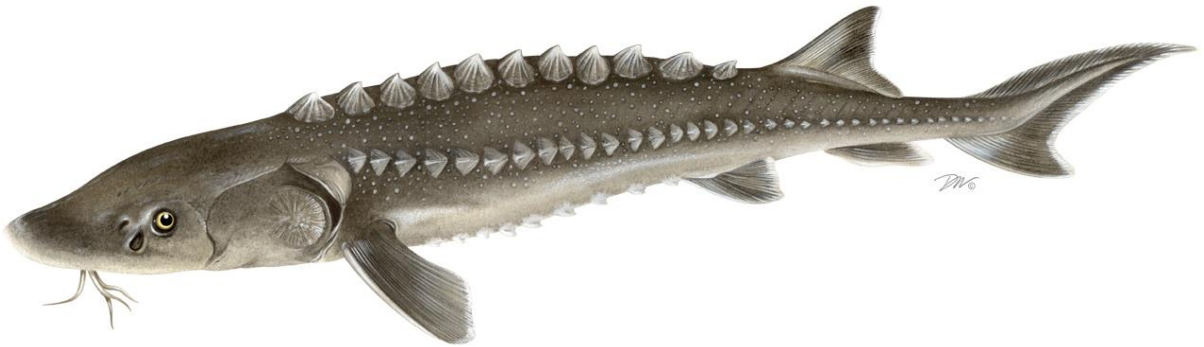


2018-2020 REVIEW OF THE
ATLANTIC STATES MARINE FISHERIES COMMISSION
FISHERY MANAGEMENT PLAN FOR
ATLANTIC STURGEON (*Acipenser oxyrinchus oxyrinchus*)



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**REVIEW OF THE ASMFC FISHERY MANAGEMENT PLAN FOR
ATLANTIC STURGEON (*Acipenser oxyrinchus oxyrinchus*) FOR 2018-2020**

I. Status of the Fishery Management Plan

<u>Date of FMP Approval:</u>	November 1990
<u>Amendments:</u>	Amendment 1 (July 1998)
<u>Addenda:</u>	Technical Addendum #1 (October 2000) Addendum I (January 2001) Addendum II (May 2005) Addendum III (November 2006) Addendum IV (September 2012)
<u>Management unit:</u>	Migratory stocks of Atlantic sturgeon from Maine through Florida
<u>Jurisdictions with declared interest:</u>	Maine through Florida, including District of Columbia and the Potomac River Fisheries Commission
<u>Committees:</u>	Sturgeon Management Board, Plan Review Team, Plan Development Team, Technical Committee, Stock Assessment Subcommittee, Culture and Stocking Committee

The Atlantic Sturgeon Fishery Management Plan (FMP) was approved by the Atlantic Sturgeon Management Board (Board) in 1990. By 1995, the member states and jurisdictions determined that the FMP was insufficient for conservation and restoration of Atlantic sturgeon stocks, and initiated development of Amendment 1, which was approved by ASMFC in June 1998. The goal of the Amendment is “to restore Atlantic sturgeon spawning stocks to population levels which will provide for sustainable fisheries, and ensure viable spawning populations” (ASMFC 1998a). Based on recommendations of the 1998 ASMFC Atlantic Sturgeon Stock Assessment, the specific objectives to achieve this goal include:

- Establish 20 protected year classes of females in each spawning stock;
- Close the fishery for a sufficient time period to reestablish spawning stocks and increase numbers in current spawning stocks;
- Reduce or eliminate bycatch mortality of Atlantic sturgeon;
- Determine the spawning sites and provide protection of spawning habitats for each spawning stock;
- Where feasible, reestablish access to historical spawning habitats for Atlantic sturgeon; and
- Conduct appropriate research as needed, especially to define unit stocks of Atlantic sturgeon.

Under Amendment 1, states must maintain complete closure of any directed fishery for Atlantic sturgeon and prohibit landings from any fishery. Additionally, possession of Atlantic sturgeon,

or any parts thereof including eggs, is prohibited. Exemptions to the moratorium on possession for the purpose of scientific research or educational display are detailed in Technical Addendum 1. Applicants for exemption for the purpose of aquaculture and importation of non-indigenous Atlantic sturgeon (i.e., originating from outside U.S. jurisdiction) must adhere to the terms, limitations, enforcement and reporting requirements which were approved by the Commission in January 2001, and receive approval from the Board through the adaptive management process (e.g., see Addenda I-III detailed below).

Amendment 1 requires that, beginning in 1999, states report annually on the following topics to ASMFC:

- Results of bycatch monitoring for Atlantic sturgeon in other fisheries;
- Monitoring results (tagging, juvenile abundance indices, etc.);
- Habitat status (restoration efforts, FERC relicensing studies, etc.), in accordance with the recommendations in the FMP; and
- Aquaculture operations authorized, status of regulations, disease-free certification status, etc., including any additional reporting requirements outlined in the ASMFC Terms, Limitations, Enforcement and Reporting Requirements Document (2001).

Addendum I (2001) to the Atlantic Sturgeon FMP exempts Florida from the possession moratorium for the purposes of developing private aquaculture facilities for cultivation and propagation of the species. Addendum II (2005) exempts a private company in North Carolina from the moratorium on possession, propagation, and sale of Atlantic sturgeon meat and eggs, and allows a Canada-based exporter to export Atlantic sturgeon fry and fingerlings into North Carolina. Addendum III (2006) similarly allows a private company in North Carolina to import Atlantic sturgeon from a Canada-based exporter. Addendum IV (2012) updates habitat information for Atlantic sturgeon and identifies areas of concern and research needs.

The Atlantic sturgeon Advisory Panel (AP) was disbanded in August 2018. With Atlantic sturgeon listed under the ESA, and the 2017 benchmark assessment showing very little change in the resource's abundance since the 1998 assessment, it's unlikely that there will be any management activity for the foreseeable future. If the Board determines that it would benefit from the input of an AP down the road, staff will work with the states to re-establish an AP at that time.

II. Status of the Stock

In 1998, a benchmark stock assessment conducted by the Commission concluded that Atlantic sturgeon populations throughout the species' range were either extirpated or considered to be at historically low abundances (ASMFC 1998b). Also in 1998, NOAA Fisheries evaluated the status of the species with regard to listing under the Endangered Species Act (ESA) and concluded that listing was not warranted at the time (NOAA 2007). In 2007, a Status Review Team (SRT) identified five Distinct Population Segments (DPS; discrete population units with

distinct physical, genetic, and physiological characteristics) along the Atlantic coast (NOAA 2007).

In 2009, and based on the recommendations from the 2007 Status Review, the National Resources Defense Council petitioned NOAA Fisheries to list Atlantic sturgeon under the provisions of the ESA. Following review, NOAA Fisheries published two proposed rules (75 FR 61872 and 75 FR 61904) in October 2010 to list each DPS under the provisions of the ESA. In April, 2012, NOAA Fisheries published two final rules (77 FR 5880 and 77 FR 5914) declaring the Gulf of Maine DPS as threatened and the remaining four DPSs as endangered. In 2013, in response to the ESA listing, the Board initiated the development of a coastwide benchmark stock assessment to evaluate stock status, stock delineation, and bycatch. The benchmark assessment was externally peer-reviewed in August 2017 by a panel of independent experts, and approved by the Board for management use in October.

The Stock Assessment Subcommittee (SAS) explored a number of different models and analyses to evaluate the status of Atlantic sturgeon, including trend analysis, data poor methods, genetic methods, per recruit models, and a multi-state Jolly-Seber tagging model based on telemetry records to estimate mortality. Unfortunately, efforts to assess the status of Atlantic sturgeon are hampered by a lack of data. Of the 50 fishery-independent surveys that were evaluated, only nine of the surveys met the criteria to be used as indices of relative abundance in the assessment. The accepted surveys ranged from Maine to South Carolina and mostly caught juveniles and sub-adults. The other surveys were not used because they rarely encountered sturgeon or because their methods were inconsistent throughout the time series.

The assessment based stock status on the results of the ARIMA (Auto-Regressive Integrated Moving Average) trend models and the tagging models. The ARIMA model uses fishery-independent indices of abundance to estimate how likely an index value is above or below a reference value. The tagging model estimated the survival rate of Atlantic sturgeon at the coastwide and DPS levels. An egg-per-recruit (EPR) model was used to compare recent total mortality (Z) with a total mortality reference point that would result in 50% of the egg production of an unexploited population. This reference point ($Z_{50\%EPR}$) was used in the 1998 benchmark assessment and continued in the 2017 assessment as an appropriate target to aid in stock recovery. The survival estimate from the tagging model was compared to $Z_{50\%EPR}$ to determine if total mortality was too high.

According to the 2017 Atlantic Sturgeon Stock Assessment Report, Atlantic sturgeon populations remain depleted at the coastwide and DPS-levels relative to historical abundance (Table 1). The “depleted” determination was used instead of “overfished” because of the many factors that contribute to the low abundance of Atlantic sturgeon. On a coastwide basis, however, the population appears to be recovering slowly since 1998 (the year the moratorium was implemented). Despite the fishing moratorium, the population still experiences mortality from several sources, but the assessment indicates that total mortality is sustainable.

Impediments to recovery include directed and incidental fishing, habitat loss, ship strikes, and climate change. The 2017 report indicates that anthropogenic mortality is a leading cause of Atlantic sturgeon mortality. Despite there being no directed fisheries for Atlantic sturgeon for nearly two decades, sturgeon are caught as bycatch in fisheries for other species, predominantly in gillnets, and to a lesser extent trawls and pound nets. Other potential emerging threats include invasive species, such as blue (*Ictalurus furcatus*) and flathead (*Pylodictis olivaris*) catfishes. In regions where sturgeon from different DPS mix in coastal aggregations, threats to these aggregations (e.g., bycatch mortality and ship strikes) may have disproportionate population effects at the DPS-level. Poaching of Atlantic sturgeon, at an unknown level, also occurs.

Following review of the benchmark assessment results, the Board discussed the need to support management actions that have contributed to recovery seen to date (e.g., the moratorium, habitat restoration and protection, better bycatch monitoring), and acknowledged the need to improve data collection along the Atlantic coast to support future stock assessments and improve the current understanding of stock status.

III. Status of the Fishery

Directed Harvest

Atlantic sturgeon have been harvested for their flesh and eggs (i.e., caviar) along the Atlantic coast since pre-colonial times. Commercial landings records for Atlantic sturgeon were first kept in 1880. At that time, landings were high and concentrated in the Delaware and Chesapeake systems, although commercial fisheries rapidly expanded to include most known spawning rivers. Reported landings of Atlantic sturgeon peaked in 1890 at 7.5 million pounds and declined precipitously thereafter. During the 1970s and early '80s, the bulk of fishing effort and landings shifted to North Carolina, South Carolina, and Georgia (ASMFC 1998a; ASMFC 1998b). As the 1980s progressed, landings from these states declined and coastwide landings shifted to New York and New Jersey.

By 1996, following approval of the 1990 Interstate FMP which suggested that the dramatic decline in landings was likely caused by overfishing, Atlantic sturgeon fishery closures were instituted in 10 states and jurisdictions along the Atlantic coast. Since 1997, all states have enacted bans on harvest and possession of Atlantic sturgeon and sturgeon parts. NOAA Fisheries enacted a ban on harvest and possession of Atlantic sturgeon in federal waters in 1998. Per Amendment 1, these moratoria will remain in effect until stocks exhibit a minimum of 20 protected year classes of spawning females and the FMP is modified to permit harvest and possession.

Bycatch

Since Atlantic sturgeon are an anadromous species spending portions of their lives in rivers, estuaries, and both nearshore and offshore ocean waters, they are vulnerable to incidental capture in many different fisheries conducted along the Atlantic coast. Accordingly, bycatch is one of the most significant threats to the viability of Atlantic sturgeon populations (ASMFC

2017). The Commission hosted several workshops between 2003 and 2007 that focused on collecting information on Atlantic sturgeon bycatch, identifying bycatch issues, estimating fishery-specific bycatch, and developing recommendations for dealing with Atlantic sturgeon bycatch in other directed fisheries.

The 2017 benchmark stock assessment was able to estimate bycatch from three different data sources; the Federal observer program, i.e., the Northeast Fisheries Observer Program (NEFOP) and the At-sea Monitoring Program (ASM), the North Carolina estuarine gill-net fishery observer program, and the South Carolina American shad fishery logbook program. However, it is hard to compare the estimates from the Federal and North Carolina observer programs to the estimates from the South Carolina logbook program due to the differences in how the data are collected. The South Carolina data are self-reported and are most likely an underestimate, since under-reporting is known to occur, while the Federal and North Carolina estimates are developed from a sample of fishing trips in these regions and have their own degree of uncertainty.

Estimates of total bycatch from the Federal observer programs (gillnets and trawls combined) were lower than estimates from the North Carolina observer programs, but estimates of dead discards were similar because the Federal observer program encountered a higher proportion of dead fish on gillnet hauls than North Carolina did. Estimates of bycatch from the Federal observer data averaged 1,139 Atlantic sturgeon caught per year with 295 dead in the gillnet fishery and 1,062 a year with 41 dead in the otter trawl fishery. Estimates of bycatch from the North Carolina gillnet fishery averaged 4,179 per year with 218 dead. The South Carolina American shad fishers reported an average of 4.3 Atlantic sturgeon caught per year in rivers in the South Atlantic DPS and 92.4 per year in waters in the Carolina DPS. Refer to ASMFC 2017 for more information regarding bycatch and bycatch mortality estimates.

Amendment 1 requires states and jurisdictions to report Atlantic sturgeon bycatch, although the quality of available data varies. Anecdotal evidence suggests that many Atlantic sturgeon bycatch encounters are unreported, indicating the need for reliable state-directed reporting programs.

In 2018, excluding confidential data, 242 Atlantic sturgeon were reported as bycatch from state water fisheries as recorded through state observer and bycatch monitoring programs (excluding NEFOP observations). Most reported bycatch of Atlantic sturgeon was from gillnet fisheries. The state-specific bycatch totals are as follows: Connecticut (31), New Jersey (4), PRFC (confidential), Virginia (26), North Carolina (24), South Carolina (138), and Georgia (19). Additionally, NEFOP fisheries observers reported 375 Atlantic sturgeon in 2018.

In 2019, excluding confidential data, 84 Atlantic sturgeon were reported as bycatch from state water fisheries as recorded through state observer and bycatch monitoring programs (excluding NEFOP observations). Most reported bycatch of Atlantic sturgeon was from gillnet fisheries. The state-specific bycatch totals are as follows: Connecticut (1), New Jersey (confidential), PRFC

(confidential), Virginia (20), North Carolina (6), South Carolina (19), Georgia (37), and Florida (1). Additionally, NEFOP fisheries observers reported 281 Atlantic sturgeon in 2019.

In 2020, excluding confidential data, 107 Atlantic sturgeon were reported as bycatch from state water fisheries as recorded through state observer and bycatch monitoring programs (excluding NEFOP observations). Most reported bycatch of Atlantic sturgeon was from gillnet fisheries. The state-specific bycatch totals are as follows: Connecticut (29), PRFC (confidential), Virginia (49), North Carolina (18), South Carolina (2), and Georgia (9). Additionally, NEFOP fisheries observers reported 22 Atlantic sturgeon in 2020. The most drastic change over the time series is the reduction in bycatch reported from South Carolina, which corresponded with reduced participation in the state's shad fishery after the 2018 fishing year.

Fishery-Independent Takes

Atlantic sturgeon are not often encountered by fishery-independent surveys; many river systems have few fish and particular stretches of rivers known to support sturgeon are often not easily sampled. However, several states have been conducting both long and short-term monitoring of Atlantic sturgeon through fishery-independent surveys, tagging programs, and other research efforts. Refer to Table 2 for a list of takes from fishery-independent surveys and research programs by state.

Aquaculture

A management objective of the 1990 FMP is to enhance and restore Atlantic sturgeon stocks. The use of aquaculture aims to achieve that objective by providing a unique opportunity to research conservation, restoration, and recovery techniques for wild-spawning Atlantic sturgeon.

The U.S. Fish and Wildlife Service (USFWS) maintains eight adult Atlantic sturgeon at the Bears Bluff National Fish Hatchery in South Carolina under Endangered Species Act (ESA) Section 10(a)(1)(A) Permit #17367-01 issued on March 14, 2013, and continued under Permit #21198 since 2018. These fish were collected from 2008 to 2010 from the Altamaha River in Georgia. Fertilized eggs have been produced from at least one of these fish every year since 2011. The 2020 spawning effort yielded approximately 22,938 eggs and 7,924 fry hatched from those eggs, but one adult broodfish died. Groups of progeny from the successful spawning events are currently being reared for future research. At the end of the year, approximately 117 progeny were held on station. . In 2020, Atlantic sturgeon or parts of them were distributed to permitted partners including the U.S. Geological Survey and Mississippi State University for research purposes. The USFWS's Welaka National Fish Hatchery in Florida also maintains 55 Atlantic sturgeon from three year classes, 2011-2013, after the sale of 3 fish from the 2012 class in 2019. These fish were obtained from the Bears Bluff National Fish Hatchery for future research, and as a refugium for endangered species. The total number of Atlantic sturgeon kept at the hatchery was reduced due to space limitations and to allow for better conditions for the remaining fish. Lastly, the USFWS Northeast Fishery Center in Lamar, Pennsylvania terminated its captive spawning research program in 2017 and held no Atlantic sturgeon in captivity.

Maryland Department of Natural Resources' Sturgeon Conservation Partnership, in cooperation with GenOn Energy (formerly NRG Energy) and the University of Maryland's Aquaculture and Restoration Ecology Laboratory (AREL), had funding removed in late 2017, causing all sturgeon to be transferred to an outdoor culture tank at the Cooperative Oxford Laboratory (COL) in Oxford, Maryland. The partnership continues to support the efforts through ESA Permit #21434 issued on February 8, 2018. This research was previously conducted under ESA Permit #17364 held by USFWS for its Northeast Fishery Center which was modified on January 6, 2016, to include facilities controlled by MD DNR. In 2018 and 2019, 168 sturgeon were distributed to the New York Aquarium (7 wild origin), the Patuxent Naval Air Station (150 Canadian origin), and Delaware State University (11 Canadian origin) for educational and research purposes. The remaining Canadian origin sturgeon are regularly transferred between the GenOn Energy and COL facilities, although the COVID-19 pandemic caused the sturgeon to remain in the GenOn Energy facility for all of 2020. As of October 2019, GenOn Energy's Chalk Point Generating Station housed 7 wild Atlantic sturgeon from Chesapeake Bay and 56 Canadian hatchery origin Atlantic sturgeon.

In 2005, LaPaz LLC of Lenoir, North Carolina, received approval from the ASMFC and North Carolina Department of Marine Fisheries to commercially rear Atlantic sturgeon for the purpose of sale of meat and caviar (ASMFC 2005; ASMFC 2006). LaPaz imported 5,883 fertilized Atlantic sturgeon eggs from Canadian sources from 2006-2008. Shortly thereafter, LaPaz began shifting focus away from Atlantic sturgeon. From 2010-2012, LaPaz culled nearly all of the 2006 fish, and 435 fish from 2008 were transported from LaPaz to the West Virginia University (WVU) to be involved in a study evaluating aquaculture potential of reclaimed water from coal mining. The fish were accompanied by proper tracking and documentation and WVU received permission from the West Virginia Fish and Game Division to possess the fish at their facility. Since West Virginia is not an ASMFC member state, the disposition of these fish is not well documented. Accordingly, the PRT expressed concerns regarding the transfer of Atlantic sturgeon to facilities outside of ASMFC jurisdiction and regarding the ability for facilities under import exemption to transfer live Atlantic sturgeon to research facilities that may not be held to the same Best Management Practices as the exempt facility. LaPaz then culled an additional 937 fish during 2013-2014 and later accepted an offer from Horse Creek Aquafarm in Arcadia, Florida to purchase the remaining fish.

Horse Creek Aquafarm, a commercial food farm, received 600 Atlantic sturgeon from LaPaz in February 2015. Unfortunately, several power outages resulted in mortalities and only 117 Atlantic sturgeon remain on the farm. The Horse Creek Aquafarm received a Division of Aquaculture certificate from the Florida Department of Agriculture and Consumer Services under the provisions of Addendum I to Amendment 1. As of 2020, 24 Atlantic sturgeon remained at the aquafarm.

Endangered Species Act (ESA) Listing
ESA Section 10 Incidental Take Permits

Table 3 provides an overview of the status of ESA Section 10(a)(1)(b) Incidental Take Permits (ITPs) by state. The PRT recommends that states and jurisdictions coordinate with the ASMFC regarding the progress of ITP applications. For more information on the status of state ITPs, please consult the 2019-2021 state compliance reports or contact the state's department directly.

ESA Listing 5-Year Review and Recovery Plan

NOAA Fisheries is developing 5-year reviews for each of the five distinct population segments (DPSs) of Atlantic sturgeon. The intent of the 5-year reviews is to determine whether the species listing status should be changed (e.g., reclassified from endangered to threatened, or delisted). In August 2021, NOAA Fisheries provided the draft 5-year reviews for the Gulf of Maine, New York Bight, and Chesapeake Bay DPSs to the Commission's Atlantic Sturgeon Technical Committee. Per NOAA's request, members of the Technical Committee provided a courtesy review of the three drafts. Final versions were published in February 2022.

Preparation of the 5-year reviews for the Carolina and South Atlantic DPSs are ongoing by NOAA Fisheries. After NOAA publishes the final 5-year reviews, and if warranted, a separate rulemaking is required to make any changes to the species listing. The Recovery Plan is intended to identify measureable criteria which, when met, would result in a determination that the species be delisted. NOAA published a Recovery Plan Outline to provide interim strategies and goals for recovering the species, and further development of the Plan is expected once the 5-year reviews are completed.

Additionally, in response to a 2021 ESA section 7 Biological Opinion evaluating ten fisheries, NOAA Fisheries convened an Atlantic Sturgeon Bycatch Working Group to develop an action plan that will reduce Atlantic sturgeon bycatch in federal large gillnet (≥ 7 inches stretched) fisheries by 2024. The working group is currently reviewing available bycatch data and soliciting further input from state sources and the general public, with the draft plan set to be published on May 26, 2022.

IV. Status of Management Measures and Issues

Mandatory management measures include:

1. Complete closure, through prohibiting possession of Atlantic sturgeon, and any and all parts thereof including eggs, of any directed fishery for and landings of Atlantic sturgeon until the fishery management plan is modified to reopen fishing in that jurisdiction. In February 1999, NMFS imposed a harvest and possession moratorium on Atlantic sturgeon in the EEZ.
2. In addition, states shall implement any restrictions in other fisheries as outlined in bycatch reduction sections of the FMP.
3. States may grant limited specific exceptions to prohibitions on possession for imports of non-U.S. Atlantic sturgeon and/or cultured Atlantic sturgeon upon adoption of FMP addenda that specify the terms, limitations, and enforcement requirements for each such exception. It is intended that each such addenda shall be developed by the Atlantic

Sturgeon Plan Development Team (PDT), in consultation with representatives of the ASMFC federal partners, applicable state aquaculture authorities, the ASMFC Law Enforcement Committee, the state(s) for which shipments are intended, and the party(ies) requesting the exception.

In addition to these mandatory regulations, states are implementing several recommendations in the FMP including development of a coastwide tagging database and culture techniques, incorporation of shortnose sturgeon issues in Atlantic sturgeon research (and vice versa), stock identification, and habitat restoration.

V. Current State-by-State Implementation of FMP Compliance Requirements

As described in *Sections 3.4* and *5.1.2* of Amendment 1, states and jurisdictions must report on monitoring programs and provide estimates of bycatch of Atlantic sturgeon in other fisheries under their jurisdiction. Reports on compliance are submitted by each jurisdiction, annually, by October 1, and are reviewed by the PRT. Compliance reports must cover the previous calendar year at a minimum and should include significant findings of the current year. Based on the 2019-2021 compliance reports, all states and jurisdictions **met** the requirements of Amendment 1 (and its four addenda) to the Atlantic sturgeon FMP in 2018-2020. See Table 4 for a state-by-state summary of compliance in 2018-2020.

VI. Research Needs

Research priorities and recommendations were identified through the [2017 benchmark stock assessment](#) to support future stock assessments and interjurisdictional fisheries management for Atlantic sturgeon in state and federal waters (ASMFC 2017).

VII. Ongoing Research and Notable Comments Highlighted in 2021 Compliance Reports

Several state and federal agencies, and academic institutions, are conducting research projects to further understand Atlantic sturgeon life history, genetics, behavior, and aquaculture. States and jurisdictions are encouraged to include such information in annual compliance reports. Accordingly, please see the 2021 state-specific compliance reports for details regarding ongoing research and other notable comments (ASMFC 2021).

VIII. Recommendations of Plan Review Team

There **are** new recommendations this year from the PRT. In future compliance reports, the PRT recommends that New Jersey provide additional habitat research information to more fully capture the habitat work being conducted in the Delaware River. For the next round of compliance reports for calendar year 2021, the PRT will provide an updated compliance report template to the Board and the Technical Committee to streamline the compliance report

format across all states. The PRT seeks to improve efficiency both for states providing the necessary compliance information and for the PRT during the review process.

The PRT also notes that many fishery monitoring efforts in 2020 were impacted due to the COVID-19 pandemic, including fishery-independent surveys. Table 2 notes COVID-19 impacts to 2020 fishery-independent Atlantic sturgeon data, as identified by state compliance reports. The PRT recognizes that these impacts may continue into 2021 for some monitoring programs.

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Table 1. Stock status determination for the coastwide stock and DPSs based on mortality estimates and biomass/abundance status relative to historic levels, and the terminal year (i.e., the last year of available data) of indices relative to the start of the moratorium as determined by the ARIMA analysis. *For indices that started after 1998, the first year of the index was used as the reference value. Source: ASMFC 2017.

Population	Mortality Status	Biomass/Abundance Status	
	Probability that $Z > Z_{50\%EPR}$ 80%	Relative to Historical Levels	Average probability of terminal year of indices > 1998* value
Coastwide	7%	Depleted	95%
Gulf of Maine	74%	Depleted	51%
New York Bight	31%	Depleted	75%
Chesapeake Bay	30%	Depleted	36%
Carolina	75%	Depleted	67%
South Atlantic	40%	Depleted	Unknown (no suitable indices)

Table 2. Atlantic sturgeon takes (number of fish) reported from fishery-independent data sources, 2018-2020. Source: 2019-2021 ASMFC state compliance reports for Atlantic sturgeon.

State	Location	Method	Type of Survey or Research	Data Source	2018	2019	2020	Comments
ME	ocean	trawl	Groundfish	ME/NH joint survey	6	0	1	70 captured from 2000-2020
NH	state waters		estuarine seine survey, spring fyke net survey for rainbow smelt, and anadromous fish spawning run monitoring of six coastal fishways	NH Fish and Game	0	0	0	No known reproducing populations within NH waters.
MA	ocean	trawl	-	DMF	0	0	No sampling	No known reproducing populations within MA waters. Last sturgeon caught in survey was in 1986
RI	RI Sound	trawl and seine	Coastal Trawl Survey	RI DFW	0	0	0	Only 3 Atlantic Sturgeon since 1979 (1997, 2005, and 2014).
CT	Connecticut River	unspecified	Research	CT DEP	178	511	322	Directed research; efforts and methods highly variable over time and should not be used as an index of abundance
	Long Island Sound	trawl	Survey	CT DEP	7	9	No sampling	Multi-species survey; unreliable for abundance trends
NY	Hudson R. Estuary	anchored gillnet	Juvenile Atlantic sturgeon abundance monitoring	NYSDEC	533	319	90	Juveniles and sub-adults; juvenile abundance sampling
	Hudson R. Estuary	gill nets	Spawning Atlantic sturgeon sampling	NYSDEC	158	154	31	Adults
	Hudson R.		Voluntary reporting of mortalities	NYSDEC	33	26	31	Voluntary reporting Atl sturgeon mortalities in the Hudson River
	NY marine waters		Voluntary reporting of mortalities	NYSDEC	13	9	20	Voluntary reporting of Atl sturgeon mortalities along the NY coast

State	Location	Method	Type of Survey or Research	Data Source	2018	2019	2020	Comments
NJ	Coastal ocean	trawl	-	NJ DEP-DFW	12	29	6*	Sandy Hook to Cape May; *2020 only included January cruise
	Delaware Bay	gillnet	Striped Bass & American Shad	NJ DEP-DFW	2	0	0*	Striped bass tagging program; *2020 only included one week of sampling
	State waters	unspecified	Voluntary reporting of Atlantic sturgeon interactions	NJ DEP-DFW	37	45	37	Online volunteer reporting for sturgeon interactions; 2018: 9 alive and 22 dead; 2019: 9 alive and 36 dead; 2020: 12 alive and 22 dead
NJ/PA/DE	Delaware River	Trawl	DRMCD Project.	ERC/USACE	728	1,367	190	2018: ACOE private partners moved individuals in PA for relocation, 1 juvenile mortality; 2019: ACOE relocated individuals with one juvenile mortality that was speculated to have been dead for two or three days before the survey
DE	Delaware River	ship strike	-	DE DFW-Reporting	18	16	9	Collaboration with DSU. Includes fish reported in PA's portion of Delaware Estuary. 2018: 7 had injuries consistent with ship strike, many causes unknown; 2019: 1 gill net, 9 vessel strike, 6 unknown; 2020: 6 with vessel strike injuries and 3 unknown
	Delaware River	trawl	Juvenile abundance	DE DFW	8	7	4	Two otter trawl surveys; large (30') and small (16')
	Delaware River and Bay	gill and trammel nets	Juvenile abundance	DE DFW	240	18	69	2020 sampling efforts decreased by one third due to funding

State	Location	Method	Type of Survey or Research	Data Source	2018	2019	2020	Comments
MD	Chesapeake Bay	gill net	Striped Bass spawning stock survey	MD DNR	0	0	1	2020 encounter in upper Chesapeake Bay
	Nanticoke River System	gill net	Adult Atlantic Sturgeon Tagging	MD DNR	7	8	8	2018: 2 new captures and 5 recaptures; 2019: 3 new captures and 5 recaptures; 2020: 3 new captures and 5 recaptures
VA	James River, York River, Chesapeake Bay	trawl	Juvenile fish and Blue Crab survey	VIMS	Unk	41	5	2018: Report notes 67 observed since 1955 2019: 39 in James River; 2020: 3 in the James, 1 in the Rapp, 1 in Bay
	James River	gillnet	Adult Atlantic Sturgeon Tagging	VCU	324	376	665	
	James, York & Rapp. Rivers	anchored gillnet	American Shad monitoring	VIMS	11	9	7	2018: Majority captured in the James River. 2019: 8 in James River and 1 in York River; 2020: 6 in Rappahannock and 1 in York
NC	Albemarle Sound	gillnet	Survey	NCDMF	155	212	149	Mortalities: 16 in 2018; 31 in 2019; 10 in 2020
	Pamlico Sound and River, Pungo, Neuse Rivers	gillnet	Survey	NCDMF	8	3	0	Mortalities: 2 in 2018; 1 in 2019
	Cape Fear and New Rivers	gillnet	Survey	NCDMF	3	2	0	Mortalities: 0 in 2018; 0 in 2019
SC	Edisto River System	unspecified	Juvenile Atlantic Sturgeon	SCDNR	203	194	167	2018: 64 recaptures ; 2019: 41 recaptures; 2020: 35
	Freshwater and estuarine rivers	gillnet	Shortnose Sturgeon	SCDNR	156	214	111	Freshwater Fisheries Section; designed for Shortnose but captures are Atlantic
GA	Altamaha River	drift gillnet	Adult shad	GADNR-WRD	5	5	3	2018: additional 2 Shortnose. All measured and released alive. 2019: 1 Shortnose
	ocean	trawl	Commercial crustaceans	GADNR-CRD	3	2	3	Released alive.

State	Location	Method	Type of Survey or Research	Data Source	2018	2019	2020	Comments
GA <i>cont'd</i>	Altamaha & Wassaw Sound	trammel & gill nets	Spotted Sea Trout & Red Drum	GADNR-CRD	0	0	0	Entanglement gear surveys.
	Altamaha River	trammel & gill nets	Juvenile Sturgeon	UGA	NA	500	373	2019: 58 recaptures, additional 110 Shortnose with 25 recaptures; 2020: 48 recaptures, additional 190 shortnose captured with 10 recaptures
	Savannah River	trammel & gill nets	Juvenile Sturgeon	UGA	484	230	110	May-August, fresh/saltwater interface. 2018: 133 were recaptures; 2019: 66 recaptures, Additional 134 Shortnose with 51 recaptures; 2020: 10 recaptures, Additional 79 Shortnose with 0 recaptures
FL	Florida	Voluntary reporting	FL FWC fish kill hotline	FL FWC	1	0	2	Atlantic sturgeon carcasses reported to FL FWC

Table 3. Status of Endangered Species Act Section 10(a)(1)(B) Incidental Take Permits (ITP) for Atlantic sturgeon by state. Source: Atlantic Sturgeon Board Administrative Commissioners and members of the Atlantic Sturgeon Technical Committee. N/A = not applicable.

State	Status of ITP	Gear/Fishery	Status Rationale
ME	N/A	N/A	Little to no interaction with Atlantic sturgeon in state fisheries.
NH	N/A	N/A	One fishery interaction with Atlantic sturgeon since 1980s.
MA	N/A	N/A	No problems with Atlantic sturgeon bycatch in state water fisheries.
RI	Developing	Trawl, Gill Net	Joint ITP for sturgeon, sea turtles and whales. Analysis regarding spatio-temporal sturgeon distribution and bycatch estimates are being explored.
CT	N/A	N/A	Atlantic sturgeon interactions reduced via implementation of gear restricted areas for otter trawls and sink gill net fisheries. Plans for an ITP are on hold given staffing levels and budgetary considerations.
NY	N/A	N/A	
NJ	Developing		Applying for a renewal of the previous ITP, NMFS Permit No. 21858. Has submitted a draft ITP to NMFS GARFO and is working on finalizing details.
PA	N/A	N/A	No interactions with Atlantic sturgeon in state water fisheries.
DE	N/A	N/A	
MD	N/A	Gill Net, Pound Net, Fyke, Pots	Working on a conservation plan for various fisheries, but have insufficient data and resources to complete an ITP application in the near-term.
DC	N/A	N/A	No Atlantic sturgeon sightings in DC waters in over 30 years.
PRFC	N/A	N/A	
VA	Pending	Gill Net	Joint ITP for Atlantic sturgeon and sea turtles and including the implementation of an observer program to improve Atlantic sturgeon bycatch estimates.
NC	Received	Anchored Gill Net	10-year permit expiring July 2023.
SC	Pending	Shad Fishery	Application has been submitted and includes bycatch data demonstrating that changes in the shad fishery have reduced sturgeon bycatch.
GA	Received	Shad Fishery	Permit No. 16645.
FL	N/A	N/A	

Table 4. State-by-State compliance, 2018-2020. Note: C = In Compliance, P = Partial, N = Not in Compliance/No Report Submitted, NA = Not Applicable. * = Monitoring not completed due to impacts of the COVID-19 pandemic.

State	Bycatch Monitoring 1			Monitoring Results 2			Habitat Status 3			Aquaculture Operations 4			Moratorium on Harvest and Possession5		
	2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020
ME	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
NH	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
MA	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
RI	C	C	C	C	C	C	NA	NA	NA	NA	NA	NA	C	C	C
CT	C	C	C	C	C	C	NA	NA	NA	NA	NA	NA	C	C	C
NY	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
NJ	C	C	C	C	C	C	N	N	N	C	C	C	C	C	C
PA	C	C	C	C	C	C	NA	NA	NA	NA	NA	NA	C	C	C
DE	C	C	C	C	C	C	C	C	C	NA	NA	NA	C	C	C
MD	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
PRFC	C	C	C	NA	NA	NA	NA	NA	NA	NA	NA	NA	C	C	C
DC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	C	C	C
VA	C	C	C	C	C	C	C	C	C	NA	NA	NA	C	C	C
NC	C	C	C*	C	C	C*	C	C	C	NA	NA	NA	C	C	C

State	Bycatch Monitoring 1			Monitoring Results 2			Habitat Status 3			Aquaculture Operations 4			Moratorium on Harvest and Possession ⁵		
SC	C	C	C	C	C	C	C	C	C	NA	NA	NA	C	C	C
GA	C	C	C	C	C	C	C	C	C	NA	NA	NA	C	C	C
FL	C	C	C	NA	NA	NA	C	C	C	C	C	C	C	C	C

¹**REQUIRED** Bycatch Monitoring may be implemented via law enforcement observations, FI surveys, ACCSP and/or at-sea observer programs.

²**RECOMMENDED** Monitoring Results should include: (a) details of how juvenile abundance survey will be performed (recommended every 5 years), (b) calculated CPUE estimates of juveniles, (c) reports on tag and release programs, and (d) assessment of spawning stock status including examination of sex ratio, size, and age structure by sex of the larger sub-adults and adults.

³**RECOMMENDED** Habitat Monitoring reports should include: (a) assessment of sturgeon habitats of particular concern, (b) restoration programs, and (c) FERC relicensing evaluations.

⁴**RECOMMENDED** Aquaculture monitoring reports should include: (a) aquaculture research and development, (b) collection of brood stock and release of cultured progeny, (c) translocation of sturgeons and inadvertent spread of diseases, (d) introduction of non-native sturgeons for commercial aquaculture, (e) collection and archiving tissue samples for genetic analysis, and (f) monitoring effectiveness of restoration programs.

REQUIRED for states with private aquaculture exemptions to the harvest and possession moratorium.

⁵**REQUIRED** State moratorium on the harvest and possession of Atlantic sturgeon currently applies throughout ASMFC jurisdiction.