Atlantic Sturgeon Biological Status Review Report

March 31, 2011

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION
620 South Meridian Street
Tallahassee, Florida 32399-1600

Biological Status Review
for the
Atlantic Sturgeon
(*Acipenser oxyrinchus oxyrinchus*)
March 31, 2011

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate species listed as Threatened or Species of Special Concern as of November 8, 2010 that had not undergone a status review in the past decade. Public information on the status of the Atlantic sturgeon was sought from September 17 to November 1, 2010. The members of the Atlantic sturgeon Biological Review Group (BRG) met on December 6, 2010. Group members were Dr. Mark Peterson (University of Southern Mississippi), Mr. Frank Parauka (United States Fish and Wildlife Service), and Dr. Jeffrey Wilcox (FWC lead) (Appendix 1). In accordance with rule 68A-27.0012, Florida Administrative Code (F.A.C.), the Atlantic sturgeon BRG was charged with evaluating the biological status of the Atlantic sturgeon using criteria included in definitions in 68A-27.001, F.A.C., and following the protocols in the *Guidelines for Application of the IUCN Red List Criteria at Regional Levels (Version 3.0)* and *Guidelines for Using the IUCN Red List Categories and Criteria (Version 8.1)*. Please visit http://myfwc.com/wildlifehabitats/imperiled/listing-action-petitions/ to view the listing process rule and the criteria found in the definitions.

In late 2010, staff developed the initial draft of this report which included BRG findings and a preliminary listing recommendation from staff. The draft was sent out for peer review and the reviewers' input has been incorporated to create this final report. The draft report, peer reviews, and information received from the public are available as supplemental materials at http://myfwc.com/wildlifehabitats/imperiled/biological-status/.

The BRG found that Atlantic sturgeon met multiple listing criteria. FWC staff recommends that the Atlantic sturgeon be listed as a Threatened species.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida. FWC staff gratefully acknowledges the assistance of the biological review group members and peer reviewers. Staff would also like to thank Dr. Joseph Mitchell who served as a data compiler on the species.

BIOLOGICAL INFORMATION

Taxonomic Classification – This biological status report is for the Atlantic sturgeon, *Acipenser oxyrinchus oxyrinchus*, Mitchill 1815, in Florida (Vladykov and Greeley, 1963; Musick, 2002). For the purposes of this assessment, Atlantic sturgeon is considered distinct from its federally-listed sub-species: Gulf of Mexico sturgeon, *Acipenser oxyrinchus desotoi*.

Life History References – Atlantic Sturgeon Status Review Team (ASSRT) (2007); Atlantic sturgeon stock assessment peer review report (1998); Gilbert (1989); Peterson et al., (2008).

Geographic Range and Distribution – The species' historic range included major estuarine and riverine systems that spanned from Hamilton Inlet on the coast of Labrador, Canada to the Saint Johns River in Florida (ASSRT 2007). This is similar to the current range.

Population Status and Trend – Florida presently has no documented breeding population of Atlantic sturgeon in either the St. Johns or St. Marys Rivers. In 1884, William Hams, E.N. reported to the US Fish Commission that, while he recommended establishing a shad hatchery on the St. Marys River on the Florida-Georgia border (near Kings Ferry), he also recommended that two sturgeon nets be used to fish for every shad net, "because the sturgeon were so plentiful" and destructive to shad gill-nets. The entire Atlantic sturgeon fishery was closed in 1998 by the Atlantic States Marine Fisheries Commission (ASMFC), when a fishing moratorium was imposed for ~40 years, or at least until 20 year classes of mature female Atlantic sturgeon were present (ASMFC 1998). Since that time only two reports of Atlantic sturgeon in the St. Johns River, Florida or St. Marys River, Florida/Georgia have been confirmed, until 2010.

In January 2010, shrimp try-nets in 15 meter depths were used for chase-trawling chilled sea turtles during Kings Bay Trident submarine channel maintenance. During this exercise, a trawler netted and released 21 sub-adult (~1 meter) Atlantic sturgeon in the St. Marys estuary (Slay, Pers. Comm. 2010). Dr. Doug Peterson's University of Georgia sampling study also captured nine subadult (~1 meter) Atlantic sturgeon in the tidally-influenced St. Marys, ranging through summer, fall, and winter captures during 2010 (Peterson, Pers. Comm. 2010). In February of 2011, two year-one/year-two juvenile (~40 centimeter) Atlantic sturgeon were caught on hook and line, from the shore, in the St. Johns River (Snyder, Pers. Comm. 2011). This could suggest that the nearby Atlantic sturgeon populations are increasing sufficiently to re-establish resident juvenile populations in the St. Marys and St. Johns Rivers. This is the first step which necessarily precedes the St. Marys River and St. Johns River regaining their own breeding populations, as the resident juveniles mature. So the status is "extirpated or nearly extirpated, but migrants are occupying northeast Florida rivers."

Quantitative Analyses – None available for Florida.

BIOLOGICAL STATUS ASSESSMENT

Threats – Threats to the Atlantic sturgeon in the St. Marys and St. Johns Rivers are primarily poor water quality, fishery by-catch, and habitat degradation issues. Water quality issues focus on low dissolved oxygen levels in some river reaches, excessive coliform counts in others, and observed hypoxic detritus bed(s) in the estuaries. Not all water quality issues are necessarily reversible. Harvest is prohibited by the ASMFC, but trawl and gill-net fisheries by-catch data are unavailable. Overall, future habitat degradation is tougher to predict, particularly with respect to unforeseen impacts of human responses to climate change. Silvicultural and agricultural best management practices continue to reduce those industries' impacts to the watershed, but further suburban development with allowed septic tanks (adding coliform bacteria) and hardened surfaces (increasing overland flow and erosion) is predicted. It is unknown which of these processes has the greater influence for this species. Of paramount importance is habitat management actions which restore a minimum dissolved oxygen concentration exceeding 3.0 ppm throughout the river systems, this being the lower threshold for sturgeon and most recreational fishing species. The situation will have to be closely monitored.

Population Assessment – Findings from the BRG are included in Biological Status Review Information Findings tables.

LISTING RECOMMENDATION

Staff recommends listing the Atlantic sturgeon as a Threatened species because the species met listing criteria as described in 68A-27.001, F.A.C., and as evaluated in the findings table.

SUMMARY OF THE INDEPENDENT REVIEWS

Comments on the draft biological status review report were received from 3 peer reviewers, Dr. Mark Collins (South Carolina Department of Natural Resources), Dr. Doug Peterson (University of Georgia) and Dr. Kenneth Sulak (US Geological Survey-Southeastern Ecological Center). Appropriate editorial changes recommended by the reviewers were made to the report, but did not alter the BRG's finding.

Two reviewers concurred with the staff recommendation. One reviewer stated the Atlantic sturgeon should not be listed because of the lack of a documented breeding population in Florida waters. The BRG recognizes the absence of documentation for an existent breeding population; but, also note that there is no evidence that there isn't a breeding population. Staff's recommendation to list as threatened is unchanged. Peer reviews are available at MyFWC.com

LITERATURE CITED

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Peterson, D.L. 2010. Reporting capture of 9 sub-adult Atlantic sturgeon and 1 shortnose sturgeon in the St. Marys river, Florida. Personal Communication.

Slay, Chris. 2010. Reporting capture of 21 sub-adult Atlantic sturgeon in the St. Marys river estuary, Florida. Personal Communication.

Snyder, Michael. 2011. Reporting capture of 2 sub-adult Atlantic sturgeon in the St. Johns river, Florida. Personal Communication.

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Biological Status Review Information
Findings

Species/taxon: Atlantic Sturgeon
Date: 12/06/10
Assessors: Wilcox, Peterson, Parauka

Generation length: 29

Criterion/Listing Measure	Data/Information	Data Type*	Sub-Criterion Met?	References
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). Sub-Criterion met - yes (Y) or no (N).				
(A) Population Size Reduction, ANY of				
(a)1. An observed, estimated, inferred or suspected population size reduction of at least 50% over the last 10 years or 3 generations, whichever is longer, where the causes of the reduction are clearly reversible and understood and ceased[1]	95-99% decline in population estimated or suspected since 1933. Harvest is prohibited, but other threats not clearly reversible and ceased.	I	N	ASSRT 2007; Hams 1884
(a)2. An observed, estimated, inferred or suspected population size reduction of at least 30% over the last 10 years or 3 generations, whichever is longer, where the reduction or its causes may not have ceased or may not be understood or may not be reversible[1]	95-99 % decline in population estimated or suspected since 1933. Harvest is prohibited. Water quality issues may not be entirely reversible. Incidental by-catch remains unreported.	I	Y	ASSRT 2007; Hams 1884
(a)3. A population size reduction of at least 30% projected or suspected to be met within the next 10 years or 3 generations, whichever is longer (up to a maximum of 100 years) [1]	Insufficient data		N	
(a)4. An observed, estimated, inferred, projected or suspected population size reduction of at least 30% over any 10 year or 3 generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased or may not be understood or may not be reversible.[1]	Insufficient data		N	
[1] based on (and specifying) any of the following: (a) direct observation; (b) an index of abundance appropriate to the taxon; (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat; (d) actual or potential levels of exploitation; (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.				
(B) Geographic Range, EITHER				
(b)1. Extent of occurrence < 20,000 km^2 (7,722 mi^2) OR	220 km^2	E	Y	FWC unpublished data
(b)2. Area of occupancy < 2,000 km^2 (772 mi^2)	22.6 km^2	E	Y	FWC unpublished data
AND at least 2 of the following:				
a. Severely fragmented or exist in ≤ 10 locations	2 location	I	Y	ASSRT 2007
b. Continuing decline, observed, inferred or projected in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent, and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals	Insufficient data		N	

c. Extreme fluctuations in any of the following: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals	Insufficient data		N	
(C) Population Size and Trend				
Population size estimate to number fewer than 10,000 mature individuals AND EITHER	Population estimated at 10 mature individuals	E	Y	FWC unpublished data
(c)1. An estimated continuing decline of at least 10% in 10 years or 3 generations, whichever is longer (up to a maximum of 100 years in the future) OR	Natural mortality estimated at 17%, exceeds this criterion.	E	Y	ASSRT 2007, Peterson 2008
(c)2. A continuing decline, observed, projected, or inferred in numbers of mature individuals AND at least one of the following:	Natural mortality estimated at 17%, exceeds this criterion.	E	Y	ASSRT 2007, Peterson 2008
a. Population structure in the form of EITHER	TRUE	E	Y	FWC unpublished data
(i) No subpopulation estimated to contain more than 1000 mature individuals; OR				
(ii) All mature individuals are in one subpopulation	TRUE	I	Y	FWC unpublished data
b. Extreme fluctuations in number of mature individuals	UNKNOWN		N	
(D) Population Very Small or Restricted, EITHER				
(d)1. Population estimated to number fewer than 1,000 mature individuals; OR	Population estimated at 10 mature individuals (10X net caught adults).	E	Y	FWC unpublished data
(d)2. Population with a very restricted area of occupancy (typically less than 20 km^2 [8 mi^2]) or number of locations (typically 5 or fewer) such that it is prone to the effects of human activities or stochastic events within a short time period in an uncertain future	AOO is 23 km^2. Number of locations is two.	E	Y	FWC unpublished data
(E) Quantitative Analyses				
e1. Showing the probability of extinction in the wild is at least 10% within 100 years	No quantitative analysis done.		N	

Initial Finding (Meets at least one of the criteria/sub-criteria OR Does not meet any of the criteria/sub-criteria)	Reason (which criteria/sub-criteria are met)
Does meet criteria	A2: C1+2a(i, ii); D1+2
Is species/taxon endemic to Florida? (Y/N)	No
If Yes, your initial finding is your final finding. Copy the initial finding and reason to the final finding space below. If No, complete the regional assessment sheet and copy the final finding from that sheet to the space below.	
Final Finding (Meets at least one of the criteria/sub-criteria OR Does not meet any of the criteria/sub-criteria)	Reason (which criteria/sub-criteria are met)
Does meet criteria	A2: C1+2a(i, ii); D1+2

1	Species/taxon:	Atlantic Sturgeon
2	Biological Status Review Information Regional Assessment Date:	12/6/10
3	Assessors:	Wilcox, Peterson, Parauka
4		
5		
6		
7		
8	Initial finding	Supporting Information
9		
10	2a. Is the species/taxon a non-breeding visitor? (Y/N/DK). If 2a is YES, go to line 18. If 2a is NO or DO NOT KNOW, go to line 11.	YES
11	2b. Does the Florida population experience any significant immigration of propagules capable of reproducing in Florida? (Y/N/DK). If 2b is YES, go to line 12. If 2b is NO or DO NOT KNOW, go to line 17.	DO NOT KNOW
12	2c. Is the immigration expected to decrease? (Y/N/DK). If 2c is YES or DO NOT KNOW, go to line 13. If 2c is NO go to line 16.	
13	2d. Is the Florida population a sink? (Y/N/DK). If 2d is YES, go to line 14. If 2d is NO or DO NOT KNOW, go to line 15.	
14	If 2d is YES - Upgrade from initial finding (more imperiled)	
15	If 2d is NO or DO NOT KNOW - No change from initial finding	
16	If 2c is NO or DO NOT KNOW- Downgrade from initial finding (less imperiled)	
17	If 2b is NO or DO NOT KNOW - No change from initial finding	NO CHANGE
18	2e. Are the conditions outside Florida deteriorating? (Y/N/DK). If 2e is YES or DO NOT KNOW, go to line 24. If 2e is NO go to line 19.	
19	2f. Are the conditions within Florida deteriorating? (Y/N/DK). If 2f is YES or DO NOT KNOW, go to line 23. If 2f is NO, go to line 20.	
20	2g. Can the breeding population rescue the Florida population should it decline? (Y/N/DK). If 2g is YES, go to line 21. If 2g is NO or DO NOT KNOW, go to line 22.	
21	If 2g is YES - Downgrade from initial finding (less imperiled)	
22	If 2g is NO or DO NOT KNOW - No change from initial finding	
23	If 2f is YES or DO NOT KNOW - No change from initial finding	
24	If 2e is YES or DO NOT KNOW - No change from initial finding	
25		
26	Final finding	NO CHANGE

Additional Information – Two items of discussion were noted.

1. Since net captures rarely gather 100% of a population, we presumed ten mature fish potentially live in the St. Marys. All 30 Atlantic sturgeon captured so far have been sub-adults. We have only one anecdotal report for adults residing and jumping in the St. Marys River near Orange Bluff and one anecdotal report of a six inch (15 cm) young-of-the-year caught on hook and line in 1997 (implying a local spawning event). Conservative action requires that we do not presume a lack of documented evidence necessarily implies that no breeding adults enter the St. Marys or St. Johns Rivers. Furthermore, two documented possibly year-one or -two Atlantic sturgeon were caught on hook and line in February of 2011 in the St. Johns River, implying another potential local spawning event last year.

2. The discussion regarding the Regional assessment pivoted around the term "non-breeding visitors". Atlantic sturgeon are reputed to be "natal stream spawners", like salmon, so are most often considered non-breeding visitors along the Atlantic Seaboard. However, they also inhabited nearly every major river system on the East Coast; thus some visitors must spawn in non-natal rivers for this historic distribution to have existed prior to European colonization. Because of the absence of young-of-the-year juveniles captured during 1400 hours of gill and trammel netting, but the one anecdotal record a young-of-the-year in 1997 and two year-one or -two juveniles in 2011, the St. Marys and St. Johns Rivers Atlantic sturgeons were presumed to be non-breeding visitors at this time. We don’t have good evidence either way. This needs to be closely monitored as the resident juveniles mature to determine if they are potential founders for a breeding population in the St. Marys or St. Johns Rivers.

APPENDIX 1. **Brief biographies of the members of the Atlantic sturgeon Biological Review Group.**

Frank Parauka received his B.S. degree from Utah State University in 1968. He started working with the US Fish and Wildlife Service in 1968 at a National Fish Hatchery in Michigan. He spent 15 years rearing salmonids, coolwater and warmwater fish species. Frank's last 27 years have been spent in the USFWS-Panama City office. He has coordinated striped bass restoration efforts with FWC, provided fishery technical assistance to federal land managers and has been the lead biologist in this office for Gulf sturgeon recovery and management activities for the last 20+ years. Mr. Parauka was part of the team that developed the Gulf Sturgeon Recovery and Management Plan and the critical habitat designation for Gulf sturgeon. Frank has been involved in numerous Gulf sturgeon life history studies throughout the Florida panhandle river systems, bays and Gulf of Mexico. His duties hold him responsible for population estimates, movement and habitat use (fresh and marine systems), evaluation of spawning habitat and threats, documentation of spawning with the collection of eggs, and coordinating activities with state and federal agencies, universities and NGOs.

Dr. Mark Peterson received his Ph.D. from the University of Southern Mississippi in 1987. He has a broad interest in how fishes and other nekton (crabs, shrimp, etc.) interact with their habitat and the other organisms (plants, invertebrates, etc.) that live there in a quantitative manner and use various statistics to support these relationships. In that vein, he is interested in how altered coastal habitat functions compared to more pristine habitat in terms of survival, growth, reproduction and habitat use patterns of fishes and other nekton in a comparative manner. His program at the University of Southern Mississippi Gulf Coast Research Laboratory is the primary source of research on the saltmarsh topminnow (*Fundulus jenkinsi*), across its range in the northern Gulf of Mexico.

Dr. Jeffrey Wilcox is currently the Fish Taxa Coordinator for FWC's Species Conservation Planning Section, focusing on non-game species. Jeff received his PhD from the University of Florida in developmental biology in 2001. He conducted research on larval feeds critical to successful post-hatch development in marine fishery species at Florida State University prior to coming to FWC. Although a sturgeon specialist by recent training, he has been studying non-game fishes since 1966, and working to conserve them since 2006.

APPENDIX 2. Summary of letters and emails received during the solicitation of information from the public period of September 17, 2010 through November 1, 2010.

No additional public information was received during the public solicitation period.