Supplemental Information for the Atlantic Sturgeon

Biological Status Review Report

The following pages contain peer reviews received from selected peer reviewers, comments received during the public comment period, and the draft report that was reviewed before the final report was completed

March 31, 2011

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Peer review #1 from Dr. Kenneth Sulak

From: Kenneth J Sulak
To: Imperiled
Cc: Wilcox, Jeffrey
Subject: Re: Atlantic sturgeon Draft BSR Report - Sulak Review
Date: Tuesday, January 04, 2011 3:15:51 PM
Attachments: Atlantic sturgeon Final Draft BSR-REV-KJS.doc
Importance: High

Imperiled & Jeff Wilcox,

I have complete review of the Atlantic sturgeon draft BSR review. My comments are inserted on the attached copy of the manuscript, as markup comments using the Word markup utility. I concur with the suggested 'Threatened' designation for the AS in Florida. On purely biological grounds, with a handful of records from the past 3 decades, the species certainly fits the 'Endangered' designation in Florida. However, designation as 'Endangered', particularly via the federal ESA process, would raise major obstacles to conducting field research and experimental manipulation of the species. I concur that the species is probably nearly extirpated in Florida. I do not think, however, that an informed opinion can be rendered about whether the remaining small Florida population is composed totally of expatriates from Georgia northward, or represents a remnant of the original indigenous Florida population. Probably, it is a mix of both. I think it is very unlikely that AS from the nearshore-offshore winter feeding aggregation that seasonally moves along the SE coast enter or remain in Florida rivers. This seasonal migratory aggregation, studied for years by USFWS Wilson Laney winter cruises, is drawn from populations in Virginia and the Carolinas. Much more likely would be the straying movement of individual fish from the Georgia populations, especially the Altamaha, Satilla and Ogeechee, into Florida waters. Such occasional strays from nearby rivers, which fit the mold of biological emigrants exploring new habitat, are much more likely to remain in residence in a newly explored river.

I think that it is erroneous to conclude that AS would visit and enter the SMR only for feeding and only in winter. Indeed, I think this is rather improbable. The best evidence from the best-studied AS populations is that the species feeds both in the rivers and in marine waters (unlike the Gulf sturgeon).

The present status of knowledge of the AS in Florida waters is very poor. The absence of either adults(?) or YOY in the limited SMR sampling recently conducted cannot be taken as definitive evidence. That limited sampling, conducted on a shortnose sturgeon protocol, is not very informative and certainly not definitive. Previous net sampling for AS in the SJR also followed a flawed protocol, based on the way incidental AS records were obtained during the former shad fishery. Whenever and wherever a sturgeon species has been considered extirpated in the past, a properly motivated or designed sampling program has proven that the population in question was much larger than anticipated. A telling example is the Chesapeake Bay. Lacking any scientific samples over several decades, and wanting to prove that the AS was indeed extirpated, to provide a rationale for stocking, the State of Virginia initiated a fisherman reward program ($100 per record) some years ago. In less than two weeks the reward fund was exhausted. Over 200 AS were documented in the initial reward period. We were similarly surprised to net ca 200 GS from

the Yellow River in 2001, the first year of the USGS 3-year sampling program. Results were a population estimated at 500-1,000 net-vulnerable GS. How, when, where, how often, what gear, how set, for how long, and by whom (level of experience and knowledge of sturgeons) - determines whether or not sturgeon are caught, and in what numbers.

Kenneth J. Sulak, Ph.D.
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Lead Scientist
Coastal Ecology and Conservation Research Group
U.S. Geological Survey
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Gainesville, FL 32653

Biological Status Review
for the
Atlantic Sturgeon,
Acipenser oxyrinchus oxyrinchus

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate all species listed as Threatened or Species of Special Concern as of September 1, 2010. 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 (USM), Mr. Frank Parauka (USFWS), Dr. Jeffrey Wilcox (FWC lead). 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(3) 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-process/ to view the listing process rule and the criteria found in the definitions.

The BRG found that Atlantic sturgeon met criteria A2; C1+2a(i, ii); D1+2. FWC staff recommends that the Atlantic sturgeon be listed as a State-designated Threatened species.

Comment [k1]: I agree. If ESA listing as 'Endangered' is granted, this will make it very difficult to conduct the kind of exploratory research that is still needed to assess the status of the species in Florida.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida.

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).

Comment [k2]: USGS has good records for AS from the Indian River (angled specimen) and the St. Lucie Inlet (specimens impinged on power plant screen). So, the species probably extends a bit further south. Indeed, historically referenced sturgeon specimens from Bermuda, Guyana, Cuba, and Looe Key are probably attritibutable to the AS, not the Gulf sturgeon which rarely ventures so far afield during largely along-coast migrations.

Population Status and Trend – Florida presently has no known 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 per one shad net (both before and after), "because the sturgeon

were so plentiful" and destructive to shad gill-nets. The entire Atlantic sturgeon fishery was closed 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 or St. Marys have been confirmed, until 2010.

In January 2010, while chase-trawling for chilled sea turtles during Kings Bay Trident submarine channel maintenance, a trawler netted and released 21 sub-adult (~1 Meter) Atlantic sturgeon in the St. Marys estuary (Slay, Pers. Comm. 2010). This implies that the nearby (Satilla & Altamaha Rivers) Atlantic sturgeon populations are increasing sufficiently to re-establish winter-feeding populations in the St. Marys estuary. This is the first step toward establishing a "reproductive sink" population of Satilla or Altamaha River stock, which necessarily precedes the St. Marys regaining its own breeding population. So the trend is "extirpated or nearly extirpated, but immigrants are returning to the river."

While Atlantic sturgeon appear to be using the St. Marys estuary feeding sites in winter; it is critical to remember that Atlantic sturgeon do not feed in freshwater rivers, which in the South, means primarily during winter (Gu et al., 2001).

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 the dissolved oxygen sags in some river reaches, excessive coliform counts in others, and observed anoxic detritus bed(s) in the estuary. Not all water quality issues are necessarily reversible. Harvest is prohibited by the ASMFC, but trawl and gill-net fisheries by-catch data is unavailable. Overall future habitat degradation is tougher to predict. 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. Which of these has the greater influence overall for this species remains anyone's guess. The situation will be closely monitored.

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

LISTING RECOMMENDATION – Staff recommends listing the Atlantic sturgeon as a Threatened species because the species met criteria for listing as described in 68A-27.001(3) F.A.C

Comment [k3]: In the report of the U.S. Commissioner of Fisheries for the year ending 30 June 1901, Townsend 1902 publication date: East Florida sturgeon landings were reported for 1889 as 40,600 pounds, in 1890 as 28,055 pounds. and subsequently no catches reported through 1901. In the same report series for calendar year 1895, Brice 1897, no landings of sturgeons were reported for NE Florida. In this series Jacksonville is identified as the rail terminal to which fishery products were conveyed by the fishermen for shipment north. I believe I have read in another of the reports in this series (cannot remember which year – did not save information at the time since not referring to Gulf sturgeon) that sturgeons were landed in quantity from the St. Marys River. In any event, there was certainly a substantial resident population of AS in NE Florida when commercial fishing operations began to target sturgeons in the late 1880s. A catch of 40,600 lbs translates to a probable N of ca 400-500 fish.

Comment [k4]: Gu et al, (2001) used a limited sample of Gulf sturgeon to evaluate stable isotopic evidence of food source. Their results corresponded with earlier (e.g., Mason and Clugston) and subsequent research confirming trophic dormancy for GS during the spring-fall period of freshwater residence. The same topic HAS NOT BEEN STUDIED in the AS. Indeed, all indications from the literature are that AS DO FEED in freshwater rivers in summer. This is not a temperature-dependent phenomenon. Food resources are abundant in most E. Coast rivers, but very poor in Gulf Coast blackwater rivers. I do not think that there is any literature stating that AS show similar seasonal trophic dormancy. Recent acoustic telemetry in New England has surprised researchers, showing that AS remain in the rivers following spawning. Thus, the untested conventional wisdom that they leave the rivers in summer may be wrong.

Comment [k5]: The St. Marys River is undammed, providing access to potential ancestral upriver spawning grounds. However, in the St. Johns River system, the only part of the system that might originally have provided access to upriver spawning grounds with high flow and rock substrate is denied by the dam at the mouth of the Ochlawaha River. Thus, the most serious threat to re-establishment of a resident St. Johns River population is denial of access to potential spawning grounds. Black Creek is unlikely as a suitable alternative.

LITERATURE CITED

Atlantic States Marine Fisheries Commission (ASMFC). 1998. Atlantic sturgeon fishery management plan, Amendment 1, fishery management report 31, 60 pp.

Atlantic Sturgeon Status Review Team (ASSRT). 2007. Status Review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. 174 pp.

Atlantic Sturgeon Stock Assessment Peer Review Report. 1998. Report to the Atlantic States Marine Fisheries Commission, Atlantic sturgeon Technical Committee and Management Board, March, 1998. 139 pp.

Gilbert, C.R. 1989. Species Profiles: Life histories and environmental requirements of coastal fishes and invertebrates (Mid-Atlantic Bight) -- Atlantic and Shortnose Sturgeons. U.S. Fish and Wildlife
Service Biol. Rep. 82(11.122). U.S. Army Corps of Engineers TR EL-82-4. 28 pp.

Gu, B., D. M. Schell, T. Frazer, M. Hoyer and F. A. Chapman. 2001. Stable carbon isotope evidence for reduced feeding of Gulf of Mexico sturgeon during their prolonged river residence period. Estuarine, Coastal and Shelf Science 53 (3): 275-280

Musick, J. 2002. Sturgeons: Order Acipenseriformes, in Bigelow and Schroeder's Fishes of the Gulf of Maine, Third Edition, B. Collette & Klein-MacPhee, G. eds.: pgs. 83-88, Smithsonian Institute Press, Washington, D.C.

Hams, William 1884. Characteristics of Florida rivers with a view to shad hatching. Bulletin of the United States Fish Commission, Vol. IV: 206-209

Peterson, D.L., P. Schueller, R. Devries,J. Fleming, C. Grunwald,I. Wirgin. 2008. Annual tuna size and genetic characteristics of Atlantic sturgeon in the Altamaha river, Georgia. Transactions of the American Fisheries Society 137: 393-401

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

Vladykov, V. D., and J. R. Greeley. 1963. Order Acipenseroidei. Fishes of the Western North Atlantic. Sears Foundation for Marine Research, Yale University, New Haven. 1(3): 24-60

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*	Criterion Met?	References
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). 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	O	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)	Insufficient data		N	

number of mature individuals				
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	O	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	O	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 OR Does not meet any of the criteria)	Reason (which 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 OR Does not meet any of the criteria)	Reason (which 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

Comment [k6]: I would say 'do not know'. A limited previous survey netted in the wrong places at the wrong time. There are about 20 anecdotal records of sturgeons in E. Coast Florida waters over the past several decades, from the mouth of the St. Marys River to the St. Lucie inlet area.

Comment [k7]: Some of the incidental reports/records of AS in Florida E.Coast waters were of very large specimens = AS, of a size capable of reproduction. I would score a "Yes' here

Additional Information – Two items of discussion were noted.

1. Since net captures rarely gather 100% of a population, presuming 10% net capture efficiency we computed roughly ten mature fish potentially live in the St. Marys. If the one Atlantic sturgeon caught in the summer was a vagrant, our estimate was high but conservative.
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 likely are non-breeding visitors; but since they also inhabited every major river system on the East Coast, there must be some "breeding visitors" who stray from their natal rivers to have seeded all the major rivers. Due to the absence of young-of-the-year juveniles captured during 1400 hours of gill and trammel netting, the St. Marys Atlantic sturgeons are presently presumed to be non-breeding visitors.

Comment [k8]: The cited 1400 hours of netting in the SMR was not a sufficient or appropriately conduced program to detect YOY. In 34 years of sampling in the Suwannee River, with thousands of days of net sampling with meshes down to ¾" bar, only ca 50 YOY have been captured. The total from all other GS river sampling since 1970 is 10 YOY. The recent SMR samping program sampled the salt-wedge at slack tide in summer, a protocol appropriate for shortnose sturgeon, but not AS. AS sampling needs to be conducted in spring and fall in freshwater areas above the fresh-salt interface, or in winter below the interface. The SMR sampling by UGA was not an appropriate or sufficient effort to detect presence of either adults or YOY of the AS.

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

Frank Parauka (USFWS-Panama City)
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 (USM, Gulf Coast Research Laboratory)
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 (FWC/SCPS, Lead-Atlantic sturgeon)
Dr. 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.

APPENDIX 3. Information and comments received from independent reviewers.

To be added after the peer review.

Comment [k9]: There really has been no consistent or target effort to assess the status of the AS in Florida E. Coast waters. I would concur that the species is likely 'nearly extirpated'. We do have a number of anecdotal records of sturgeons from the former commercial shad fishery in the SJR, from bait shrimpers working in the waters at the mouths SJR and SMR and Nassau River, from trap net fishermen, from private citizens, and from agency personnel (e.g., personnel reporting impinged AS on screens of Port St. Lucie generating plant). The one SJR netting effort of limited scale and duration did not fish appropriately or long enough to be effective in capturing AS. The recent SMR effort was even more limited and based on a shortnose sturgeon sampling protocol that would be rather ineffective in targeting AS. I would doubt that a reproductive population still exists. However, we may still have a remnant population representing the indigenous Florida population that was seriousy fished in the late 1880s. All netted or incidental captures need to be tissue sampled (fin clip) for genetic fingerprinting to resolve whether all records are indeed extralimital expatriates from Georgia populations. The coastal migratory offshore winter feeding aggregation that showed up in S. Georgia waters recently is probably unlikely to take up residence in Florida. This migratory winter feeding aggregation has been a topic of study by USFWS, Wilson Laney, for a number of years. In cold winters, it likely extends further south into Georgia coastal waters.

Peer review #2 from Dr. Doug Peterson

Jeff et al.,

Please find my review of the BSR for Atlantic sturgeon. In general, it thought it was pretty well done. I only had a few minor comments/additions (see comments on attached text file).

Please let me know if you have questions or would like additional feedback.

Regards,

Douglas L. Peterson
Associate Professor - Fisheries
Warnell School of Forest Resources
Athens, GA 30602

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The BRG found that Atlantic sturgeon met criteria A2; C1+2a(i, ii); D1+2. FWC staff recommends that the Atlantic sturgeon be listed as a State-designated Threatened species.

Comment [d10]: Why not Endangered? Seems like it couldn't get much more "imperiled" unless it was actually extinct in FL.....

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida.

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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 the dissolved oxygen sags in some river reaches, excessive coliform counts in others, and observed anoxic detritus bed(s) in the estuary. 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. 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. Which of these has the greater influence overall for this species remains anyone's guess. The situation will be closely monitored.

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

LISTING RECOMMENDATION – Staff recommends listing the Atlantic sturgeon as a Threatened species because the species met criteria for listing as described in 68A-27.001(3) F.A.C

Comment [d11]: UGA team also caught 9 subadult ATS in the RIVER (tidally influenced, but NOT the sound). All were clearly subadults – not river resident, so this further supports statement made here.

Comment [d12]: Juveniles do feed freshwater

Comment [d13]: This paragraph needs some clarification. Not sure what the point is….

Comment [d14]: Is it anoxic or merely hypoxic? Seems like hypoxia is more likely.

Comment [d15]: Especially in the context of global climate change!

Comment [d16]: I think it's pretty clear that fish need oxygen. You might consider rewording this to point out that restoration of minimum DO (>3.0 ppm) should be a priority.

LITERATURE CITED

Atlantic States Marine Fisheries Commission (ASMFC). 1998. Atlantic sturgeon fishery management plan, Amendment 1, fishery management report 31, 60 pp.

Atlantic Sturgeon Status Review Team (ASSRT). 2007. Status Review of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). Report to National Marine Fisheries Service, Northeast Regional Office. February 23, 2007. 174 pp.

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Service Biol. Rep. 82(11.122). U.S. Army Corps of Engineers TR EL-82-4. 28 pp.

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Musick, J. 2002. Sturgeons: Order Acipenseriformes, in Bigelow and Schroeder's Fishes of the Gulf of Maine, Third Edition, B. Collette & Klein-MacPhee, G. eds.: pgs. 83-88, Smithsonian Institute Press, Washington, D.C.

Hams, William 1884. Characteristics of Florida rivers with a view to shad hatching. Bulletin of the United States Fish Commission, Vol. IV: 206-209

Peterson, D.L., P. Schueller, R. Devries,J. Fleming, C. Grunwald,I. Wirgin. 2008. Annual tuna size and genetic characteristics of Atlantic sturgeon in the Altamaha river, Georgia. Transactions of the American Fisheries Society 137: 393-401

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

Vladykov, V. D., and J. R. Greeley. 1963. Order Acipenseroidei. Fishes of the Western North Atlantic. Sears Foundation for Marine Research, Yale University, New Haven. 1(3): 24-60

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*	Criterion Met?	References
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). 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	O	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	O	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	O	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 OR Does not meet any of the criteria)	Reason (which 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 OR Does not meet any of the criteria)	Reason (which criteria are met)
Does meet criteria	A2: C1+2a(i, ii); D1+2

1	Species/taxon:	Atlantic Sturgeon
2	Biological Status Review Information Date:	12/6/10
3	Regional Assessment Assessors:	Wilcox, Peterson, Parauka
4		
5		
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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.

3. Since net captures rarely gather 100% of a population, presuming 10% net capture efficiency we computed roughly ten mature fish potentially live in the St. Marys. If the one Atlantic sturgeon caught in the summer was a vagrant, our estimate was high but conservative.

4. 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 likely are non-breeding visitors; but since they also inhabited every major river system on the East Coast, there must be some "breeding visitors" who stray from their natal rivers to have seeded all the major rivers. Due to the absence of young-of-the-year juveniles captured during 1400 hours of gill and trammel netting, the St. Marys Atlantic sturgeons are presently presumed to be non-breeding visitors.

Comment [d17]: See previous comment re: 9 ATS subadults captured in the summer 2010. Genetic characterization of those fish is ongoing.

Comment [d18]: Agreed, but this should probably be monitored over the next few years.

Peer review #3 from Dr. Mark Collins

From: Mark Collins
To: Imperiled
Cc: Wilcox, Jeffrey
Subject: RE: Atlantic sturgeon Draft BSR Report
Date: Friday, December 17, 2010 10:48:47 AM

I was asked to look at your document for Atlantic sturgeon. However, since there are no known reproducing populations of Atlantic sturgeon (A. o. o.) in Florida, I see no reason for you to list them. To our knowledge all specimens that might be encountered in Florida would be transients from farther north, probably subadults, and probably only encountered in shrimp trawls (if that, now that TEDs are used).

Mark R. Collins, Ph.D.
Marine Resources Research Institute
SCDNR
POB 12559
Charleston, SC 29422

Copy of the Atlantic sturgeon BSR draft report that was sent out for peer review

Biological Status Review for the Atlantic Sturgeon, *Acipenser oxyrinchus oxyrinchus*

EXECUTIVE SUMMARY

The Florida Fish and Wildlife Conservation Commission (FWC) directed staff to evaluate all species listed as Threatened or Species of Special Concern as of September 1, 2010. 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 (USM), Mr. Frank Parauka (USFWS), Dr. Jeffrey Wilcox (FWC lead). 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(3) 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-process/ to view the listing process rule and the criteria found in the definitions.

The BRG found that Atlantic sturgeon met criteria A2; C1+2a(i, ii); D1+2. FWC staff recommends that the Atlantic sturgeon be listed as a State-designated Threatened species.

This work was supported by a Conserve Wildlife Tag grant from the Wildlife Foundation of Florida.

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).

Population Status and Trend – Florida presently has no known 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 per one shad net (both before and after), "because the sturgeon were so plentiful" and destructive to shad gill-nets. The entire Atlantic sturgeon fishery was closed 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 or St. Marys have been confirmed, until 2010.

In January 2010, while chase-trawling for chilled sea turtles during Kings Bay Trident submarine channel maintenance, a trawler netted and released 21 sub-adult (~1 Meter) Atlantic sturgeon in the St. Marys estuary (Slay, Pers. Comm. 2010). This implies that the nearby (Satilla & Altamaha Rivers) Atlantic sturgeon populations are increasing sufficiently to re-establish winter-feeding populations in the St. Marys estuary. This is the first step toward establishing a "reproductive sink" population of Satilla or Altamaha River stock, which necessarily precedes the St. Marys regaining its own breeding population. So the trend is "extirpated or nearly extirpated, but immigrants are returning to the river."

While Atlantic sturgeon appear to be using the St. Marys estuary feeding sites in winter; it is critical to remember that Atlantic sturgeon do not feed in freshwater rivers, which in the South, means primarily during winter (Gu et al., 2001).

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 the dissolved oxygen sags in some river reaches, excessive coliform counts in others, and observed anoxic detritus bed(s) in the estuary. Not all water quality issues are necessarily reversible. Harvest is prohibited by the ASMFC, but trawl and gill-net fisheries by-catch data is unavailable. Overall future habitat degradation is tougher to predict. 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. Which of these has the greater influence overall for this species remains anyone's guess. The situation will be closely monitored.

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

LISTING RECOMMENDATION – Staff recommends listing the Atlantic sturgeon as a Threatened species because the species met criteria for listing as described in 68A-27.001(3) F.A.C

LITERATURE CITED

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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*	Criterion Met?	References
*Data Types - observed (O), estimated (E), inferred (I), suspected (S), or projected (P). 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	O	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	O	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	O	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 OR Does not meet any of the criteria)	Reason (which 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 OR Does not meet any of the criteria)	Reason (which criteria are met)
Does meet criteria	A2: C1+2a(i, ii); D1+2

1	Species/taxon:	Atlantic Sturgeon
2	Biological Status Review Information Date:	12/6/10
3	Regional Assessment 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.

5. Since net captures rarely gather 100% of a population, presuming 10% net capture efficiency we computed roughly ten mature fish potentially live in the St. Marys. If the one Atlantic sturgeon caught in the summer was a vagrant, our estimate was high but conservative.
6. 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 likely are non-breeding visitors; but since they also inhabited every major river system on the East Coast, there must be some "breeding visitors" who stray from their natal rivers to have seeded all the major rivers. Due to the absence of young-of-the-year juveniles captured during 1400 hours of gill and trammel netting, the St. Marys Atlantic sturgeons are presently presumed to be non-breeding visitors.

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

Frank Parauka (USFWS-Panama City)
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 (USM, Gulf Coast Research Laboratory)
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 (FWC/SCPS, Lead-Atlantic sturgeon)
Dr. 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.

APPENDIX 3. Information and comments received from independent reviewers.

To be added after the peer review.