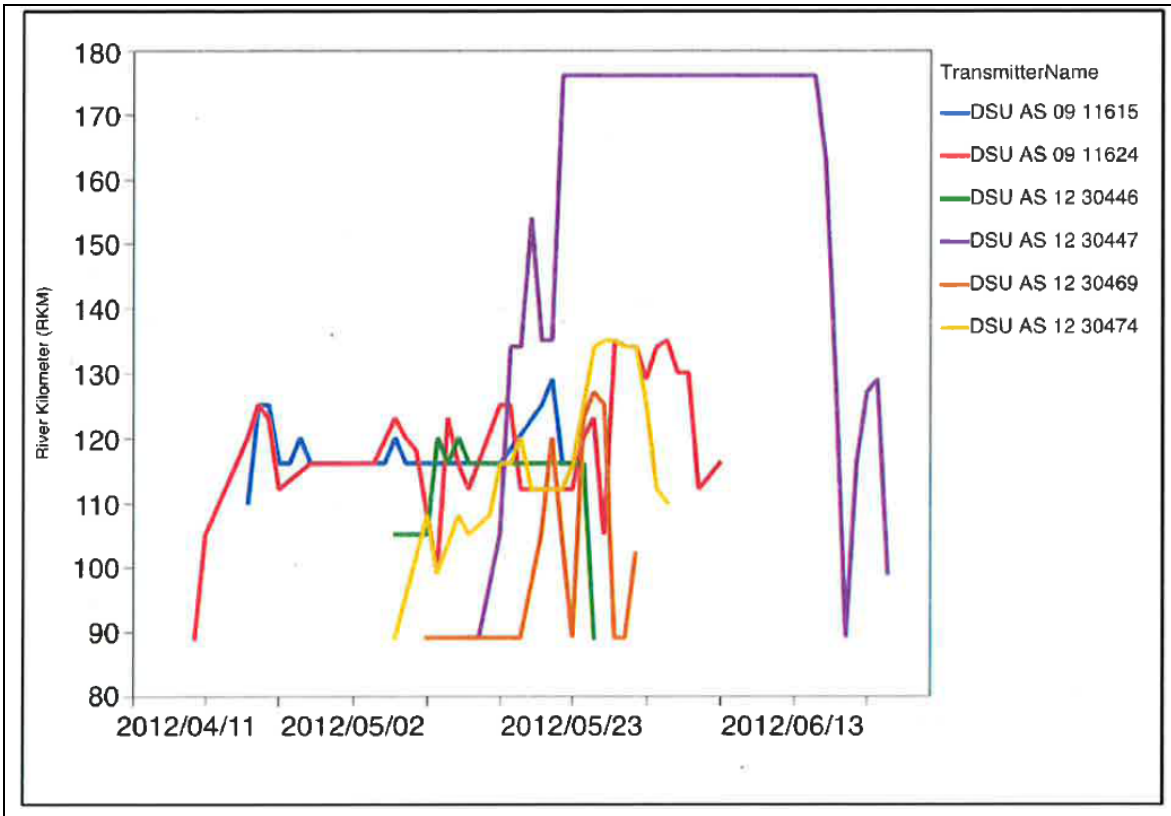

Figure 2. Daily mode location of individual adult Atlantic sturgeon by river kilometer during the likely period of spawning in 2012.

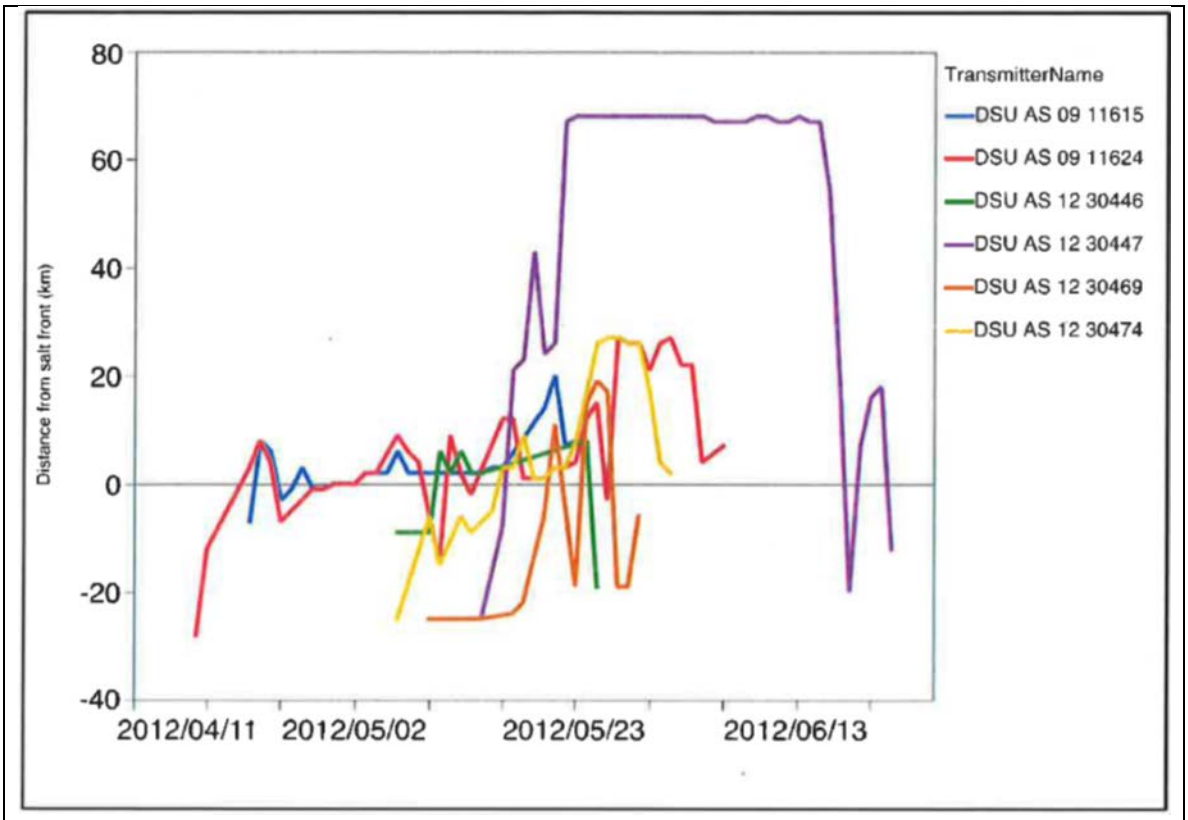

Figure 3. Daily mode location of adult Atlantic sturgeon in comparison to the salt front during the likely period of spawning in 2012.

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Maryland 2013 Atlantic sturgeon *Acipenser oxyrinchus* compliance report

Submitted to
Atlantic States Marine Fisheries Commission

Reporting period through December 31, 2012 unless otherwise noted

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Introduction:

Atlantic sturgeon (*Acipenser oxyrinchus*) were an important species to early settlers throughout the Chesapeake Bay region. High exploitation rates during the late 1800s and the building of stream blockages significantly reduced the Atlantic sturgeon population in the Chesapeake Bay. By 1928, Atlantic sturgeon were rarely caught north of the Potomac River (Merritt 1992). The Atlantic sturgeon fishery in Maryland waters was closed in 1994. Speir and O'Connell (1996) reviewed Maryland research records and concluded that the stock was not adequate to sustain meaningful reproduction. Atlantic sturgeon were considered biologically extirpated, or below minimum viable population size in the Chesapeake Bay by the late 1990s (Secor et al. 2000).

A joint Maryland Department of Natural Resources (DNR), University of Maryland, and U.S. Fish and Wildlife Service (USFWS) Atlantic sturgeon stocking project conducted in 1996 (Secor et al. 2000) and a subsequent Maryland Sturgeon Reward Program (Welsh et al. 1999) have provided important information on Atlantic sturgeon movement, distribution, growth, habitat, bycatch, feasibility of restoration stocking and survivability in commercial gear. The stocking project placed 3,275 marked, hatchery-origin juveniles into the Nanticoke River.

DNR maintains a captive brood stock population that could be utilized to conduct future hatchery-based restoration under the guidance of an approved recovery plan for Maryland. In addition to providing a future source of eggs and larvae, these fish are a valuable research tool and used to investigate gamete maturation, spawning physiology, sex identification, fish health and pathology, gamete cryopreservation, population genetics, nutrition, culture, and marking techniques. Surplus fish provide excellent outreach and education opportunities.

Federal Endangered Species Act (ESA) Listing:

The Maryland Sturgeon Reward Program was terminated on February 16, 2012 due to the designation of Chesapeake Bay Atlantic sturgeon as endangered. The National Marine Fisheries Service (NMFS) listed Atlantic sturgeon in five Distinct Population Segments (DPS). Four of the DPS were designated as endangered and the Gulf of Maine was designated as threatened. The listing occurred on February 6, 2012 and took effect on April 6, 2012. The listing status required the DNR hatchery program to suspend all ongoing conservation activities associated with the reward program and captive brood stock. The listing secures all fish in captivity (not to be restocked), and requires a permit to handle additional wild sturgeon. Wild stock held at the time of listing is to be maintained with only normal fish husbandry and fish health care. Canadian-origin hatchery stock is not subject to regulation by the ESA.

Bycatch Monitoring:

Maryland's commercial sturgeon fishery was closed in 1994. As recently as 1993, more than 5,000 pounds were reported landed in state waters. DNR conducts several fishery dependent and fishery independent surveys that provide the opportunity to observe live or dead sturgeon encountered as bycatch (Table 1).

On April 6th 2012, NMFS listed four of the five Atlantic sturgeon DPS as endangered under the federal ESA. DPS from the New York Bight, Chesapeake Bay, Carolina, and South Atlantic were all determined to be endangered status. Only the Gulf of Maine DPS was listed as threatened. The Maryland Sturgeon Reward Program was terminated February 16, 2012.

Maryland watermen voluntarily reported their live catches of sturgeon (1996-February 2012) to the USFWS Maryland Fishery Resources Office (USFWS-MFRO), who responded to measure, tag and release these fish. At the time of program termination, a $50.00 reward was offered for each live sturgeon (<1.828 m TL) turned into the program. A $250.00 reward was offered for any live Atlantic sturgeon measuring more than 1.828 m TL (six feet). Atlantic sturgeon larger than 1.828 m TL are presumed to be mature adults. The additional reward was offered to increase reporting for spawning stock assessment. During this seventeen-year period (1996-2012), Maryland watermen reported 2,282 live Atlantic sturgeon caught in commercial gear (567 hatchery-origin, 1,715 wild fish). Of the 567 hatchery fish reported recaptured, 463 were captured once (14% recapture rate), 79 were captured twice, 23 were captured three times and two fish were captured four times. All fish are tagged with coast-wide standardized PIT tags and an external T-bar tag prior to release.

Commercial pound nets, fyke nets and gill nets accounted for all but two of the sturgeon reported to the reward program as bycatch in Maryland. Figure 1 shows the annual reports of Atlantic sturgeon in the Maryland portion of the Chesapeake Bay from pound nets and gill nets over time. CPUE of Atlantic sturgeon reported through the reward program was estimated for pound nets and is equal to the annual catch divided by the annual summation of the number of pound nets set per month. CPUE for gill nets is equal to the annual number of Atlantic sturgeon reported through the reward program divided by the number of annual gill net license holders reporting catch of any species in Maryland (Figure 2). Data for 2012 is not included since the reward program was terminated early in the year.

DNR also conducts a monthly observer program in the Atlantic Ocean where onboard DNR biologists subsample the catch of the trawl fishery. The number of Atlantic sturgeon observations is variable from year to year (Table 2). No CPUE from these data was estimated because sample size and gear were not standardized.

Maryland DNR conducts an annual striped bass spawning stock gill net survey throughout Maryand's portion of the Chesapeake Bay. This survey previously encountered 39 Atlantic sturgeon from 1982 through 1995, but none were observed again until 2012.

Monitoring results:

Reward Program

The Maryland Sturgeon Reward Program, which operated from 1996 through February 16, 2012, paid commercial fishermen for each live sturgeon reported to the program. Due to a record number of reported Atlantic sturgeon captures from October 2005 through May 2006, the reward level was reduced from $100.00 to $50.00 in October 2006. A $250.00 reward for larger fish (> 1.828 m TL) was instituted beginning December 1, 2007. Reward payments were maintained at this level through the termination of the program on February 16, 2012. The reward program was operational from October 1 through May 31 each year. Watermen contacted USFWS at 1-800-448-8322 to obtain a confirmation number prior to transporting any sturgeon. If the capture was outside of normal business hours (7:30-4:00 Monday-Friday), an alternative contact number was provided to the caller. Transport of Atlantic sturgeon without a confirmation number or scientific collection permit was prohibited. Participants were provided with handling instructions to ensure that fish were retained under conditions that minimized stress and injury.

Experimental hatchery stocking:

During the summer of 1996, 3,275 age one hatchery-origin Atlantic sturgeon were released in the Nanticoke River. These fish were produced at USFWS Northeast Fishery Center (USFWS-NFC) in Lamar, PA. During the fall of 1996, hatchery-produced Atlantic sturgeon were captured by commercial fishermen in the lower Nanticoke River as they moved into the Chesapeake Bay. They were caught throughout the Bay by winter of 1996. By the spring of 1997, these fish were dispersed throughout the main Bay and tributaries of Maryland and Virginia. Recaptures occurred in the Atlantic Ocean by October 1998, as they became ocean migrants. The long-term recapture reports within the Chesapeake Bay continued to decline due to ocean emigration and since 2002, only one hatchery reared Atlantic sturgeon has been reported (Figure 3). These fish are now at the age at which we could expect them to return to the Chesapeake Bay if they successfully imprinted to the stocking tributary. Since these fish were tagged with CWT, there is little chance that they will be identified by most sampling programs since the majority of researchers do not scan for CWT. The Maryland Sturgeon Reward Program did screen for CWT and PIT prior to tagging any captured sturgeon. There have been multiple reports of large, breaching sturgeon observed in the Nanticoke River over the past several years.

Monitoring of wild stock-Fishery dependent surveys:

There were 1,592 wild, first-time Atlantic sturgeon captures reported to the reward program from gill and pound nets between February 1996 and February 16, 2012. These fish ranged from 405 mm TL to 2,420 mm TL. No young-of-year (YOY) fish were reported during this time. Several mature adults have been reported but none of these captures were in spawning habitats. Therefore, no confirmation of spawning has been observed in Maryland waters since the start of the reward program.

A subsample of tissues collected from these fish was submitted to USFWS-NFC Population Ecology Branch (Richardson et al, 2007) for genetic analysis. Origin assignments were generated by Tim King, USGS (Table 3). This analysis indicated that the majority of the fish originated from the James River and Hudson River populations (46% and 39%, respectively). The reward program encountered fish that originated as far south as Georgia and as far north as Canada, indicating that Maryland's Chesapeake Bay waters serve as habitat for all coastal populations (Richardson et al. 2007).

Reward program reports from January 1, 2012 to February 16, 2012 totaled 12 fish captured in gill nets. Length ranged from 480-1397 mm TL. All but one fish were first time captures.
Capture reports for wild Atlantic sturgeon from all gears in the Chesapeake Bay are extremely variable from year to year (Figure 3). Length-frequencies of captured wild Atlantic sturgeon for selected years are presented in Figure 4. The reward program provided valuable information regarding Atlantic Sturgeon in the Chesapeake Bay and watermen participated in the reward program. However, since the ESA listing, Atlantic sturgeon are not permitted to be handled unless collectors are in possession of a specific NMFS permit.

An increase in the relative abundance of Atlantic sturgeon in 2005 and 2006 captured in pound nets and gill nets may be partially attributed to increased reporting rates by commercial fishermen due to a reward program reminder that was distributed to commercial watermen in January 2005 (Figure 2). In addition, the apparent increase in abundance of Atlantic sturgeon using the Chesapeake Bay as a nursery or staging area may be attributed to recruitment from the James River and Hudson River since origin assignment indicates that these tributaries are major

contributors to the Maryland migrant stock (85% combined). Migrant sub-adult Atlantic sturgeon appear in Maryland's portion of the Chesapeake Bay at approximately 500 mm TL and are subsequently captured in large numbers over a two-year period until they migrate back to the coastal population. The observed increase in relative abundance is therefore not indicative of increasing populations in Maryland. CPUE for captures from 2012 were not calculated, as the reward program was discontinued in February 2012.

Monitoring of Wild Stocks-Fishery independent surveys:

The Maryland DNR Striped Bass Project captured one juvenile Atlantic sturgeon on May 1, 2012 during a striped bass spawning stock gill net survey. This 996 mm TL fish was captured in the Potomac River at the mouth of Quantico Creek. Soak time in the 10" stretch mesh drift gill net was 54 minutes and the fish was released alive in excellent condition.

Habitat:

Spawning habitat

Since no wild YOY Atlantic sturgeon have been detected in the Maryland portion of the Chesapeake Bay by fishery dependent or fishery independent sampling, defining spawning habitat is difficult. Self-sustaining populations of Atlantic sturgeon did exist in Maryland prior to 1900. Historic landings records indicate that spawning populations existed in the Patuxent River, Potomac River, Choptank River, Nanticoke River and Pocomoke River (Secor 2002).

Spawning occurs in fresh or brackish waters of estuaries (Smith 1985) and presumably occurred historically in all major Chesapeake Bay tributaries (ASMFC 1998). One factor that may limit spawning in the Chesapeake Bay is the loss of hard substrate to sedimentation (Secor et al. 2000,

NMFS 1998). Secor also hypothesizes that increasing water temperatures and hypoxia will continue to restrict Atlantic sturgeon in the Chesapeake Bay (Secor and Niklitschek 2001).

Another limiting factor that affects spawning in some watersheds is stream blockages. The 1987 Chesapeake Bay Agreement committed to reopening access to historic habitat through fish passage and removal of blockages. The Fish Passage Workgroup of the Chesapeake Bay Program's Living Resources Subcommittee was charged with reopening blocked tributaries in Chesapeake Bay. Their ten-year goal was to reopen 1,357 miles of streams. That goal has since been increased to 2,807 miles for the Chesapeake Bay watershed. This is a cooperative effort between Virginia, Maryland, Pennsylvania and the District of Columbia. As of September 2013, 471 miles of Maryland streams have been reopened since 1988. (Jim Thompson DNR, pers. comm.). This was accomplished through the construction of fish passage facilities, dam removals and altering blockages with breeches or notches. The workgroup recently developed a new mapping tool to prioritize fish passage projects. The tool uses more than one dozen habitat and biological metrics to rank blockages across the entire Chesapeake Bay watershed. The tool can be accessed at http://maps.tnc.org/EROF_ChesapeakeFPP/ . There are currently no blockages to historic Atlantic sturgeon spawning habitat in Maryland since all remaining impediments to migration are upstream of the fall line.

YOY habitat

There has been no evidence of successful spawning in Maryland tributaries for at least 40 years and no mature adults have been observed during spawning season in spawning tributaries since the early 1970s. Therefore, it is unknown if Maryland tributaries will support successful larval survival, growth and dispersal. Presumably, increased sedimentation and hypoxia could limit the

available nursery habitat for larval sturgeon. Experimental stocking trials could provide this necessary assessment.

Juvenile habitat

Experimental stocking of yearling Atlantic sturgeon in the Nanticoke River demonstrated that there is sufficient available habitat to support that life stage within Maryland's Chesapeake Bay. Stocked fish exhibited excellent survival, dispersal and growth up to one year after stocking (Secor et al. 2000). These fish continued to appear in reward program collections as they moved out into the main stem Chesapeake Bay and eventually migrated to the coastal stocks over the following several years.

The reward program documented sub-adult sturgeon catches throughout Maryland waters from 1996 through 2012 (Figure 5). Multiple recaptures indicate good survival and growth (Maryland Sturgeon Reward Program data). This was a fishery dependent survey and data are influenced by gear location.

Annual capture data has provided information on Atlantic sturgeon distribution, growth and habitat utilization within the Chesapeake Bay. Based on data collected through the Maryland Sturgeon Reward Program and the experimental stocking trial in 1996, Maryland's Chesapeake Bay appears to provide adequate nursery habitat for yearling sturgeon and forage habitat for migratory sub-adults. Mature adults have also been documented in the main stem Chesapeake Bay. Further investigation into identification and assessment of available spawning habitat and larval nursery habitat is necessary to completely evaluate the potential for Atlantic sturgeon conservation in Maryland. Test releases of larval sturgeon could verify habitat availability in target tributaries.

Aquaculture:

DNR Fisheries Service sturgeon conservation partnership, in cooperation with NRG Energy (formerly GenOn Energy) and the University of Maryland, are currently rearing 221 sub-adult and adult Atlantic sturgeon at NRG Energy's Chalk Point Generating Station (Patuxent River), the University of Maryland's Center for Environmental Science Aquatic and Restoration Ecology Laboratory at Horn Point (AREL, Choptank River), and the Cooperative Oxford Laboratory (Tred Avon River). The purpose of the captive stock is to develop a genetically appropriate wild brood population and to continue culture, physiology and tagging research using hatchery-origin stock. These fish originated either as eggs purchased from Canada (Acadian Sturgeon & Caviar Co. St. John, NB Canada), hatchery progeny of Hudson River brood stock spawned at USFWS-NFC between 1992 and 1998 or wild migrants collected from the Chesapeake Bay. All research and restoration activities using wild-origin stock were suspended due to the ESA listing.

The wild-origin sturgeon are cultured for future use as captive brood stock. The domestic Hudson River origin sturgeon are cultured for research on reproductive physiology, cryopreservation and spawning techniques, and culture methodologies.

A small number of fertilized eggs and/or yolk sac larvae (~7,500) are imported each year from the Acadian Sturgeon and Caviar Company (St. John, New Brunswick, Canada) for research purposes. Research is primarily focused on improvement of culture techniques, larval and juvenile nutrition, marking and streamside culture to address imprinting issues. As these fish mature, they are also useful to investigate recirculating aquaculture system designs, fish health, reproductive physiology and adult nutrition. Surplus fish are utilized in education and outreach activities. These fish are

tracked through a chain of custody procedure according to a plan presented to the ASMFC Atlantic Sturgeon Technical Committee and will not be released into surface waters. Canadian-origin sturgeon are currently housed at AREL, Chalk Point, and Cooperative Oxford Laboratory.

A summary of current sturgeon inventories is included in Table 4. Fish culture and husbandry methodologies are based on those described by Mohler (2004). All Atlantic sturgeon of suitable size are PIT tagged for individual identification and tissue samples from wild fish are archived for genetic analyses. Captive brood stock or any other sturgeon products are not subject to sale.

Facility descriptions:

NRG Energy Potomac River Generating Station (Alexandria, Virginia) cultured sturgeon in flow-through culture tanks. All larval tank outflows were securely screened with 100-micron mesh and juvenile culture tanks were fitted with double standpipes to prevent escapement. Discharge was to the power plant screen house intake. This facility was used to address stream fidelity concerns if a restoration stocking effort was implemented. The coal fired power plant was decommissioned in 2012 and the culture facility closed soon after.

The NRG Energy Chalk Point Generating Station Aquaculture Center is located on the Patuxent River in Aquasco, Maryland. It consists of an intensive culture building, containing flow-through culture tanks 6.1 m in diameter and earthen holding ponds with no drains or catch boxes. There is no filtration other than screened intakes. In a catastrophic event, ponds would overflow into a cooling channel, which is blocked off by netting.

AREL is located on the Choptank River in Cambridge, Maryland. This facility cultures Atlantic sturgeon in indoor culture tanks (2.4-3.7 m diameter) for training to commercial diets. Tanks can operate on either flow-through or recirculating supply. Discharge from this facility is strictly controlled and includes screens, filters and chemical treatment. Some sturgeon are also cultured in lined, earthen ponds. These ponds have no direct discharge to surface waters.

DNR's Manning Hatchery (Brandywine, Maryland) consists of indoor tank-culture facilities and earthen ponds with catch boxes and drains. Currently, sturgeon are not regularly cultured in ponds. Tanks range from 2.4-6.7 m in diameter. Water supply can operate under either recirculating or flow-through conditions. This facility discharges into a drainage pipe/ditch system so there is no direct discharge to surface waters. All outflows are screened to prevent escapement. Earthen ponds are used to hold excess sturgeon intermittently. Outflow is securely screened and ultimately flows to a drainage ditch so there is no direct discharge to surface waters. There are no sturgeon currently housed at Manning Hatchery.

Cooperative Oxford Laboratory (COL, Oxford, Maryland) is a research laboratory that is jointly operated by Maryland DNR and National Oceanic and Atmospheric Administration. All culture tanks on site are supplied by flow-through river water. All tank outflows are securely screened and no escapement is possible through the external standpipe drain system. Drains empty into a tidal settling pond, which drains to the Choptank River. No fish are cultured in ponds.

To date, no escapement has been documented at any facility dating back to the inception of the project in 1996.

There are currently no certifications or authorizations relating to the health of the captive broodstock. Captive fish usually experience some parasite infestations of *Argulus sp* ("fish lice" or "sea lice") during summer high water temperatures. A variety of isolated health ailments have been documented over the duration of the project including parasites, bacterial infections, and fungal infections.

Current funding is from the DNR Fisheries Service operating budget and in-kind contributions from NRG Energy.

Disposition of surplus Canadian-origin juveniles

Surplus Canadian-origin hatchery fish are provided to any suitable facility for research, outreach or education purposes. Participating institutions include universities, school programs, environmental educators, and other state and federal agencies. DNR maintains a permit system to evaluate applicants and maintain written records for sturgeon transfers. The applicant must demonstrate suitable experience and facility resources in order to culture sturgeon for an extended time period. They must also agree not to release any fish into surface waters. Applicants agree to obtain required permits from state and federal regulatory agencies and will not transfer fish without written approval from DNR. All fish are tagged with PIT for permanent identification and records are maintained by Chuck Stence (DNR, 410.643.6788 x2114) in Stevensville, MD.

Transfers of surplus fish have been of great benefit to researchers and educators and serve to raise the profile of Atlantic sturgeon and promote stewardship for the resource. There are currently nine institutions participating in the program and they care for 250 animals as of December 2012 (2005-

11 year classes). A “sturgeon in schools” classroom program was terminated in 2011, which resulted in a decrease from 37 participating institutions.

Spawning and experimental stocking rationale

Captive brood stock should ultimately produce progeny that could be utilized in stocking trials. Proposed experimental stocking is one component of a larger sturgeon conservation project conducted by DNR, USFWS, the University of Maryland and NRG Energy. The overall goal of the conservation effort is to support spawning populations of Atlantic sturgeon in Maryland’s Chesapeake Bay tributaries. Experimental stocking is one strategy that could be employed to produce several outputs and outcomes.

The intended objective of captive Atlantic sturgeon spawning and experimental stocking is to monitor survival, growth and movement of stocked fish. Successful spawning and subsequent experimental stocking could produce important benefits including:

1. Further refine culture techniques
2. Assess efficacy of cryopreserved Atlantic sturgeon sperm
3. Evaluate marking techniques
4. Estimate survival and juvenile abundance of stocked sturgeon
5. Investigate imprinting and stream fidelity
6. Develop streamside culture facilities
7. Assess target tributaries and related habitat suitability

Experimental stocking is an objective of our conservation effort and would evaluate several aspects of the project. Stocking trials would utilize the guidance documents from the Atlantic States Marine Fisheries Commission Guidelines for Stocking Cultured Atlantic Sturgeon for Supplementation or Reintroduction (ASMFC).

A summary of a proposed experimental stocking plan was presented to the ASMFC Atlantic Sturgeon Technical Meeting in Manchester, New Hampshire on July 25, 2007. DNR solicited peer review from committee members on the proposed experimental stocking project in the event that a spawning opportunity arises. If such an opportunity does occur, we would seek approval for experimental stocking with the support of the Technical Committee and NMFS.

Streamside culture

Genetic analysis indicates low gene flow from riverine sub-populations (Wirgin et al. 2000; King et al. 2001) strongly suggesting that Atlantic sturgeon return to their river of origin to spawn. The mechanism of imprinting and homing in Atlantic sturgeon is undetermined. In order to address imprinting concerns, fish cultured streamside to the target tributary could be a valuable restoration technique. If chemical imprinting is the mechanism for stream fidelity, streamside culture should improve homing for fish stocked as juveniles since they will have been grown in water sourced from the target tributary. Experimental stocking trials could also provide some insight into the timing of imprinting. A cooperative fish culture facility at the NRG Energy Potomac River Generating Station in Alexandria, Virginia has already been constructed for this purpose. This facility has successfully cultured yolk-sac larvae to juvenile size and successful grow out for a period of one year. NRG Energy committed funds through 2012 to continue the project, but the

facility was decommissioned in 2012. Technical problems such as episodic high sediment loading and high larval culture water temperatures were under investigation.

Conservation target tributaries

Potential target tributaries were being evaluated. Several factors dictate the decision process:

1. Historical records
2. Habitat and hydrology similar to other mid-Atlantic tributaries that currently support spawning populations of Atlantic sturgeon
3. Indications of shortnose sturgeon spawning
4. Feasibility to conduct appropriate monitoring
5. Ability to conduct streamside culture

Atlantic sturgeon historically spawned in the larger tributaries of the Chesapeake Bay (Secor et al. 2000, ASMFC 1998). At this time, the most likely suitable Maryland tributaries for targeted evaluation and conservation efforts are the Potomac River, Pocomoke River and Choptank River. Historical records indicate that these tributaries supported spawning populations of Atlantic sturgeon. Existing sampling programs, in addition to commercial fisheries, closely monitor these rivers. USFWS-MFRO tracked shortnose sturgeon in the Potomac River and mature fish have migrated to historical spawning sites during the spawning season. This could indicate potential spawning habitat, although no direct evidence of successful spawning activity (eggs or larvae) has been observed. Finally, DNR and NRG Energy Potomac River Generating Station collaborated on development of a streamside sturgeon culture facility at their Alexandria power plant. NRG Energy provided physical plant space and significant financial support to enable larval and juvenile

culture to take place utilizing water drawn directly from the Potomac River. The Choptank River and Pocomoke River have potential sites that would be appropriate for streamside culture facility construction. The NRG Energy Potomac River Generating Station was decommissioned from active service in 2012, but the previously developed technical process is readily transferrable to alternate culture sites.

Conservation

Research will continue with Canadian-origin hatchery fish in order to improve culture, spawning and marking techniques for Atlantic sturgeon. Captive brood stock will be maintained and a NMFS scientific research permit will be obtained in order to monitor reproductive maturity in the wild-origin stock. Funding for fishery independent surveys will be pursued to document the presence or absence of spawning populations in potential target tributaries. Identification of potential spawning and larval nursery habitat is also a research priority in Maryland.

2012 research

Spermiation trials-No spermiation trials were conducted in 2012.

Laparoscopic evaluations-No laparoscopic evaluations were conducted in 2012.

Sea lice infestation -Sea lice *Argulus sp*. are external parasites that infect a variety of freshwater fish species. Environmental conditions such as temperature change and high organic loading from feed may increase the incidence of external parasites. Captive sturgeon brood stock are cultured at the NRG Energy Chalk Point aquaculture facility in Aquasco, MD. Sturgeon are cultured in four

6.1 meter circular flow through tanks. River water is supplied and filtered by 100 micron screening installed on the water inlet. As water temperatures rise in June, *Argulus sp.* egg clusters begin to appear on the surfaces of the culture tanks. Most sturgeon are infected with *Argulus sp.* by mid July. Infestations cause substantial redness and inflammation of the integument. The subsequent lesions present a pathway for opportunistic pathogens to infect the captive populations. Stress and bacterial infection result in poor fish condition, morbidity and mortality. There are no chemicals currently labeled for use to eradicate sea lice on Atlantic sturgeon. Hydrogen peroxide and formalin are viable alternatives, however H_2O_2 becomes lethal to sturgeon when administered at water temperatures above 25˚C and formalin can have environmental impacts. Emamectin benzoate is potentially effective to treat sea lice and is the active ingredient in SLICE®. It was originally developed for the food crop industry but has been incorporated into the Investigational New Animal Drug (INAD) program. This joint program is operated by the U.S. Food & Drug Administration and the USFWS Aquatic Animal Drug Approval Partnership (AADAP) to collect data that supports label use approval for aquaculture drugs. SLICE® is top coated to fish feed. When ingested, SLICE® is incorporated in the tissues. The louse dies by paralysis resulting from the disruption of nerve impulses (USFWS Study Protocol INAD # 11-370). Emamectin benzoate is slowly metabolized by the sturgeon, resulting in an extended period of protection. SLICE® treatments are currently only authorized for use under the AADAP program but in the future, this extended protection could be used as a prophylactic treatment to eliminate these infestations.

In 2012, 101 individuals totaling 887 kg of sub-adult and adult sturgeon were treated for seven days with SLICE®. In previous years treated feed was offered only during the initial feeding of the day to ensure that SLICE® would be ingested. Results were mixed. Staff speculated that the fish may not be consuming all of the treated feed due to the extremely high water temperatures and

lack of observed feeding. To be certain that the fish were receiving treated feed, in 2012, SLICE® was incorporated into the entire ration for the day. Treatments in 2012 were very successful. Trial success could not be quantified, due to extremely high air and water temperatures and related stress to the animals. Each fish was examined at 28 days post-treatment and all of the fish appeared robust and in good health. Abdomen and fins were white with no observed redness or inflammation. Few *Argulus sp*. were still present on the sturgeon, even though post-treatment inspections revealed *Argulus sp*. egg clusters on many of the tank walls. Isolated *Argulus sp*. were also observed on a few of the fish. The absence of redness and swelling on these fish suggest that SLICE® is an effective treatment for *Argulus sp*. Photographs and a grading system will be integrated in the future to qualify the severity and subsequent recovery of infected sturgeon.

Captive feed training and environmental tolerance research-Cooperating AREL researchers performed feed training and captive brood stock development activities. They also conducted research trials to evaluate Atlantic sturgeon temperature tolerance and stress response. Their research report, Temperature tolerance of Atlantic sturgeon fry and juveniles using survival and glucose levels as a measure of stress (Lazur and Ryder 2012) is attached as Appendix I. This is an unpublished progress report to MD DNR. Request for a copy of the full report or questions regarding this research can be addressed to Erin Markin eryder@hpl.umces.edu or 410.221.8326.

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Table 1. Summary of statewide sampling programs that could potentially encounter Atlantic sturgeon. Sturgeon are observed frequently in the Maryland Sturgeon Reward Program. The Atlantic Ocean Observer Program and the Experimental gill net & pound net surveys are the only other programs that have encountered sturgeon. Observations from these surveys are variable among years and not common overall.

Area	Gear Type	Target Species	Years	Program Status	Atlantic Sturgeon Captured
Chesapeake Bay and Tributaries	Various commercial gear (Maryland Sturgeon Reward Program)	All commercial species	1996 - 2012	Terminated on February 16, 2012	Yes
Chesapeake Bay and Tributaries	Seine (MDNR Juvenile Finfish Survey)	Juvenile striped bass	1959-present	Ongoing	No
Chesapeake Bay	Bottom trawl (MDNR Blue Crab and Fisheries Service Surveys)	Blue crabs and juvenile finfish	1977-present	Ongoing	No
Conowingo Dam	Fish Lifts (Power company survey)	Anadromous species	1972-present	Ongoing	No
Chesapeake Bay and Tributaries	Experimental gill nets & pound nets (Conducted by MDNR)	Mature striped bass	1982-present	Ongoing	Yes
Atlantic Ocean	Various commercial gear (Observer program)	All commercial species	1995 - present	Ongoing	Yes

Table 2. Annual catch of Atlantic sturgeon as observed by Maryland Atlantic coast onboard observer program, 1995-2012.

Year	Number of Atlantic sturgeon Captured during the Observer Program
1995	1
1996	0
1997	2
1998	6
1999	1
2000	0
2001	0
2002	0
2003	0
2004	0
2005	27
2006	4
2007	7
2008	0
2009	0
2010	0
2011	1
2012	0

Table 3. Origin assignments for sub-adult Atlantic sturgeon collected from the Maryland Sturgeon Reward Program. A subsample (N=312) of archived tissue samples originally collected from 1997-2006 was analyzed for origin. Delaware River populations are not included in the baseline data due to low sample size for known origin fish from this tributary. Origin assignments were generated by Tim King, USGS.

Origin assignment population	N	Percent
St. John (New Brunswick, Canada)	5	1.6
Kennebec (Maine, USA)	8	2.6
Hudson (New York, USA)	121	38.8
James (Virginia Chesapeake Bay, USA)	142	45.5
Albermarle (North Carolina, USA)	4	1.3
Savannah (Georgia, USA)	23	7.4
Altamaha (Georgia, USA)	4	1.3
Ogeechee (Georgia, USA)	5	1.6

Table 4. Atlantic sturgeon inventories at three facilities cooperating with the Maryland DNR sturgeon conservation project. Facilities include University of Maryland Aquaculture and Restoration Ecology Laboratory (AREL, Cambridge, MD), NRG Chalk Point Generating Station (Aquasco, MD) and Cooperative Oxford Laboratory (COL, Oxford, MD). All fish are implanted with PIT tags as soon as they reach suitable size (approximately 6-9 months age). YC=year class, H=hatchery origin, W=wild origin.

Facility	YC	Num.	Mean weight (kg)	Origin	Source	Date of inventory
AREL tanks	2008	20	2.84	Canada	H	08/21/12
AREL tanks	2010	75	0.91	Canada	H	08/21/12
AREL tanks	2011	125	0.14	Canada	H	08/21/12
AREL tanks	2012	15	0.048	Canada	H	08/21/12
NRG Chalk Point	≤ 1998	13	23.67	Hudson	H	07/03/2013
NRG Chalk Point	2005	1	8.02	Canada	H	07/11/2013
NRG Chalk Point	2007	4	3.98	Canada	H	07/11/2013
NRG Chalk Point	2008	65	4.26	Canada	H	07/11/2013
NRG Chalk Point	Various	18	15.2	Chesapeake	W	07/03/2013
COL	2005	1	11.26	Canadian	H	08/19/2013
COL	2006	4	12.67	Canadian	H	08/19/2013
COL	Various	10	21.2	Chesapeake	W	08/19/2013

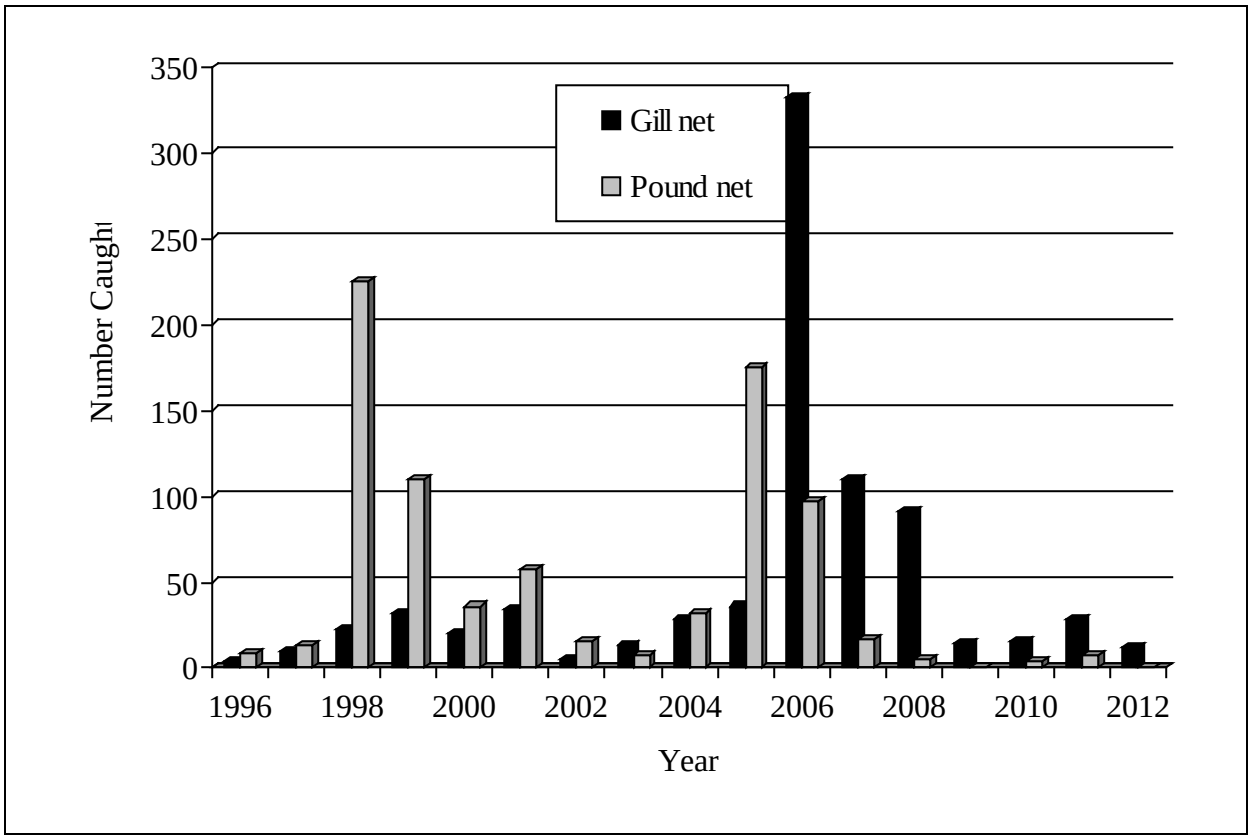

Figure 1. Annual number of Atlantic sturgeon captured by pound and gill nets as reported to the U.S. Fish and Wildlife Service, 1996-2012 during the Maryland Sturgeon Reward Program. This program was terminated February 16, 2012.

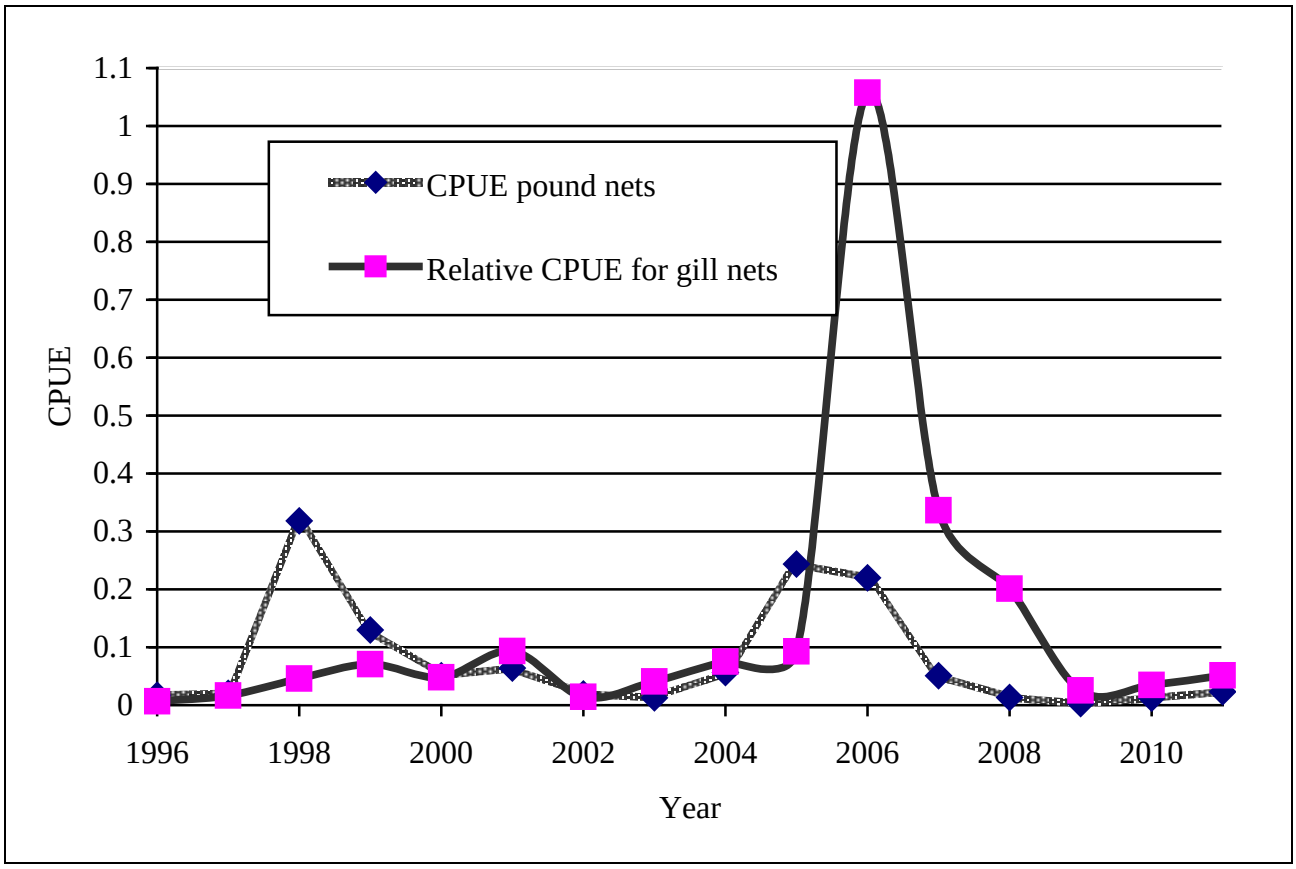

Figure 2. CPUE of pound and gill net Atlantic sturgeon captures from Maryland's portion of the Chesapeake Bay, 1996-2011. Pound net CPUE is the total number of sturgeon reported to the Maryland Sturgeon Reward Program from pound nets divided by the annual summation of the number of pound nets fished monthly in Maryland. CPUE for gill nets is equal to the annual number of Atlantic sturgeon reported from gill nets through the reward program divided by the number of annual gill net license holders reporting catch of any species in Maryland. CPUE for 2012 was not included because the reward program was terminated February 16, 2012.

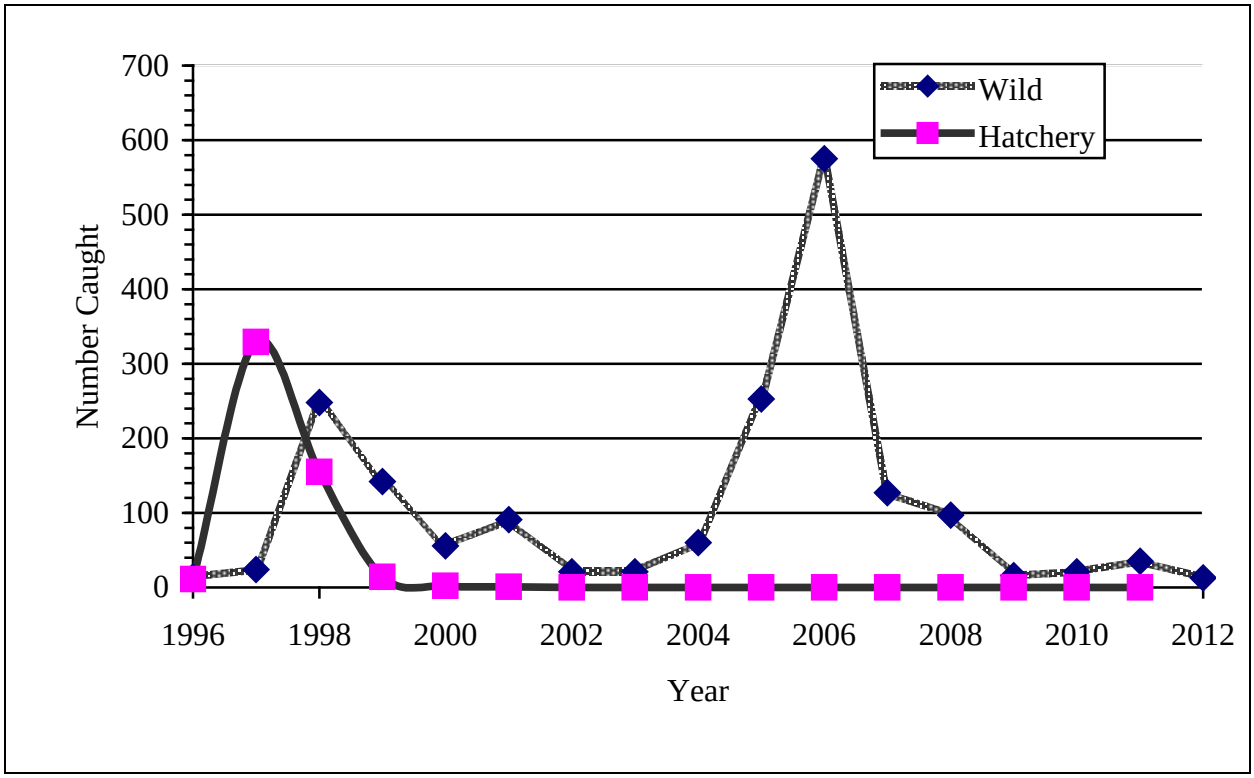

Figure 3. Total annual catch of hatchery and wild Atlantic sturgeon as reported to the U.S. Fish and Wildlife Service from the Maryland Sturgeon Reward Program, 1996-2012. The reward program was terminated February 16, 2012.

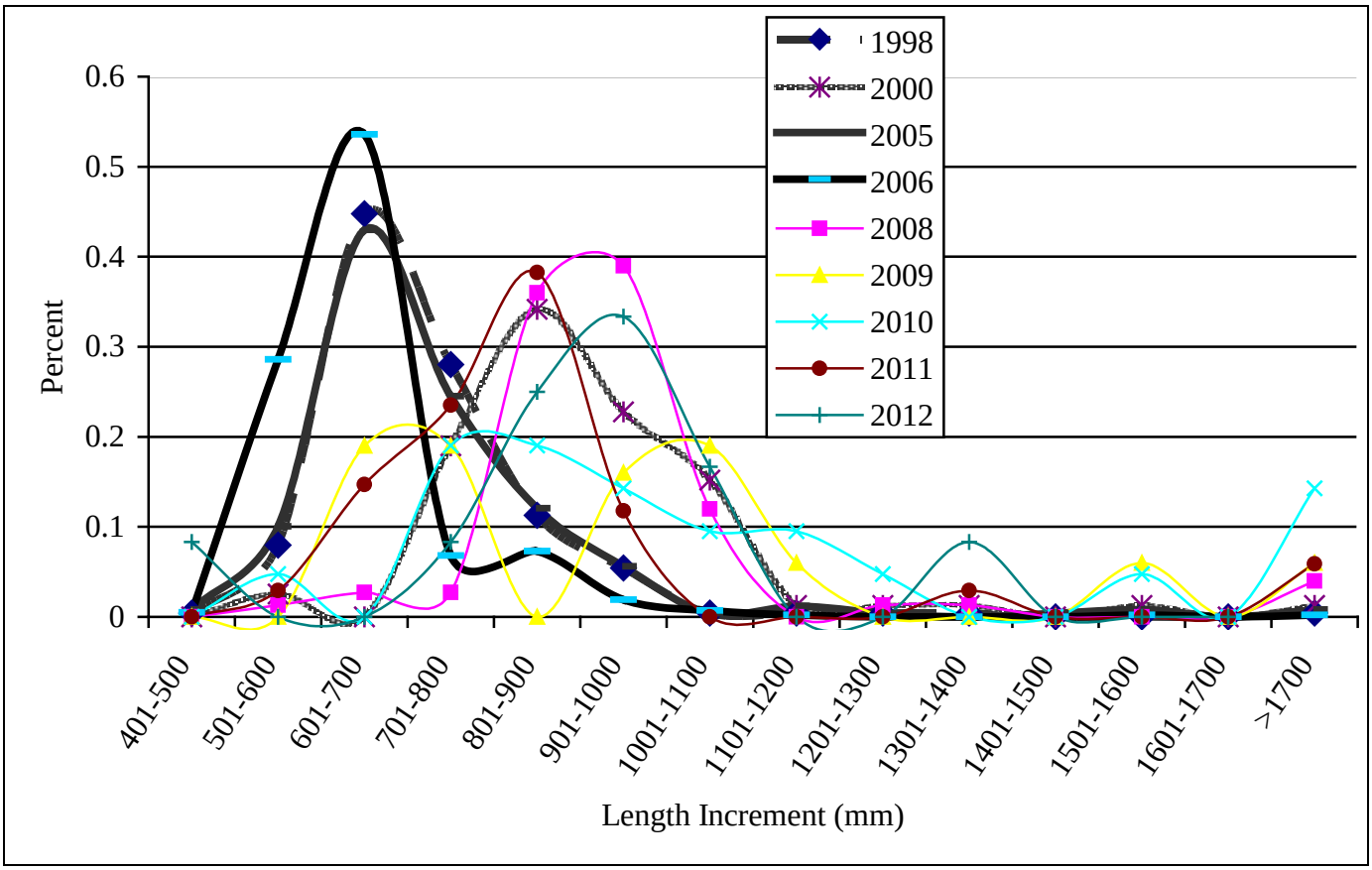

Figure 4. Length-frequencies of wild Atlantic sturgeon reported to the U.S. Fish and Wildlife Service for select years 1998, 2000, 2005, 2006, 2008-12.

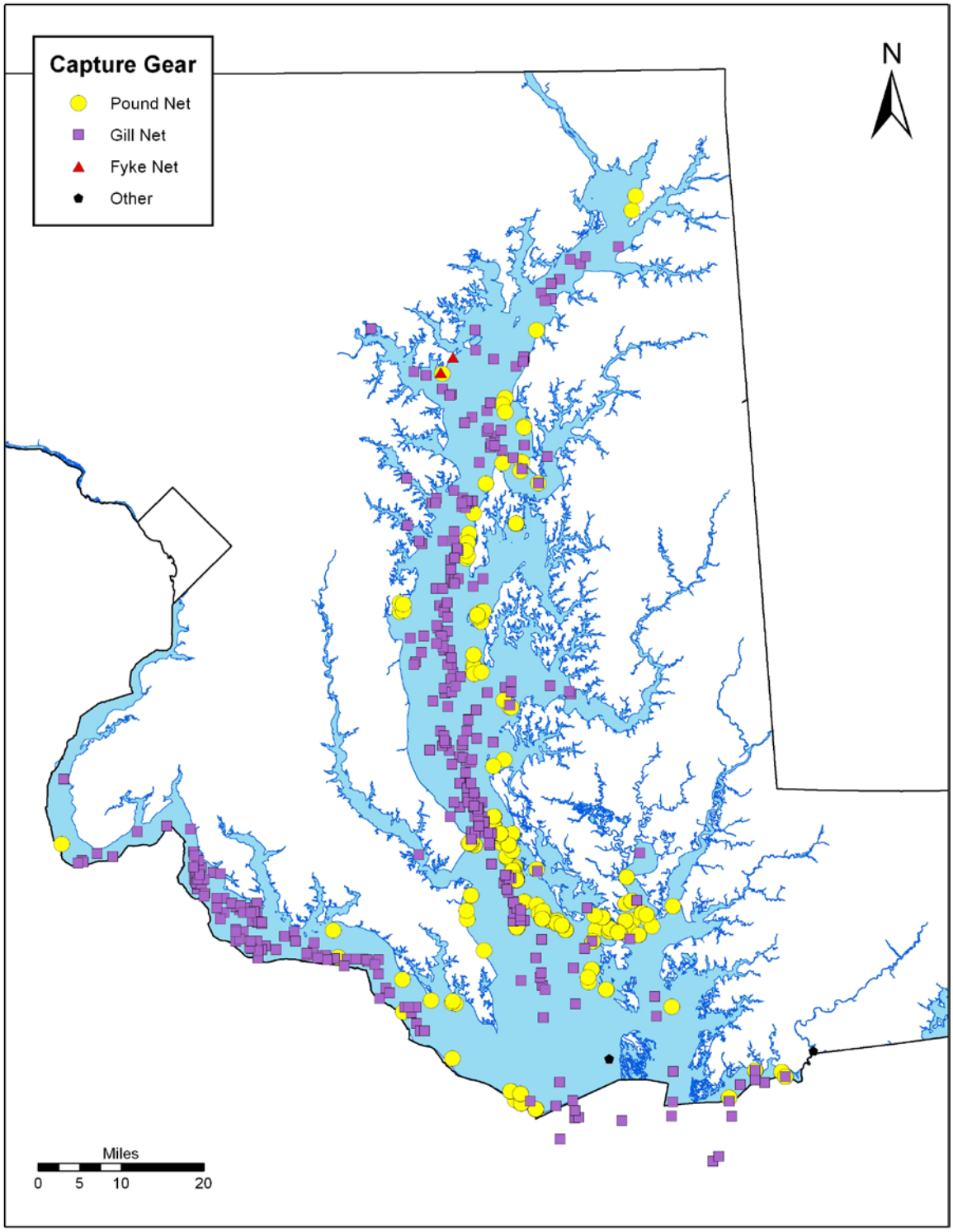

Figure 5. Atlantic sturgeon capture locations reported to the Maryland Sturgeon Reward program from 1996-2012 by gear type. Gear listed as "other" includes crab pots and eel pots. This fishery dependent survey is not a comprehensive indicator of sturgeon habitat preference use since the data is influenced by gear location.

Appendix I. 2012 UMCES-HPL Atlantic Sturgeon Research Final Report

Project Title: Continuation of broodstock development and feed training of Atlantic sturgeon. Temperature tolerance of Atlantic sturgeon fry and juveniles using survival and glucose levels as a measure of stress - subcontract to MD DNR Fisheries Service
Principal Investigators: Andrew Lazur (project leader), Erin Ryder, UM Ctr. for Environmental Science
Funding Agency: Maryland Department of Natural Resources
Project Start Date: January 2012 through March 2013

Introduction

With the possibility of rising water temperatures due to global warming, it is necessary to understand the effect increased temperatures could have on growth, survival and physiological stress of juvenile Atlantic sturgeon. Elevated temperatures can lead to thermal stress allowing fish to be more susceptible to changes in other parameters, such as decreased dissolved oxygen. Little work has been done on determining optimum temperatures for growth of larval and juvenile Atlantic sturgeon. Mohler (2004) reared larvae in 15-19°C, with higher growth rates observed by Kelly and Arnold (1999) at 19°C. In studies using green sturgeon, elevated and cycling temperatures in the 19-24.8°C range did not adversely affect juveniles and the bioenergetic performance was optimal between 15.8°C and 19.8°C (Mayfield and Cech 2004, Allen et al. 2006). Hardy and Litvak (2004) found that decreasing temperatures delayed yolk absorption, escape initiation (rapid movement of the body trunk), time to reach maximum size and time to 100% mortality for both shortnose sturgeon and Atlantic sturgeon. Beluga (*Huso huso*) juveniles reared in different temperatures showed water temperature affects some physiological fish processes, such as glucose concentration, hematocrit, and Ca^{2+} concentration (Zarejabad et al. 2010). Water temperature is a strong abiotic factor influencing biology of fishes and has an effect on chemical and biological processes of fishes (Zarejabad et al. 2010). Using 2010YC (2yrs old) and 2011YC (1yr old), we used hematological parameters to determine if stress was induced by rearing in elevated temperatures. Growth was also measured during the course of the study.

Objective and Methods

Feed Training and Broodstock Development

Atlantic sturgeon brought to HPL since 2003 by DNR personnel were kept as part of a captive broodstock at HPL. Due to the endangered species listing in 2012, no new fish were included as part of the captive broodstock in 2012. Fish were weighed to monitor weight loss/gain. In order to transition fish to commercial diet, sturgeon were fed shrimp followed by a transition diet consisting of natural and commercial feed. After acceptance to transition diet, commercial fish feed (Ziegler™) was offered.

Optimum Growth Habitats for Juveniles -

Two year classes (2010YC and 2011YC) of juvenile sturgeon (Canadian source) were subjected to elevated temperatures (20°C, 25°C and 30°C) for 6 months. Twenty-seven 2010YC sturgeon were stocked in nine 4' diameter tanks, three per tank. Twenty-seven 2011YC sturgeon were stocked in nine 2' diameter tanks, three per tank. Each temperature treatment contained nine 2010 and 2011YC sturgeon. Growth was measured initially and at the termination of the experiment. Table 1 shows average initial and final weights for each year class and treatment. Experiment was conducted in freshwater so Choptank River water would not be introduced to the system. Glucose levels, hemoglobin, hematocrit, and total proteins were measured after acclimation to freshwater and at the end of the experimental period. The acclimation period to freshwater, was over the course of three weeks. After initial blood samples were taken after acclimation to freshwater, temperatures in each treatment were increased 1°C per day until treatment temperature was reached – 2 days for 20°C, 5 days for 25°C and 10 days for 30°C. Temperatures were regulated using an YSI5200 Recirculating System Monitor (YSI Environmental, Yellow Springs, OH). All systems were recirculating. Fish were fed 1% body weight per day.

Blood samples were collected using a 22 gauge 1" PrecisionGlide® needle and 3mL syringe. Blood was then put into a 3mL BD Vacutainer® PST™ Gel and Lithium Heparin Tube. Whole blood was used to measure glucose, hematocrit and hemoglobin. Blood was then centrifuged at 10,000xg for 10 minutes and plasma was transferred to a vial. Plasma was used to analyze for total proteins using a WSI™ Portable Refractometer. A OneTouch® Ultra® 2 Blood Glucose Monitoring System and Ultra Test Strips were used to measure blood glucose (Evans et al. 2003). For hematocrit analysis, blood was collected in Micro-Hematocrit Capillary Tubes (Fisherbrand, Fisher Scientific) and centrifuged in an IEC Micro-MD centrifuge for 10 minutes. Hemoglobin was measured using a HemoCue® $Hb201^{+}$.

Statistical analysis was completed using SAS 9.2. One-way ANOVA was used to compare weight gain, initial blood parameters and final blood parameters between temperature treatments. A paired t-test was used to compare initial and final blood parameters within temperature treatments.

Results

Feed Training –

In 2012, there were 30 wild-caught Atlantic sturgeon being held at HPL. All fish transitioned to commercial diet during 2012 and are now on commercial diet (Zielger™). Table 2 shows status as of August 21, 2012. Only one fish did not train to commercial feed and perished. Two other fish jumped and perished. The cause of death for the fourth fish is unknown.

Optimum Growth Habitats for Juveniles -

There was no significant difference in weight gain between temperature treatments using 2010YC juvenile Atlantic sturgeon (age 2 years) however the amount of weight gained decreased as temperature increased - 20°C> 25°C>30°C (Fig. 1). For 2011YC juvenile Atlantic sturgeon (age 1 year) there was a significant difference between temperature treatments with weight gain higher in the 30°C treatment than both the 20°C and 25°C treatments ($p=0.0059$) (Figure. 2). After acclimation to freshwater and before increasing water temperature, blood samples were analyzed. Hemoglobin, hematocrit showed no significant difference between treatment groups in either year class at the start of the study (Fig. 3, Fig. 4, Fig. 5 and Fig. 6). There was no significant difference in final hemoglobin concentrations and hematocrit between treatments for 2010YC and 2011YC juvenile Atlantic sturgeon (Fig. 3, Fig. 4, Fig. 5, Fig. 6). For total proteins, there was a significant difference ($p=0.0093$) between the 20°C and 30°C treatments with final total protein concentrations being higher in the 30°C treatment ($p=0.0093$) however initial total protein concentrations were significantly different ($p=0.0004$) at the start of the study between these treatments (Fig. 7).

Within each temperature treatment there was no significant difference between initial and final hemoglobin or hematocrit concentrations for 2010YC juvenile Atlantic sturgeon (Fig. 3, Fig. 4). 2011YC juvenile Atlantic sturgeon in the 20°C treatment showed a significant decrease ($p=0.0049$) in hemoglobin concentrations from the initial sampling to the final sampling (Fig. 5). There was also a significant increase ($p=0.0390$) from initial to final concentrations of total proteins in the 20°C treatment for 2011YC juvenile Atlantic sturgeon (Fig. 8). There was no significant difference in 2011YC juvenile Atlantic sturgeon hemoglobin concentrations for 25° and 30°C (Fig. 5). There were no significant responses regarding hematocrit levels in all three temperature treatments (Fig. 6). There was no significance in total protein concentration changes for either the 25°C or 30°C treatments (Fig. 8). Glucose and total proteins concentrations for the 2010YC juvenile Atlantic sturgeon are summarized in Table 3. Since the glucose meter can only measure concentrations 20 mg/dL and above, some measurements resulted in readings <20 so the actual glucose value is unknown. Generally speaking, glucose values in the 20°C treatment increased from initial values. Glucose values in the 25°C treatment generally decreased from the initial values and values in the 30°C treatment also decreased. Total proteins increased from initial values in all three treatments. Glucose concentrations for the 2011YC juvenile Atlantic sturgeon are summarized in Table 4. Generally, glucose concentrations did not change much between initial and final samples.

Discussion

Unusually high or low temperatures, insufficient food or decrease in dissolved oxygen concentrations in water have adverse effect on the values of blood indices (Bahmani et al., 2001). Oxygen concentrations during this study were well above 6mg/L so should not have affected blood indices. Atlantic sturgeon were fed 1% body weight which should be an adequate feeding rate and not present nutritional stress. For this study,

temperature was manipulated and elevated to 30°C which can be stressful to sturgeon species (Mayfield & Cech, 2004; Allen et al, 2006; Ziegeweid et al. 2008). Reference ranges for glucose for hatchery-reared Atlantic sturgeon range from 0 to 28.83 mg/dL (Mark Matsche, personal communication), wild-caught shovelnose sturgeon range from 74.7-124 mg/dL (Sepulveda et al. 2012), wild-caught lake sturgeon were 33 mg/dL (Sepulveda et al. 2012) and hatchery-reared lake sturgeon were 36 mg/dL (Sepulveda et al. 2012). All sturgeon species where glucose values are available, the range is 12-124 mg/dL (Sepulveda et al. 2012). The 2-year old Atlantic sturgeon (2010YC) did not show a statistically significant response to elevated temperatures in regards to weight gain, hematocrit and hemoglobin. Glucose tended to increase in the 20°C treatment but concentrations decreased in the 25°C and 30°C treatments however it is unknown if the change from initial levels would be considered physiologically significant as little is known about the response Atlantic sturgeon have to stressors and how glucose may be affected. However, some individuals' glucose concentrations in this study had a 2-fold decrease from initial to final values. In a study where lake sturgeon were handled and captured in gill nets, blood-glucose levels almost doubled (Baker et al. 2008) which is different than the response we received where final glucose levels were half the initial values. We do not know if the difference in stressor – temperature vs. handling/capture – could result in this observed response of glucose levels or it could be a species specific response. Total protein concentrations for 2-year old Atlantic sturgeon in this study increased across all temperature treatment however it is unknown if the response is physiologically significant as the values are well within the range of other sturgeon species (Sepulveda et al. 2012).

In contrast to 2-year old sturgeon, 1-yr old Atlantic sturgeon (2011YC) showed a significant response in regards to weight gain, hemoglobin and total proteins and did not show a significant response in regards to hematocrit. A study using Beluga (*Huso huso*) juveniles (69.2±4.1 g) reared at three different temperatures (9-14°C, 15-20°C, 21-26°C) showed hemoglobin was not altered by different water temperatures nor was plasma glucose (Zarejabad et al. 2010) however 1-yr old fish (134g average weight) in our study showed hemoglobin concentrations were altered in 20°C water but glucose concentrations didn't tend to alter in our study. One-year and 2-year old *A. persicus* and *Huso huso* reared under artificial conditions had lower hemoglobin levels (1-yr: 46.6 g/L, 55.7 g/L,; 2-yr: 49.3 g/L, 49.9 g/L, *A. persicus* and *Huso huso* respectively) (Bahmani et al. 2001) than we saw with Atlantic sturgeon in our study showing blood indices may differ between sturgeon species. A decreased hemoglobin level may lead to a deteriorated oxygen supply in high temperatures (Zarejabad et al. 2010), however, hemoglobin levels at the elevated temperature treatments in this study were not elevated so fish were not compensating for low oxygen levels. The 20°C treatment had a statistically significant decrease in hemoglobin levels but oxygen levels were kept above 6 mg/L throughout the study so should not have led to a deteriorated oxygen supply especially since this was observed in our lowest temperature treatment.

This study showed that elevated temperatures can affect several blood indices and growth of Atlantic sturgeon. However, during the course of the study, sturgeon had to be replaced due to individuals jumping from the experimental tanks. Initial blood

samples for these fish were taken prior to stocking however fish were not acclimated before being stocked into treatments. Also, the recirculating systems failed on occasion resulting in temperature fluctuations. However, all sturgeon in the experiment were subjected to three months of uninterrupted temperatures held at their treatment. Final blood samples were collected at the end of the three-month period. The temperatures have may be dependent on age of the sturgeon, however this study was not designed to infer the role age may play in stress response. It does give us insight on the response of different aged Atlantic sturgeon to elevated temperatures. Future research will be conducted to better understand stress response of Atlantic sturgeon to temperature regimes – both elevated and decreased temperatures.

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Table 1. Initial and final weights (kg) of two year classes of Atlantic sturgeon used in temperature study.

	2010YC		2011YC	
Temperature	Weight (kg)_Initial	Weight (kg)_Final	Weight (kg)_Initial	Weight (kg)_Final
20°C	0.827	1.572	0.134	0.135
25°C	0.688	1.040	0.130	0.127
30°C	0.906	1.052	0.129	0.280

Table 2. Status of wild-caught Atlantic sturgeon held as part of a captive broodstock population.

Tank	PIT	starting weight	11/18/2011	3/22/2012	6/27/2012	8/21/2012	Status
ECT 1	1C2D60CF20	2.5	n/a	2.42	1.85	1.9	
ECT 1	1B796D8D08	3.23	n/a	2.76	2.24	2.01	Died 9/18/2
ECT 1	1B796D924B	2.61	n/a	2.31	2.25	2.3	
ECT 1	1C2D461901	2.13	n/a	1.91	1.7	1.83	
ECT 3	1BF1CE658C	3.22	n/a	2.8	2.43	2.265	
ECT 3	1BF1CE4D75	3.42	n/a	3.2	2.52		Died 8/12/1
ECT 3	1BF1CE4D79	4.46	n/a	4.0	3.64	3.57	
ECT 3	1BF1A1B8B1	4.13	n/a	3.77	3.25	3.2	
ECT 4	1C2D168358	1.4	1.78	2.1	2.41	2.33	
ECT 4	1C2D165539	2.06	3.5	4.33	4.25	3.745	
ECT 4	1C2D21E6A2	2.14	3.09	4.06	4.62	4.12	
ECT 4	1C2D1684AC	9.7	7.85	9.14	7.68		Died - jump
ECT 5	1BF1CE5235	1.45	1.17	1.47	2.17	1.875	
ECT 5	1C2D615114	1.465	1.16	1.43	1.78	1.735	
ECT 5	1C2D60CDF4	0.775	1.33	1.79	1.75	1.43	
ECT 5	1C2D60D009	1.75	1.52	1.97	2.71	2.445	
ECT 7	1BF1CEC1A7	3.475	n/a	3.25	2.53	2.28	
ECT 7	1BF1A18CF2	3.9	n/a	2.9	2.9	2.875	
ECT 7	1BF1CE41DA	2.035	n/a	1.66	1.75	1.85	
ECT 8	1BF1CE63C5	3.19	n/a	2.75	3.14	3.3	Died - jump
ECT 8	1BF1CE82EE	3.095	n/a	2.54	2.68	2.765	
ECT 8	1BF1CE640D	3.22	n/a	2.41	2.15	2.24	
ECT 8	1BF1A71831	3.44	n/a	2.92	2.47	2.33	
ST 1	1BF1A71745	32.45	31.86	32.81	37.6		
ST 1	1BF1CE730D	39.25	32.66	34.81	37.3		
ST 1	EC99	14.42	23.86	23.91	24.4		
ST 1	414D	24.56	29.66	26.51	26.4		
ST 1 moved from pd 2	424D2F7E79	4.25	15.1	17.5	21.4		
ST 1 moved from pd 3	424E5D7B2E	3.85	14.2	16.8	17.9		
ST 1 moved from pd 4	424D637E43	3.65	5.7	6.65	8.97		

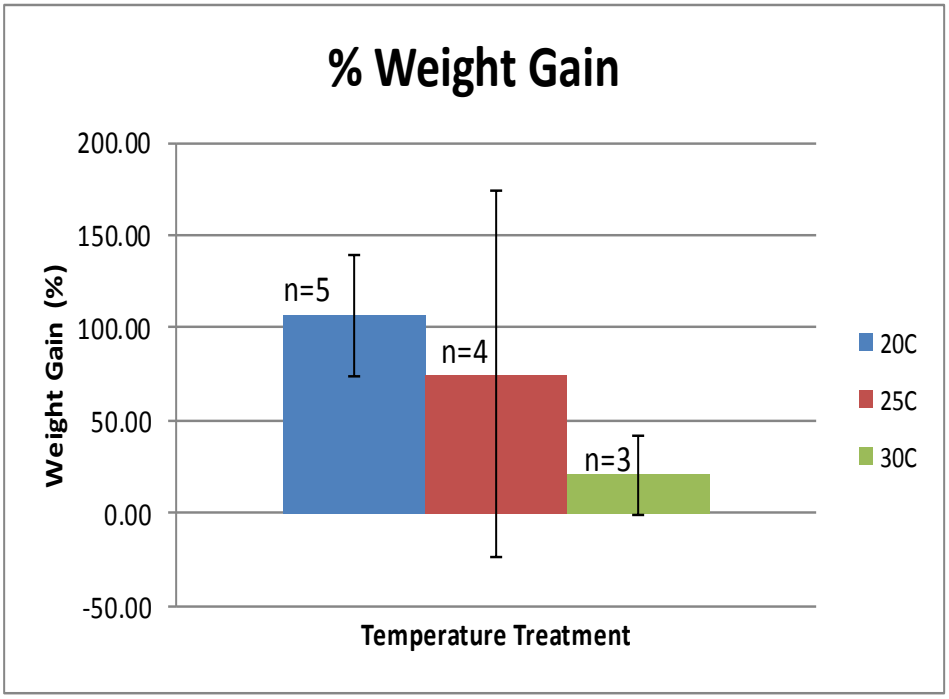

Figure 1. Percent weight gain of 2010YC juvenile Atlantic sturgeon (age 2 years) during temperature study. Bars indicate standard of deviation.

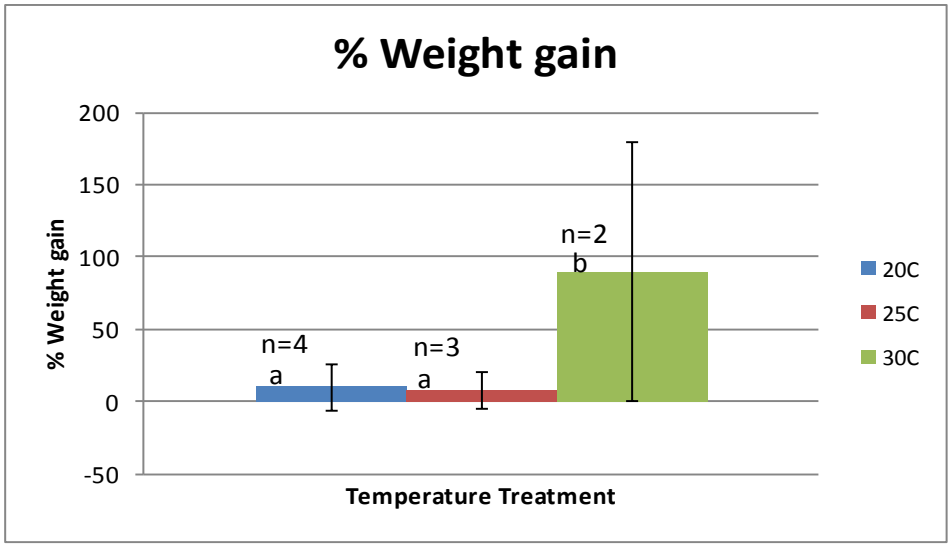

Figure 2. Percent weight gain of 2011YC juvenile Atlantic sturgeon (age 1 year) during temperature study. Bars indicate standard of deviation. Different letters denote significant difference ($p<0.05$).

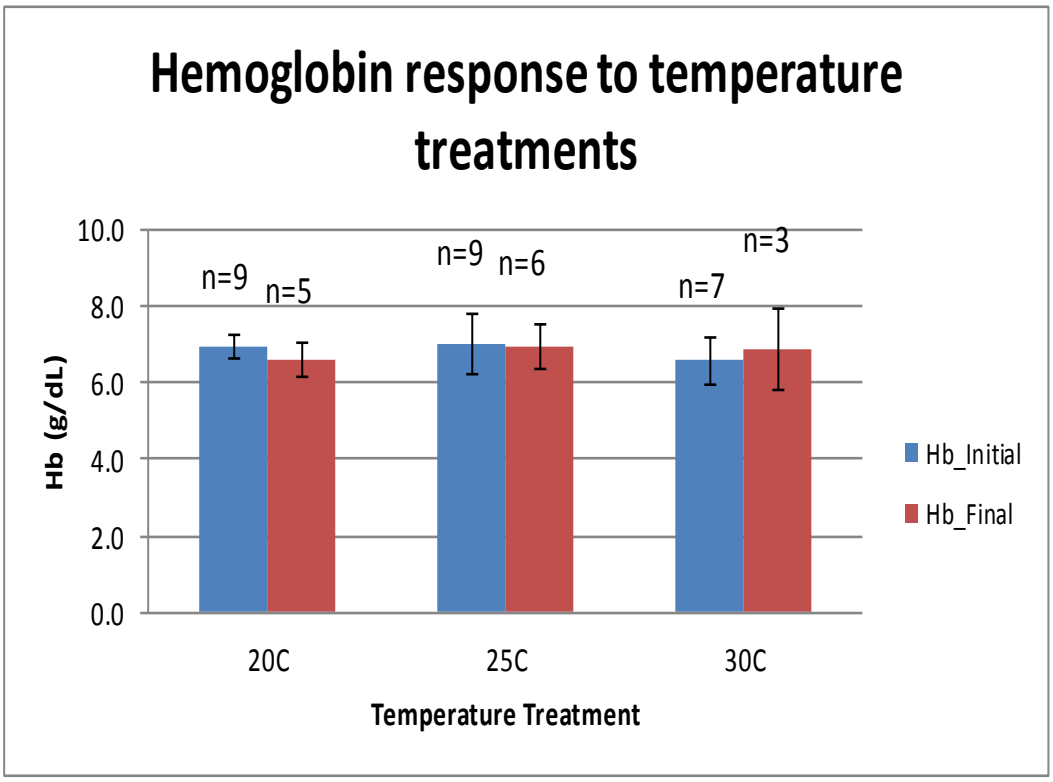

Figure 3. Hemoglobin concentrations of 2010YC juvenile Atlantic sturgeon (age 2 years) during temperature study. Initial concentrations represent baseline levels. Final concentrations were measured at the termination of the study. Bars indicate standard of deviation.

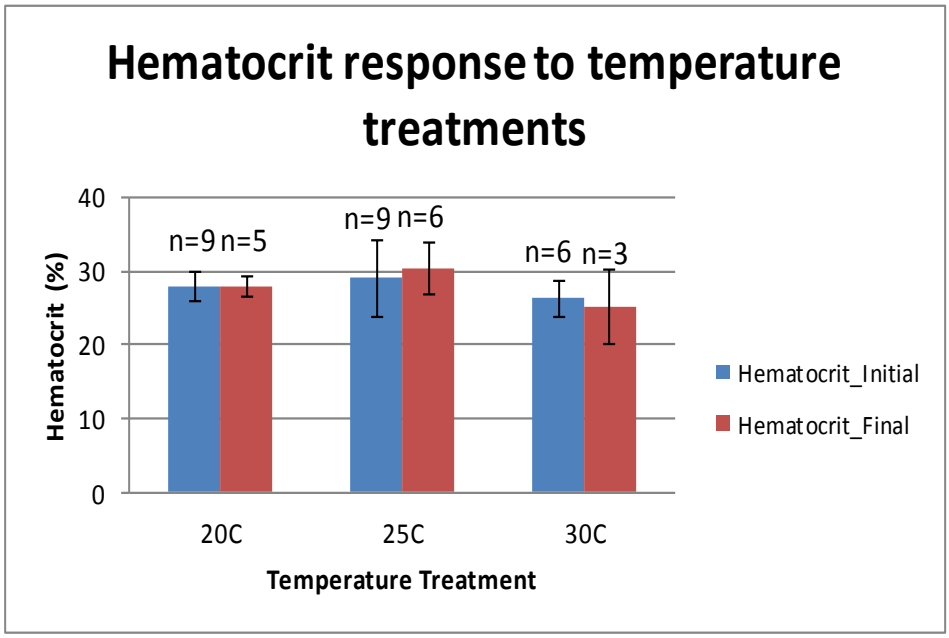

Figure 4. Hematocrit levels of 2010YC juvenile Atlantic sturgeon (age 2 years) during temperature study. Initial concentrations represent baseline levels. Final concentrations were measured at the termination of the study. Bars indicate standard of deviation.

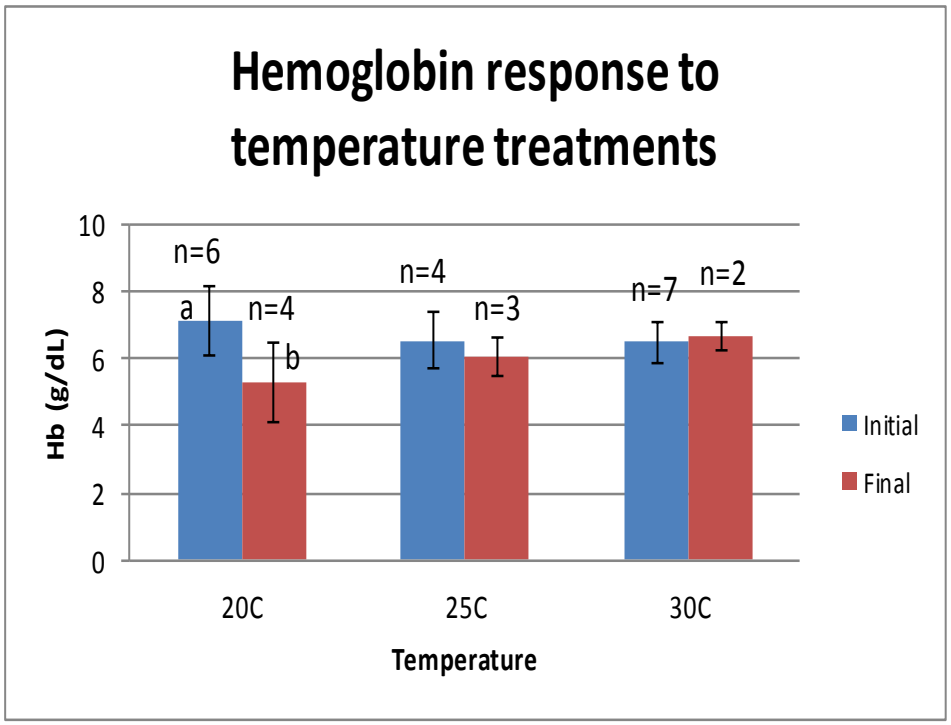

Figure 5. Hemoglobin concentrations of 2011YC juvenile Atlantic sturgeon (age 1 year) during temperature study. Initial concentrations represent baseline levels. Final concentrations were measured at the termination of the study. Bars indicate standard of deviation. Different letters denote significant difference ($p<0.05$).

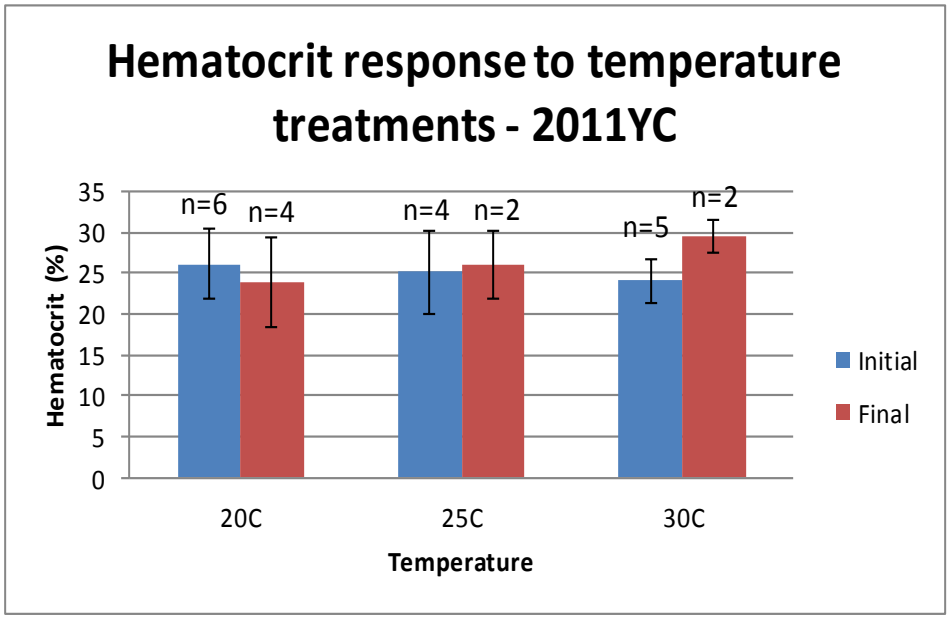

Figure 6. Hematocrit levels of 2011YC juvenile Atlantic sturgeon (age 1 year) during temperature study. Initial concentrations represent baseline levels. Final concentrations were measured at the termination of the study. Bars indicate standard of deviation.

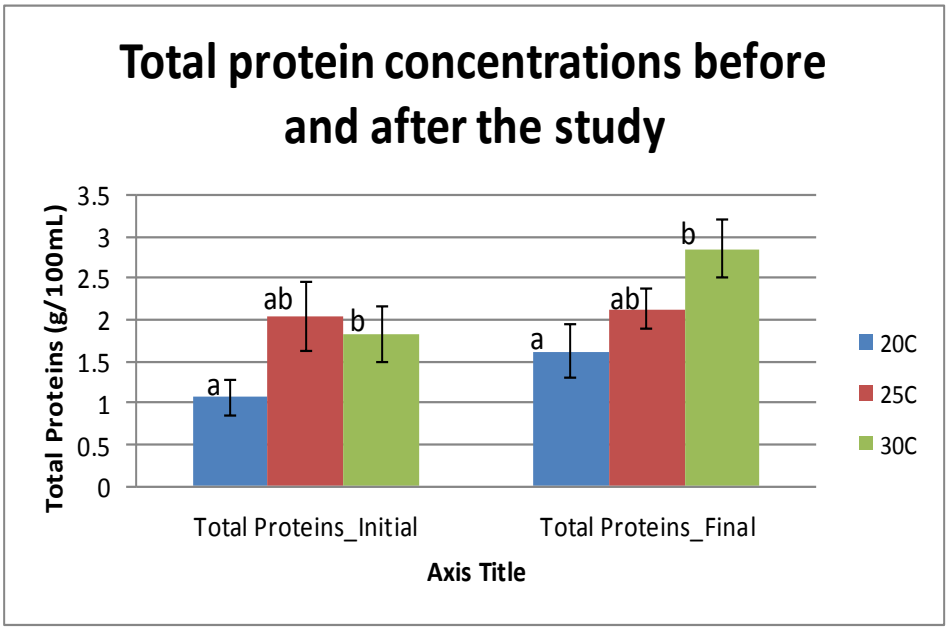

Figure 7. Total protein concentrations in 2011YC juvenile Atlantic sturgeon (age 1 year) during temperature study. Initial concentration represent baseline levels. Final concentrations were measured at the termination of the study. Bars indicate standard of deviation. Different letters denote significant difference ($p<0.05$).

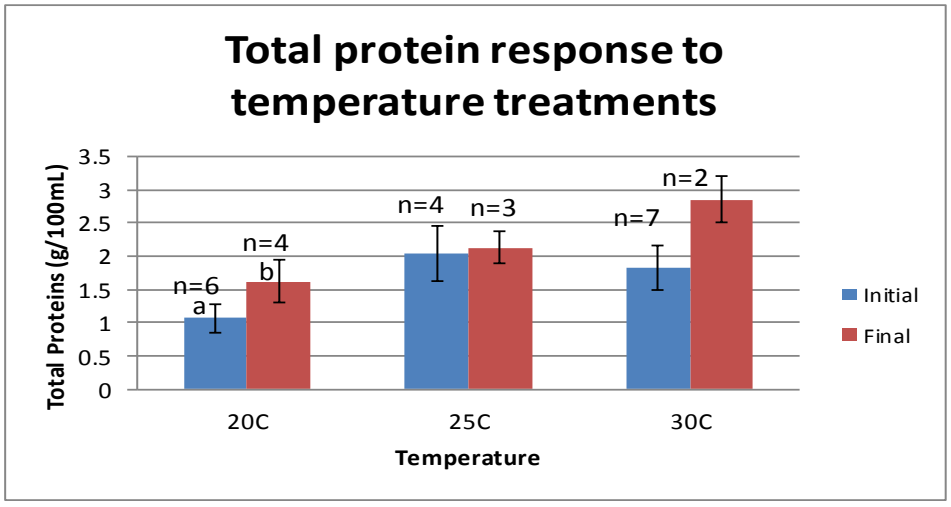

Figure 8. Total protein concentrations in 2011YC juvenile Atlantic sturgeon (age 1 year) during temperature study. Initial concentration represent baseline levels. Final concentrations were measured at the termination of the study. Bars indicate standard of deviation. Different letters denote significant difference ($p<0.05$).

Table 3. Glucose and total protein concentrations of individual juvenile Atlantic sturgeon (2010YC; 2 years old) during temperature study.

PIT#	Treatment	Glucose_Initial (mg/dL)	Glucose_Final (mg/dL)	Total Proteins_Initial (g/100mL)	Total Proteins_Final (g/100mL)
0B1D	20C	<20	<20		3.2
A797	20C	23	25		2.8
D6FE	20C	<20	24	2.6	3
DFD5	20C	21	27	2.2	3.6
1066	20C	23	31	<2	2.7
FEF4	20C	21	n/a	<2	n/a
2BF5	20C	20	n/a	2.2	n/a
144F	20C	<20	n/a	1.6	n/a
24DC	20C	25	n/a	2	n/a
C0F6	25C	37	n/a	2.4	n/a
1274A	25C	37	23	2	2.8
20E5	25C	<20	n/a	2.2	n/a
5624A	25C	27	<20	2.2	2.8
2373A	25C	<20	<20	2.4	3
5380A	25C	41	<20	2.4	2.6
D81F	25C	<20	28	<2	3.4
7111A	25C	30	n/a	2.2	n/a
61076	25C	27	<20	<2	2.9
21B0	30C	30	n/a	2.4	n/a
CDEC	30C	31	n/a	2.8	n/a
D090	30C	29	n/a	2.8	n/a
C40C	30C	25	n/a	2	n/a
2AFF	30C	33	<20	2.4	3
2B17	30C	25	<20	2	2.6
F07E	30C	28	<20	2.8	3.2

Table 4. Glucose concentrations of individual juvenile Atlantic sturgeon (2011YC; 1 year old) during temperature study.

PIT#	Treatment	Glucose_Initial (mg/dL)	Glucose_Final (mg/dL)
9270A	20C	<20	
2672A	20C	24	22
3615A	20C	<20	20
4623A	20C	<20	<20
6351A	20C	<20	<20
1695A	20C	<20	
5294A	25C	<20	<20
2597A	25C	<20	<20
5367A	25C	<20	<20
6267A	25C	<20	
1672A	30C	20	
5190A	30C	<20	
5185A	30C	<20	
1162A	30C	21	<20
4693A	30C	<20	
6564A	30C	21	<20
6496A	30C	<20	

DISTRICT OF COLUMBIA FISHERIES AND WILDLIFE MANAGEMENT DIVISION
2012 ANNUAL STATE COMPLIANCE REPORT FOR ATLANTIC STURGEON

Fisheries Research Branch

Introduction

In the District of Columbia the Potomac River historically supported a good population of Atlantic sturgeon. Due to habitat degradation and over-fishing this species has been nearly decimated from the waters in the District for well over 60 years. With evidence of a tagged sturgeon in D.C. waters as recently as the spring of 2005, interest in restoring the Atlantic sturgeon has peaked. Complying with the Atlantic Sturgeon Management Plan will create the potential for seeing the return of this magnificent fish to the Potomac River.

II. Request for *de minimis,* where applicable.

Not applicable.

III. Previous calendar year's fishery and management program

a. Activity and results of fishery-dependent monitoring (provide general results and references to technical documentation).

Not applicable since no commercial fishery for sturgeon exists in the District of Columbia

b. Activity and results of fishery-independent monitoring (provide general results and references to technical documentation).

There is no monitoring program specifically directed at the capture of sturgeon in the District, and none have been collected during any routine fishery sampling.

c. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

There are no commercial fisheries in the District, and there is currently a moratorium on the recreational catch or possession of sturgeon.

d. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available).

No commercial fishery for sturgeon exists in the District of Columbia, and we have no data on recreational by-catch.

e. Review of progress in implementing habitat recommendations.

There is no specific program in the District to modify or enhance Atlantic sturgeon habitat.

IV. Planned management programs for the current calendar year.

There are no planned management programs for sturgeon.

a. Summarize regulations that will be in effect. (Copy of current regulations if different from III c.

There is currently a moratorium on the recreational catch or possession of sturgeon in the District of Columbia.

b. Summarize monitoring programs that will be performed.

While there is no specific sampling targeted at sturgeon, the District's general anadromous and resident fish surveys will continue in 2013. Sampling methodologies for these surveys include electrofishing, seining, push-netting and gillnetting.

c. Highlight any changes from the previous year.

No change.

V. Plan specific requirements

a. Results of bycatch monitoring for Atlantic sturgeon in other fisheries as per Section 3.4 of the FMP.

No commercial fishery for sturgeon exists in the District of Columbia, and we have no data on recreational bycatch.

b. Monitoring results (tagging, five-year juvenile abundance index studies).

There is no monitoring program specifically directed at the capture of sturgeon in the District, and none have been collected during any routine fishery sampling.

c. Habitat status (restoration efforts, FERC relicensing studies, etc.), in accordance with the recommendations in Sections 4.1.1, 4.1.2, and 4.1.4.

There is no specific program in the District to modify or enhance Atlantic sturgeon habitat.

d. Aquaculture operations authorized, status of regulations, disease-free certification status, stocking.

Currently the District of Columbia has no aquaculture operations directed at sturgeon.

MARYLAND - VIRGINIA
"Potomac River Compact of 1958"

Potomac River Fisheries Commission
222 Taylor Street
P.O. BOX 9
Colonial Beach, Virginia 22443
TELEPHONE: (804) 224-7148 · (800) 266-3904 · FAX: (804) 224-2712

Atlantic Sturgeon
2012 Annual State Report
June 1, 2013

I. Introduction

The Potomac River Fisheries Commission maintains a total closure on the possession of Atlantic sturgeon by all gear types and all fisheries. There are no plans to reopen the fishery.

II. Monitoring

Mandatory weekly commercial catch reporting forms are used in the Potomac River, which include information on by-catch for all fisheries. No sturgeon were reported as caught in any gear.

III. Habitat

The Potomac River Fisheries Commission cooperated in efforts to modify the Little Falls Dam in Washington, DC with an improved fish ladder design (primarily for American Shad). All other habitat issues are functions and responsibilities of Maryland and/or Virginia state agencies.

IV. Aquaculture

No Atlantic sturgeon aquaculture operations are within the Potomac River Fisheries Commission's jurisdiction.

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

Douglas W. Domenech
Secretary of Natural Resources

Jack G. Travelstead
Commissioner

October 1, 2013

MEMORANDUM

TO: Mike Waine, Atlantic Sturgeon Fishery Management Plan Coordinator
Atlantic States Marine Fisheries Commission

FROM: Adam B. Kenyon, Fisheries Management Specialist Senior
Virginia Marine Resources Commission

SUBJECT: Virginia's 2013 Compliance Report for Atlantic Sturgeon

The attached document describes Virginia's Atlantic sturgeon data and fisheries management program for the 2012 calendar year.

ABK

Attachment

ATLANTIC STURGEON COMPLIANCE REPORT

I. Introduction

The Atlantic sturgeon is listed on the Virginia Rare Animal List, which is maintained by the Virginia Department of Conservation and Recreation's Division of Natural Heritage (Roble 2013). This list provides information on the rank, legal status, and biological status of a listed species. Species are assigned both a state and global rank. Atlantic sturgeon have been assigned a state rank of "S2", which is given to those species that are considered very rare and imperiled with 6 to 20 occurrences or fewer remaining individuals in the state or species that are vulnerable to extirpation in the state. The global rank assigned to Atlantic sturgeon is "G3", which is assigned to species that are very rare and local throughout the entire species range or found locally in a restricted range. A global rank of "G3" may also be assigned to species that are vulnerable to extinction due to other factors.

The Virginia Rare Animal list also gives the state and federal status of listed species (Roble 2013). The Virginia Department of Game and Inland Fisheries (VDGIF) determines the state status of animal species (except insects) that occur in Virginia. The Atlantic sturgeon has been designated "LE" meaning it is Listed Endangered and is threatened with extinction throughout all or a significant portion of its range within the state, though this is not a legal status (Roble 2013; VDGIF 2013; VFWIS 2013).

Federal status is determined by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service (NMFS). In February 2007, a status review team convened by NMFS finalized its report on the status of Atlantic sturgeon in the U.S. (NOAA 2007). Atlantic sturgeon in the Chesapeake Bay were identified as one of five distinct population segments (DPS) along the east coast. A DPS is defined as a population unit with distinct physical, genetic, and physiological characteristics. On February 6, 2012 NMFS released its final ruling to list the Chesapeake Bay DPS as an endangered species under the Endangered Species Act (ESA), effective on April 6, 2012. The New York Bight, Carolina, and South Atlantic DPSs were also ruled endangered while the Gulf of Maine DPS was determined to be a threatened species. The ESA defines an endangered species as "any species which is in danger of extinction throughout all or a significant portion of its range" (NOAA 2012). The Chesapeake Bay DPS was found to have (1) declines in population sizes; (2) a limited amount of current spawning; and (3) and has threats that have an will continue to prevent population recovery. These threats include dredging and habitat degradation, poor water quality, vessel strikes, and incidental catch. In order to comply with federal ESA requirements Virginia is developing a Section 10 (a)(1)(b) application for any expected interactions with Atlantic sturgeon.

II. Request for *de minimis*, where applicable

The VMRC does not request *de minimis* status for this fishery.

III. Previous calendar year's fishery and management program

A. Activity and results of fishery-dependent monitoring (provide general results and references to technical documentation).

The harvest or landing of Atlantic sturgeon has been prohibited in Virginia since 1974 (Code of Virginia § 28.2-303, Appendix A). There are currently no fishery-dependent sampling programs in Virginia that target Atlantic sturgeon harvested commercially or landed from state waters

The NMFS Marine Recreational Information Program (MRIP) program routinely samples recreational harvest (Type A+B1) encountered in its angler intercept survey to collect biological data. The MRIP raw intercept files demonstrate that no Atlantic sturgeon have been encountered during interviews of Virginia's recreational anglers over the entire survey time series.

B. Activity and results of fishery-independent monitoring (provide general results and references to technical documentation).

The Virginia Institute of Marine Science (VIMS) Juvenile Fish and Blue Crab Survey monitors the distribution and abundance of important finfish and invertebrate species occurring in the Chesapeake Bay. Since the survey's introduction in 1955, only 62 Atlantic sturgeon have been observed. During mid-March of 2004, a single Atlantic sturgeon was captured in the James River. The small size of that fish, (70 mm TL) suggested successful spawning occurred in the James River system. Five Atlantic sturgeon were captured by the trawl survey in 2005, and one was captured in 2006. The survey did not capture any Atlantic sturgeon from 2007 through 2010. On December 1, 2011, one young-of-the-year Atlantic sturgeon (133 mm TL) was captured in the Pamunkey River, indicating that successful spawning occurred in the York River System. Three additional young-of-the-year Atlantic sturgeon were captured in the Pamunkey River in January 2012.

In 2012, a final Virginia Fishery Resource Grant Program report was published on using raised footlines in Virginia's striped bass gill net fishery as a mechanical method of reducing sturgeon interactions in anchored gill nets. This project, conducted over a period of 39 days, used two different net configurations and hanging methods to test methodologies to reduce the bycatch of Atlantic sturgeon, while not affecting the catch of striped bass. Nets were hung using conventional methods allowing the net to rest on the bottom of the waters. Experimental nets were also hung to float 3' from the bottom. All nets were hung using mesh sizes ranging from 5.5" to 8". All catch was recorded and compared to determine the effects of the different hanging methods. Upon completion of this project it was concluded that use of floating nets can aid in lowering the Atlantic sturgeon bycatch, often while not greatly affecting the catch of striped bass. Some mesh sizes in the experimental nets resulted in a reduction of the target species by approximately 10% (VASG, 2012).

C. Copy of regulations that were in effect, including a reference to the specific compliance criteria as mandated in the FMP.

The taking and sale of any sturgeon has been prohibited in Virginia since 1974 (Code of Virginia § 28.2-303, Appendix A). All vessels landing seafood in Virginia for commercial purposes must possess a Seafood Landing License, unless the vessel owner is a registered Virginia Commercial Fisherman. All registered commercial fishermen and Seafood Landing License holders selling to non-federally permitted dealers are required to report daily harvest from Virginia tidal and federal waters to the Virginia Marine Resources Commission (VMRC) on a monthly basis (Chapter 4VAC20-610-10 et seq., Appendix C). The state of Virginia also requires a license to catch finfish for recreational purposes in tidal waters (Code of Virginia § 28.2-225, Appendix B).

D. Harvest broken down by commercial (by gear type where applicable) and recreational, and non-harvest losses (when available)

Virginia established a moratorium on the harvesting of sturgeon in 1974 (see Section III.C.). The VMRC collected voluntary reports of commercial landings from seafood buyers from 1973 to 1992. A mandatory harvester reporting system was initiated in 1993 and collects data on harvest and landings within Virginia waters. Records of fish harvested from federal waters and landed in Virginia have been provided by the NMFS and it's predecessors since 1929. There have been no reports of Atlantic sturgeon harvest or landings in the voluntary or mandatory harvester records.

The MRIP is the primary source of recreational fisheries statistics for Virginia. The MRIP data indicate there has been no harvest or live releases of Atlantic sturgeon by Virginia's recreational anglers from 2004 through 2012.

IV. Planned management programs for the current calendar year

A. Summarize regulations that will be in effect. (copy of current regulations if different from III.C.)

Virginia's ban on the taking, selling, and possession of Atlantic sturgeon will remain in effect (Code of Virginia § 28.2-303, Appendix A).

B. Summarize monitoring programs that will be performed.

The VMRC mandatory harvest reports will continue to be monitored for reports of Atlantic sturgeon. The MRIP angler intercept data will continue to be reviewed for encounters with Atlantic sturgeon. The occurrence of Atlantic sturgeon in fisheries-independent surveys conducted in Virginia will continue to be monitored.

In the spring of 2008, the Virginia Fishery Resource Grant Program awarded a grant to support the continuation of ongoing research of by-catch in Virginia's commercial white perch gill-net fishery (see Section V. A.). The main purpose of this study was to evaluate white perch fisheries catch and determine the impact on Atlantic sturgeon.

If an impact was noted, then fishery techniques would be analyzed to lower by-catch. This study will continue, focused on interactions of Atlantic sturgeon in the striped bass gill net fishery, through 2013.

As part of a new NOAA Section 6 Grant to Virginia and Maryland, Virginia Commonwealth University (VCU) will expand its Atlantic sturgeon research program in the James River focusing on identifying critical riverine habitats, assessing early life history stages (ages 0-3), documenting threats, continuing its tagging and acoustic telemetry program.

In 2013, VCU partnered with the U.S. Geological Survey to map putative sturgeon spawning habitat in the tidal freshwater James River using side scan sonar and GIS analysis. Results of this effort will be available in 2014.

C. Highlight any changes from the previous year.

No significant changes in Virginia's fishery management program for Atlantic sturgeon are planned for 2013.

V. Plan Specific Requirements

A. Results of bycatch monitoring for Atlantic sturgeon in other fisheries as per Section 3.4 of the FMP

Atlantic sturgeon are caught as by-catch in three staked gill nets used to monitor abundance of adult American shad in the James, York, and Rappahannock rivers in the VIMS American shad monitoring program. A total of 225 Atlantic sturgeon have been captured and released since 1998, with 186 of them being from the James River (Table 1). This study is very selective in the size of sturgeon that are collected because the study uses small mesh sizes that are selective towards juvenile sturgeon.

B. Monitoring results (tagging, five-year juvenile abundance index studies).

<u>Tagging</u>

The VCU and its partners, including the James River Association, Luck Stone, Vulcan Materials, and the Fish America Foundation, constructed two Atlantic sturgeon spawning reefs in the James River in 2010 and 2011. Reef number 1 is located at the Turkey Island cut and reef number 2 is located at the Jones Neck cut. The VCU conducted limited post-construction monitoring of both structures; monitoring consisted of egg-mat deployment during suspected spawning periods, as well as gill-netting and limited telemetry of adult sturgeon in the area. The VCU has conducted gill net surveys for adult Atlantic sturgeon in the James River since 2009 and has captured, tagged (PIT and VEMCO acoustic), and released over 150 sturgeon. In 2012, these studies generated very strong evidence of a fall spawn by Atlantic sturgeon in the James River.

Although no sturgeon eggs have been collected on the two reefs, The VCU has collected a significant number of reproductively-active, adult sturgeon in the vicinity of the lower reef. VCU has documented fertilized eggs of other commercially important fishes, including white perch, blueback herring, and hickory shad on both structures.

In 2012, The Virginia Department of Game and Inland Fisheries (DGIF) and VCU assumed responsibility for the BEMCO passive acoustic array in the James River.

Juvenile Abundance

Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon recommends that member jurisdictions with reproducing populations of Atlantic sturgeon should survey abundance and calculate catch-per-unit-effort estimates of juveniles (ASMFC 1998). Virginia has not yet developed a survey that targets juvenile sturgeon. The presence of a spawning population of adult Atlantic sturgeon in Virginia waters, and especially in the James River, has been assumed based on genetic studies and occasional reports of young-of-year individuals, but the size and strength of this population is less clear. Infrequent occurrences of young-of-year Atlantic sturgeon have been reported from the James and York rivers, with one captured by the VIMS Juvenile Fish and Blue Crab Survey in the Pamunkey River in 2011. The VIMS annual seine survey for juvenile striped bass has no record of Atlantic sturgeon.

C. Habitat status (restoration efforts, FERC relicensing studies, etc.), in accordance with the recommendations in Sections 4.1.1, 4.1.2, and 4.1.4 of the FMP

During 2008, the VIMS Center for Coastal Resources Management (CCRM) continued their project to assess the availability of Atlantic sturgeon spawning habitat in the James and Appomattox rivers (Bilkovic et al. 2009). The project used side-scan sonar to identify viable spawning habitat within the known range of historic spawning areas. The results of the project are intended to support Atlantic sturgeon restoration efforts.

This study led to a proposal by the James River Association, partnering with VCU and Luck Stone, and funded by the National Fish and Wildlife Foundation, to construct an artificial spawning reef for sturgeon (See Section V. B).

D. Aquaculture operations authorized, status of regulations, disease-free certification status, stocking.

NA

E. See ASMFC Terms, Limitations and Enforcement Document for additional requirements.

NA

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Available:
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Table 1. Total number of Atlantic sturgeon captured and released during the VIMS American shad monitoring program from the York, Rappahannock, and James rivers, Virginia, 1998 through 2012.

Year	Number Captured	Number Captured in James River
1998	37	30
1999	23	21
2000	16	15
2001	6	5
2002	1	1
2003	3	3
2004	4	3
2005	25	22
2006	40	31
2007	30	22
2008	9	7
2009	8	5
2010	10	7
2011	12	11
2012	4	4
Total	225	186

APPENDIX A. Copy of the Code of Virginia statute prohibiting the taking and sale of sturgeon in Virginia.

Code of Virginia

Chapter 3 - Finfish

Article 2 - Fisheries and Habitat of the Tidal Waters.

§ 28.2-303. Taking and sale of sturgeon prohibited; penalty.

Except as otherwise provided by regulation, it shall be unlawful for any person to take, catch or possess any sturgeon. Any sturgeon caught by any person shall be immediately returned to the water.

It shall be unlawful for any dealer or wholesaler of fish for human consumption to buy from others or to otherwise possess for purposes of resale any sturgeon.

A violation of this section is a Class 1 misdemeanor.

APPENDIX B. Copy of the Code of Virginia statute requiring a license to catch finfish for recreational purposes in tidal waters.

Code of Virginia

Chapter 2 – General Provisions

Article 5 – Licensing Generally.

§ 28.2-225. Fishing license required; penalty.

It shall be unlawful to fish in the tidal waters of the Commonwealth or those waters under the joint jurisdiction of the Commonwealth without first obtaining the required license, subject to the exemptions set out in § 28.2-226.

A violation of this section is a Class 1 misdemeanor.

Appendix C.

VIRGINIA MARINE RESOURCES COMMISSION
"PERTAININGTO COMMERCIAL FISHING AND MANDATORY HARVESTREPORTING"
CHAPTER 4VAC20-610-10 ET SEQ.

PREAMBLE

This chapter describes the procedures and manner for application for registration as a commercial fisherman, the manner and form of mandatory harvest reports by commercial fishermen and others, and exceptions to the registration process and delay requirements as specified in § 28.2-241 of the Code of Virginia. A commercial hook-and-line license is also established.

This chapter is promulgated pursuant to authority contained in §§ 28.2-201, 28.2-204, 28.2-242, and 28.2-243 of the Code of Virginia. This chapter amends and readopts, as amended, previous Chapter 4VAC20-610-10 et seq. which was promulgated February 26, 2013 and made effective on March 1, 2013. The effective date of this chapter, as amended, is July 1, 2013.

4VAC20-610-10. Purpose.

The purpose of this chapter is to establish the procedures for the registration of commercial fishermen and the manner and form of mandatory harvest reports from fishermen and others. Further, the purpose is to license commercial fishermen using hook-and-line, rod-and-reel, or hand line.

4VAC20-610-20. Definitions.

The following words and terms when used in this chapter shall have the following meanings unless the context clearly indicates otherwise:

“Agent” means any person who possesses the commercial fisherman registration license, fishing gear license, or fishing permit of a registered commercial fisherman in order to fish that commercial fisherman's gear or sell that commercial fisherman’s harvest.

"Clam aquaculture harvester" means any person who harvests clams from leased, subleased or fee simple ground or any aquaculture growing area, within or adjacent to Virginia tidal waters.

"Clam aquaculture product owner" means any person or firm that owns clams on leased, subleased, or fee simple ground, or any aquaculture growing area within or adjacent to Virginia tidal waters that are raised by any form of aquaculture. This does not include any riparian shellfish gardeners whose activities are authorized by 4VAC20-336, General Permit No. 3 Pertaining to Noncommercial Riparian Shellfish Growing Activities.

"Clam aquaculture product owner vessel" means any vessel, legally permitted through a no-cost permit, by a clam aquaculture product owner, used to transport clam aquaculture harvesters who do not possess an individual clam aquaculture harvester permit.

"Commission" means the Marine Resources Commission.

"Commissioner" means the Commissioner of the Marine Resources Commission.

"Continuing business enterprise" means any business that is required to have a Virginia Seafood Buyer's License or is required to have a business license by county, city or local ordinance.

"Oyster aquaculture harvester" means any person who harvests oysters from leased, subleased or fee simple ground or any aquaculture growing area, within or adjacent to Virginia tidal waters.

"Oyster aquaculture product owner" means any person or firm that owns oysters on leased, subleased, or fee simple ground, or any aquaculture growing area within or adjacent to Virginia tidal waters that are raised by any form of aquaculture. This does not include any riparian shellfish gardeners whose activities are authorized by 4VAC20-336, General Permit No. 3 Pertaining to Noncommercial Riparian Shellfish Growing Activities.

"Oyster aquaculture product owner vessel" means any vessel, legally permitted through a no-cost permit, by an oyster aquaculture product owner, used to transport oyster aquaculture harvesters who do not possess an individual oyster aquaculture harvester permit.

"Sale" means sale, trade, or barter.

"Sell" means sell, trade, or barter.

"Selling" means selling, trading or bartering

"Sold" means sold, traded, or bartered.

4VAC20-610-25. Oyster aquaculture permit requirements.

A. For the purposes of collecting oyster fisheries statistics from the Virginia aquaculture industry, as authorized by §28.2-204 of the Code of Virginia and in accordance with §28.2-613 of the Code of Virginia, which describes conditions that determine the duration of a lease, any oyster aquaculture product owner shall obtain an oyster aquaculture product owner’s permit and shall report harvest of any oysters from leased, subleased or fee simple ground or any aquaculture growing area within or adjacent to Virginia tidal waters in accordance with 4VAC20-610-60

B. It shall be unlawful for any person, except an oyster aquaculture product owner permittee, oyster aquaculture harvester permittee or a harvester designated for harvest by an oyster aquaculture product owner vessel permit, to harvest oysters from leased, subleased or fee simple ground or any aquaculture growing area, within or adjacent to Virginia tidal waters, unless that person is authorized to harvest oysters from areas described in this subsection, by an oyster aquaculture product owner.

C. It shall be unlawful for any person permitted as an oyster aquaculture harvester to fail to possess that permit on his person while harvesting unless that person is on a permitted oyster aquaculture product owner vessel and is harvesting oysters of that oyster aquaculture product owner.

D. Minor persons younger than 18 years of age shall be exempt from the requirements to obtain an oyster aquaculture harvester's permit provided that minor person is harvesting oysters under the supervision of a legally permitted oyster aquaculture product owner.

4VAC20-610-26. Clam aquaculture permit requirements.

A. For the purposes of collecting clam fisheries statistics from the Virginia aquaculture industry, as authorized by §28.2-204 of the Code of Virginia and in accordance with §28.2-613 of the Code of Virginia, which describes conditions that determine the duration of a lease, any clam aquaculture product owner shall obtain a clam aquaculture product owner's permit and shall report harvest of any clams from leased, subleased, or fee simple ground or any aquaculture growing area, within or adjacent to Virginia tidal waters, in accordance with 4VAC20-610-60.

B. It shall be unlawful for any person, except a clam aquaculture product owner permittee, clam aquaculture harvester permittee, or a harvester designated for harvest by a clam aquaculture product owner vessel permit, to harvest clams from leased, subleased, or fee simple ground or any aquaculture growing area, within or adjacent to Virginia tidal waters, unless that person is authorized to harvest clams from areas described in this subsection by a clam aquaculture product owner.

C. It shall be unlawful for any person permitted as a clam aquaculture harvester to fail to possess that permit on his person while harvesting unless that person is on a permitted clam aquaculture product owner vessel and is harvesting clams of that clam aquaculture product owner.

D. Minor persons younger than 18 years of age shall be exempt from the requirements to obtain a clam aquaculture harvester's permit provided that minor person is harvesting clams under the supervision of a legally permitted clam aquaculture product owner.

4VAC20-610-30. Commercial Fisherman Registration License; exceptions and requirements of authorized agents.

A. In accordance with §28.2-241 C of the Code of Virginia, only persons who hold a valid Commercial Fisherman Registration License may sell, trade, or barter their harvest, or give their harvest to another, in order that it may be sold, traded, or bartered. Only these licensees may sell their harvests from Virginia tidal waters, regardless of the method or manner in which caught. Exceptions to the requirement to register as a commercial fisherman for selling harvest are authorized for the following persons or firms only:

1. Persons taking menhaden under the authority of licenses issued pursuant to §28.2-402 of the Code of Virginia

2. Persons independently harvesting and selling, trading, or bartering no more than three gallons of minnows per day who are not part of, hired by, or engaged in a continuing business enterprise.

a. Only minnow pots, a cast net or a minnow seine less than 25 feet in length may be used by persons independently harvesting minnows.

b. All other marine species taken during the process of harvesting minnows shall be returned to the water immediately.

B. Requirements of authorized agents.

1. No person whose Commercial Fisherman Registration License, fishing gear license, or fishing permit is currently revoked or rescinded by the Marine Resources Commission pursuant to §28.2-232 of the Code of Virginia is authorized to possess the Commercial Fisherman Registration License, fishing gear license, or fishing permit of any other registered commercial fisherman in order to serve as an agent for fishing the commercial fisherman's gear or selling the harvest

2. No registered commercial fisherman shall use more than one person as an agent at any time

3. Any person serving as an agent shall possess the Commercial Fisherman Registration License and gear license of the commercial fisherman while fishing.

4. When transporting or selling a registered commercial fisherman's harvest, the agent shall possess either the Commercial Fisherman Registration License of that commercial fisherman or a bill of lading indicating that fisherman's name, address, Commercial Fisherman Registration License number, date and amount of product to be sold.

C. Requirements of authorized blue crab fishery agents.

1. Any person licensed to harvest blue crabs commercially shall not be eligible to also serve as an agent.

2. Any person serving as an agent to harvest blue crabs for another licensed fisherman shall be limited to the use of only one registered commercial fisherman’s crab license; however, an agent may fish multiple crab traps licensed and owned by the same person.

3. There shall be no more than one person, per vessel, serving as an agent for a commercial crab licensee.

4. Prior to using an agent in any crab fishery, the licensee shall submit a crab agent registration application to the Commission. Crab agent registration applications shall be approved by the Commissioner, or his designee, for a crab fishery licensee, according to the following guidelines:

a. Only 168 agents may participate in the 2013 crab fishery, as described in subdivision b, unless the Commissioner or his designee approves a request for agent use because of a non-economic hardship circumstance; and

b. 153 of the 168 agents may be utilized by those crab fishery licensees who received approval for agent use in 2012 or who currently are licensed by a transferred crab fishery license, from a licensee approved for agent use in 2012, except that should any of these licensees described in this subdivision fail to register for agent use, applications for agent use by other 2013 licensees shall be approved on a first-come, first-serve basis, starting with those licensees who have registered prior to the effective date of this regulation.

D. Failure to abide by any of the provisions of this section, shall constitute a violation of this regulation.

E. In accordance with §28.2-241 H of the Code of Virginia, only persons with a valid Commercial Fisherman Registration License may purchase gear licenses. Beginning with licenses for the 1993 calendar year and for all years thereafter, gear licenses will be sold only upon presentation of evidence of a valid Commercial Fisherman Registration License.

Exceptions to the prerequisite requirement are authorized for the following gears only and under the conditions described below:

1. Menhaden purse seine licenses issued pursuant to §28.2-402 of the Code of Virginia may be purchased without holding a Commercial Fisherman Registration License.

2. Commercial gear licenses used for recreational purposes and issued pursuant to §28.2-226.2 of the Code of Virginia may be purchased without holding a Commercial Fisherman Registration License.

F. Exceptions to the two-year delay may be granted by the commissioner if he finds any of the following:

1. The applicant for an exception (i) has demonstrated, to the satisfaction of the commissioner, that the applicant has fished a significant quantity of commercial gear in Virginia waters during at least two of the previous five years; and (ii) can demonstrate, to the satisfaction of the commissioner, that a significant hardship caused by unforeseen circumstances beyond the applicant's control has prevented the applicant from making timely application for registration. The commissioner may require the applicant to provide such documentation as he deems necessary to verify the existence of hardship

2. The applicant is purchasing another commercial fisherman's gear, and the seller of the gear holds a Commercial Fisherman Registration License and the seller surrenders that license to the commission at the time the gear is sold

3. An immediate member of the applicant's family, who holds a current registration, has died or is retiring from the commercial fishery and the applicant intends to continue in the fishery.

4. Any applicant denied an exception may appeal the decision to the commission. The applicant shall provide a request to appeal to the commission 30 days in advance of the meeting at which the commission will hear the request. The commission will hear requests at their March, June, September, and December meetings.

5. Under no circumstances will an exception be granted solely on the basis of economic hardship.

4VAC20-610-40. Registration procedures.

A. An applicant may renew his Commercial Fisherman Registration License by registering during the months of December through February as commercial fishermen as follows:

1. The applicant shall complete an application for a Commercial Fisherman Registration License

2. The applicant shall mail the completed application to the Virginia Marine Resources Commission, 2600 Washington Avenue, 3rd Floor, Newport News, VA 23607.

3. The Commercial Fisherman Registration License will be returned to the applicant by mail upon validation of his application.

B. Persons desiring to enter the commercial fishery and those fishermen failing to register as provided in subdivision A may apply only during December, January or February of each year. All such applications shall be for a delayed registration and shall be made as provided below.

1. The applicant shall complete an application for a Commercial Fisherman Registration License by providing his complete name, mailing address (and 911 address if different than mailing address), social security number, birth date, weight, height, eye color, hair color, telephone number of residence, and signature.

2. The applicant shall mail the completed application to the Virginia Marine Resources Commission, 2600 Washington Avenue, Newport News, VA 23607.

3. The Commercial Fisherman Registration License will be returned to the applicant by mail two years after the date of receipt of the application by the commission. Notification of any change in the address of the applicant shall be the responsibility of the applicant.

C. No part of the Commercial Fisherman Registration License fee shall be refundable.

D. The Commercial Fisherman Registration License may be renewed annually during the months of December, January or February, only when any and all mandatory reporting harvest reports are up to date and there are no outstanding compliance issues. Any person

failing to renew his license shall be subject to the delay provision of subsection B of this section.

4VAC20-610-50. Commercial hook-and-line license.

A. On or after January 1, 1993, it shall be unlawful for any person to take or harvest fish in the tidal waters of Virginia with hook-and-line, rod-and-reel, or hand line and to sell such harvest without first having purchased a Commercial Hook-and-Line License from the commission or its agent.

B. A Commercial Fisherman Registration License, as described in §28.2-241 H of the Code of Virginia, is required prior to the purchase of this license.

4VAC20-610-60. Mandatory harvest reporting.

A. It shall be unlawful for any valid commercial fisherman registration licensee, seafood landing licensee, oyster aquaculture product owner permittee, or clam aquaculture product owner permittee to fail to fully report harvests and related information as set forth in this chapter.

B. It shall be unlawful for any recreational fisherman, charter boat captain, head boat captain, commercial fishing pier operator, or owner of a private boat licensed pursuant to §§28.2-302.7 through 28.2-302.9 of the Code of Virginia, to fail to report recreational harvests, upon request, to those authorized by the commission.

C. All registered commercial fishermen and any valid seafood landing licensee shall complete a daily form accurately quantifying and legibly describing that day's harvest from Virginia tidal waters and federal waters. The forms used to record daily harvest shall be those provided by the commission or another form approved by the commission. Registered commercial fishermen and seafood landing licensees may use more than one form when selling to more than one buyer.

D. Any oyster aquaculture product owner permittee or clam aquaculture product owner permittee shall complete a monthly form accurately quantifying and legibly describing that month’s harvest from Virginia tidal waters. The forms used to record monthly harvest shall be those provided by the commission or another form approved by the commission.

E. Registered commercial fishermen, seafood landing licensees, valid oyster aquaculture product owner permittees and valid clam aquaculture product owner permittees shall submit a monthly harvest report to the commission no later than the fifth day of the following month. This report shall be accompanied by the daily harvest records described in subsection F of this section. Completed forms shall be mailed or delivered to the commission or other designated locations.

F. The monthly harvest report requirements shall be as follows:

1. Registered commercial fishermen shall be responsible for providing monthly harvest report and daily harvest records that include the name and signature of the registered commercial fisherman and his commercial fisherman’s registration license number; the name and license registration number of any agent, if used; the license registration number of no

more than five helpers who were not serving as agents; any buyer or private sale information; the date of any harvest; the city or county of landing that harvest; the water body fished, gear type, and amount of gear used for that harvest; the number of hours any gear was fished and the number of hours the registered commercial fisherman fished; the number of crew on board, including captain; species harvested; market category; live weight or processed weight of species harvested; and vessel identification (Coast Guard documentation number, Virginia license number, or hull/VIN number). Any information on the price paid for the harvest may be provided voluntarily.

2. The monthly harvest report from oyster aquaculture product owner permittees and clam aquaculture product owner permittees shall include the name, signature, permit number, lease number, date of the last day of the reporting month, city or county of landing, gear (growing technique) used, weight or amount of species harvested by market category, total number of individual crew members for the month, and buyer or private sale information.

3. The monthly harvest report and daily harvest records from seafood landing licensees shall include the name and signature of the seafood landing licensee and his seafood landing license number; buyer or private sale information; date of harvest; city or county of landing; water body fished; gear type and amount used; number of hours gear fished; number of hours the seafood landing licensee fished; number of crew on board, including captain; nonfederally permitted species harvested; market category; live weight or processed weight of species harvested; and vessel identification (Coast Guard documentation number, Virginia license number, or hull/VIN number).

G. Registered commercial fishermen, oyster aquaculture product owner permittees and clam aquaculture product owner permittees not fishing during a month, or seafood landing licensees not landing in Virginia during a month, shall so notify the commission no later than the fifth of the following month by postage paid postal card provided by the commission or by calling the commission's toll free telephone line.

H. Any person licensed as a commercial seafood buyer pursuant to §28.2-228 of the Code of Virginia shall maintain for a period of one year a copy of each fisherman's daily harvest record form for each purchase made. Such records shall be made available upon request to those authorized by the commission.

I. Registered commercial fishermen, seafood landing licensees, oyster aquaculture product owner permittees and clam aquaculture product owner permittees shall maintain their harvest records for one year and shall make them available upon request to those authorized by the commission.

J. Registered commercial fishermen, seafood landing licensees and licensed seafood buyers shall allow those authorized by the commission to sample harvest and seafood products to obtain biological information for scientific and management purposes only. Such sampling shall be conducted in a manner that does not hinder normal business operations.

K. The reporting of the harvest of federally permitted species from beyond Virginia's tidal waters that are sold to a federally permitted dealer shall be exempt from the procedures described in this section.

L. The owner of any purse seine vessel or bait seine vessel (snapper rig) licensed under the provisions of §28.2-402 of the Code of Virginia shall submit the Captain's Daily Fishing Reports to the National Marine Fisheries Service, in accordance with provisions of Amendment 1 to the Interstate Fishery Management Plan of the Atlantic States Marine Fisheries Commission for Atlantic Menhaden, which became effective July 2001.

4VAC20-610-65. Non-Compliance.

A. Any initial violation of 4VAC20-610-60 by any registered commercial fisherman, oyster aquaculture product owner permittee, clam aquaculture product owner permittee, or seafood landing licensee shall be subject to penalties as described in subdivisions 1 through 4 of this subsection.

1. Any failure to report harvest or no harvest activity or no landing in Virginia within one to three months after that report was due shall result in a minimum of one year of probation.

2. Any failure to report harvest or no harvest activity or no landing in Virginia within four to six months after that report was due shall result in a minimum of two years of probation.

3. Any failure to report harvest or no harvest activity or no landing in Virginia within seven to twelve months after that report was due shall result in a minimum of six months of suspension of all commercial licenses and permits.

4. Any failure to report harvest or no harvest activity or no landing in Virginia more than twelve months after that report was due shall result in a minimum of one year of suspension of all commercial licenses and permits.

B. Any second or subsequent violation of 4VAC20-610-60 by any registered commercial fisherman, oyster aquaculture product owner permittee, clam aquaculture product owner permittee, or seafood landing licensee may be subject to having his commercial licenses and permits suspended by the Commission.

4VAC20-610-70. Penalty.

A. As set forth in §28.2-903 of the Code of Virginia, any person violating any provision of this chapter shall be guilty of a Class 3 misdemeanor, and a second or subsequent violation of any provision of this chapter committed by the same person within 12 months of a prior violation is a Class 1 misdemeanor

B. In addition to the penalties described by law, any person violating any provision of this chapter may be subject to license suspension or revocation.

* * * * * * * **

ASMFC ATLANTIC STURGEON PLAN – AMENDMENT 1

NORTH CAROLINA ANNUAL ATLANTIC STURGEON COMPLIANCE REPORT 2012

October 2013

North Carolina Department of Environment and Natural Resources

Division of Marine Fisheries

PO Box 769

Morehead City, NC 28557

Section 3.0 Monitoring results

The North Carolina Division of Marine Fisheries (NCDMF) currently has three independent gill net programs that encounter and tag Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus)* (Figures 1, 2, and 3). The Albemarle Sound Independent Gill Net Survey (IGNS) is a stratified random gill net survey that employs gill nets with mesh sizes that range from 2.5 inch stretch mesh (ISM) through 7 ISM (0.5 ISM increments) and 8 ISM and 10 ISM of floating and sinking nets (Figure 1). Gill nets are fished in 40 yard shots totaling 960 yards per set. Each set is fished for approximately 24 hours before retrieval. Nets were fished from January through May, November, and December 2012 totaling 3,212 net days. Sixty-five Atlantic sturgeon were collected. There was one Atlantic sturgeon mortality, 56 fish were tagged (T-bar, Passive Integrated Transponder (PIT)) and released, and nine were recaptures that were rereleased. Lengths ranged from 296 to 1,060 mm fork length (FL) (Table 1).

The Pamlico Sound Independent Gill Net Survey (PSIGNS) is conducted in Pamlico Sound, Pungo, Pamlico, and Neuse rivers, and consists of gill net sets, ranging in mesh size from 3.0 ISM through 6.5 ISM (0.5 ISM increments) and are fished for approximately 12 hours before retrieval (Figure 1). During 2012, approximately 240 yards were fished per sample and 628 samples were completed. The Fisheries Independent Assessment Program (FIAPOG) is modeled after the PSIGNS. The areas fished include the New and Cape Fear rivers (Figure 2). Two-hundred and forty yards were fished per sample and 120 samples were completed. Trips conducted in the Atlantic Ocean include an additional 2.5 ISM net. The areas fished include the coastal ocean waters off New and Cape Fear rivers (Figure 3). Two-hundred and seventy yards were fished per sample and 24 samples were completed in 2012. Eight Atlantic sturgeon were collected and six were tagged and released in these two surveys during 2012 (Tables 2 and 3). Sturgeon were collected in Neuse River (625 mm TL), Pamlico Sound (1,415 mm FL), and Atlantic Ocean off Lockwoods Folly Inlet (593, 954, 650, 626, 708, and 935 mm FL), two collected in the Atlantic Ocean were mortalities.

During 2010, The NCDMF joined a multi-state grant entitled “Research and Management of Endangered and Threatened Species in the Southeast: Riverine Movements of Shortnose and Atlantic Sturgeon” cooperating with South Carolina Department of Natural Resources, The University of Georgia, and North Carolina State University (NCSU). Funding was provided through the National Marine Fisheries Service (NMFS), Section 6. Obtaining funding, acquiring equipment and hiring staff delayed field work until 2011.

During sampling efforts for 2012, 32 Atlantic and 2 shortnose (*Acipenser brevirostrum*) sturgeon were collected in the Cape Fear River. The Atlantic sturgeon ranged in size from 625 mm to 1,753 mm FL and the shortnose sturgeon were 866 mm and 745 mm FL. Twenty of the Atlantic and both shortnose sturgeon were implanted with Vemco telemetry tags. The remaining 12 fish were either too small or the condition of the fish was not appropriate for telemetry tagging but were PIT and T-bar tagged. Seven Atlantic sturgeon were collected and three of those were telemetry tagged in the Albemarle Sound during 2012. Lengths ranged from 507 mm to 1,062 mm FL.

Additional sampling effort was conducted in the Roanoke River during October and November 2012. Due to permit restraints, sampling was not allowed on Atlantic sturgeon during their fall spawning run in the Roanoke River. However, once spawning was complete and fish began their emigration, observed through telemetry tags, the NCDMF and NCSU attempted to net fish within the Roanoke River. Attempts were made to identify potential sturgeon presence

through the use of side-scan sonar. Once a target was identified nets were deployed. One adult Atlantic sturgeon was captured, tagged, released, and subsequently tracked on existing acoustic arrays. A more detailed description of these activities can be found in the progress reports submitted to NMFS.

Section 3.4 Assessing bycatch fishing mortality

The NCDMF provides at sea observer coverage for the fall flounder fishery as well as other large and small mesh fisheries throughout the state. Staff observed 545 large mesh trips (668,231 yards) and 91 (65,282 yards) small mesh trips throughout the estuaries of North Carolina during 2012. Eight Atlantic sturgeon (2 mortalities) were observed during large mesh trips and two Atlantic sturgeon were observed during small mesh trips. No shortnose sturgeon were observed during these trips in 2012.

Fisherman participating in the American shad (*Alosa sapidissima*) fishery conducted in the Cape Fear (drift nets) and Brunswick rivers (anchored gill nets) were interviewed for interactions with Atlantic sturgeon during nine fishing trips. No Atlantic or shortnose sturgeon were reported during 2012.

North Carolina is currently developing a Section 10 Incidental Take Permit for the estuarine waters of N.C. relative to gill net fishing. Through this process N.C. developed a zero inflated poisson general linear model that estimated bycatch in the gill net fisheries. This model divided the state estuarine waters into management units and estimated takes (live and dead) within each of these units, by season, and mesh size (large and small). Results from this model are available in the Application for an Incidental Take Permit submitted to the National Marine Fisheries Service in December 2012 by the NCDMF.

Section 4.1.1 Preservation of existing habitat

The NCDMF regularly provides input to federal and state regulatory agencies of the location of habitats used by Atlantic sturgeon. The Division reviews impact statements and permit applications for projects or facilities, which may impact sturgeon spawning or nursery areas and provides appropriate recommendations to minimize impacts or to preserve habitats.

Section 4.1.2 Avoidance of incompatible activities

The NCDMF routinely works with the U.S. Army Corps of Engineers and the NC Department of Transportation on windows of compatibility for activities (dredging, pile driving, bridge replacement) that may adversely affect Atlantic sturgeon. The guidelines for in water construction include a moratorium on activities from February 15th through September 30th; dates may vary depending on location.

Section 4.1.4 Habitat restoration, improvement, and enhancement

The NCDMF and the North Carolina Wildlife Resources Commission (NCWRC) have designated Anadromous Fish Spawning Areas for their respective jurisdictions. Also, the NC Coastal Habitat Protection Plan (CHPP) was adopted in 2005 to reach 4 goals: 1. Improve effectiveness of existing rules and programs protecting coastal fish habitats, 2. Identify, designate, and protect strategic habitat areas, 3. Enhance habitat and protect it from physical impacts and, 4. Enhance and protect water quality, all of which will directly impact habitats

utilized by Atlantic sturgeon (Street 2005). The CHPP was updated in 2010, but maintains these same four goals.

The NCDMF approved Strategic Habitat Areas (SHA) for region 1 in North Carolina in January 2009. "Strategic Habitat Areas represent priority habitat areas for protection due to their exceptional condition or imminent threat to their ecological functions supporting estuarine and coastal fish and shellfish species" (NCDMF 2009). The SHA areas will be incorporated into conservation and restoration efforts. SHA #3: Bellows Bay to Knotts Island Bay (28,462 acres) was identified partially due to the near shore ocean areas that are important for Atlantic sturgeon and striped bass (Figure 4). SHA #8: Chowan and Roanoke rivers, and western Albemarle Sound (401,233 acres) was identified and may include one of few Atlantic sturgeon spawning habitats in NC (Figure 4).

The NCDMF has identified approximately 150 SHAs for region 2 and is currently reviewing proposed sites (Figure 5; NCDMF 2011). Many of the proposed sites include habitats where Atlantic sturgeon have been collected or observed. Important travel routes into and out of Pamlico and Albemarle sounds have been identified as SHAs: Oregon Inlet System, Hatteras Inlet System, and Ocracoke Inlet System. Other SHAs have been identified that potentially include important spawning habitat or forage areas for Atlantic sturgeon in the Tar, Pamlico, and Neuse rivers.

Considerable progress has also been made on the addition of a rock rubble arch ramp at Lock and Dam # 1 on the Cape Fear River. North Carolina DMF has detected two striped bass utilizing the ramp to pass the dam, however it is unknown if Atlantic or shortnose sturgeon have used the ramp. Vemco receivers are in place at the base of the ramp, as well as the top to identify passage of any fish outfitted with a transmitter. The ramp construction is complete.

Aquaculture Operations

In 2005, LaPaz LLC. received approval from the Atlantic States Marine Fisheries Commission (ASMFC) and NCDMF to operate an Atlantic sturgeon aquaculture operation in North Carolina. After experiencing difficulty in acquiring Atlantic sturgeon in the fall of 2005, LaPaz made a request to the NCWRC and the NC Department of Agriculture to allow LaPaz to possess and culture Siberian sturgeon (*Acipencer baerii*). LaPaz imported 2,022 fertilized Atlantic sturgeon eggs from Supreme Sturgeon and Caviar during 2006. An additional 3,861 fertilized Atlantic sturgeon eggs were imported in July 2008, now weighing an estimated 5,161 kg. Recently, the LaPaz facility reduced the number of Atlantic sturgeon being held, nearly all of the 2006 fish have been culled and 435 fish from 2010 were transported to Kenneth J. Semmens, Extension Specialist, University of West Virginia (Hinshaw 2012). Table 4 shows the current inventory of Atlantic sturgeon in the LaPaz LLC facility.

LaPaz is shifting their focus away from Atlantic sturgeon and plans to concentrate on production of other species. During this transition, LaPaz anticipates marketing some meat and potentially some caviar from the remaining Atlantic sturgeon that are on-site, and are of suitable size and quality. Fish that are not mature or large enough for efficient processing will likely be removed from the systems and disposed (composted, buried, or rendered). Much of this transition is planned to be accomplished in 2013 (Hinshaw 2012).

The fish that were transferred (donated 8/11/12) to West Virginia University (WVU) are involved in a research study at one of their facilities evaluating aquaculture potential of reclaimed water from coal mining. The fish were accompanied by copies of the CITES

documents and Health Inspection report for this group of fish, as well as a copy of Appendix II from ASMFC, and a letter transferring ownership of these fish to them. West Virginia University received permission from the West Virginia Fish and Game Division allowing possession of the fish at their facility. The contact person for University of West Virginia is: Kenneth J. Semmens, Extension Specialist, Aquaculture, P.O. Box 6108, Agricultural Sciences Building, Rm. 1052, Morgantown, WV 26506-6108, (304) 293-2657 - (304) 293-6954 Fax, Ken.Semmens@mail.wvu.edu, Web site: http://www.wvu.edu/~agexten/aquaculture (Hinshaw 2012).

Literature Cited

Hinshaw, J. 2012. Personal communication.

NCDMF 2009. Strategic Habitat Nominations for Region # 1: Albemarle Sound To Northeastern Coastal Ocean of North Carolina. North Carolina Division of Marine Fisheries, Morehead City, NC, 91 pp.

NCDMF 2011. Strategic Habitat Area Nominations for Pamlico Sound System, North Carolina (Region 2). North Carolina Division of Marine Fisheries, Morehead City, NC. 135 pp.

Street, M.W., A.S. Deaton, W.S. Chappell, and P.D. Mooreside. 2005. North Carolina Coastal Habitat Protection Plan. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC, 656 pp.

Table 1. Number of Atlantic sturgeon collected and released from the Albemarle Sound Independent Gill Net Survey, Albemarle Sound, NC, 2012.

Month	# Caught	# Tagged	# Released	Mean Size (mm FL)	Minimum Size (mm FL)	Maximum Size (mm FL)
January	13	12	13	556	450	787
February	12	9	12	609	470	872
March	9	9	9	580	497	741
April	4	3	4	628	542	700
May	6	4	5	464	296	710
November	10	9	10	595	453	1,060
December	11	10	11	543	426	710
Total	65	56	64	570	296	1,060

Table 2. Number of Atlantic sturgeon collected and released from the Pamlico Sound Independent Gill Net survey, Pamlico Sound, Pamlico, Pungo, and Neuse rivers, NC, 2012.

Month	# Caught	# Tagged	# Released	Mean Size (mm TL)	Minimum Size (mm TL)	Maximum Size (mm TL)
February	0	0	0			
March	0	0	0			
April	1	1	1	625	625	625
May	0	0	0			
June	0	0	0			
July	0	0	0			
August	1	1	1	1,415	1,415	1,415
September	0	0	0			
October	0	0	0			
November	0	0	0			
December	0	0	0			
Total	2	2	2	1,020	625	1,415

Table 3. Number of Atlantic sturgeon collected and released from the Fisheries Independent Assessment Program, Cape Fear River and the Atlantic Ocean, NC, 2012.

Month	# Caught	# Tagged	# Released	Mean Size (mm FL)	Minimum Size (mm FL)	Maximum Size (mm FL)
February	0	0	0			
March	6	4	4	744	593	954
April	0	0	0			
May	0	0	0			
June	0	0	0			
July	0	0	0			
August	0	0	0			
September	0	0	0			
October	0	0	0			
November	0	0	0			
December	0	0	0			
Total	6	4	4	744	593	954

Table 4. Inventory of Atlantic sturgeon located at LaPaz LLC Aquaculture Facility, Lenoir, NC, 2011-2012.

Year Obtained	Year Class	Tank	Number	Weight (kg)
2006	2006	Culled		
2006	2006	Culled		
2007	2000/2002	GO 9	58	963
2007	2000/2002	GO 10	144	2,162
2008	2008	GO 5	548	2,968
2008	2008	GO 6	850	2,193
2003/2006	2003/2006	S3	16	93
2010	2010	Moved to WV	435	952
Total Inventory			1,616	8,379
Total Removed *			1,698	952

- 435 Atlantic sturgeon moved to West Virginia, 1,263 culled and/or used for product development. Nearly all of the 2006 year class was culled.

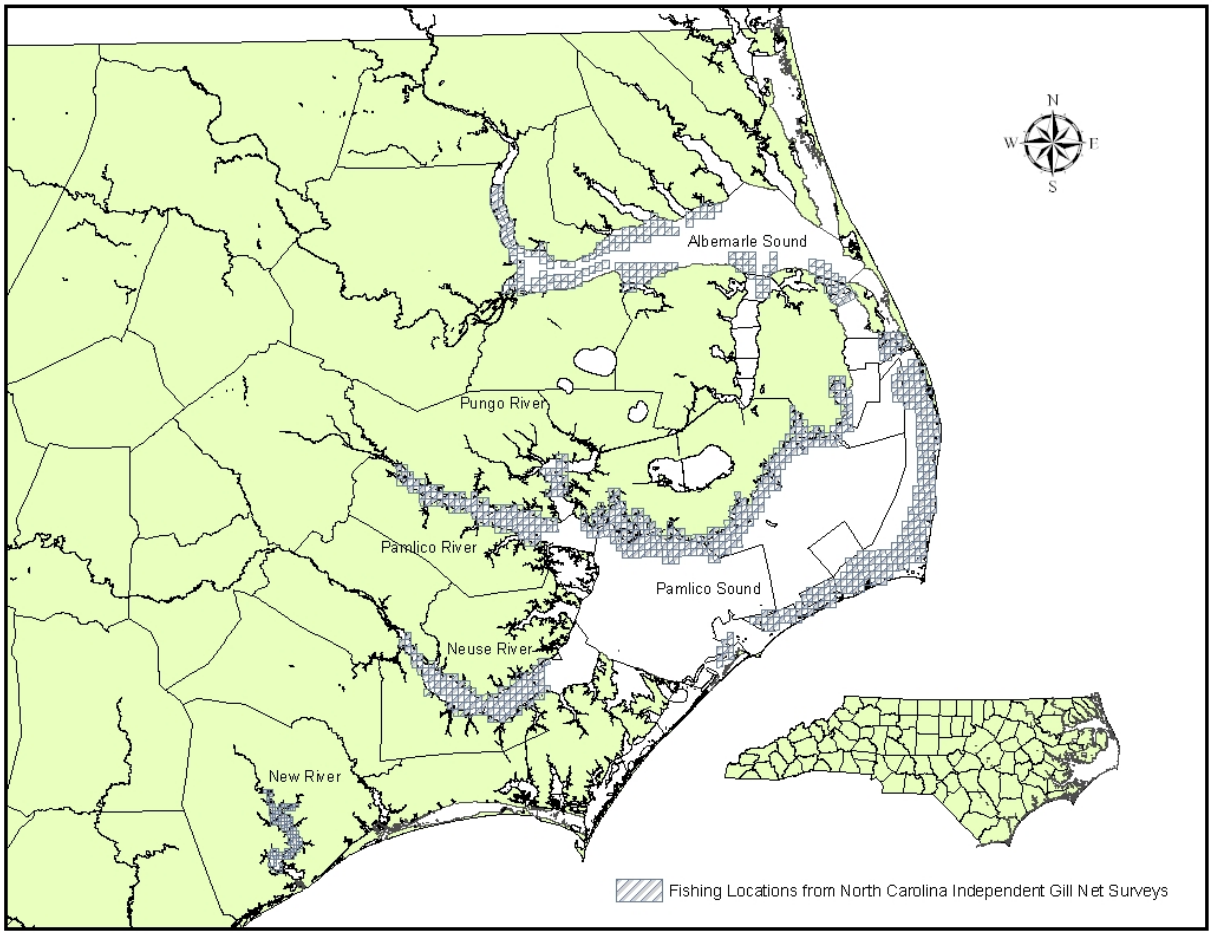

Figure 1. Fishing locations from Independent Gill Net Surveys conducted in Albemarle and Pamlico sounds, and Pungo, Pamlico, Neuse, and New rivers, North Carolina, 2012.

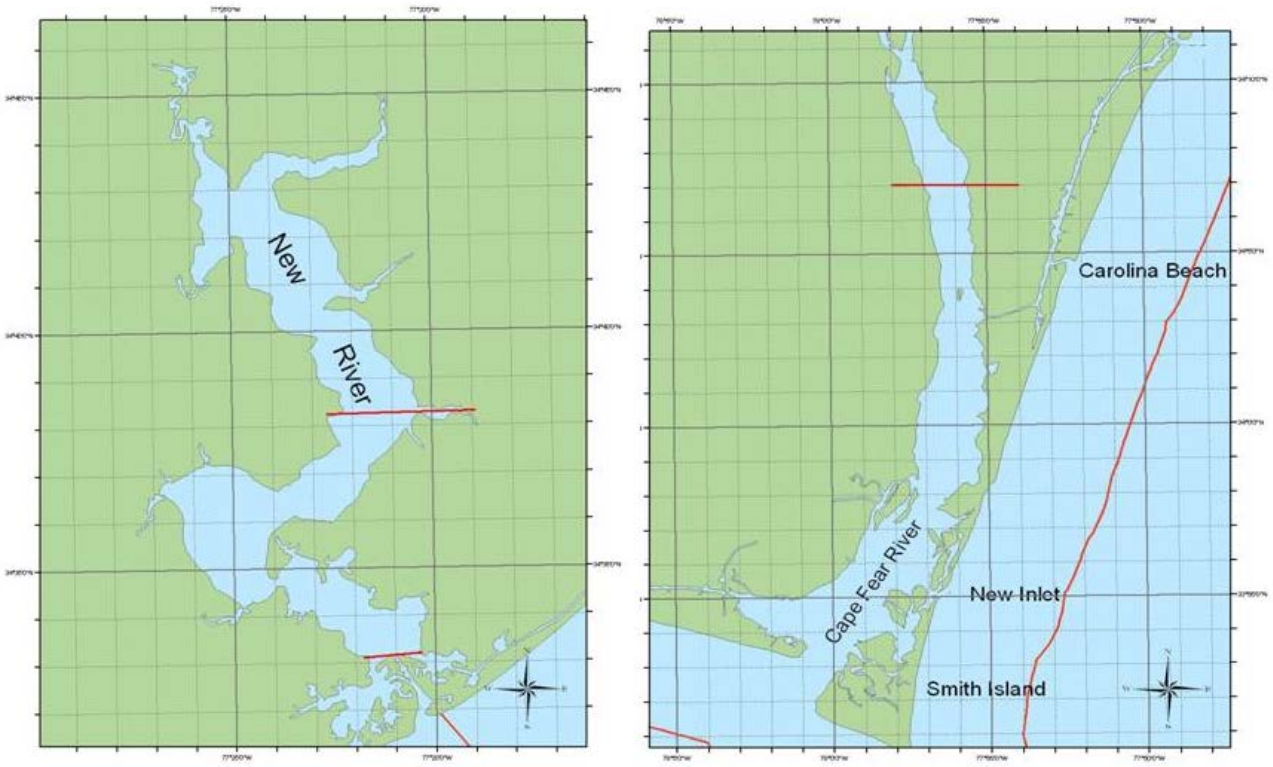

Figure 2. The sample regions and grid system for the Fisheries Independent Assessment Program (New and Cape Fear rivers) of North Carolina during 2012 with areas numbered (New: 1-Upper, 2-Lower; Cape Fear).

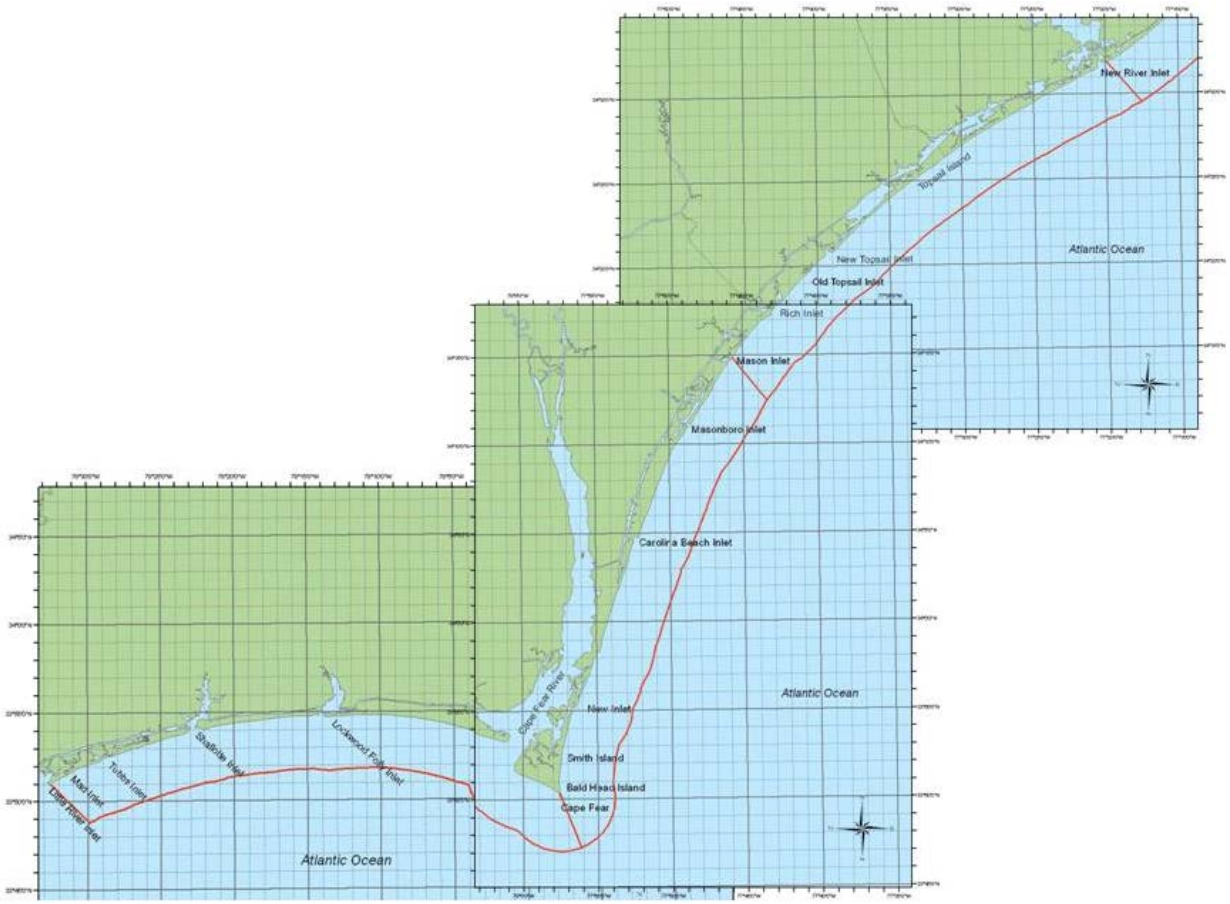

Figure 3. The sample regions and grid system for the Fisheries Independent Assessment Program (Atlantic Ocean) of North Carolina during 2012 including the Topsail, Masonboro, and Brunswick areas.

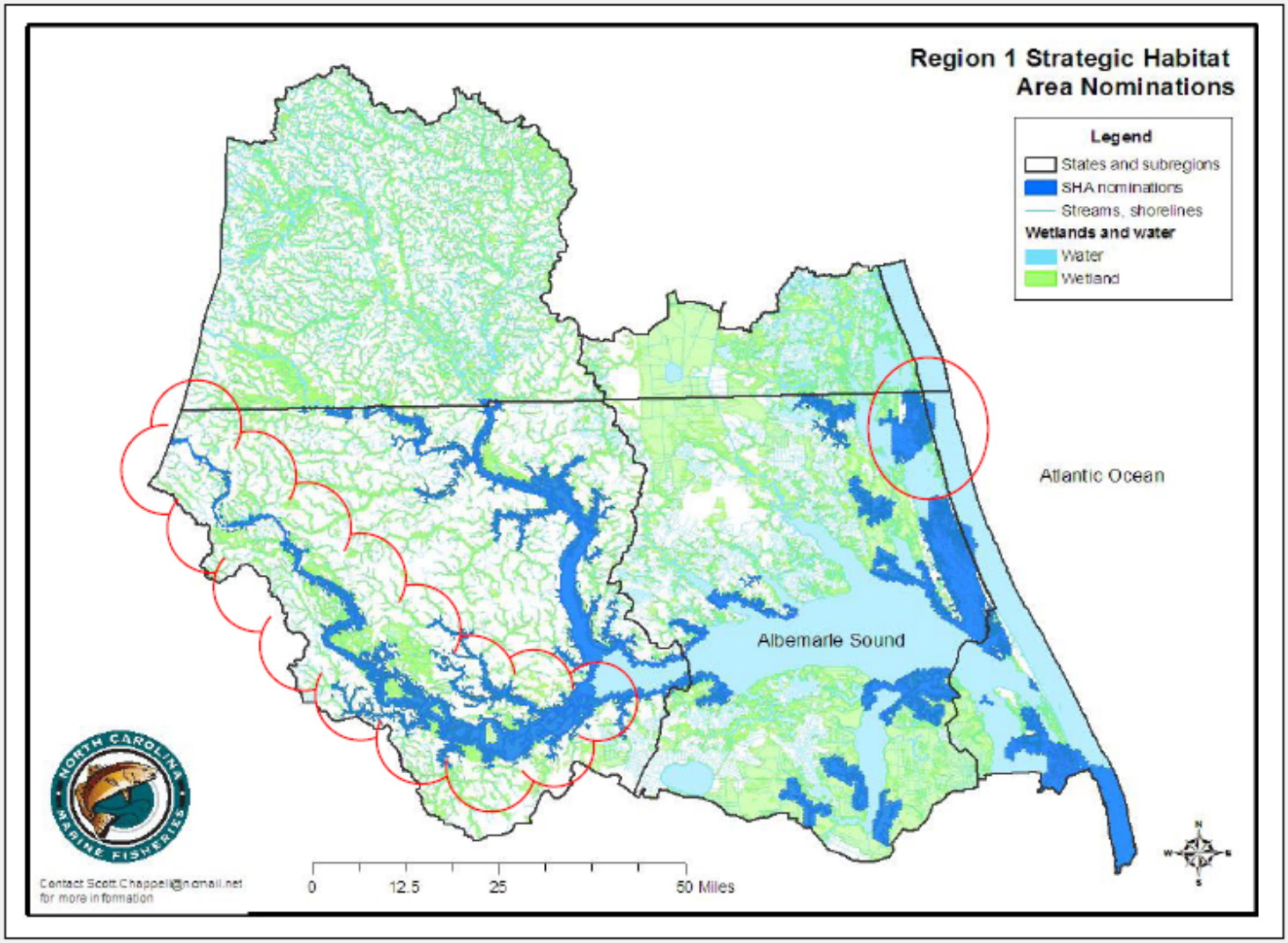

Figure 4. Region 1 Strategic Habitat Area Nominations, North Carolina, 2010.

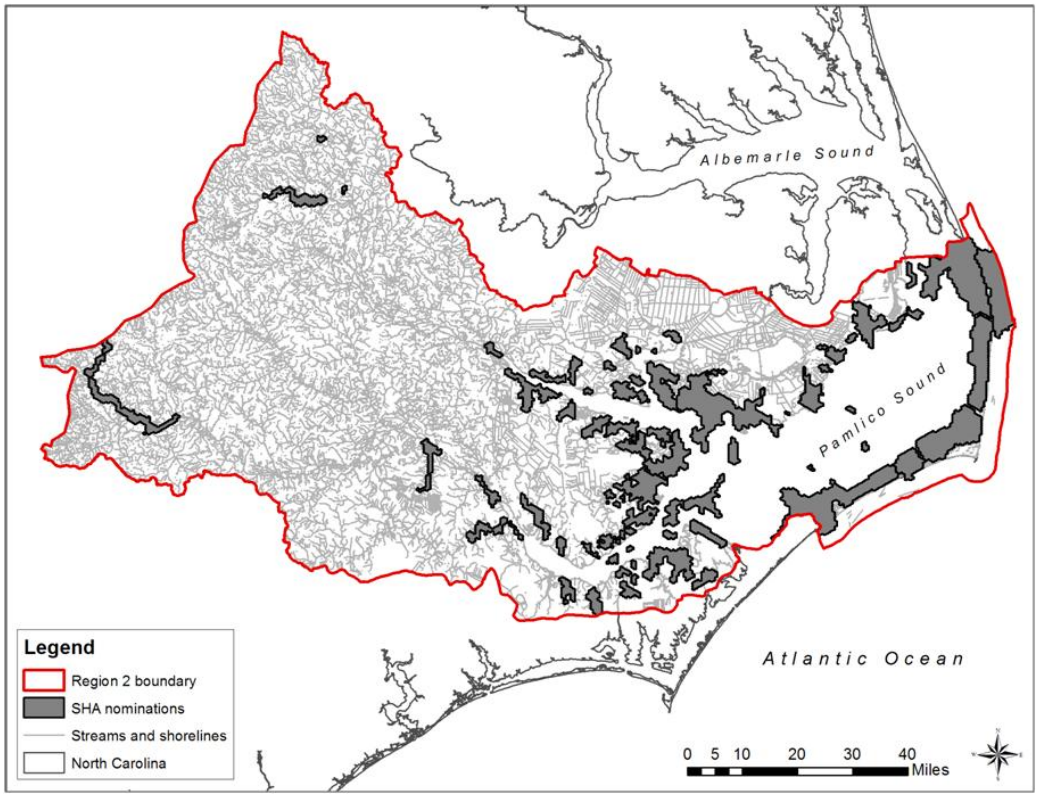

Figure 5. Region 2 Strategic Habitat Area Nominations, North Carolina, 2011 (NCDMF 2011).

South Carolina
Atlantic Sturgeon Management Program
Compliance Report for the Year 2012

October 1, 2013

Prepared by:

Marine Resources Division &
Freshwater Fisheries Section
South Carolina Department of Natural Resources

I. INTRODUCTION

Harvest of Atlantic sturgeon is not allowed in South Carolina territorial waters. No significant changes to the state-directed monitoring of sturgeon populations or state regulations pertaining to sturgeon were made in 2012.

II. REQUEST FOR *de minimis* - Not applicable.

III. ATLANTIC STURGEON MANAGEMENT PROGRAM

A. Fishery Dependent Monitoring:

Not applicable. No commercial or recreational fishery exists.

B. Fishery Independent Monitoring:

Fishery independent data related to South Carolina's sturgeon populations are acquired through the combined efforts of both the Marine Resources Division and Freshwater Fisheries Section of the SCDNR.

Marine Resources Division Efforts

Assessing Recruitment

Juvenile Atlantic sturgeon sampling is being conducted on the Edisto River and has been since 1994. The sampling in 1994 and 1995 was incidental to tagging studies being conducted on American shad. However, from 1996 through 2012, sampling activities were directed for juvenile sturgeon with gear modified to capture age-1 sturgeon effectively. The sampling period has been standardized as 4 days/month during May-September. The presence of nominal age-1 fish is indicative of an extant spawning population of Atlantic sturgeon in the Edisto River system. In 2012, 66 Atlantic sturgeon were tagged in the Edisto River (526-1289 mm FL), 0 of which were nominal age-1. There were 7 recaptures. Thus, if this standardized sampling is a valid indicator, annual recruitment of age-1 fish is highly variable, at least in this river system. Zero, nominal age-1 fish may be caused by low flow and high salinity in the sample site.

Table 1: Edisto River captures and recaptures of sturgeon from 2004 through 2012.

2004	Initial Captures	Recaptures
Atlantic Sturgeon	214	69
2005		
Atlantic Sturgeon	150	46
2006		
Atlantic Sturgeon	154	39
2007		
Atlantic Sturgeon	34	13
2008		
Atlantic Sturgeon	30	7
2009		
Atlantic Sturgeon	75	6
2010		
Atlantic Sturgeon	76	14
2011		
Atlantic Sturgeon	81	13
2012		
Atlantic Sturgeon	66	7

Assessing Migration

Juvenile Atlantic sturgeons are being tagged with external tags (Hallprint nylon dart tags) and PIT (passive integrated transponder) tags and acoustic transmitters. Information on migratory activity is supplied to NMFS through annual progress and completion reports. Recapture data have been analyzed to determine movements among estuarine or river systems. Tagged fish have been reported from as far south as St. Augustine, FL and as far north as Delaware. In past years, recaptures of Atlantic sturgeon outside the Edisto River were reported in trawls in the St. Helena Sound or adjacent Atlantic Ocean coastal areas during late fall through early spring. One Atlantic sturgeon (20.95kg) has been reported, captured in a trawl, by SEAMAP just off the South Carolina coast. However, in recent years no recapture events were reported from other sources outside DNR. There is little doubt that trawlers are still capturing Atlantic sturgeon, but unfortunately many commercial fishers (certainly in South Carolina) are now unlikely to report sturgeon captures or tags found in such animals. Thus, other basin transfer observations would likely be unavailable.

Since juvenile Atlantic sturgeon typically move into coastal bays and near shore ocean waters during winter to early spring, it seems very probable that numerous tagged animals have been cumulatively taken over past years in the lower portions of the Santee River, the Winyah Bay complex, the Savannah River, and near shore Atlantic Ocean waters adjacent to these drainage mouths. The statewide reported by-catch of Atlantic sturgeon from the shad gill-net fishery in 2012 was 205 (none were reported from herring fisheries), all but 11 from the Winyah Bay and Santee Systems. Thirty-five shortnose sturgeon were reported as incidental catches in 2012. However the potential problem of misidentification should be noted. (SCDNR POC: postb@dnr.sc.gov; collinsm@dnr.sc.gov)

Freshwater Fisheries Section Efforts

In 2012, various sampling efforts designed for shortnose sturgeon, but applicable to Atlantic sturgeon in the freshwater and estuarine rivers, particularly sub-adults, were conducted. These included gillnetting with either 5.5 inch stretched mesh, 5 – 7 – 9 inch stretched mesh alternating panel experimental, and 5.5 inch top panel 2.5 inch bottom panel gill nets. Fifteen Atlantic Sturgeon were captured in 2012 by the Freshwater Fisheries Section.

C. Atlantic Sturgeon Regulations in Effect:

Harvest Controls

South Carolina Code of Laws

SECTION 50-5-1505. Taking of shad, herring, or sturgeon.

The department must monitor the various drainage basins and water bodies of this State and may promulgate regulations to set seasons, take (catch) and size limits, areas, methods, times, equipment requirements, and catch reporting requirements for taking of shad, herring, and sturgeon as needed for proper management in each basin or water body as a zone. It is unlawful to take or attempt to take shad, herring, or sturgeon except as authorized by this article. It is unlawful to possess more than the legal limit of shad, herring, or sturgeon**.**

SECTION 50-5-1508. Zones, seasons, times, catch limits, size limits, methods and equipment for taking sturgeon.

In addition to other provisions of law, the following provisions govern seasons, times, methods, equipment, size limits, and take limits in fishing for Atlantic sturgeon in the waters of this State:

(a) Territorial sea:
Season: **No open season**.

(b) Internal waters:
Season: **No open season**.

Maximum size limit – Not applicable.

Commercial restrictions – No commercial harvest allowed in South Carolina waters.

D. Atlantic Sturgeon Harvest:

Recreational Harvest Data – Not applicable.

Commercial Harvest Data – Not applicable.

Non-harvest losses – Unknown.

E. Progress Related to Habitat Recommendations:

(See Section V. subsection C. below.)

IV. PLANNED ATLANTIC STURGEON MANAGEMENT PROGRAM

A. Summary of Regulations:

No changes anticipated from 2012.

B. Planned Monitoring Activities:

Fishery dependent and fishery independent sturgeon monitoring activities described will continue in 2013 without significant change.

C. Changes from 2012:

No changes in South Carolina's current overall Atlantic sturgeon management program or strategy are anticipated to occur in 2013.

V. PLAN SPECIFIC REQUIREMENTS

A. By-catch Monitoring

Mandatory catch and effort reports were required from South Carolina shad fishermen in 2012 and included reporting requirements for incidental catches of Atlantic and shortnose sturgeon. The 2012 catch reports had records of 205 Atlantic and 35 shortnose sturgeon (the Atlantics were caught mostly from the Winyah Bay and Santee System). No data were available on the mortality associated with these incidental captures. The actual, overall level of by-catch in the shad gillnet fishery is most likely under-reported, and its impact on achieving the goals and objectives of the Atlantic sturgeon FMP is not really known. Better documentation of the by-catch in gillnet and trawl fisheries statewide is certainly desirable. (SCDNR POC: postb@dnr.sc.gov ; collinsm@dnr.sc.gov)

B. Monitoring Results

(See Section III. Subsection B. above.)

C. Habitat Status

Preservation of Existing Habitat

The SCDNR is working closely with federal agencies to identify Atlantic sturgeon and other anadromous fish habitat and the type of threats posed to populations of sturgeon due to habitat alteration. The Edisto River survey (1994-2012) has demonstrated the apparent preference, of age-1 and -2 Atlantic sturgeon to a region of several miles within, and immediately inland of, the zone of movement of the fresh/brackish water interface from late winter through late fall. Fish of these cohorts, and apparently older animals within the river, redistribute themselves seaward and into sounds, bays and near shore ocean waters during the winter period of lowest water temperature. Otherwise, more inland river reaches

(not yet delineated) provide essential habitat for some older animals (generally > age 2) that select riverine habitats for summer residency.

SCDNR biologists make recommendations to regulatory agencies that will minimize or eliminate threats to current habitat quantity and quality that may affect stocks of Atlantic sturgeon. Current knowledge of spawning and nursery habitat locations is not sufficient in most cases to provide specific input on habitat areas of particular concern. There is however a generalized commitment to preserve and protect important riverine and associated wetland habitats that are integral to the success of anadromous and other species. Various authorities (e.g., Section 404 of the Clean Water Act, Farm Bill, Fish and Wildlife Coordination Act, FERC relicensing and other dam-related studies) are utilized to review most newly proposed development activities that would adversely affect anadromous fish habitat. SCDNR biologists work closely with staff from USFWS and NMFS in developing recommendations to protect habitat utilized by Atlantic sturgeon.

The lack of adequate data on essential fish habitat for Atlantic sturgeon in most South Carolina riverine systems hampers efforts to designate waters as High Quality Waters or Outstanding Resource Waters relating to sturgeon protection. In the coastal zone, the Outstanding Resource Waters category is most often utilized to protect shellfish resources. Although specific data related to the importance of particular areas to Atlantic sturgeon stocks is often lacking, the SCDNR plays an active role in conjunction with federal agencies in maintaining and improving water quality throughout the state. SCDNR staff work closely with the Department of Health and Environmental Control (DHEC) in providing input on water quality issues that relate to fishery and wildlife needs.

The SCDNR plays a significant role in monitoring and protecting coastal habitats important to sturgeon and other diadromous species. Water quality criteria specific to Atlantic sturgeon spawning and nursery areas have not been established but it is believed that established water quality standards would be adequate for this species. The SCDNR provides input on federal permits and licenses required by the Clean Water Act, Federal Power Act and National Pollutant Discharge Elimination System (NPDES).

Avoidance of Incompatible Activities

The introduction of compounds known to be accumulated in Atlantic sturgeon tissues, and which pose a threat to human or Atlantic sturgeon health, is reduced or eliminated through the previously mentioned water quality monitoring and regulation programs administered by SCDNR, DHEC and federal agencies. The establishment of windows of compatibility for activities adversely affecting Atlantic sturgeon life stages and their habitats is hampered by a scarcity of Atlantic sturgeon specific data regarding habitat utilization and life stage requirements. Activities such as navigational dredging, bridge construction, wetland alterations and dredged material disposal are commented on by state

agencies in terms of their effect on the general ecosystem when specific information relative to Atlantic sturgeon is unavailable. The effectiveness of such comments will be greater as more information on habitat utilization and requirements for Atlantic sturgeon becomes available.

Water withdrawals from spawning or nursery habitats for power generation and cooling, irrigation, water supply projects etc., are recognized as posing potential threats to Atlantic sturgeon stocks. Power plant and municipal water supply withdrawals require an Army Corp of Engineers permit for intake structures and SCDNR staff have the opportunity to comment on possible adverse effects on fishery resources. Removals for irrigation are not adequately monitored or controlled at this time. Recent attention has been focused on maintaining minimum in-stream flows necessary for the health of anadromous fish stocks in dam-controlled rivers. Attention to these factors is particularly important during severe drought cycles that have been periodically experienced in South Carolina and other southeastern states.

Habitat Restoration, Improvement and Enhancement

An interagency team consisting of the USFWS, NMFS and, SCDNR have completed the Santee-Cooper Basin Diadromous Fish Restoration Plan. One objective of this plan is to restore and enhance populations of these species in the Santee-Cooper basin. The intent of the plan is to: restore spawning and maturation habitats, access to these habitats and address required fishery related elements of the Federal Energy Regulatory Commission (FERC) re-licensing process for power generation facilities within the basin. Prospective partners in addition to the SCDNR, the USFWS and NMFS, include the U. S. Army Corps of Engineers, South Carolina Electric and Gas Company, Santee-Cooper, Duke Power Company, Lockhart Power Company and others managing and using the public-owned water resources of the basin. A similar plan is under development for the Savannah River basin where multiple dams are also undergoing the FERC-relicensing process. Also, FERC-relicensing is underway for Blewett Falls Dam, just across the South – North Carolina state line, on the Pee Dee River. Strategies to be employed to effect restoration of diadromous resources include:

1. Identify needs for upstream and downstream passage; instream flows; water quality; and habitat protection.
2. Identify required studies to determine modifications needed at each passage barrier within a particular basin.
3. Submit any such plan to FERC as a Comprehensive Plan under Section10 (a) (2) (a) of the Federal Power Act for consideration during the re-licensing procedure.
4. Participate with state and federal agencies and the ASMFC concerning management of fishing activities.

5. Direct re-licensing studies, enhancement, and restoration efforts as well as potential grant monies, towards identified research needs and fish enhancement or restoration projects.

The provisions of the Santee-Cooper Basin Diadromous Fish Restoration Plan apply to all diadromous species, but several proposed studies are directed at sturgeon. Although the emphasis at this time is on the shortnose sturgeon, it is anticipated that these studies will also collect data on Atlantic sturgeon that are encountered in sampling efforts. Proposed studies will be conducted in a cooperative effort between the Wildlife and Freshwater Fisheries Division and the Marine Resources Division of the SCDNR and possibly by non-government consultants.

Projected benefits of installing or improving fish passage facilities are usually measured in terms of increases in American shad and blueback herring. The upstream passage of adult Atlantic sturgeon may not be accomplished with facilities designed primarily for shad and herring, but additional studies may be conducted to make passage facilities as versatile as possible. Downstream passage facilities may also be a problem for adult Atlantic sturgeon and young of the year moving toward their estuarine over-wintering areas. The scope of restoration plans must be broad enough to consider these aspects of sturgeon restoration work.

At present, passage of both sturgeon species is under consideration for both Pinopolis Dam on Cooper River and Wilson Dam on Santee River. Funding for related studies may be obtained from Santee-Cooper Electric Cooperative as part of the requirements for the FERC-relicensing process.

The SCDNR, USFWS, The Nature Conservancy, the Army Corp of Engineers, and NMFS have discussed fish passage options as recently as 2010 for the Savannah River at the New Savannah Bluff Lock and Dam near Augusta, GA. There was a consensus to construct a passage facility capable of passing adult sturgeon as well as shad and river herring. Fish passage, possibly to include both sturgeons, may be an option at other facilities undergoing FERC-relicensing on the Savannah River. However, New Savannah Lock and Dam is the lowermost dam on the Savannah River, and passage of sturgeons must be accomplished there if these species are to have access to more inland dams.

D. Aquaculture Operations

There are currently no stock enhancement or commercial aquaculture activities involving sturgeon being conducted in South Carolina. There are no permitting procedures in place dealing specifically with sturgeon and any requests for permits would be dealt with on a case-by-case basis. There is no disease free certification procedure in place at the present time. It is anticipated that if commercial aquaculture activity were to be initiated the SCDNR would develop such procedures.

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
COASTAL RESOURCES DIVISION

MARK WILLIAMS
COMMISSIONER

A.G. 'SPUD' WOODWARD
DIRECTOR

October 1, 2013

Mike Waine
FMP Coordinator
Atlantic States Marine Fisheries Commission
1050 N. Highland St., Suite 200 A-N
Arlington VA, 22201

Mike:

Please find enclosed Georgia's 2012 Atlantic Sturgeon Compliance Report. Please let me know if you require additional information.

Sincerely,

Chris Kalinowsky

Chris Kalinowsky
Marine Fisheries Section

cc: Pat Geer
Spud Woodward

ONE CONSERVATION WAY | BRUNSWICK, GEORGIA 31520-8686
912.264.7218 | FAX 912.262.3143 | WWW.COASTALGADNR.ORG

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
COASTAL RESOURCES DIVISION

MARK WILLIAMS
COMMISSIONER

A.G. 'SPUD' WOODWARD
DIRECTOR

1. Introduction: Summary of the year: highlight any significant changes in monitoring, regulations, or harvest.

Georgia's Atlantic sturgeon fishery has been closed due to a moratorium since February 1997. Current Georgia regulation, Board of Natural Resources Rule 391-2-4-.04 (previously submitted), does not allow the harvest or possession of Atlantic sturgeon and does not provide for an open fishing season in state waters. This rule applies to anyone fishing for Atlantic sturgeon in Georgia waters, or landing, or offering Atlantic sturgeon for sale in Georgia. This moratorium was first implemented through an Emergency Rule effective February 1997 in anticipation of Amendment One to the ASMFC Atlantic Sturgeon Plan (Section 5.1.1.1). A permanent Rule was later adopted and became effective on May 13, 1997.

2. Request for *de minimis*, where applicable.

Not Applicable

3. Previous calendar year's fishery and management program.

Georgia's Atlantic sturgeon fishery has been closed due to a moratorium since February 1997. (GA Board of Natural Resources Rule 391-2-4-.04)

4. Planned management programs for the current calendar year.

Georgia's Atlantic sturgeon fishery has been closed and will remain closed due to a moratorium since February 1997. (GA Board of Natural Resources Rule 391-2-4-.04)

5. Plan Specific Requirements.

Fishery Dependent

A. Section 10 Application- Contact: Don Harrison (Ga. DNR-CRD)

In December of 2012, GA DNR received a Section 10 consultation from NMFS that addressed incidental bycatch of shortnose and Atlantic sturgeon in the commercial shad fishery. GA DNR is collecting and reporting sturgeon bycatch data from commercial shad trip tickets completed by fishermen and direct observer coverage on approximately 10% of all commercial shad fishing trips.

As a result of ASMFC Shad and River Herring Amendment 3 and to reduce incidental bycatch of shortnose sturgeon, new commercial shad fishing regulations took effect January 1, 2011. Changes in the commercial regulations closed the upper portions of Altamaha, Ogeechee, and Savannah rivers to commercial shad fishing gear. These changes reduced areas open to commercial shad fishing by 65%,

66%, and 35% respectively for the Altamaha, Ogeechee, and Savannah rivers. In addition, the Satilla and St. Marys rivers were entirely closed to commercial shad fishing.

B. Recreational Fishery- Contact: Kathy Knowlton (Ga. DNR-CRD)

In 2012, CRD continued to monitor the catch and effort of marine recreational anglers in Georgia through participation in the NMFS marine recreational fishing surveys (MRIP). During the survey year no Atlantic sturgeon were reported caught.

C. At-Sea Observer Program- Contact: Jim Page (Ga. DNR-CRD)

Coastal Resources Division (CRD) bycatch observers are available to perform fishery-dependent characterization work aboard commercial whelk trawl vessels. Observers recorded information from four tows on one whelk trip taken during the 2012 season. No sturgeon (Atlantic or shortnose) were observed during the 2012 season (Table 1). Though the potential does exists for these anadromous species to occur in this fishery, the use of turtle excluder devices (TEDs) greatly reduces such potential.

D. GADNR Trawl Characterization Cruises- Contact: Jim Page (Ga. DNR-CRD)

CRD biologists have conducted fisheries-independent monitoring and assessment of Georgia's commercially important crustaceans on a monthly basis since 1976. In March 2003, the monitoring of all finfish was implemented to provide a comprehensive trawl characterization study. Fifteen-minute tows of a 40' flat otter trawl are conducted monthly at 42 stations along Georgia's coast. Between January 1, 2012 and December 31, 2012, 494 tows totaling 124.8 hours of bottom trawling along Georgia's beaches, estuaries, rivers and creeks resulted in encounters with four Atlantic sturgeon (Table 1). All captured sturgeons were promptly returned to the water alive.

Table 1. Bycatch Assessment for Georgia Fisheries.

Fishery	Atl. Sturgeon Catch	Number Of Tows	Number of Trawl Hours
Whelk (observation)	0	0	0
GADNR Trawl Survey (independent)	4	494	124.8

Fishery Independent

A. Shad Survey- Don Harrison (Ga. DNR-WRD)

During Wildlife Resources Division's (WRD) fishery-independent monitoring of the adult shad populations in the Altamaha River, a drift gill net with a minimum 4-½ inch stretch mesh was used. In the 2012 sampling season, during a total of 15 days, 24 Atlantic and 9 shortnose sturgeon were encountered (Table 2). All sturgeon were measured and released alive. No population estimate could be made from this limited effort, but these data will be followed through time as a possible relative abundance trend indicator for the population (Table 3).

Table 2. Altamaha River sturgeon caught, measured, and released during WRD shad monitoring.

Date	*Species*	*Fork Length (mm)*	*Total Length (mm)*	*Temp(C)*
1/7/2012	Atlantic Sturgeon	610	690	10
1/7/2012	Atlantic Sturgeon	670	770	10
1/13/2012	Atlantic Sturgeon	523	616	11.7
1/13/2012	Atlantic Sturgeon	567	662	11.7
1/13/2012	Atlantic Sturgeon	590	689	11.7
1/13/2012	Atlantic Sturgeon	590	694	11.7
1/13/2012	Atlantic Sturgeon	616	714	11.7
1/13/2012	Shortnose Sturgeon	760	860	11.7
1/27/2012	Atlantic Sturgeon	495	559	16.1
1/27/2012	Atlantic Sturgeon	538	621	16.1
1/28/2012	Atlantic Sturgeon	505	591	15.6
1/28/2012	Shortnose Sturgeon	498	580	15.6
2/4/2012	Shortnose Sturgeon	580	675	14.9
2/11/2012	Atlantic Sturgeon	517	605	14.1
2/11/2012	Atlantic Sturgeon	605	706	14.1
2/11/2012	Atlantic Sturgeon	648	762	14.1
2/11/2012	Shortnose Sturgeon	618	702	14.1
2/11/2012	Shortnose Sturgeon	860	981	14.1
2/18/2012	Atlantic Sturgeon	625	701	13.3
2/24/2012	Shortnose Sturgeon	668	980	17.2
2/25/2012	Atlantic Sturgeon	540	632	16.7
2/25/2012	Atlantic Sturgeon	628	718	16.7
2/28/2012	Shortnose Sturgeon	610	712	15
2/28/2012	Shortnose Sturgeon	695	751	15
3/6/2012	Atlantic Sturgeon	528	614	15.6
3/6/2012	Atlantic Sturgeon	574	674	15.6
3/6/2012	Atlantic Sturgeon	618	708	15.6
3/6/2012	Atlantic Sturgeon	624	730	15.6
3/6/2012	Atlantic Sturgeon	646	740	15.6
3/7/2012	Shortnose Sturgeon	768	880	15.6
3/15/2012	Atlantic Sturgeon	651	755	18.3
3/15/2012	Atlantic Sturgeon	689	803	18.3
3/15/2012	Shortnose Sturgeon	566	646	18.3

Table 3. Total numbers and CPUE by year for sturgeon caught, measured and released during WRD shad monitoring.						
Year	***Atlantic***	***CPUE (day)***	***CPUE (hour)***	***Shortnose***	***CPUE (day)***	***CPUE (hour)***
2011	13	0.81	0.10	4	0.25	0.03
2010	1	0.06	0.01	0	0.00	0.00
2009	2	0.11	0.01	4	0.21	0.03
2008	12	0.71	0.09	3	0.17	0.02
2007	5	0.25	0.04	9	0.45	0.08
2006	5	0.29	0.05	5	0.29	0.05
2005	0	0.00	0.00	1	0.06	0.01
2004	2	0.11	0.02	4	0.21	0.04
2003	1	0.06	0.01	1	0.06	0.01
2002	1	0.07	0.01	41	2.73	0.45
2001	4	0.21	0.04	7	0.37	0.06
2000	7	0.35	0.06	12	0.60	0.10
1999	21	1.05	0.18	5	0.25	0.04
1998	1	0.08	0.01	0	0.00	0.00
1997	3	0.27	0.05	3	0.27	0.05

B. Marine Sportfish Population Health Project- Contact: Chris Kalinowsky (Ga. DNR-CRD)

During 2012, CRD biologists conducted netting surveys designed to provide fishery-independent estimates of relative abundance for recreationally important finfish species. The two primary target species were spotted seatrout and red drum. Sampling gear consisted of 300' x 7' trammel nets (14" stretch outer panels, 2.75" stretch inner panel) and 300' x 9' gill nets (2.5" stretch). Sampling conducted in the Altamaha Sound consisted of 75 trammel and 108 gill net sets, and sampling in the Wassaw Sound consisted of 75 trammel and 108 gill net sets. No Atlantic sturgeon were caught.

Monitoring Results-

A. Riverine Movements of Atlantic sturgeon in GA- Contact: Doug Peterson (UGA)

UGA sturgeon research team completed year 2 of a 4 years study of the seasonal movements and habitat use of adults Atlantic sturgeon and shortnose sturgeon in coastal Georgia. A stationary telemetry array consisting of 136 Vemco VR2W acoustic receivers is currently in place across six Georgia rivers: the Altamaha River. Within the Altamaha Drainage (~800 rkm on the Altamaha, Ocmulgee, and Oconee Rivers), the UGA team has continued to maintain a total of 59 receivers on the Altamaha River, 18 on the Ocmulgee River, 20 on the Oconee River, 18 on the Ogeechee, 3 on the Satilla, and 3 on the St. Marys.

Acoustic Tagging of Adult Atlantic Sturgeon

During spring 2012, the UGA team implanted acoustic transmitters into 13 adult Atlantic sturgeon (28 since 2011) on the Altamaha River (Table 4). Adult Atlantic sturgeon were targeted from April through late June using large mesh (10”-16” stretch) multifilament drift nets in Altamaha Sound.

Of the 30 Atlantic sturgeon tagged in the Altamaha River during 2011 and 2012, 21 were documented during this reporting period on acoustic receivers in Georgia or South Carolina rivers.

Analyses of Atlantic sturgeon data conducted during this reporting period show that seasonal movements of these fish have been much more variable than those of shortnose sturgeon. Nonetheless, several patterns have started to emerge. Although additional data and analyses are needed to better define spatial

and temporal details of seasonal movement patterns, several informative examples of Atlantic sturgeon movements documented during this period are provided here:

Static Movements

Two Atlantic sturgeon tagged in 2012 (45347; 45371) showed static movement during this reporting period. Although this lack of movement could indicate that the tags were expelled or that the fish has died, long periods of static movement have been documented for adult Atlantic sturgeon in other river systems (e.g. Hudson River). Manual tracking of these individuals will be attempted during the next reporting period to better determine the fate of these fish.

Staging Movements

Several Atlantic sturgeon tagged in the Altamaha River in 2011 and 2012 (45350; 45354; 45356; 45357; 45358; 45353; 45374; 45379; 45380) were detected moving within the lower Altamaha (< rkm 150) during this reporting period, but none of these fish moved upstream of the confluence where suitable spawning habitat has been previously identified. (rkm 250). Although inferences regarding these movements should be made with caution, they are consistent with pre-spawn "staging" behaviors reported by researchers working in other Atlantic coast rivers.

Spawning Movements

Several Atlantic sturgeon made extensive (>250 rkm) upstream migrations during this reporting period. These movements are likely indicative of a fall spawning migration because of the water temperatures during this period, and because the upstream terminus of these movements coincided with suitable spawning habitats in the lower Ocmulgee (just upstream of the confluence). Four of the Atlantic sturgeon tagged in 2011 (Figure 1) and two Atlantic sturgeon tagged in 2012 (Figure 2) were documented making these potential spawning migrations during this reporting period. Movements of tagged adults provided no evidence of spawning activity at any time except during the fall months of Sept-Dec. Water temperatures were favorable for spawning from mid Oct-Nov.

Table 4. Acoustic tagging data for adult Atlantic sturgeon from the Altamaha River, Georgia, 2012.

Date	Species	PIT Tag #	Transmitter #	FL (mm)	TL (mm)
4/21/2012	A. oxy.	900118001146513	45370	1600	1790
5/14/2012	A. oxy.	900118001169368	45349	1710	2040
5/17/2012	A. oxy.	900118001169946	45379	1930	2220
5/17/2012	A. oxy.	900118001146313	45376	1460	1640
5/18/2012	A. oxy.	900118001169244	45380	1880	2120
5/18/2012	A. oxy.	900118001171021	45371	1700	1950
5/21/2012	A. oxy.	90011800116995	45373	1660	1870
5/23/2012	A. oxy.	452F257B1F	45377	1950	2240
5/25/2012	A. oxy.	900118001164328	45378	1940	2220
5/31/2012	A. oxy.	452F582C40	45374	2000	2130
6/11/2012	A. oxy.	900118001168604	45353	1640	1940
6/15/2012	A. oxy.	900236000056783	45351	1650	1870
6/15/2012	A. oxy.	900236000056795	45347	1830	2040

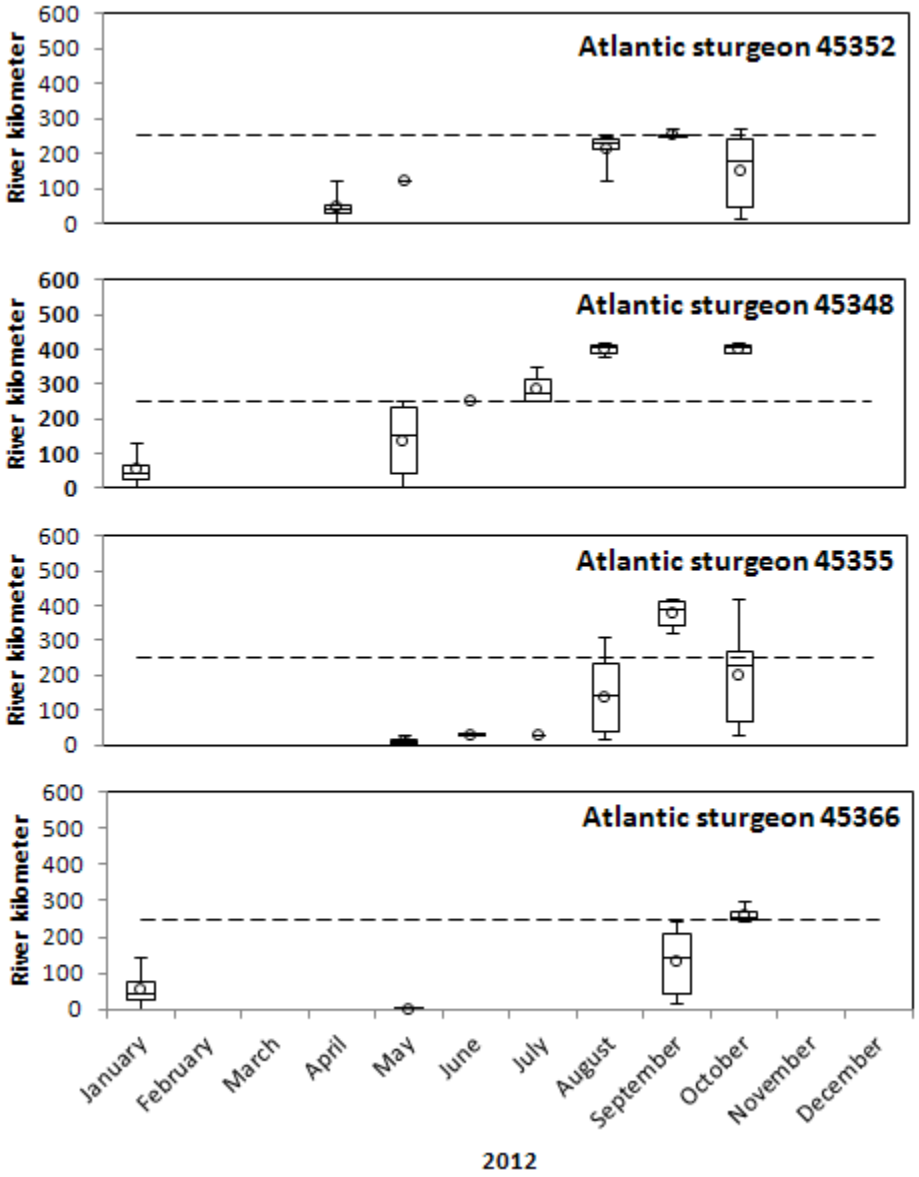

Figure 1. Examples of possible spawning migrations of four individual Atlantic sturgeon (45352; 45348; 45355; 45366) in the Altamaha River system (originally tagged in 2011). Movements are represented as unique daily locations by river kilometer (rkm) during each month. Areas of suspected spawning habitat are located above the Altamaha River confluence (rkm 250; represented by the dashed line). Whisker bars represent maximum and minimum river kilometer (rkm) when available. Boxes represent 2nd and 3rd quartiles of rkm locations for each month when available. Average rkm location for each month is represented by (°) when available.

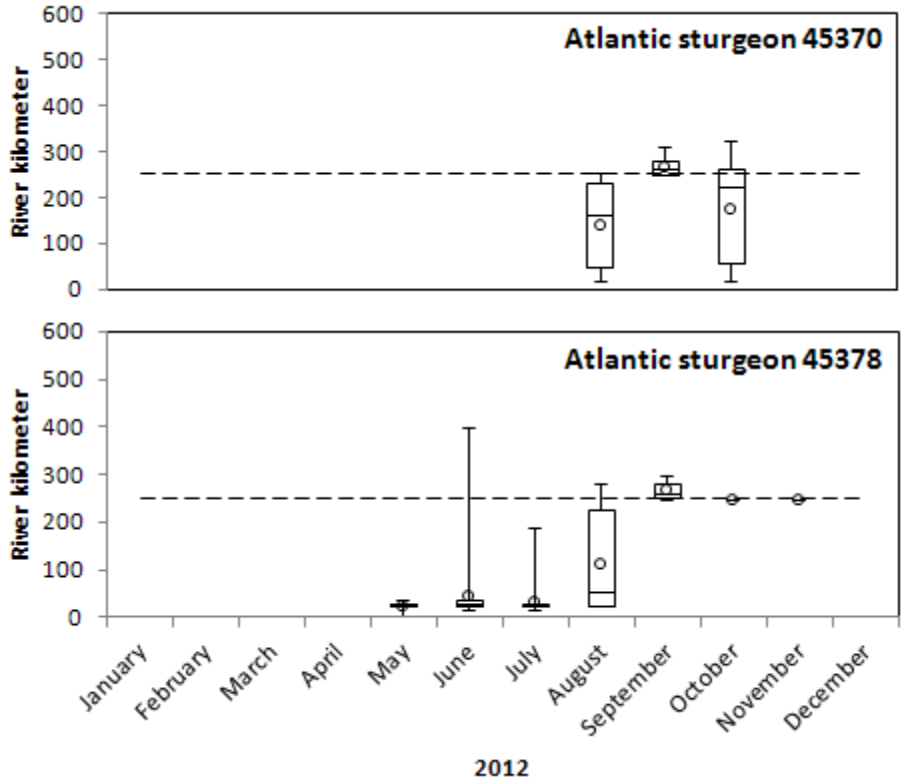

Figure 2. Examples of possible spawning migrations of two individual Atlantic sturgeon (45370; 45378) within the Altamaha River system (originally tagged in 2012). Movement is represented as unique daily locations by river kilometer (rkm) per month. Areas of suspected spawning habitat are located above the Altamaha River confluence (rkm 250; represented by a dashed horizontal line). Whisker bars represent maximum and minimum river kilometer (rkm) when available. Boxes represent 2nd and 3rd quartiles of rkm location for each month when available. Average rkm location for each month is represented by (°) when available.

Habitat Status-

A. Water Quality- Contact: Kelie Moore (Ga. DNR-CRD)

The GA DNR has been providing input on the water quality regulations and associated consistency with the Coastal Zone Management Act to promote protection of Atlantic sturgeon. CRD and EPD are on the Corps of Engineers (COE) Interagency Review Team (IRT) that reviews, makes recommendations in coordination with WRD and provides regulatory approval for various projects occurring within waters of the United States.

B. Savannah Harbor Deepening- Contact: Kelie Moore (Ga. DNR-CRD)

The Port of Savannah is the second busiest port in the United States for containerized cargo. For several years, the Georgia Port Authority (GPA) has sought to deepen the harbor from 42 to 47 feet. As a Trustee Agency, DNR is committed to providing oversight to GPA. An interagency fisheries committee helped determine that the deepening project would alter water flows in the vicinity of the Savannah River National Wildlife Refuge and affect freshwater intertidal wetlands (including sturgeon habitat). The final Record of Decision (ROD) was signed in October 2012 that included a plan for mitigating these impacts that will be put into place before construction begins and which will be monitored for 10 years. CRD, EPD and WRD will review monitoring results to determine if the mitigation features perform as expected and whether or not those impacts exceed those predicted in the Final Environmental Impact Statement. The resource agencies approved a Scope of Work in March 2013 for Atlantic sturgeon habitat impacts that include telemetry studies performed by the South Carolina Department of Natural Resources to collect information, analyze data, and provide reports to the Corps and Georgia DNR. Dredging is not anticipated to begin prior to 2014.

Aquaculture Operations Authorized, Status of Regulations, Disease-Free Certification Status, etc.

A. Bears Bluff and Warm Springs National Fish Hatcheries- Contact: Kent Ware (F.W.S)

The US Fish and Wildlife Service currently maintains eight adult Atlantic sturgeon at the Bears Bluff National Fish Hatchery in South Carolina. Four fish were acquired during fall of 2008, four were acquired during spring of 2009, and an additional fish was acquired during the spring of 2010. All fish were captured from the Altamaha River population. Unfortunately one fish was lost during routine fish lice treatment in July, 2010 due to an ammonia spike in a re-circulating system. All of the fish have responded well to feeding and a successful protocol has been developed to initiate feeding of wild fish held in captivity. Two fish had released eggs while in captivity, unfortunately both events occurred during the fall and sperm were unavailable. In both cases eggs were slightly over ripe, and it appeared that fall spawning (rather than conventional life-history theory of springtime spawning) might be a real possibility for Atlantic sturgeon.

The Atlantic sturgeon holding regime was adjusted in 2011 to explore the options for fall spawning at Bears Bluff. The sturgeon responded favorably to the environmental conditions, and several animals produced eggs. Progeny are now hatching (the week of Sept 26^{th,} 2011). The 2011 cohort of juvenile sturgeon will be used for tag-retention and similar studies, in preparation for hatchery propagation of this species for a potential (future) reintroduction effort in the St. Marys River system. These fish will not be used for stocking purposes.

Approximately 7000 Atlantic sturgeon fry were hatched from the one female spawned in September of 2011. Two female and two male Atlantic sturgeon were again spawned in September 2012.

Approximately 7,500 sturgeon fry were hatched from the 2012 effort. Noteworthy observations include the fact that each pair of spawning adults were held in separate recirculating systems and females ovulated within 24 hours of each other. In addition, one female was a repeat spawner from 2011. No hormone intervention was used to induce spawning in 2011 or 2012. Fish were allowed to spawn naturally in tanks using a temperature regime designed to mimic naturally occurring temperature regimes common in southern rivers. Groups of progeny from each successful spawning event are currently being reared at the Bears Bluff NFH, SC and the Welaka NFH, FL for research purposes.

Use of these captive sturgeon has provided a unique opportunity for FWS staff and cooperating researchers to improve our understanding of spawning behavior in Atlantic sturgeon and to refine techniques for consistent spawning, rearing and handling of Atlantic sturgeon in captivity. Resulting progeny from captive spawning activities are currently available to cooperating researchers to complete important life history studies necessary for restoration of this unique species.

The US Fish and Wildlife Service also had one 1998 year-class Atlantic sturgeon in its possession at the Warm Springs National Fish Hatchery in Warm Springs, Georgia, but it was subsequently transferred (June 15, 2006) to the Flint River Aquarium, in Albany, Georgia, for display purposes. This animal was the remnant Atlantic sturgeon received from USFWS Fish Technology Center in Lamar, Pennsylvania, for use in a study comparing growth, survival, and morphometrics of Atlantic sturgeon verses Gulf sturgeon. This fish was offspring from Hudson River stock.

Atlantic States Marine Fisheries Commission
Annual Compliance Report:
Florida Fish and Wildlife Conservation Commission:
Atlantic and Shortnose sturgeon

FY 2012-2013
Submitted September 26, 2013

Shortnose sturgeon: *Acipenser brevirostrum*

Reported by-catch: zero
Incidental take: zero
Collected for scientific research: zero
Aquaculture: produced for food production: zero
Aquaculture: produced for restoration/restocking: zero

Atlantic sturgeon: *Acipenser oxyrinchus oxyrinchus*

Reported by-catch: zero
Incidental take: zero
Collected for scientific research: zero
Aquaculture: produced for food production: zero
Aquaculture: produced for restoration/restocking: zero

Commercial producers of non-native sturgeons continue to desire for the Sturgeon Production Working Group of the Florida Department of Agriculture and Consumer Affairs to pursue an ESA exemption for food production of shortnose sturgeon in Florida. While Florida FWC has not established an official position on this issue, the low incidence of wild-capture of this species in Florida suggests that minimal genetic risk exists to a native population from inland food production aquaculture of shortnose sturgeon.

The St. Marys River continues to be assessed for water quality by the St. Johns River Water Management District, the Georgia Department of Natural Resources (GaDNR), the USFWS, and the University of Georgia. USGS and USFWS teams have continued to conduct side-scan sonar assessments of stretches of the St. Marys River to explore for potential spawning sites and benthic regions needing rehabilitation or dredging to restore natural conditions.

FWC regulations regarding Special Activity Licenses authorizing release of captured-for-monitoring and/or cultured-for-restoration/recovery-release insure that neither new nor old diseases and parasites, nor genetically inappropriate stocks, are introduced to Florida waters.

FWC has an Atlantic sturgeon Species Action Plan, focusing on the St. Marys, Nassau, and St. Johns Rivers, for which FWC is currently soliciting public

comment. All interested parties are invited to provide comment: http://share1.myfwc.com/ISMP/Saltwater%20Fish%20Management%20Plans/Atlantic%20Sturgeon%20Draft%20Species%20Action%20Plan.pdf

Jeffrey Wilcox, Ph.D.
Fish Taxa Coordinator,
Species Conservation Planning
Florida Fish and Wildlife Conservation Commission
Tallahassee, Florida

Atlantic States Marine Fisheries Commission

1050 N. Highland Street • Suite 200A-N • Arlington, VA 22201
703.842.0740 • 703.842.0741 (fax) • www.asmfc.org

MEMORANDUM

January 9, 2014

TO: Atlantic Sturgeon Management Board

FROM: Tina Berger, Director of Communications

SUBJECT: **Advisory Panel Nomination**

Attached for your review and approval is a nomination to the Atlantic Sturgeon Advisory Panel – John Pedrick, a recreational fishermen from Pennsylvania. Since the Atlantic Sturgeon AP has not met for over a decade, the Board might want to consider reviewing the attached membership and updating as necessary. It is anticipated that the panel will meet over the next couple of years as the Commission develops the upcoming benchmark assessment and considers possible management responses to that assessment.

Enc.

M14-03

ATLANTIC STURGEON ADVISORY PANEL

Bolded names await approval by the Atlantic Sturgeon Management Board
Bolded and italicized name denotes Advisory Panel Chair January 9, 2014

Maine
Vacancy

Rhode Island
Vacancy

New York
Jon Powell (comm/gillnet)
P.O. Box 279
Round Top, NY 12473
Phone (day): (518)828-4181
Phone (eve): (518)622-2058
Appt. Confirmed: 10/24/96
Appt. Reconfirmed 9/15/00
Appt. Reconfirmed 9/04
Appt. Reconfirmed 9/08

Roger Tollefsen (processing/marketing)
252 East Montauk Highway
Hampton Bays, NY 11946
Phone (day): (516)728-3474
Phone (eve): (516)728-3082
FAX: (516)728-3690
Appt. Confirmed: 10/24/96
Appt. Reconfirmed 9/15/00
Appt. Reconfirmed 9/04
Appt. Reconfirmed 9/08

Recreational vacancy

New Jersey
James Brindley
P.O. Box 977
Barnegat Light, NJ 08006
Appt. Confirmed: 10/24/96
Appt. Reconfirmed 9/15/00
Appt Reconfirmed 2/9/06
Appt Reconfirmed 5/17/10

Delaware
Michael Joseph Doebley (rec)
227 Clinton Street, Box 131
Delaware City, DE 19706
Phone (day): (302) 668-8246
Phone (eve): (302)836-1361
Email: mjdoebley@verizon.net
Appt. Confirmed: 10/24/96

Pennsylvania
John Pedrick (rec)
936 Langstroth Lane
Bensalem, PA 19020
Phone (day): 215.817.3929
Phone (eve): 215.633.6777
jjpedrick@verizon.net

Maryland
Mary Kilbourne (naturalist)
14706 Willoughby Road
Upper Marlboro, MD 20772
Phone (day): (301)627-6074
Phone (eve): (301)627-3741
Appt. Confirmed: 10/24/96
Appt. Reconfirmed 9/15/00
Appt. Reconfirmed 9/04
Appt. Reconfirmed 9/08

Georgia
Vacancy (comm)

REC'D 1/17 MAR

ATLANTIC STATES MARINE FISHERIES COMMISSION

Advisory Panel Nomination Form

This form is designed to help nominate Advisors to the Commission's Species Advisory Panels. The information on the returned form will be provided to the Commission's relevant species management board or section. Please answer the questions in the categories (All Nominees, Commercial Fisherman, Charter/Headboat Captain, Recreational Fisherman, Dealer/Processor, or Other Interested Parties) that pertain to the nominee's experience. If the nominee fits into more than one category, answer the questions for all categories that fit the situation. **Also, please fill in the sections which pertain to All Nominees (pages 1 and 2). In addition, nominee signatures are required to verify the provided information (page 4), and Commissioner signatures are requested to verify Commissioner consensus (page 4). Please print and use a black pen.**

Form submitted by: Leroy Young (your name) State: PA

Name of Nominee: John Pedrick

Address: 936 Langstroth Lane

City, State, Zip: Bensalem Pa. 19020

Please provide the appropriate numbers where the nominee can be reached:

Phone (day): 215 817 3929 Phone (evening): 215 633 6777

FAX: _____ Email: jjpedrick@verizon.net

FOR ALL NOMINEES:

1. Please list, in order of preference, the Advisory Panel for which you are nominating the above person.
   1. Atlantic Sturgeon
   2. _____
   3. _____
   4. _____

2. Has the nominee been found in violation of criminal or civil federal fishery law or regulation or convicted of any felony or crime over the last three years?

   yes _____ no X

3. Is the nominee a member of any fishermen's organizations or clubs?

   yes X no _____

   If "yes," please list them below by name.

Delaware River Fishermans Assn

Delaware Valley Fly Fisherman

Trout Unlimited

4. What kinds (species) of fish and/or shellfish has the nominee fished for during the past year?

Sheepshead

Flounder

Striped bass

Trout

Salmon

5. What kinds (species) of fish and/or shellfish has the nominee fished for in the past?

Al lof above species and

Tuna

Drum

Steelhead

Largemouth Bass

Smallmouth bass

FOR COMMERCIAL FISHERMEN:

1. How many years has the nominee been in the commercial fishing business? _____ years
2. Is the nominee employed only in commercial fishing? yes_____ no_____
3. What is the predominant gear type used by the nominee?_____
4. What is the predominant geographic area fished by the nominee (i.e., inshore, offshore)?_____

N/A

FOR CHARTER/HEADBOAT CAPTAINS:

1. How long has the nominee been employed in the charter/headboat business? _____ years
2. Is the nominee employed only in the charter/headboat industry? yes _____ no_____

   If "no," please list other type(s)of business(es) and occupation(s):_____

   _____

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

   _____

N/A

FOR RECREATIONAL FISHERMEN:

1. How long has the nominee engaged in recreational fishing? 55 years

2. Is the nominee working, or has the nominee ever worked in any area related to the fishing industry? yes X no _____

   If "yes," please explain.

Commercial clammer Brigantine New Jersy 1964 to 1967

FOR SEAFOOD PROCESSORS & DEALERS:

1. How long has the nominee been employed in the business of seafood processing/dealing? _____ years

2. Is the nominee employed only in the business of seafood processing/dealing?

   yes _____ no X _____ If "no," please list other type(s) of business(es) and/or occupation(s):

N/A

Retired Conservation Officer for Pennsylvania Fish and Boat Commission

Retired Conservation Officer for Pennsylvania Fish and Boat Commission

Retired Conservation Officer for Pennsylvania Fish and Boat Commission

3. How many years has the nominee lived in the home port community? _____ years

   If less than five years, please indicate the nominee's previous home port community.

FOR OTHER INTERESTED PARTIES:

1. How long has the nominee been interested in fishing and/or fisheries management? 20 years

2. Is the nominee employed in the fishing business or the field of fisheries management? yes X no X

   If "no," please list other type(s) of business(es) and/or occupation(s):

Retired Conservation Officer for Pennsylvania Fish and Boat Commission

Retired Conservation Officer for Pennsylvania Fish and Boat Commission

Retired Conservation Officer for Pennsylvania Fish and Boat Commission

FOR ALL NOMINEES:

In the space provided below, please provide the Commission with any additional information which you feel would assist us in making choosing new Advisors. You may use as many pages as needed.

Nominee is and active advisor for both Striped Bass and American Eel boards

Nominee Signature: _____ Date: 6/22/2013

Name: John Pedrick
(please print)

COMMISSIONERS SIGN-OFF (not required for non-traditional stakeholders)

_____
State Director

_____
State Legislator

_____
Governor's Appointee