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Westley Patrick, Atlantic sturgeon Status Review Coordinator
NOAA Fisheries, Northeast Region
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Dear Westley,

I have reviewed the Status Review and found the Report a comprehensive review of the state-of-knowledge on the biology, threats, and status of Atlantic sturgeon. There are some deficiencies, likely none that will greatly affect the conclusions of the status review. For example, the inaccurate location for the historical spawning site of Connecticut R. Atlantic sturgeon (river kilometer 110, not 167) is likely repeated many times in other rivers in Table 7 where the fall line is used instead of empirical information on spawning location.

Although the report briefly mentions fish passage for Atlantic sturgeon, this restoration activity is not adequately covered. This management technique is likely to be important on some rivers in the South (but also on some Northern rivers). Thus, I would have liked the report to at least note that more research and information was needed on the passage of sturgeons. My comments that address the five specified topics follow.

- a. Distinct population segments —The report presents genetic information supporting a grouping of river populations into DPS groups. Individual river populations is accepted by NMFS for DPS of shortnose sturgeon, a conspecific species with Atlantic sturgeon. Increasing life history information supports individual river DPS for Atlantic sturgeon, so it seems there are separate river populations of both species, each that home to their natal river and that have unique adaptations to the local river environment.

I should have made my position clearer on the grouping of Atlantic sturgeon into the DPS groups in the Review. As I remember, this was done on the basis of comparative genetic similarity, which without conflicting life history information is usually the best that we can do. However, in the case of Atlantic sturgeon there is conflicting life history information (innate dispersal pattern of early life stages) that strongly suggests each river should be a DPS, like shortnose sturgeon.

We found differences in the innate dispersal patterns of early life stages between a pair of lake sturgeon populations (Wolf and Menominee Rivers), between two shortnose sturgeon populations (Connecticut and Savannah Rivers), between two Atlantic sturgeon populations (Hudson and Suwannee Rivers), and between two white sturgeon populations (Sacramento and Kootenai Rivers). Thus, in four species of sturgeons examined, we found major innate

behavioral diversity between each pair of river populations for dispersal and habitat selection of early life stages. The paper on Suwannee R. Atlantic sturgeon (Environ. Biol. Fishes) that presents the comparison for this species suggests that the life history differences represent adaptations by populations to their natal river. The information on shortnose sturgeon has been gathered by my PhD student, Erika Parker. 2006. Latitudinal variation in behavior and morphology of shortnose sturgeon. PhD Dissertation, Univ. of Mass., Amherst. The information on lake sturgeon is (unpublished data) to be written up for publication this winter. The information on white sturgeon is in the Environ. Biol. of Fish. 74: 19-30 and a second paper (in Press). We can send you copies of any of the info if you wish.

The early life history results from every river pair of any species we have examined does not support the position that, at this time, river populations of Atlantic sturgeon should be grouped into any larger unit until we have a better survey of dispersal patterns within the species. This research is what I called for in my review: an expansion of the studies of early life dispersal and habitat selection within Atlantic sturgeon. This seems increasingly possible, particularly with increasing participation by researchers studying spawning (where eggs could be collected and behavior of early life stages studied after hatching in the lab). The innate behavior of early life stages is a great innate character to reveal differences in life history within a sturgeon species.

- b. The report has done a good review of the threats to the species and river habitats. Sturgeons of all species form concentration areas to forage, winter, or summer. Fish home to these areas with regularity showing their importance to life history. While in the concentration area, the particular life stage is vulnerable to anthropogenic impacts. The importance of identifying and protecting concentration areas in rivers, estuaries, or coastal areas is not addressed.
- c. This type of risk analysis has been used before and ranking by experts has an intuitive common-sense basis that is likely the best that can be obtained when there is a lack of adequate data for a more rigorous analysis. Unfortunately, there is not a “cannot evaluate category” for experts that lack adequate information to make a reasonable judgment. History has shown the total absence of particular information by experts (for example, information on early life dispersal) is the weakness of this methodology.
- d. In general, the conclusions are logical and sound, except for DPS groupings.
- e. The report contains a fair discussion of the issues.

I support the needed Research outlined in section 6. It is a real problem that spawning and early life history has not been seriously studied in any river. Additional thoughts on needed research follow.

Besides the Research identified in section 6, if conservation stocking is planned to reestablish populations, to identify the innate characteristics of larval dispersal and avoid a mismatch of donor stock with river. We have already found major innate differences in larval dispersal between northern and southern shortnose sturgeon and differences between Hudson R. and Suwannee R. Atlantic sturgeon (information published in journals). There is a need to identify the innate dispersal pattern and habitat selection of larvae in all possible rivers to understand the dispersal biodiversity present in Atlantic sturgeon during the period when year class strength is established.

There is also the need to identify and protect coastal concentration areas (noted previously in b). The Chesapeake and Delaware Bays are clearly coastal concentration areas for foraging juveniles. Our preliminary tag-recapture and fisher survey data indicates that Cape Cod Bay

may be a major concentration area for northern Atlantic sturgeon populations (US and Canadian) north of the Bay. Many juveniles are apparently captured there each summer by trawlers. The Conte Lab would be interested in testing this hypothesis using satellite tagging of juveniles in the Bay (like we are doing with Chinese sturgeon in the Yangtze Estuary, China). If the hypothesis is upheld, it would provide the basis for protection for juveniles using the Bay.

Sincerely,

Boyd Kynard
Section Ldr. Fish Behavior