

STATUS REVIEW OF SMALLTOOTH SAWFISH (*Pristis pectinata*)

Peer Review of the ESA Status Assessment
and Proposal for Listing as Endangered

Review Submitted 13 August, 2001 via E-mail
Revised and Resubmitted 9 October, 2001 via E-mail

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

I have reviewed the document entitled “Status Review of the Smalltooth Sawfish (*Pristis pectinata*)” (Adams et al., 2000). This document consists of 64 pages of text, figures, and tables, plus 11 pages of appendix material. In addition, I have reviewed a 12 page document from the Federal Register Vol. 66, No. 73, pp. 19414-19420 entitled “Endangered and Threatened Species: Proposed Endangered Status for a Distinct Population Segment of Smalltooth Sawfish (*Pristis pectinata*) in the United States.

The authors of the report have done a very good job in assembling information in support of this listing. I agree with their overall assessment. The literature review seems to be thorough, at least for information relating to US populations, and the authors have made substantial efforts to assemble unpublished information on the species. As noted, there is very little published information on this sawfish, and much of what is written is based on interpretation of historic records and on extrapolation from the related largetooth sawfish. Given the rarity of the species today and the urgency of action, this approach is both prudent and expedient. I believe that the report is based on the best scientific and commercial information and data currently available. I recommend that the report be accepted and that the smalltooth sawfish be listed as Endangered under the ESA.

BACKGROUND

The smalltooth sawfish, *Pristis pectinata*, is a large elasmobranch characterized by a shark-like body form, a ventrally positioned mouth, and a long rostral extension with laterally directed teeth on each side (the “saw”.) This species was once common and widespread in shallow coastal waters of the southeastern US from the Carolinas around Florida and along the Gulf of Mexico coast as far west as Texas. Over the last century, the species has experienced declining abundance and contraction of its range. The last remaining population that seems to be viable is found in southwestern Florida in the area of the Everglades and Florida Bay.

NMFS was petitioned to list this species as Endangered by the Center for Marine Conservation. NMFS subsequently made a determination that listing might be warranted based on information given in the petition and initiated a formal status review. A status

review team was assembled and it issued a report in December 2000. I was contacted and subsequently contracted to conduct a peer review of the status assessment by the Independent System for Peer Review office at the University of Miami.

DESCRIPTION OF REVIEW

During the period August 7-12, 2001 I spent four days reading and analyzing the material provided (see Bibliography), consulting references in my personal library, and preparing and editing this report.

FINDINGS AND COMMENTS

Declining Abundance: The assessment does a good job of documenting the reduction in abundance of this species in the absence of data on stock size. Based on museum records and published reports and anecdotes, this sawfish must have been very common if not abundant in some parts of its range approximately 100 years ago. I note specifically that with reference of to museum records, the very large size of this elasmobranch precludes their preservation in numbers representative of their abundance in the wild. Only a small subset of museums would have had facilities to transport, handle, and preserve whole sawfish, and then only in small numbers. Thus available museum records must surely under represent the historic abundance of this species. The decline in abundance throughout most of the US range is necessarily based partly on negative evidence but is given compelling support by commercial landing and CPUE data from Louisiana, the only fishery information available for the species.

Reduction in Range: The authors have reported a contraction in the US range of this species based on the reduction in or absence of recent records from parts of the historic range. They report that the range has been reduced by 90%. This number clearly is an estimate, and it is unclear how it was calculated. The authors argue, for example, that based on the lack of winter reports, size distribution, and other anecdotal information, the records from the US Atlantic coast north of Florida did not represent resident populations but represented summer-time migrations of large adults out of the Florida “core” population. Records from as far north as New York clearly must represent occasionally waifs. The hypothesis that the sawfish underwent a north-south migration

on the Atlantic coast with a critical temperature of 16-18 C is reasonable and consistent with what is known about some other large rays and sharks. The situation in the Gulf of Mexico is less clear, but the authors suggest that records from the northern and western Gulf may represent summer migrations of adults out of the core population in Florida rather than a permanent resident Gulf population. If the Gulf records represent migrants, then records from as far west as west Texas may represent waifs, similar to the New York record on the Atlantic coast. Depending on how the hypothetical waifs are treated, the 90% estimate might be too high. Regardless of the precision of this number, it is clear that the historic “normal” range, approximately east Texas/Louisiana to North Carolina, has been severely reduced. An alternative interpretation of this data would be that the absence of recent records from the northern and western parts of the historic range represents simply a change in migratory patterns. Such a change might be occasioned by the reduction in density of the “core” population in Florida if migration was a density-dependent response. I don’t think this alternative can be ruled out.

Life History Parameters: The assessment relates life history parameters to possibility that this species might maintain stable populations or even recover to former levels. Unfortunately, nothing is known about the life history of this species. The authors have thus extrapolated from what little is known about the related largetooth sawfish plus what is known about other large rays and sharks, especially those subjected to commercial exploitation. This is a perfectly reasonable approach in the absence of data on the smalltooth sawfish. The analysis predicts a species with long life, slow growth, long age to maturation, and low fecundity. This translates to a classic “K-selected” species with a low rate of intrinsic population increase. No mention is made of the sex ratio, data that I thought might be available from the literature, museum records, or Everglades recreational catch records. In many large elasmobranchs females are larger than males. If this is the case in the smalltooth sawfish, and if larger individuals are more easily entangled in commercial gear, more prized by recreational anglers, or otherwise suffer higher mortality than smaller individuals, this might lead to a sex ratio favoring males and a disproportionate reduction in large, mature females. This would further depress the ability of the population to sustain itself or recover. Finally, it is unknown how reduced population density might indirectly affect reproduction. In some

rays and in many other vertebrates, courtship and mating occur in social aggregations and may be “socially facilitated.” If this is the case, then reduced density of sawfish might contribute to low levels of reproduction among the remaining individuals.

Cause of Decline: The authors have argued that the primary cause of the decline in the smalltooth sawfish is overutilization. The loss or deterioration of habitat seems to be a secondary or contributing factor, but its impact is much harder to identify due to the lack of specific information. I agree with this conclusion based especially on the record from the Indian River Lagoon on the east coast of Florida. There the species was once so common as to be considered a nuisance by commercial fishers. The virtual disappearance of the species from the lagoons seems to predate modifications to the system caused by dredging, construction of causeways, impounding of salt marshes, and significant encroachment of development.

The major source of overexploitation seems to be incidental bycatch due to entanglement in net gear deployed in fishing for other species. This might at first seem odd but I think it is a reasonable interpretation of the information available. Although the flesh, fins, skin, and “saws” of the species might have, or might have had in the past, only limited commercial value, there is no evidence of a significant directed commercial fishery for this species. Although there is now a small recreational fishery for the species in the Everglades, this is most likely a recent phenomenon. I doubt that this type of “extreme angling” has been significant historically, especially when more desirable targets were still abundant. Clearly everything about the size, body form, swimming behavior, and habitat choice of this species predispose it to net gear entanglement and render it virtually impossible to return one, especially a large adult, to the water alive much less unstressed. In the days of virtually unregulated commercial fishing in shallow coastal waters with all types of net gear, one can imagine large and biologically significant numbers of these rays being removed from the population annually.

Distinct Population Segment (DPS): There do not appear to be any clear data available for an assessment of this species on a range wide basis. In the western Atlantic, this species is reported to range (or have ranged) from Brazil through the Caribbean, throughout the northern Gulf of Mexico, the east coast of the US, and Bermuda. Adams et al. (2000) state “NMFS does not have any information available to support that there is

a population in Mexico.” However, a population in Mexico, at least historically, would not be unexpected. Unfortunately, no data are presented and there is little discussion of the status of populations from outside US waters in the western Atlantic. Forms of the smalltooth sawfish have also been reported from the eastern Atlantic and Mediterranean Sea and in the Indo-west Pacific region. The status of these populations are not reported in the documents at hand and there is some question as to whether many of these populations represent the same species found in US waters.

There are no hard data on smalltooth sawfish population structure. Likewise, there are no data on movements or migrations, but strong speculation that they may have regularly migrated between Florida and the Carolinas on the US east coast. Although the species is usually characteristic of shallow coastal habitats, museum records indicate that the species may be found as deep as 50-70 meters (Adams et al., Appendix A). It would seem to me that this opens the possibility that the Florida population might interact with populations further south and east, in the Bahamas, for example (Bohlke and Chaplin, 1968), or possibly Cuba, where it is said to occur "on both coasts" (Bigelow and Schroeder, 1953). Although deep water gaps such as the Florida Straits might be assumed to isolate the Florida population, the fact that the species once occurred in Bermuda (Smith-Vaniz et al., 1999) suggests that deep oceanic waters and strong currents might not be an absolute barrier to long distance dispersal and gene flow.

The strongest argument that the US population should be considered “discrete” is that it is delimited from other known or suspected populations by international governmental boundaries where conservation and management practices might be different. This is clearly the case for the smalltooth sawfish, since there is no evidence that any country except the United States regulates exploitation of this species. Both Florida and Louisiana prohibit the capture or possession of smalltooth sawfish in their states' waters.

The significance of the US population of the smalltooth sawfish relative to the species as a whole is an important issue designation of a DPS. Unfortunately, all information relating to the species elsewhere in the western Atlantic is based on negative evidence. The status review panel was unable to find any verifiable recent records of the species from outside US waters. This suggests that non-US populations must be either

extirpated on severely reduced. This argues strongly that the remaining US population centered in SW Florida must be considered significant in the long-term survival of the species as a whole. Based on these considerations, the US population of smalltooth sawfish meets the criteria for being considered a Distinct Population Segment.

Benefits of Listing: If listing of this species as Endangered should be made final, the species would fall under ESA protection, a recovery plan would be developed, and critical habitat would be designated. It would appear that the major focus of these considerations would be directed toward the SW Florida, the only area in the US where the population seems to be persistent and self sustaining. Based on the data presented in this report, the critical habitat should be relatively easy to designate. Much of the critical habitat would fall within the Everglades National Park, an area already under federal management. Since the state of Florida currently restricts gill and entanglement nets in coastal waters and prohibits most inshore trawling, Endangered status for this fish might only marginally reduce incidental bycatch due to gear interactions. Since the state of Florida already prohibits taking of sawfish in state waters, ESA protection would presumably eliminate the existing recreational fishery in the Everglades and further restrict or eliminate the capture of specimens for aquarium display. These actions are clearly warranted, but given the severe reduction in the species' density and range and its life history characteristics, the effectiveness of these actions in stopping or reversing population decline will likely take decades to evaluate.

CONCLUSIONS

I believe that the assessment is based on the best scientific and commercial information and data currently available. The report documents, to the extent possible, a DPS that has experienced severe reduction in abundance and contraction of range in the past century. The major factor in population decline seems to be incidental bycatch by entanglement in net gear fished for other species, followed in importance by loss and deterioration of critical coastal habitats. The only remaining population that is viable and self sustaining is found in extreme southwestern Florida in the area of the Everglades and Florida Bay. This population is critical to the survival of the species yet is still subject to recreational angling. The suspected life history of the species indicates that it is “K-

selected”, and as such, has a low rate of population increase. This predicts a long recovery time even under the best of circumstances. I recommend that the report by the assessment team be accepted and that the smalltooth sawfish be listed as Endangered under the ESA as quickly as possible.

BIBLIOGRAPHY

The following material was provided to me by the University of Miami Center for Independent Experts for purpose of this peer evaluation:

Adams, W. F. et al. 2000. Status Review of the Smalltooth Sawfish (*Pristis pectinata*), December, 2000. This document consists of 64 pages of text, figures, and tables, plus 11 pages of appendix material.

Anon. 2001. Endangered and Threatened Species: Proposed Endangered Status for a Distinct Population Segment of Smalltooth Sawfish (*Pristis pectinata*) in the United States. Federal Register Vol. 66, No. 73, pp. 19414-19420. (The FAX copy of this document provided has different pagination than the original.)

The following are additional references cited in this review:

Bigelow, H. B. and W. C. Schroeder. 1953. Sawfishes, guitarfishes, skates, and rays, pp. 1-514. *In*: Tee-Van, J., C. M. Breder, A. E. Parr, W. C. Schroeder, and L. P. Schultz (eds). Fishes of the Western North Atlantic, Part 2. Mem. Sears Found. Mar. Res. I.

Bohlke, J. E. and C. C. G. Chaplin. 1968. Fishes of the Bahamas and Adjacent Tropical Waters. Livingston Publ. Co., Wynnewood, PA. 771 pp.

Smith-Vaniz, W. F., B. B. Collette, and B. E. Luckhurst. 1999. Fishes of Bermuda: History, Zoogeography, Annotated Checklist, and Identification Keys. Amer. Soc. Ichthyologists & Herpetologists, Spec. Publ. 4. 424 pp.

STATEMENT OF WORK

Consulting Agreement Between The University of Miami and Dr. Franklin Snelson

December 9, 2003

General

The National Marine Fisheries Service was petitioned to list U.S. populations of smalltooth sawfish as an endangered species under the Endangered Species Act (ESA) on November 30, 1999. In order to conduct a comprehensive review of smalltooth sawfish, a status review team was created to investigate the status of the species with regard to the listing criteria provided by the ESA. In addition to its own resources and data, the status review team gathered all known records and data of smalltooth sawfish by contacting fishery managers, museums and other research collectors. The document addresses the status of the species, the five listing determination criteria, and the effect of efforts underway to protect the species. NMFS has accepted the findings of the status review and, on April 16, 2001, published a proposed rule to list smalltooth sawfish as an endangered species.

NMFS is required to use the best scientific and commercial information available in its ESA listing decisions, and has a policy of seeking peer review of its ESA status review documents. The current review of the smalltooth sawfish status review document will help ensure and confirm that the final listing decision is based on the best available information.

The consultant is expected to evaluate whether the smalltooth sawfish status review document and the proposed rule to list smalltooth sawfish properly use the best available scientific and commercial data. The consultant should identify important additional sources of information of which the consultant may be aware and provide critique and comments on the documents.

Specific

The consultant's duties shall not exceed a maximum total of four days, including reviewing background material and producing a written report of the findings. It is expected that the individual contribution of the consultant shall reflect the consultant's area of expertise; therefore, no consensus opinion (or report) will be accepted. Specific tasks and timings are itemized below:

1. Read and become familiar with the relevant documents provided in advance to the consultant;
1. No later than August 13, 2001, submit a written report of findings, analysis, and conclusions. The report should be addressed to the "UM Independent System for

Peer Reviews, “ and sent to David Die, UM/RSMAS, 4600 Rickenbacker Causeway, Miami, FL 33149 (or via email to ddie@rsmas.miami.edu).

Signed _____

Date _____

PRELIMINARY BUDGET

1. Salary (maximum of 4 days)	\$2,400
2. Mailing costs	\$100
TOTAL	\$2,500

ANNEX I: REPORT GENERATION AND PROCEDURAL ITEMS

1. The report should be prefaced with an executive summary of findings and/or recommendations.
1. The main body of the report should consist of a background, description of review activities, summary of findings, and conclusions/recommendations.
1. The report should also include as separate appendices the bibliography of materials provided by the Center for Independent Experts and the center and a copy of the statement of work.
1. Individuals shall be provided with an electronic version of a bibliography of background materials sent to all reviewers. Other material provided directly by the center must be added to the bibliography that can be returned as an appendix to the final report.

Please refer to the following website for additional information on report generation:

http://www.rsmas.miami.edu/groups/cimas/Report_Standard_Format.html