Farms, fish and phytoplankton: How watersheds mediate food web interactions in reservoirs of the Midwestern USA

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Ecosystems often receive subsidies of materials (e.g., nutrients) and energy from outside their boundaries, which can have profound effects on the recipient ecosystems. Reservoirs are aquatic ecosystems with large watersheds, and therefore receive large subsidies of nutrients, sediments, and water from the surrounding terrestrial landscape. Such subsidies can affect phytoplankton and hence mediate trophic interactions. In addition, sediment-feeding, detritivorous fish (the gizzard shad, *Dorosoma cepedianum*) are abundant and provide another type of subsidy to phytoplankton. These fish feed on sediment-bound, detrital nutrients and excrete some of these nutrients into the water column. In reservoirs of the Midwest USA, gizzard shad are abundant and provide a significant amount of nutrients. They are especially abundant in highly productive reservoirs with a dominance of agriculture in their watersheds. In this talk, I discuss how watersheds and detritivorous fish (gizzard shad) interactively regulate reservoir food webs and ecosystems, focusing on two central questions: 1) how important are watersheds and gizzard shad in providing nutrients for phytoplankton, and what are the consequences for phytoplankton?; and 2) to what extent do terrestrial subsidies account for the dominance of gizzard shad in agriculturally-dominated, productive reservoirs? I also discuss the implications of these interactions for eutrophication and water quality management.