

Meeting Notes

Atlantic and Shortnose Sturgeon Research and Management: Past, Present, and Future

May 16-20, 2016

Shepherdstown, West Virginia

Hosted by the National Marine Fisheries Service (NMFS) and the U.S. Geological Survey (USGS)

http://www.nmfs.noaa.gov/pr/conservation/Sturgeon_2016_Workshop.html

Updates since the meeting:

NMFS and USGS would like to thank everyone for attending the meeting and finding your way out to Shepherdstown, WV. The week was very productive and within the notes below, there are many action items, which we hope you will all actively engage. Ideally, over the next year or two, the action items will be addressed, leading to improved conditions for sturgeon and advances in our ability to manage them. We plan to try to make this a biennial or triennial meeting, with the next scheduled for summer or fall of 2018 or 2019.

It is with incredible sadness that we share that Tim King will not be with us at future meetings. Tim unexpectedly passed away on September 30, 2016. For those interested in his legacy and the truly extraordinary breadth of his work, [his obituary is posted on the website](#). I wanted to convey what Tim meant to me, and likely most of us, on a more personal level. Tim was a friend, a mentor, a colleague, a collaborator, and a dedicated scientist. I'd get to stop in and visit about once a month or so, going through NMFS's highest priorities, discussing how his analyses could help us answer questions, and ultimately ensuring we could best manage our sturgeon species. He was one of those people who are so kind and easy going that it made working together really easy and enjoyable. He was so generous with his time; spending hours letting me fumble through a remedial understanding of genetics, correcting me where I was wrong without making me feel stupid. I'm selfishly unapologetic about how much of his time I wasted, yet fully aware I must have been a frustrating collaborator at times.

One of the last times I met up with Tim was about 9 pm in early September on a Wednesday evening heading back from the York River to northern Virginia, making a slight detour to meet Tim in eastern West Virginia. He was interested in finding a non-invasive DNA collection method that we could give to commercial fishermen to better identify bycatch. I had taken a few different samples from a number of fish so he could compare the quality of DNA from each collection type. We met on the side of the highway at a Burger King in Charles Town, West Virginia, in what I can only assume looked like your typical drug deal. Tim had a real love of cars and always had one that made me jealous (and in our case, likely made him look like the kingpin and me the low level pusher). This time he showed up in his new Honda SUV. We got out of our cars and walked across the parking lot to shake hands. But under my arm, I'm carrying a large, transparent plastic box full of vials, some with liquid, and some with what appear to be syringes or various swabs. I handed him the plastic box, and we chatted for a few minutes, then both returned to our cars and drove off. Possibly in any other state, police would have been on us immediately, but in West Virginia, I'm not sure anyone batted an eye. Were it not for his dedication, he likely wouldn't have gotten those samples until the end of my field season when I had time to resume our visits at USGS. In this case, that would have been too late.

Tim loved his job more than most of us who've chosen this field. I've talked to a lot of people who worried about how many hours Tim worked and whether he pushed too hard, but the hours Tim spent in the office running models or arranging databases weren't stressful for him. He genuinely enjoyed it. And the legacy he leaves is one that has made the entire sturgeon community better at our jobs. I think for a lot of us, particularly those further removed, it's easy to lose track of his contributions. His loss is likely to sink in months or years later when it's clear that replacing the extent and quality of work he was doing will be next to impossible. In the meantime, I look forward to continuing along the trajectory he has established.

Overarching Goals of the Meeting

- Where should we focus upcoming research efforts?
 - Threats based or demographics
 - Specific life stage
 - Genetics
- What are the greatest management needs to avoid jeopardizing populations at the present? What about in the future with critical habitat designation?
- NOAA's data and publication policy directive - discuss how this directive defines "data sharing" and what it means for the telemetry and genetic data issues.

Monday afternoon through Wednesday included presentations by researchers organized into five sessions: 1) threats, 2) genetics, 3) telemetry, 4) population dynamics, and 5) emerging technology. Each session was followed by a panel discussion among panelists and participants. Information presented and discussed during these sessions informed management discussions on Thursday and Friday.

Participants who presented and attended the first three days of the meeting are listed in Attachment 1. Those who attended the management discussions are listed in the notes.

Monday, May 16, 2016

Session 1: Threats

Location: National Conservation Training Center (NCTC)

Moderator: Andy Herndon (NMFS Southeast Regional Office)

Panel members: Andy Herndon, Stephania Bolden (NMFS Southeast Regional Office), Kim Damon-Randall (NMFS Greater Atlantic Regional Fisheries Office)

Session 1 Goals:

- Identify any new threats since 2012
- Extent of threats in each region – top 2 limiting factors
- Identify habitat fragmentation, habitat degradation (dams, spawning habitat, water quality), bycatch, and vessel strike

***Note: Abstracts for each presentation are available on meeting website.**

12:50 - 13:00 Introduction to Threats Session

- 13:00 – 13:20 [Thermal Effects on the Early Life-Stages of Shortnose and Atlantic Sturgeons.](#)
Chambers, R.C., E.A. Habeck, K.M. Habeck, and I. Wirgin
- 13:20 - 13:40 [Behavioral responses of sub-adult Atlantic Sturgeon \(*Acipenser oxyrinchus oxyrinchus*\) to electromagnetic and magnetic fields under laboratory conditions.](#)
McIntyre, A., G. Garman, A. Filippas, and C. Deloglos
- 13:40 - 14:00 [Contaminant and Co-stressor Effects on the Early Life-Stages of Shortnose and Atlantic Sturgeons](#)
Chambers, R.C., A.C. Candelmo, E.A. Habeck, K.M. Habeck, and I. Wirgin
- 14:00 - 14:20 [An overview of adult and juvenile Atlantic sturgeon research in the James River, VA](#)
Balazik, M., G. Garman, and A. Spells
- 14:20 - 14:40 [Abundance of adult Atlantic sturgeon in the York River and an assessments of the primary threat to the population.](#)
Kahn, J.E., C. Hager, and C. Watterson
- 14:40 - 15:00 [A Case Study of Atlantic Sturgeon on the Altamaha River, Georgia: Are We on the Road to Recovery?](#)
Bednarski, M.S. and D.L. Peterson
- 15:00 – 15:20 [2016 Review of the Fishery Management Plan for Atlantic Sturgeon.](#)
Appelman, M.
- 15:20 - 15:40 BREAK
- 15:40 - 17:00 **Threats Panel Discussion**
NMFS personnel provided participants with a matrix used for a Shortnose Sturgeon Biological Assessment (2010), which showed threats by river as reported in the Assessment. NMFS asked participants to complete the sheet and return by Wednesday for use in the management discussion. Participants were asked to provide citations if possible and note if they felt one river in a distinct population segment (DPS) was particularly important. In addition, participants were asked to include any missing or emerging threats that weren't included in the matrix, for example climate change and predation. Additional threats discussed during the panel discussion were threats in the marine environment. These threats include seismic testing, bycatch, wind fields, and shipping. For wind fields, both the construction of and the electromagnetic fields they produce were of concern to participants.
- Ship strikes** were of concern to several workshop participants. Rivers where ship strikes are a concern included the Kennebec River, Hudson River (Tappan Zee Bridge construction), Cape Fear River, Savannah River, Delaware River, and James River. Other systems may have this threat but it hasn't been documented yet. This may also be an issue at sea or in large bays, where we know little about the fate of sturgeon. The panel asked if additional outreach would be useful and workshop participants agreed it would be. Participants discussed the salvage network that is in place for marine

mammals that can serve as a model; and, the South Atlantic Fishery Management Council may be able to include sturgeon in their citizen science program. There was concern of altering the model for estimating mortality due to ship strikes for those areas that already have reporting in place. Participants noted there may be a seasonal component to the problem since sturgeon in some systems enter and leave the systems differently. The Greater Atlantic Regional Fisheries Office (GARFO) mentioned interest in more work on this threat.

The next threat discussed was **bycatch**. The panel asked: Is it a significant concern? Do we have enough information? Participants agreed there was not enough bycatch information available. Participants noted anecdotal information where fisheries incidentally caught sturgeon but didn't report them because it is not mandated. Some fisheries do have mandatory reporting but it is self-reporting or volunteer reporting. Fisheries that may be of concern for sturgeon bycatch include: winter skate fishery, shrimp fishery, and summer flounder trawl fishery. The panel asked how we could get a handle on this, and whether observers are needed. NMFS GARFO noted that New York has initiated mandatory observer reporting and bycatch reporting was mandatory. Virginia has also funded an observer program to monitor inshore gill net fisheries. North Carolina has an observer program as well to monitor gill nets in state waters.

Predation was the next threat discussed for the marine environment. Would sharks prey upon sturgeon? Sand tigers are probably not a major contributor to predation on sturgeon. A participant commented that at least one Atlantic sturgeon had been recorded as prey from a white shark, and they would try to locate the reference.

The panel moved on to discuss **wind fields and seismic testing**. Participants discussed wind lease areas and the potential impacts associated with them. There was an update on South Atlantic wind areas. Another threat proposed was impacts from hydrokinetic turbines in areas including the East River and/or Bay of Fundy and Minas Basin. It was agreed that wind lease areas should be identified as a threat, but it was suggested we don't know enough yet (i.e., where power lines would go, etc.).

A general discussion arose to determine if there are **opportunities to look at threats on a large scale**. One topic that arose was that the Environmental Protection Agency (EPA) recently issued regulations for cleaning up coal-ash areas and this may provide an opportunity for monitoring these discharges. NMFS GARFO acknowledged that we don't know whether water quality standards are protective for sturgeon. There is currently no testing protocol for sturgeon, but sturgeon should be used as a test species for toxins instead of surrogate species because sturgeon tend to be highly sensitive. NMFS Headquarters (HQ) suggested we should focus on known mortality and we (the group) divide the threats into "known" and "unknown" categories, which would assist managers in determining whether Endangered Species Act (ESA) section 7 or section 10 can be used to address whether state or federal agencies are the cause of some of the threats. It was also suggested that threats should be addressed by river and/or by life stage and to consider whether the same threats were affecting shortnose and Atlantic sturgeons in the same system.

Fish passage was the next threat discussed. NMFS Southeast Regional Office (SERO) noted that fish passage appears to be an issue but also noted dams were not considered a big threat in the Atlantic Sturgeon Status Review since most of the spawning habitat is still available. Current designs do not seem to be effective, but progress is being made as seen at the Holyoke Dam. A participant stated that the key term is “some rivers,” and on those rivers where dams are an issue, it is a big issue. It was suggested federal agencies develop requests for proposals (RFPs) and make a concerted effort to investigate fish passage at selected sites. It was also suggested that the problem isn’t just getting the fish past the dam, but also back down. A participant asked whether genetics could help determine if fish that pass up the stream are contributing to the juvenile population downstream. It was noted that NMFS and the U.S. Fish and Wildlife Service (USFWS) prescribe safe, timely, and effective up-stream passage, and the fact that we don’t have effective passage for downstream is why we haven’t been prescribing it. A workshop may be under development focusing on fish passage as it relates to sturgeon where West Coast and East Coast sturgeon researchers can meet and discuss issues. Additional factors that may be limiting fish passage is quantity of water since some methods require a lot of water. Additional options discussed were rock weirs or ramps as an option for fish passage for low-head structures. Cape Fear or Savannah may make good case studies.

Poaching was the next threat discussed for this session. Poaching is believed to occur in Delaware, Virginia, and in the Lower Eastern Shore of Maryland for both sturgeon species. There are also numerous reports of poaching in Georgia as well as suspected poaching at the mouth of the Hudson River. State and federal law enforcement personnel should be communicating with each other about this, and NMFS HQ should keep in contact with law enforcement to make sure they are reporting cases involving sturgeon to NMFS management. NMFS GARFO/SERO should reach out to the Atlantic States Marine Fisheries Commission (ASMFC) Law Enforcement Committee (LEC) and federal fishery management council LECs.

The last threat discussed for this session was **limiting factors**. While each river system faces different limitations, the question was: How do we establish partnerships to alleviate known limiting factors to increase populations? A number of ideas were put forward. It was mentioned that the EPA is considering improving their sensitivity criteria. An action area to be considered is Corps of Engineers flood plain work. There was concern of juveniles being pushed into higher salinity water by high discharge. It was also noted that NMFS SERO is working to consider other policies. Participants suggested NMFS HQ discuss the creation of off-channel habitat with the Corps of Engineers or Federal Emergency Management Agency. It was also suggested NMFS GARFO talk to the Port Authority about how to reduce ship strikes so the problem can be addressed where it occurs; this will take more partnerships. A participant noted an example where the Cape Fear Partnership was formed by NMFS to come up with a plan to improve populations of migratory fishes on Cape Fear. NMFS HQ Office of Habitat Conservation initiated this as a pilot project, which could serve as a model for sturgeon.

Tuesday May 17, 2016

Session 2: Genetics and Genomics

Location: USGS

Moderator: Tim King (USGS)

Panel: Tim King, Ike Wirgin (Department of Environmental Medicine, SUNY), Kim Scribner (Michigan State University)

Session 2 Goals:

- Agree on data management and tissue repository ownership and accessibility
- Discuss phylogenetics and population structuring – what we have, what we need
- ESA section 7 needs
- Recovery utility

- 8:10 – [A Nuclear DNA Perspective on Delineating Evolutionarily Significant Lineages in Polyploids: The Case of the Endangered Shortnose Sturgeon \(*Acipenser brevirostrum*\)](#)
8:30 King, T.L., A.P. Henderson, B.E. Kynard, M.C. Kieffer, D.L. Peterson, A.W. Aunins, B.L. Brown
- 8:30 - [Population Structure in Gulf Sturgeon](#)
8:50 Kreiser, B.
- 8:50 - [Identifying the fundamental unit of management and historical demographic patterns in the Atlantic Sturgeon: A genetic perspective](#)
9:10 King, T., J. Kahn, B. Lubinski, M. Rasser, R. Johnson, M. Eackles, I. Wirgin, L. Maceda, and B. Lellis
- 9:10 - [Use of Individual Based Assignment Tests in the Coastwide Management of Atlantic Sturgeon](#)
9:30 Wirgin, I., D. Fox, T. Savoy, and M. Stokesbury
- 9:30 - [Population genetic structure between fall and spring spawned Atlantic sturgeon \(*Acipenser oxyrinchus oxyrinchus*\) in the Edisto River South Carolina](#)
9:50 Farrae, D.J., T.L. Darden, and W.C. Post
- 9:50 - [Renewed Natural Reproduction of Atlantic Sturgeon in the Connecticut River and the Genetic Relationship of its Population to Others along the Atlantic Coast](#)
10:10 Wirgin, I., T. Savoy, and D.L. Peterson
- 10:10 - [Transitioning Atlantic sturgeon from population genetics to population genomics](#)
10:30 King, T.L., D. Kazyak, M. Eackles, R. Johnson, J. Kahn, and M. Rasser
- 10:30 - BREAK
10:50
- 10:50 - **Genetics and Genomics Panel Discussion**
12:00 The discussion revolved around genomics, tissue repository, tissue sharing, data sharing, and PARR (Public Access to Research Results).

With regard to **genomics**, one participant commented that while genomics allows for looking at gene flow patterns, neutral genetic markers can also get to that information. With genomics, you need to have hundreds of thousands of single nucleotide polymorphisms to get the same level of power that you have with microsatellite markers. The two approaches show the same pattern. There was agreement that with genomics you can further learn what adaptive differences are between rivers systems. It was questioned what managers would do with that information. Participants commented that being able to screen entire genomes enables you to select markers that are highly likely to be selective, or those that aren't. With genomics you can understand a lot of the "why" and "what if" questions that we don't understand now about the species, and we can prove whether or not the genetic polymorphisms have anything to do with variation.

With regard to data management, NMFS indicated there is a need to get a better handle on the **management of the genetic tissues**, who has access to them, and ultimately how managers can get access to the genetic information in a timely manner and allow researchers to publish their data. NMFS indicated current permits include requirements and instructions on how to collect and send in tissue for genetic analysis. A participant commented that when the tissue bank was located at the National Ocean Service (NOS), a form was sent to researchers who provided the samples anytime a tissue was requested, and the researchers would approve use of their tissues by other researchers. When the tissues were moved to USGS, this process did not continue. Participants believe the samples belong to the researcher who collected them and they should be made aware of others who want them and how they will be used. Researchers stated that since this practice was in place before, it should be the practice that is in place now.

NMFS HQ asked what would make it easier to manage samples and the tissue repository. A participant stated that the purpose of having a global repository is so everyone has access to these samples. Participants agreed, but also expressed concern that the researchers collecting the tissue should have a reasonable amount of time to use their tissue before releasing it to the public. NMFS HQ stated that researchers would like to retain proprietary rights even if submitted to the repository and asked, what is a reasonable period of time before making the samples available? They noted data sharing is an issue separate from the tissue. Participants noted researchers need to communicate needs. Some felt two years should be enough time to analyze and publish. Another suggested that researchers may need more years to address certain studies. The need for open collaboration was mentioned and others agreed and said they never had an issue with exchanging data with other collaborators. NMFS HQ suggested that we build in a provision that if a collector can't be contacted for a certain period of time, then the provision for contacting them for permission would no longer be applicable.

Some researchers asked, what is the use of a tissue repository if free access can't be maintained? They believe that is the purpose of having a global repository and felt sample ownership should be relinquished. However, it was noted that a lot of researchers spend a lot of time and money gathering the samples so they should have a reasonable amount of time to publish the information. Then why relinquish the tissue samples?

NMFS HQ believes because researchers are collecting under a federal permit and are collecting from an endangered species.

NMFS HQ is working on developing provisions (i.e., permit conditions) for researchers to choose the conditions under which they will share their tissues (e.g., at any time, after 2 years, after approval). A participant indicated they don't mind sending in samples but asked why the genetic information isn't sent back to them when the analysis is completed. NMFS HQ noted they should reserve the right to negotiate with the researchers and that data sharing is something that needs to be worked out.

The next topic of discussion was **Public Access to Research Results** (PARR), which requires making data publicly accessible. PARR applies to any federally-funded research. NMFS HQ stated that NOAA has to comply with PARR. As a community, we need to get out in front of this and help write the rules. It was noted that scientific courtesy should extend to much of this, but the reality is that there is a mandate from the Administration to make data public. NMFS noted this doesn't include the samples, just the data. NMFS HQ also indicated that permits state that tissue samples need to be sent within one year. In addition, all permits have a condition that research results must be published or otherwise made available to the scientific community in a reasonable period of time. Other examples of data sharing were mentioned including GridSea (Gulf Spill), salmon, and marine mammals.

The discussion returned to the **tissue repository and the inventory**. Tim King (USGS) was asked if an inventory of the repository could be sent out. He responded saying researchers can contact him with a list of what they need and he can let them know if they have it. However, participants noted they would like a list of what is in the repository. Several participants noted they are having trouble tracking down their samples and would like to know if they have been received by USGS, or are misplaced at the previous storage location with NOS. Tim said they can make a database and list of samples publically available, but it may not be up to date. It was asked if metadata could be linked to tissue. The plan is to ultimately have a database with information linked to the tissues, but researchers generally discussed that they do not want metadata available to the public that could be published by others. Other agencies should be contacted who may be involved in submitting samples to the repository such as the ASMFC and Technical Committees. It was noted that the priority should be informing everyone what is in the repository and what is missing from the repository.

An issue regarding samples from the Carolina DPS was discussed. The Carolina DPS has the fewest samples. Samples collected from this DPS were collected, but researchers are not sure whether they are in the repository or not.

Discussion also took place on what size should be used to consider a fish an adult. It was decided 150 cm may be a better marker than 130 cm for assigning a fish as an adult. River resident juveniles are 150-450 mm fork-length (FL). Tim King (USGS) and Jason Kahn (NMFS HQ) noted that from looking at the genetic samples of adults and river-resident juveniles, it appears that small fish are more mobile than previously believed.

Systems where samples are missing include the Cape Fear, Roanoke, Winyah, and Pee Dee.

Tuesday LUNCH

Session 3: Telemetry

Moderator: Heather Coll (NMFS HQ)

Panel: Heather Coll, Carter Watterson (U.S. Navy), Dewayne Fox (Delaware State University)

Session 3 Goals:

- Agree on data management, ownership, and accessibility
- Receiver placement, goals, and management
- Coupling genetic database with telemetry database
- Long-term, coast-wide telemetry strategies to lead to recovery

- 13:00 - 13:10 Introduction to Telemetry Session
- 13:10 – 13:30 [Migration patterns of the Pamunkey River spawning stock.](#)
Hager, C., C. Watterson, and J. Kahn
- 13:30 - 13:50 [Atlantic Sturgeon movements in of the Gulf of Maine with special attention on the Kennebec System and Penobscot Estuary](#)
Zydlowski, G.B., G.S. Wippelhauser, J. Sulikowski, M. Kieffer, M. Altenritter, and M. Kinnison
- 13:50 - 14:10 [Coastal spawning migrations of shortnose sturgeon in the Gulf of Maine](#)
Kieffer, M., G. Wippelhauser, J. Sulikowski
- 14:10 - 14:30 [Annual movement patterns of Roanoke River Atlantic sturgeon, including inter-DPS marine movements and spawning periodicity](#)
Flowers, H.J. and J.E. Hightower
- 14:30 - 14:50 [Continental Shelf Habitat of Atlantic Sturgeon Based on the Annual Cooperative Winter Tagging Cruises, 1988-2013](#)
Osborne, J.H., R.W. Laney, R.A. Rulifson
- 14:50 - 15:10 [Coastal movements of Atlantic sturgeon within the Mid-Atlantic bight.](#)
Dunton, K.J., M.C. Melynychuk, A. Jordaan, K.A. McKown, and M.G. Frisk
- 15:10 - 15:30 [Stewards of the Sea: the U.S. Navy's Efforts to Track Sturgeon Movements in the Chesapeake Bay](#)
Watterson, J.C. and C. Hager
- 15:30 - 15:50 BREAK
- 15:50 – 16:10 [The U.S. Animal Telemetry Network: A Plan for Implementation](#)

Kocik, J., M. Weise, S. Simmons, and S. Hayes

16:10 - 17:00

Telemetry Panel Discussion

No formal panel discussion was held because the presentations ran late. However, there were questions and discussions associated with many of the presentations, and in particular, with the Animal Telemetry Network (ATN). Researchers questioned how the ATN will fit in with existing telemetry databases including the Atlantic Cooperative Telemetry Network (ACT), Ocean Tracking Network (OTN) and regional telemetry centers like the Great Lakes Acoustic Telemetry Observation System (GLATOS) and the Mid-Atlantic Telemetry Observation System (MATOS). For example, would data from these other networks be automatically pulled into ATN? Participants were concerned about data access and data sharing, which are some of the big unknowns that need to be worked out. The Navy, BOEM and NMFS have all contributed funding. They are coordinating, and developing a Data Management System. Regional areas, such as GLATOS and MATOS, are the “regional nodes” and feed data into one big data center, i.e. ATN.

Phase II (field efforts 2018/2019, with planning initiated 2016) was reviewed. The work group is discussing baseline animal telemetry observation (regional workshops with the science community to identify baseline needs and priorities for animal telemetry observations); and infrastructure and capability; a top priority of the ATN operations and maintenance plan is sustainable operations of the existing tagging capability and receiver arrays deployed during the past 15 years. Through meetings/workshops the ATN will identify/prioritize infrastructure support required.

Bill Woodward will be the point-of contact for the group. There is an ATN Steering Committee, which will provide long-term direction operations guidance and decision-making for ATN. Bill’s e-mail is Bill.Woodward@noaa.gov

Wednesday May 18, 2016

Session 4: Population Dynamics

Location: NCTC

Moderator: Julie Crocker (NMFS GARFO)

Panel: Julie Crocker, Dave Kazyak (USGS), Jared Flowers (NC Division of Marine Fisheries)

Session 4 Goals:

- Short-term goals – how are populations doing?
- Long-term goals – consistent and comparable monitoring strategies
- Effective population size
- Monitoring population health

- 8:00 - 8:10 Introduction to Population Dynamics Session
- 8:10 – 8:30 [Abundance of Juvenile Atlantic sturgeon in the Hudson River Estuary](#)
Higgs, A.
- 8:30 - 8:50 [An early juvenile \(age 0-1\) Atlantic Sturgeon \(*Acipenser oxyrinchus oxyrinchus*\) abundance estimate and habitat usage within the Delaware River Estuary, USA](#)
Hale, E.A., I.A. Park, M.T. Fisher, R.A. Wong, M.J. Stangl, and J.H. Clark
- 8:50 - 9:10 [Estimating Atlantic Sturgeon \(*Acipenser oxyrinchus oxyrinchus*\) Spawning Runs in the Delaware and Hudson Rivers.](#)
Fox, D.A., A.M. Comer, B.D. Jenkins, M.W. Breece, L.M. Brown, D.C. Kazyak, A.L. Higgs, J. Madsen, and K.W. Wark
- 9:10 - 9:30 [The reproductive status, diet, and prey distribution of Atlantic sturgeon \(*Acipenser oxyrinchus oxyrinchus*\) in the Saco River, Maine](#)
Novak, A., C. Wheeler, G. Wippelhauser, G. Zydlewski, M. Kinnison, and J. Sulikowski
- 9:30 - 9:50 [Recent and Historic Status of Shortnose Sturgeon in the Altamaha River, Georgia](#)
Bednarski, M.S. and D.L. Peterson
- 9:50 - 10:10 [Atlantic and Shortnose Sturgeon recruitment in the Savannah River, Georgia](#)
Cummins, A.J., D. Bahr, and D.L. Peterson
- 10:10 - 10:30 [The state of sturgeon in Georgia: an overview of sturgeon research and sturgeon populations in the Peach State](#)
Peterson, D.L.
- 10:30 – 10:50 BREAK
- 10:50 – 12:00 **Population Dynamics Panel Discussion**
The panel discussion started off by asking: What are the significant data gaps? What do we need to know for Recovery Plans? It was agreed that quantitative work is important for assessing recovery. Spawner estimates and recruitment estimates are needed, and this information can be used to rank populations in terms of where they are relative to recovery. Effective population size may be an important number to understand. NMFS HQ suggested that management actions should focus on the life stages that are experiencing the greatest mortality. It is important to note when mortality is occurring as well as the cause of mortality. It was suggested that we need to know more about early life stages, as this could be a bottleneck for populations. A fish is considered recruited to a population at age 1, but it is important to figure out where fish are spawning and start looking at early life stages.
NMFS SERO mentioned management needs, which include the need for early

detections for population decreases. They noted that the agency is in a resource-constrained situation and needs to identify priorities. NMFS GARFO asked for help in prioritizing needs. Priorities mentioned include the Virginia recruitment bottleneck, using telemetry work for enumeration, and size and age structure of adults. Participants agreed that the telemetry data need to be analyzed and summarized. The question is still who has the skills, time, and funding to look at all the data. There were other models mentioned: University of Florida Gulf sturgeon data and River Herring Technical Expert Working Group.

The panel moved the discussion to rivers – where we think we know what the primary threats are and where can we start to address them. Discussion revolved around the Savannah and Savannah Harbor Expansion Project. Habitat mitigation is planned, which should restore access to spawning habitat and provide oxygen injection, but does not address juvenile sturgeon nursery habitat. The fish passage is a requirement and has to work. Assessment of recruitment will also occur. A participant had asked about habitat mitigation and if habitat that is going to be destroyed can it be replaced in another area. It was said this project has been in the works for almost two decades so that option cannot be addressed at this point. Another participant suggested research should be prioritized to include: conducting an assessment of the occurrence of sturgeon near dams, addressing ship strikes, conducting population assessments for adults and recruitment, and determining mortality by life stage.

NMFS GARFO ended the panel discussion by noting the sturgeon RFP is out on Grants.gov through June 4, 2016.

Wednesday LUNCH

Session 5: New Technology, New Techniques

Moderator: Jason Kahn (NMFS HQ)

Panel: Jason Kahn, Dana Wetzel (MOTE), Doug Peterson (University of Georgia)

Session 5 Goals:

- Identify new research techniques:
 - Sex identification in the field
 - Suture materials and techniques
 - Tagging and tag types
 - Electrofishing
 - Side scan sonar
 - Others?

13:00 – 13:10 Introduction to New Technology Section

13:10 - 13:30 Population viability of shortnose sturgeon in the Gulf of Maine: how are scutes involved?

[Zydlewski, G.B., M. Altenritter, M. Kinnison, M. Kieffer, and G. Wippelhauser](#)

- 13:30 - 13:50 [Using sex identification to help determine demographics and life history parameters of Gulf sturgeon \(*Acipenser oxyrinchus desotoi*\) from the Suwannee River, Florida](#)
Wetzel, D.L., M.T. Randall, J.E. Reynolds, and K.J. Sulak
- 13:50 - 14:10 [Proof-of-Concept of Environmental DNA Tools for Atlantic Sturgeon Management](#)
Hinkle, J., G. Garman, M. Balazik, M. Fine, and R. Dyer
- 14:10 - 14:30 [Atlantic Sturgeon Telemetry on the Continental Shelf Using an Acoustic Array and Acoustic Wave Glider Off North Carolina's Outer Banks](#)
Rulifson, R.A., C. Bangle, and J.J. Luczkovich
- 14:30 - 14:50 [Mapping and Characterizing Atlantic Sturgeon Habitat in the Chesapeake Bay Using Sidescan and Multibeam Sonar](#)
Vogt, B., D. Bruce, J. Lazar, and J. McGowan
- 14:50 - 15:10 [Satellite Derived Seascapes Predict Occurrence of an Endangered Species in the Coastal Ocean](#)
Breece, M.W., D.A. Fox, K.J. Dunton, M.G. Frisk, A. Jordaan, and M.J. Oliver
- 15:10 - 15:30 BREAK
- 15:30 - 17:00 **New Technology/Techniques Panel Discussion**
The discussion began with the "LP9" blood test kits used to determine sex, which were presented on earlier in the session by Dana Wetzel. Dana thinks beta test kits will be available by the end of the year, with field test kits available in early 2017. She believes the costs will be a couple hundred dollars for the reader and disposable test strips will be ~\$4 each. NMFS HQ asked if Dana was going to look at both Atlantic and shortnose sturgeon across the latitudinal range, and she responded that is their intent. The use of estradiol as an indicator was proposed, but Dana noted estradiol is only expressed post-gonadal maturation and their technique using LP9 can detect gender long before that point.

NMFS HQ asked about new techniques that researchers would like to see used. Techniques participants listed included: ancient DNA and historical genetics, scutes and cross-sections, and exposure studies.

The next round of discussion focused on telemetry issues. It was noted that VEMCO tags are not lasting as long as they claim, which needs to be considered when researchers are analyzing their data because disappearance of a tag from an array is usually recorded as a death. Another concern is multiple tags have been implanted in individual fish and this has been observed in Gulf sturgeon. This causes tag collision. It was suggested that all fish should be

checked with a hydrophone before a new tag is implanted. In addition to internal tags, fish should be checked for PIT (passive integrated transponder) tags. There was concern that some frequencies are not picked up and tags migrate. It was said that the Biomark Model 5 or newer should pick up all frequencies. It was also suggested that metal detectors or coded wire tag readers could be used to detect the presence of PIT tags.

The panel discussion ended on the subject of using dual frequency identification sonar (DIDSON) or sidescan sonar for counting fish. Of concern is the cost of the equipment. Researchers could share equipment but would need to cover the cost of the insurance. It was mentioned the Hummingbird (a boat-mounted fish finder with side scan technology) is relatively inexpensive to purchase compared to the tow behind side scan technology. Some participants have experience using sidescan sonar to estimate populations. It's important to pick the time of year to reduce fish moving in and out of the system. A participant mentioned that the USFWS' Gulf Sturgeon Coordinator, Adam Kaeser, offers a three-day course to train operators.

At the end of the Wednesday session, participants were asked if the meeting had been useful and if they would be interested in annual or bi-annual meetings. Participants liked that it was a dedicated meeting and agreed it was very beneficial for researchers to get together to talk and plan. Agency travel funds for employees are limited so NMFS HQ would need to keep that in mind when planning. It was suggested that regional American Fisheries Society meetings could be a venue for a meeting. Participants also agreed the NCTC venue was excellent.

Management Session Thursday and Friday, May 19-20, 2016

Location: NCTC

Goals: Continue more detailed discussion with managers and specific researchers geared toward management of the species. The discussions described below were based on information gained during panel discussions on threats, genetics and genomics, telemetry, population dynamics, and new technologies.

Thursday, May 19, 2016

Present: NMFS HQ - Heather Coll, Jason Kahn, Erin Markin, Malcolm Mohead, Kris Petersen, Angie Somma, Amy Sloan, Lisa Manning; NMFS SERO - Steph Bolden, Andy Herndon; NMFS GARFO - Julie Crocker, Kim Damon-Randall, Lynn Lansher; NMFS NEFSC - Christine Lipsky; DESU - Dewayne Fox; SCDNR-MRD Chad Holbrook, Bill Post; USGS-Leetown Science Center - Tim King; USFWS-SE - Wilson Laney; UGA - Doug Peterson; US Navy - Carter Watterson; SUNY - Ike Wirgin; and UME - Gayle Zydlewski

The first topic discussed was **threats**. These threats were broken down into additional categories. Participants agreed that there is a need to understand threats better. We need to know how to manage for threats. It was noted that marine and river threats can be different.

The first threat discussed was **ship strikes**. A question was posed whether ship strikes were happening in the marine environment. Participants said it may not be strikes that are of concern but noise. It is unlikely that strikes that occur in the marine environment will be observed. Another issue brought up is the shipping industry going into ports. The Navy noted sturgeon strandings occur along the mouth of the Chesapeake Bay and along the south shore. The Virginia Aquarium is a co-investigator on the NMFS salvage permit and can collect stranded sturgeon for researchers. It is also important to increase public awareness and outreach. There have been reports of strandings in areas and there is interest in getting these fish so genetic and other biological data can be collected. It is standard protocol to conduct necropsies on stranded marine mammals – is this being done for sturgeon? Veterinarians at Cornell University have necropsied stranded sturgeon. One stranding occurred in the Gulf of Fundy where eleven sturgeon were stranded. Genetic analyses were done on those fish but the cause of death was unknown. It may have been a natural occurrence. Other strandings have occurred in New York around the Tappan Zee bridge construction. As a condition of the biological opinion, New York Thruway Authority pays for necropsies of sturgeon found at the bridge. The Army Corps of Engineers pays for those associated with dredging. NMFS GARFO noted that the purpose has to be stated for those collected under a permit. They released a federal funding opportunity to try to find ways to reduce the strike hazard and noted requiring propeller cages on only a subset of vessels would be incomplete. The salvage program would be an option for collecting stranded sturgeon but funding is limited for this program. NMFS GARFO indicated that there is a form available to record information but it is not a requirement and some people tend to use their own format. The basic information on these strandings is usually given – length, strike if obvious, species, and sex. NMFS SERO has a sturgeon hotline in place for the Southeast Region. NMFS GARFO receives calls when sturgeon are spotted. The issue is retrieving the specimen; for example in 49 sturgeon strandings reported only two specimens had tissue collected from them. Discussion went back to how we can engage the public and have them covered under a salvage permit or be able to at least move floating sturgeon to the shoreline so they can be retrieved by someone on the salvage permit. It was noted that New York State Department of Environmental Conservation is on the salvage permit. By getting data from these strandings, multiple needs would be met: genetic samples, mortality information, locations, etc. It was asked if we could engage the River Keepers and their network and have them added as co-investigators on the salvage permit. The River Keeper network receives a lot of calls from the public. **Action: NMFS will identify which rivers with reproductive sturgeon populations are protected by River Keeper organizations. If there are rivers in need of protection, NMFS will engage the organization to seek prioritization of those rivers with sturgeon.**

NMFS HQ asked if this is what we need to do to identify vessel strikes – public outreach, addition of personnel on salvage permits, etc., and is this a priority? NMFS GARFO responded that it was only recently that they became aware of this issue when they started receiving phone calls. It may not only be a few rivers where this is an issue, it could be more. A participant noted dead sturgeon in the lower Cape Fear. The Delaware River is another river where this is a problem. Virginia tributaries also get reports of dead sturgeon, assumedly from ship strikes. One was found at the mouth of the Nanticoke last summer. NMFS HQ stated that outreach needs to be in place over time, and once we get a handle on the issue, that is when funds can be invested for necropsies to determine the cause of death. ESA section 6 may be a funding opportunity for

this work. The possibility of using other institutions or programs to do necropsy to lower the costs was mentioned such as natural history museums, citizen science programs, or vet schools (pro bono basis). NMFS HQ asked how do we make this happen? There needs to be consistency across space and time; i.e., we need consistent reporting and data collection (e.g., photos, location, size, circumstances) across the regions and consistent necropsy protocols. The first thing to do is start with standardized basic information, and researchers who are co-investigators on the salvage permit need to be able to acquire a subsample of the carcasses. Regions may take this role. SERO has a plan in place so GARFO will communicate with them. **Action Items: NMFS will focus on establishing standardized reporting and getting a system in place for NE and SE regions; expand public outreach for reporting carcasses and data associated with the carcass. NMFS GARFO and SERO said they would communicate with each other to establish standardized reporting in their respective regions.**

The next **threat** discussed was **bycatch**. All federal commercial fisheries have been covered by biological opinions in the Northeast. NMFS GARFO asked if all of the federal fisheries were covered by biological opinions in the Southeast and NMFS SERO said they are all covered. A participant noted there are issues with getting all the information regarding bycatch encounter rates and subsequent mortality. It was noted South Carolina has a program in place and South Carolina Department of Natural Resources (SC DNR) noted the program is mandatory and does provide some information. SC DNR indicated regulations were changed in South Carolina, which had a positive impact by greatly reducing bycatch rates of sturgeon in the American shad fishery. Virginia is funding an inshore observer program. North Carolina also has an observer program. A presentation given during the workshop was revealing regarding the number of sturgeon that can be captured during a short trawl, yet summer flounder and monkfish fisheries that operate in the same area are claiming zero bycatch. Another fishery of interest is the skate fishery, which is operating in state waters and is setting nets overnight. NMFS GARFO said they are working with New Jersey, New York, and Delaware on that issue. South Carolina and Georgia have been making management decisions to reduce bycatch. South Carolina has cut effort by 90% and has tending requirements. Georgia has done away with set nets and doesn't allow fishing in spawning grounds. Currently, only Georgia and North Carolina have completed an assessment with NMFS on the impacts of their fishery and bycatch in those states is currently not violating the ESA.

There is a need to prioritize fisheries, and life stage needs to be considered – adult mortality should be a high priority. A partnership between NMFS and the states should be the first step. NMFS HQ asked if observers are currently PIT tagging and taking tissue from fish caught by fisherman. NMFS GARFO indicated that sturgeon are not being PIT tagged by NMFS observers but they are supposed to be collecting tissue and sending it to the archive at USGS. NMFS stated that if states have incidental take permits then bycatch is covered in that state fishery. **Action items: 1) NMFS, through consultations on Fisheries Management Plans and state fisheries bycatch Conservation Plans, will work with fisherman on targeted studies on fishery bycatch; 2) prioritize fisheries that have the greatest impact on sturgeon; 3) collect genetic data (NMFS and USGS are working to identify the least invasive means of collecting DNA); and 4) observer program – increase coverage, collaboration.**

The next **threat** discussed was **seismic testing**. It was noted that the ASMFC Habitat Committee addressed this issue and a review paper by Dr. Bob VanDolah (SCDNR) was provided to the Habitat Committee. Wilson Laney said he would distribute the paper to the workshop participants. The Bureau of Ocean Energy Management (BOEM) has received letters of concern. There is more information on the effect of seismic testing on marine mammals than on fish. Acoustic work is being done but more research needs to be done. **Action Item: This is a data gap. The research community is urged to design studies to address this data gap.**

Water quality was the next **threat** discussed. The first water quality issue discussed was copper. It was noted that funding to look at the effects of copper on shortnose sturgeon was funded in the past. There has been work in the West Coast Region looking at salmon and there may be some green sturgeon data. Another contaminant that may be of concern is retene, which may be a factor in American shad early life stage mortality. It may not be of concern for sturgeon but it could be if sturgeon spawning grounds were located downstream of pulp mills. Additional contaminants mentioned by the group were mercury and selenium. **Action item: NMFS continues to work with EPA to ensure water quality standards are protective of threatened and endangered species. NMFS has conducted a literature search on known effects of contaminants on sturgeon. NMFS will post a bibliography online and request researchers to supplement our list.**

The next issue discussed was endocrine disruptors. Studies have shown sturgeon are sensitive. There is a link to a study on GARFO's website: <http://www.greateratlantic.fisheries.noaa.gov/protected/atlsturgeon/docs/impactscommonedcatlanticsalmonsturgeon.pdf>. Early life stage research has been conducted by Dr. Chris Chambers (NMFS, NEFSC) for several of the contaminants discussed. A participant asked NMFS HQ about the status of the consultation with EPA. NMFS HQ reported it is still underway. A participant noted if we can demonstrate that there is an impact on Atlantic sturgeon, this is an opportunity to produce results that can guide management of water quality to ensure it is protective of endangered species. **This is an opportunity for research to drive management.** SC DNR noted that it is not always water quality but water quantity that is an issue. They noted that as more water is taken out, the more issues created for sturgeon. A paper by Matt Breece addressed this concern in the Delaware (<http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0081321>). The ASMFC Atlantic Sturgeon Technical Committee would be a good source for information on contaminants and dissolved oxygen on a water body basis. Water quality needs to be in the context of what is normal for that system – need to look at historical data (although it is not clear what to do when historical data is only available after settlement and degradation has occurred). **Action item: NMFS will collect information on the effects of water quality degradation and if it appears to be a limiting factor in some systems, make this a funding priority.**

The next **threat** discussed was **impingement/entrainment**. NMFS GARFO said this is a big unknown. It was asked if the EPA new 316(b) rules were going to shed light on impacts to sturgeon. NMFS staff were uncertain. It would only be a concern for facilities located in sturgeon spawning or nursery habitat because small fish are more likely to be negatively affected (thought it may be worth noting that in studies done out West on entrainment in irrigation ditches, large fish can be affected as well). NMFS GARFO noted that only facilities with once-

through cooling are covered under the 316(b) guidelines. Another topic discussed was agricultural withdrawals. However, there may be state exemptions from water quality permits for agriculture, but this does not include exemptions from take caused by water withdrawals. In North Carolina, withdrawals over 1 million gallons per day need to have a permit, but there is no requirement for screening. Intakes/withdrawals for less than that amount are not required to have a permit. **Action item: All attendees should help identify water bodies with intakes likely affecting Atlantic or shortnose sturgeon. At that point NMFS will engage with the appropriate owner or licensor to establish appropriate mitigation to protect sturgeon. Additionally, we need research on the likely effect of unscreened intake pipes in various rivers.**

The **threat** discussion moved on to **dams**. It is important to list out rivers where there is a greater percentage of spawning habitat above dams. The issue isn't only getting sturgeon above dams but also back down. In systems where there isn't a lot of water, fish passage is an issue. NMFS GARFO discussed fish passage at Holyoke Dam, which was part of the biological opinion. The issue was sturgeon couldn't find the fish passage entrance due to eddies, and there was a bump-out in a concrete wall that inhibited movement. These issues were fixed and more sturgeon were reported this year using the lift. Systems listed where dams were of a concern include: Cape Fear, Merrimack, Santee-Cooper, Savannah, Hudson, Susquehanna, and Roanoke. On the Cape Fear, there are three locks. One sturgeon made it above the first lock. Lock weirs on dams 2 and 3 are proposed. In the Savannah, the issue was whether enough bottom sediment was available. On the Hudson, fish are going up to the base of the dam and there is habitat above the dam. The Susquehanna River at the Conowingo were also discussed. Sturgeon were not addressed in the settlement negotiations because it is a heavily dammed system and they didn't want to move fish above this dam. For the Roanoke, there is spawning occurring below the dam but historical spawning habitat probably occurred above the dam. There may be opportunities to address issues during relicensing or Federal Energy Regulatory Commission decommissioning. **Action item: prioritize systems based on amount of historical habitat above dams.**

Dredging was the next **threat** discussed. SC DNR noted hopper dredges are a concern for sturgeon. They have acoustic telemetry that suggests when fish are in the area. SC DNR asked if NMFS could work with the Corps to develop windows of opportunity to address avoidance of impact. June through October would be a window of opportunity, but this overlaps with active turtle periods. NMFS SERO noted they are allowing relocation trawling to remove turtles and sturgeon from in front of the hopper dredges. They noted that the Army Corps of Engineers has allowable takes so they sometimes don't want to use relocation trawling due to the cost. It is addressed in the biological opinion and they require tissue sampling of turtles and sturgeon. SC DNR noted the NMFS SERO opinion covers maintenance dredging. They said removal/relocation is required in Savannah but in Charleston they don't move anything. They asked what the difference was between the Charleston project and other projects where removal is required since both are maintenance projects. NMFS SERO indicated the opinion states a closed cod end should be used in the Charleston Harbor project. A participant noted the Corps dredges the James River all the time. A paper by Dr. Matt Balazik (Virginia Commonwealth University) is ready to be published on how sturgeon respond to dredging activity. A cutterhead dredge is used in the James River. NMFS GARFO also noted clamshell dredges can also encounter sturgeon. Other issues raised were the hydrological impacts of channel dredging, altering nursery habitats and

other features – through altering the reach of the salt wedge upstream and altering the available suitable nursery habitat essential for juvenile sturgeon. NMFS HQ asked how much authority NMFS will have to address this. NMFS GARFO stated that once critical habitat is designated then section 7 consultations will be required. If a federal action would destroy or adversely modify critical habitat, NMFS HQ can require alterations to the projects. NMFS GARFO noted it is difficult to say that an impact will be jeopardy unless they are able to demonstrate adverse modification. NMFS has to be able to document the impact on habitat. NMFS HQ asked if section 7 is getting to adverse modification, can the alternative we use be applied to other water bodies? NMFS said yes, it could be used elsewhere. A participant noted some people have written the Army Corps of Engineers in the past recommending a programmatic environmental impact statement to determine the most viable ports on the East Coast and only allowing those to move forward that were economically viable. When a project is found to jeopardize the likelihood of survival and recovery of ESA-listed species or destroy their designated critical habitat, NMFS is tasked with identifying reasonable alternatives to the proposed project to allow the project to continue; however, it is possible that there may be no reasonable alternatives, and if that is the case, the project is not viable. **Action item: There is a need for published research on the effects of dredging directly on sturgeon in the area in multiple systems. Some of this information has been gathered and needs to be published. We need studies from multiple systems to ensure NMFS can manage dredging the same way coastwide. In the future, researchers need to design studies to understand 1) impact to juvenile habitat, 2) how shortened salt wedge affects migratory behavior, and 3) how loss of habitat affects carrying capacity.**

The next **threat** discussed by the group was **limiting factors**. NMFS HQ asked: Do we know what the limiting factors are? Do we know how to address these limiting factors? It was suggested to let the ASMFC Technical Committee address this in collaboration with participants from this workshop. It was also suggested that a survey be conducted among the Technical Committee members and the participants from this workshop. Andy Herndon, NMFS SERO, volunteered to do the survey. The survey would re-evaluate threats by river, allow a discussion area in the document and then re-group with attendees/participants to make sure everyone is in agreement and then fill out the document. The limiting factor participants agreed upon was time. We need to consider which impediments deserve the most immediate attention. Time is of importance to recovery and to extirpation if recruitment in systems isn't occurring. **Action item: NMFS SERO will complete the threats survey on a river system basis by collaborating with ASMFC Technical Committee and workshop participants.**

Predation was the next **threat** discussed among group participants. It was noted that blue catfish may be a predator of concern. Some work is being done by Virginia Tech. The focus needs to be during the overlap between blue catfish presence and sturgeon spawning periods as well as blue catfish gut analysis. If blue catfish are not preying upon sturgeon, then habitat displacement may be occurring. Using telemetry to track blue catfish in the system to see if they make marked movements towards sturgeon spawning grounds was proposed. There is a social issue relating to blue catfish because there are groups passionate about diadromous species restoration and an equally passionate group who want to create an economic catfish fishing opportunity. Another possible predation concern is by gray seals in Maine, which has been observed in at least one case. It was asked if researchers could examine scat from seals to see if they are eating sturgeon.

Action item: Researchers working in systems with apparent impacts caused by predation, disease, or competition need to design studies and convey impacts to sturgeon population caused by these factors.

The **threats** discussion wrapped up by touching on three additional threats: **poaching, alternate energy, and anchorage scarring**. For poaching, we need to make sure state and federal law enforcement know to make us aware of citations involving sturgeon. **Action items: Researchers need to inform and communicate with state and Federal law enforcement. In cases where the researcher is unsure who to contact, they should work with NMFS staff in Protected Resources.**

For concerns of poached caviar, NMFS should purchase a tin or jar of caviar for genetic analysis.

NMFS will work with River Keepers to keep an eye out for poaching. NMFS will work with USFWS in Oregon for a forensics contact.

The final item on the agenda for Thursday was **genetics**. The first topic discussed was collection of the genetic sample (i.e. tissue). What is the purpose? Why is it a requirement? From a section 7 standpoint, take is broken down by DPS and they need genetics to determine which DPS sturgeon are from. **Action item: Establish baseline genotypes for all known populations.** This information is also needed from a permit standpoint (ESA section 10), because takes are issued by DPS. NMFS HQ asked if this information would inform a status review and is that enough of a reason to make it a requirement. ASMFC would benefit from the information and the information would be needed for the purpose of a stock assessment. NMFS GARFO noted that requiring samples is one thing but analysis is another matter. They noted archiving samples would be prudent because samples may be needed for future use.

Clarification was asked if tissue samples are needed from every fish handled. Some researchers do not take tissue samples if a fish is already PIT tagged. It was asked if there is value in taking genetic samples of re-captures. From USGS's perspective, it could validate metadata and act as a Quality Assurance/Quality Control but otherwise do not see the value in a second sample. However, USGS noted a number of samples are missing where they have received metadata from the old repository but no tissue. In these cases it would be good to have a second sample. Work is underway to contact the original researchers who collected the tissue. Maine noted they split the tissue samples they collect – they keep half and send the other half to the repository. They suggested all researchers do this. It was agreed after some discussion that it should not be made a requirement of the permit to split samples but it can be an option for the researchers.

Preservation methods were discussed next. Currently, ethanol is the standard methods. Samples need to be stored in ethanol for 24-48 hours then the ethanol can be poured off and shipped. The lab will then refill with ethanol upon receipt of samples. One issue is ethanol is a controlled substance and some boat operators do not want it on their ships. Another option is using "FTA" cards, which are cellulose-based cards into which you press tissue (e.g., fin clip) or fluids (e.g., mucus or blood). This could be an option for observer programs and for researchers. A third

option is “RNA Later.” There is no shipping issue but it does cost more than the other two options.

The next item discussed was the metadata that is sent with the tissue samples. **Agreement: the minimum information NMFS needs and researchers are okay with giving is: species, sample ID (can be PIT or unique), date of capture, location of capture, who captured, total length, and activity/permit number/consultation (biological opinion) number.** Permitted researchers are responsible for sending NMFS HQ and USGS this information when they send samples for the archive. The discussion went back to the purpose and/or use of the repository. Is it a repository for tissue or a repository for tissue and data? USGS believes data should be kept with the tissue so the data isn't lost. Discussion amongst managers and researchers revolved around access to this data. **Agreement: Researchers will be notified if someone requested one of their samples or data associated with a sample.** USGS agreed to be the intermediary in these cases. Is it assumed all samples will be analyzed? USGS stated that is not the case. There isn't funding to run all samples received. Priorities have been to NMFS HQ and ASMFC to enhance the baseline and for verifying incidental take statements in biological opinions. New priorities can be established if funding sources come forward with new goals for the tissue databank. Ownership of the tissue was also addressed and when information should be released. Maine asked to clarify whether NMFS can do whatever they want with the tissue. NMFS HQ said they analyze what they need to address priorities. Researchers will be notified when their samples are used and data will be shared if NMFS analyzes samples. For secondary data sharing, discussions between tissue owner and secondary researcher should occur. NMFS HQ noted the permit number for the original tissue collection needs to be associated with the tissue. **Action items: NMFS HQ will work with the Regions to develop protocols for data submittal (i.e., a form that will be required by permit) and a request form for tissue use.**

There is a need for transparency. As such, NMFS and USGS will work together to establish a website with a list of genetic samples that are maintained in the database and who to contact to inquire about samples. USGS will work on developing a database available to researchers that includes tissues/data available in the inventory.

The next **genetic** item to be discussed was the **baseline**. NMFS HQ asked about the baseline and how the data are being shared. USGS noted data have been accumulating since 2001. Initially it consisted of 550 fish and now contains about 1,800 fish. The baseline is a matrix, 27 columns wide and 1,800 rows deep with genotypes for twelve different loci. NMFS HQ asked who has access to the data. USGS has access. Ike Wirgin has his own baseline, which is 50-60 percent in common with USGS. NMFS GARFO asked what the baseline is used for. USGS responded they compare allele frequencies and genomic frequencies of fish to assign them to a DPS or system. They also use it to assign mixed-stock fish to rivers of origin, but can only assign those fish to the populations whose genotypes are in the baseline. The most recent use of the updated baseline was to compare the observer program fish to the baseline. At this point, neither of the baselines will be shared with other researchers. Publication on the updated baseline is expected soon. A policy on the use of data developed by Paul Rago was shared with the group and a PDF was emailed to participants for reference.

NMFS HQ noted they are requiring samples to be submitted. It was agreed that one year after collection should be sufficient time to submit the samples. Does the Region want to be notified when the samples are received? USGS noted they provide notice to NMFS HQ Permits Division of what they have received in the repository. NMFS HQ noted a release date needs to be determined so USGS knows when samples can be released to secondary parties. This could be accomplished through a drop-down menu in a database.

The last item discussed was ESA section 7 needs. There is a need for genetic samples from mixed stocks. NMFS and USGS are just now getting samples from observers. Offshore arrays may provide some useful information but it is only representing tagged fish. The best way to get genetics data is from bycatch. **Action items: Additional tissue samples are needed. Because of these data gaps, researchers should focus on collecting tissue from offshore, Southeast, and unidentified river populations.**

Friday, May 20, 2016 **Management Meeting Wrap-up**

Present for this session: NMFS HQ - Kris Petersen, Erin Markin, Lisa Manning, Jason Kahn, Malcolm Mohead, Amy Sloan, Heather Coll; NMFS SERO - Andy Herndon; NMFS GARFO - Lynn Lansher, Kim Damon-Randall, Julie Crocker; NMFS NEFSC - Christine Lipsky; US Navy Carter Watterson, UME - Gayle Zydlewski; DESU - Dewayne Fox; USFWS – SE -Wilson Laney ; **UGA** - Doug Peterson; and USGS-Leetown - Science Center Tim King.

Friday's management meeting began with a wrap-up of the **genetics** discussion from the previous day. The plan is for the repository to be long-term and NMFS plans on providing long-term funding for it. A NMFS-USGS written agreement on the repository is needed if one doesn't exist. An inter-agency agreement with NMFS GARFO is in the works. A contract position may be included to assist in setting up the database so people can see what is in the database. It was reiterated that if tissue is being used for a secondary project, not directed by NMFS, that the tissue owner needs to be made aware it. If any NMFS Offices (HQ, SERO, or GARFO) direct any research on the tissues, the tissue owner will also be made aware and will receive data. The researcher may be able to provide additional information on the fish that is not provided in the metadata. **Action Item: NMFS HQ or GARFO will work with USGS Kearneysville Office to develop a Memorandum of Agreement to establish the appropriate protocols for maintenance of the tissue repository. Furthermore, the meeting organizers will establish a website that provides information of the samples/data in the repository.**

Telemetry was the next topic discussed. The first part of the discussion was about ACT, ATN, and regional networks (e.g., MATOS). Currently ACT stores telemetry data for sturgeon and 50+ other species. ACT has been the network used by many researchers on the East Coast. Funding for ACT is running out and discussion revolved around trying to keep ACT funded until ATN is ready to receive data. The Navy, NMFS GARFO, and/or State of Delaware may be able to keep ACT running for another year until ATN is up and running. Several researchers are still concerned about putting their data into these new network databases until protocols for data access are established (e.g., ensuring data can only be retrieved by those who put out the tags until the tag expires – two years?).

The second part of the **telemetry** discussion was to determine where we need more coverage. It was noted that offshore, including the continental shelf, needs more coverage. There are several proposals into BOEM to fund this sort of work. For BOEM, projects need to tie into offshore energy projects, i.e. wind. For the Navy to fund, it needs to be tied to their facilities. It was noted gliders are available to rent to do offshore research. The University of Delaware, ECU, and Rutgers were mentioned as having gliders. It may be possible for researchers to partner and do multi-species research. A participant commented that there needs to be a good study design – need research questions and how to address these. For example, aggregation areas – we need to know where they are and why they are aggregating in these areas. What is the research goal that relates to recovery? Dr. Matt Oliver’s (University of Delaware) seascape talk was said to be the first presentation that seemed to address this question. It was suggested someone needs to go through the huge database of coastwide telemetry data and start working through it to see if any areas are continuously visited by sturgeon. Quantitative work on this data should be done. Carter Watterson, U.S. Navy, said he would be willing to look at the data and do a simple exercise, determine the patterns of the data, which was agreed could lead to some interesting information.

The **telemetry** discussion then moved on to when research should be published. It was asked when research is considered concluded. After being published? If the project was done using federal funding, then the data needs to be released to the public. Final reports from the project are part of this data and will be made available to the public. Some felt if their research was published in a journal and is publically accessible then that should meet the requirement. It was noted that the data need to be in an accessible data file. NOAA has a policy and now NMFS is working on their own guidelines. Data collected using public funds need to be archived long-term and decisions need to be made by NMFS where this data can be archived. If a peer-reviewed, accepted manuscript is a product of the research, it needs to be provided to the NOAA Central Library so the public has access to it. **Action Item: Researchers should provide copies of these papers to NOAA’s central library and copy representatives from NMFS HQ, SERO, and GARFO.**

Population dynamics was next on the agenda. The first topic discussed was the models being used for population estimates and concern that some of these estimates are incorrect due to the methods being used. It was asked if NMFS HQ could require certain methods to be used in research permits. The consensus seemed to be NMFS HQ couldn’t require a specific method/model to be used unless it was determined that the method was not bona fide, in which case NMFS HQ could recommend other methods; this would be documented in the administrative record demonstrating our decision-making process. New technologies, such as side-scan sonars, are being used to do population estimates. Since this is new technology, the methods are still experimental and NMFS HQ should not dictate how this technology should be used. The peer-review process should take care of any concerns that misleading data is being published. It was noted that it is important to let the method evolve and develop. **No Action Item came from this discussion.**

This ended the workshop.

Attachment 1: Participants

Participants during 1st 3 days (from May 18th roll call)

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