

Climate Change and Water Quality/ Quantity Working Group Discussion
February 10, 2011
NMFS Sturgeon workshop; Alexandria, VA

Summary of General Discussion: Climate Change

- River Specific Information
 - Penobscot
 - Oil leakage in river near overwintering SNS. State of Maine currently involved in a lawsuit over oil spill, clean up, remediation etc. (G. Zelewski)
 - Sturgeon have elevated levels of mercury, but effect is unknown
 - Merrimack
 - Sewage outflow issues. No routine monitoring. Spawning habitat suitable beyond rkm 33 (known spawning area) so wonder why/ what issues may be there.
 - Industrial reach in lower portion, municipal development and water withdraws associated with this (cumulative withdraw rules, but dips below these)
 - Delaware
 - Increased demands from NY and large scale dredging and effects of climate change is causing major flux. Salinity may be variable to examine.
 - Roanoke
 - DO major issues in NC rivers as well as flow.
 - Issues similar in NC, irrigation is major issues because of lax permit requirements with respect to withdraws - especially impacts to small tributaries etc.
 - Santee
 - Major issue due to dams, mandating flows.
 - need more data on flows and how they affect various life stage development, recruitment, habitat impacts, population processes etc.
 - Altamaha
 - North Branch there may be threat of change in future water quantity due to dams. In general dams cause major flow problems
- Specific examples of climate projects
 - Missouri river climate work?
 - upper MO pallid different than lower MO pallid
 - Climate change scenarios in Ches Bay to look at future scenarios of nutrient loading and climate change, will move into habitat suitability work for sturgeon
 - Secor will be developing habitat suitability model for sturgeon
 - NESFC involved in national ocean acidification project
 - Focus on ELS response to acidification in both SNS and ASN. Potential interactive effects of co2 and temperature.
 - Sturgeon were chosen because of their unusual life history and sensitivity to environmental factors

- Response variables
- What models are currently being used?
 - “Climate Ready Estuary” designation for Pamlico Sound
 - There is specifically climate work for ASN going on in Pamlico Sound
 - The Comprehensive Management Plan is being revised and ASN is serving as one of the indicator species.
 - What is “Climate Ready Estuary”?
- Potential impacts of climate change
 - Margin of range of species will be where most impact of climate change will be felt
 - drought would impact the entire range
 - SE estuary work may really need to examine thermal regimes and conduct more common garden experiments/ vulnerability (initial look at SNS)
 - Long term monitoring of sea level rise and influence on tidal salinity may be useful
 - Need to track and map tidal salinity (increased monitoring in these areas)
 - Role of co2 and acid deposition, question about partitioning of effects?
 - Does the evolutionary history of sturgeon relate to understanding the potential impacts of climate change?
 - Data source - Russian literature
 - Genetics may be used to further examine (i.e., RNA seq. technique) (T. King)
 - Are certain genes linked to climate change?
 - Genome sequencing
 - How does this get at plasticity? Gene sequencing and gene expression could be used to evaluate plasticity (T. King).
 - Salmonid work may also provide good examples of looking at these types of relationships
 - Potential experiment - could take the Altamaha or Hudson and look at the function of the genome and then look at variables in river (temp. etc.). Potential effects of climate change on biodiversity.
- Factors to consider when looking at climate change and impacts
 - Avoid New England bias with respect to threats associated with climate change and impacts to sturgeon.
 - Avoiding bias is of particular importance when evaluating water quality conditions in SE rivers.
 - Management recommendations and scientific sampling are sometimes bias to NE river conditions and species tolerances as well and should be considered
 - Sturgeon from various rivers in NE and SE should be used relative to the conditions that they are adapted to so there is not a Northern bias.

- Sturgeon are very plastic with respect to temp. etc., which needs to be considered and need to look broadly at range of factors

Summary of General Discussion: Climate Change

- Water Quality/ Quantity
 - Relationship between water quality and quantity
 - Examination of flow regimes might be useful
 - Need to consider competing interest of different species when looking at impacts
 - Dams and sediments behind dams is a big issue, especially related to spawning habitat
 - salinity intrusion is a major issue especially considering synergistic impacts (e.g., FL – pulp mills, irrigation practices)
 - Anything that adds nutrients to SE rivers (e.g., industrial, agri. etc.)

Research Questions and Action Items: No specific action items were identified. There were many research questions discussed during this session that are reflected above. Given that very little is known about climate change and impacts on sturgeon, most if not all of the discussion was focused on research questions and current studies.