UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
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MAR 26 2013

Ms. Anna Compton
US Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

Dear Ms. Compton:

On February 11, 2013, the Corps of Engineers, Baltimore District presented a document entitled "Reservoir Sediment Management Strategies", at the Quarterly Meeting of the Lower Susquehanna River Watershed Assessment Team. We appreciate the opportunity to outline foreseeable issues with two of the management strategy "sediment bypass" options presented in this document. These options include the hydraulic pumping of reservoir material to "sediment starved areas" of the upper Chesapeake Bay; and the hydraulic pumping of reservoir material past the Conowingo Dam into the Susquehanna Flats and northern Chesapeake Bay. We also outline alternatives to sediment bypassing that will minimize impacts to fish habitat in the Upper Chesapeake Bay.

Importance of the Upper Chesapeake Bay and lower Susquehanna River

The upper Chesapeake Bay north of Worton Point in Kent County, and Robins Point in Harford County (mainstem and tidal tributaries) and the lower Susquehanna River below Conowingo Dam are documented spawning and nursery ground for seven species of anadromous fish, including striped bass (*Morone saxatitis*), white perch (*Morone americana*), yellow perch (*Perca flavescens*), American shad (*Alosa spadissima*), alewife (*Alosa pseudoharengus*), blueback herring (*Alosa aestivalis*), and hickory shad (*Alosa mediocris*) (Lippson, 1973, O'Dell et al., 1975). Physical features of this area include; 1) abundance of shallow depths (<3 feet, mean low water); particularly in the Susquehanna Flats area; 2) low spring salinities (< 2ppt); 3) abundance of coarse bottom substrate of sand, gravel, and cobble; and 4) the tidal/freshwater discharge circulatory retention of planktonic eggs and larvae associated with the Bay mainstem Estuarine Turbidity Maximum (ETM)(North and Houde, 2001). Together, this makes the upper Bay and lower Susquehanna River the most important migratory fish spawning ground in the Chesapeake Bay.

The upper Chesapeake Bay spawning zone is also a documented nursery habitat for numerous other commercially and ecologically important finfish that spawn in Bay waters, or in nearshore coastal waters off the mouth of the Bay. These include Atlantic menhaden (*Brevoortia tyrannus*), bluefish (*Pomatomus saltatrix*), spot (*Leiostomus xanthurus*), Atlantic croaker (*Micopogon undulatus*), winter flounder (*Pseudoharengus americanus*), and bay anchovy (*Anchoa mitchilli*) (Lippson, 1973). High water column detritus and zooplankton content associated with the ETM make this nursery critical to maintenance of stock abundance for these mid-Atlantic species.

Dense and resilient beds of submerged aquatic vegetation (SAV) in the Susquehanna Flats and lower Susquehanna River also enhance the nursery ground qualities of the upper Bay spawning zone during the growing season, providing cover and forage habitat for juvenile finfish. Susquehanna Flats SAV has been stable and resilient for more than two decades, providing ecological stability to this area dating back the late 1980s of the post-Hurricane Agnus period. Because the Susquehanna Flats are the receiving waters for freshwater influx from the Susquehanna River, SAV in this area provides critical benefits that enhance ecological conditions locally in the spawning zone, and throughout the upper and middle sections of the Chesapeake Bay. These benefits include stabilizing surficial sediments, thereby sustaining water clarity in the bed areas; sequestering large amount of nitrogen and phosphorus throughout the growing season, thereby reducing concentrations of inorganic nutrients available for eutrophying phytoplankton blooms; and removing inorganic nitrogen from the estuarine system by promoting sediment biogeochemical processes such as denitrification.

Foreseeable issues with sediment bypassing options

The Chesapeake Bay has a nutrient and sediment loading problem which threatens the current and future health of this system. Nitrogen, phosphorus, and nutrient laden fine sediments transported to the Bay in freshwater discharge annually contribute to sustaining the high water column nutrient levels in mainstem and tributary waters, while nutrients settling to bottom substrates are recycled back to the water column through biogeochemical and geochemical processes (Cornwell & Owens, 1999; Boynton, Stankelis, Rohland, and Frank, 1999). Systemic ecological effects from eutrophication play multiple roles in degrading estuarine fish habitat.

Because the Susquehanna River carries almost 50% of freshwater discharge to the Chesapeake Bay, it is responsible for most of the nutrient loading problem in this system. Consequently, we are participating in the LSRWA process to assist with selection of solutions for reducing nutrient and sediment discharge from the Susquehanna River. We believe that selection of sediment management strategies should be in concert with the state TMDL reduction strategies. More importantly, we intend to recommend solutions that will protect and conserve the habitat integrity and high fishery values of the upper Chesapeake Bay spawning/nursery zone.

Conceptual reservoir sediment bypass options presented at the LSRWA quarterly meeting, and listed above, can adversely impact habitat integrity within the upper Chesapeake Bay spawning/zone. It is estimated that more than 193 million cubic yards of material is retained behind Conowingo Dam (Ann Swanson, electronic communication to LSRWA Team, 2/12/2013); with 85% silt content near the dam, and 55% silt content in upper reaches (Steve Scott, estimates provided during the August 7, 2012 LSRWA Quarterly Meeting). Hydraulic pumping of liquid slurry of such material to Susquehanna Flats will be impractical to control, and subsequent release and spreading of material will have far reaching effects on spawning substrate and SAV. Furthermore, much of the nutrient content of this material will be released to the water column of the upper Bay, contrary to state TMDL reduction strategies. These actions will result in negative impacts to sensitive finfish habitat, critical to resources of ecological and commercial importance to the Chesapeake Bay, and of broader scale importance to the mid-

Atlantic region. As such, we have significant concerns with the inclusion of sediment bypass options among the LSRWA sediment management options.

Alternative sediment reservoir management strategies
In our view, upland-based alternatives for sediment management will have the least impacts to out trust resources. Upland disposal of reservoir sediments/nutrients will provide a unique opportunity to remove fine-grain sediment and associated nutrient pollutants from the Chesapeake Bay system. Preferred upland-based options provided in the sediment management strategy document include 1) reclamation of quarries, mines, other disturbed fastland areas (including Shirley Plantation); 2) landfills; 2) innovative reuse, such as that provided by Harbor Rock, soil manufacture; and, 3) purchase of land for constructing containment facilities.

If water-based management strategies are selected, they should be located outside the upper Chesapeake Bay mainstem and tributaries anadromous fish spawning/nursery zone, including the Susquehanna Flats. Fringe or tidal tributary pocket marsh creation with reservoir material in other areas of the Bay system and Susquehanna River, including areas within and upstream of the Conowingo Pool should be considered. Such an option should consider the direct and indirect impacts to existing fish resources and habitats at a proposed site; the wave energy or riverine flow climate of the site (high energy sites should be avoided, requiring excessive amounts of armoring to retain placed material); and the physical and chemical make-up of reservoir material to be used.

Should tidal marsh creation be explored, material should be at least 70% sand in composition, and have predominant grain-size comparable to receiving sediments at the marsh creation site. Material containing excessive amounts of clay and silts is not acceptable for placement in aquatic systems for marsh creation because of its instability, and excessive rock armoring that is required to contain it. Keying in on predominantly sandy reservoir material will likely require mechanical handling and separation methods prior to placement at the marsh creation site.

Due to the large amount of material retained by the Safe Harbor, Holtwood, and Conowingo reservoirs, and the complexity of the sediment management strategies, we believe that multiple options will be required to restore reservoir trapping efficiency to a significant level.

Alternative sediment management strategies
Even with reservoir sediment trapping efficiency restored, nutrients will continue to be discharged to the upper Chesapeake Bay during high flow events. In particular, dissolved and colloidal forms of nutrients, which tend not to settle, will be components on post-sediment removal loading. It is, therefore, imperative that state and federal efforts continue to reduce nutrient and sediment loading to the Susquehanna River mainstem by applying land-based and drainage basin-based Best Management Practices within tributaries to the river. This option should be included, by default, with other options selected to reduce Chesapeake Bay loading levels.

Thank you for the opportunity to provide comments on this important initiative. If you have any questions, please contact me at (978) 281-9131; or, John Nichols at our Habitat Annapolis Field Office; John.Nichols@NOAA.GOV, or, (410) 267-5675.

Sincerely,

Christopher Boelke
Field Office Supervisor
Habitat Conservation Division

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