



**FRESHWATER MOLLUSK CONSERVATION SOCIETY  
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U.S. Environmental Protection Agency  
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Jonathan G. Kennen  
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New Jersey Water Science Center  
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RE: FMCS Comments on EPA-USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration

Dear Colleagues,

The Freshwater Mollusk Conservation Society (FMCS) is dedicated to the conservation of, and advocacy for freshwater mollusks, North America's most imperiled animals. FMCS is an international professional scientific society made up of state, federal, academic, and private scientists and conservationists, many of whom work directly with the more than 200 endangered and threatened freshwater mollusks found worldwide. Our members are considered experts in the conservation and recovery of freshwater mollusks. The FMCS is writing in response to the draft technical report released by the U.S. Environmental Protection Agency (EPA) and the U. S. Geological Survey (USGS) entitled "Protecting Aquatic Life from Effects of Hydrologic Alteration."

As largely sedentary organisms, freshwater mollusks are unable to escape environmental disturbances, making them extremely vulnerable to alterations in the natural flow regime. Deviations from 'natural' patterns of flow and accompanying changes in water quality can

expose freshwater mollusks to factors such as prolonged emersion and desiccation, increased concentrations of contaminants, displacement during flooding, hypoxia, and hyperthermia, which all increasing the risk of mortality. Several studies have demonstrated that water management practices employed in many parts of the U.S. are not protective of freshwater mollusks, particularly for threatened and endangered species.

As with many other aquatic organisms, freshwater mollusks time their life history events around predictable patterns in flow and temperature. Altered flows may (1) fail to provide necessary cues to stimulate gametogenesis and spawning, (2) result in unsuitable habitats for survival of juvenile and adult mussels, or (3) result in an asynchrony between reproductive timing and host fish availability for species with parasitic larvae. Therefore, altered flow regimes could result in loss of juvenile recruitment in already declining populations.

Freshwater mollusks also provide a number of important services to the streams, rivers, and lakes in which they reside. Deviations from 'natural' hydrologic conditions has been shown to influence the ecosystem services provided by these species, impacting important water quality parameters such as water clarity and nutrient concentrations. Therefore, altered flow regimes may not only directly affect the mollusks themselves, but could cause cascading ecosystem level effects.

The draft report on hydrologic alteration released by the EPA and USGS fails to address the impacts of flow alteration on freshwater mollusks. We respectfully suggest that the report authors draw on the readily available literature on the effects of hydrologic alterations on freshwater mollusks and their ecosystem services and incorporate these into a revised report. Freshwater mollusks are an often overlooked group of organisms, can dominate the benthic biomass of many streams and rivers, and can be more sensitive than other aquatic fauna given their limited mobility and long generation times. Therefore, we feel it is critical that specific attention be drawn to this imperiled group.

We believe that the joint EPA and USGS report provides an excellent evaluation of the effects of altered flow regimes on chemical, physical and biological processes. We support and encourage management agencies to employ the strategies and framework outlined in this document and in establishing and implementing flow targets that are protective of all aquatic species, including freshwater mollusks. Thank you for the opportunity to review and comment on this document and we appreciate your consideration.

Sincerely,



Stephen E. McMurray, Co-Chair, Environmental Quality and Affairs Committee  
Freshwater Mollusk Conservation Society