

Detection of temporal trends in Ohio River fish assemblages based on lockchamber surveys (1957-2001)

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Biographical Sketches of Authors

Jeff Thomas is an aquatic biologist for the Ohio River Valley Water Sanitation Commission (ORSANCO). Jeff has served as a crew leader in the biological program since beginning with ORSANCO in 2000. He has done extensive electrofishing work on the Ohio River and is currently responsible for managing ORSANCO's fish database and assisting with the fish tissue program. His work with Ohio River fish caused him to be involved in the creation of an Ohio River fish index (ORFI).

Erich Emery is an aquatic biologist and manager of ORSANCO's biological programs. His primary research efforts have focused on developing fish community-based assessment methods for the Ohio River, culminating in the recent development of the Ohio River Fish Index, a multi-metric tool for assessing fish community condition. His other areas of research have included the study of macroinvertebrate and fish community responses to disturbance, influences of in-stream habitats on Ohio River fish, and temporal trends in Ohio River fish community condition. Erich began his career with ORSANCO in 1993.

Dr. Frank H. McCormick was a research ecologist with the US Environmental Protection Agency from 1991 to 2003 conducting research on responses of aquatic ecosystems to anthropogenic disturbance regimes, particularly environmental contaminants. In 2003, he became a fish biologist and team leader with the Pacific Northwest Research Station of the US Forest Service in Olympia, WA studying aquatic and landscape interactions.

Abstract

ORSANCO, along with cooperating state and federal agencies, sampled fish assemblages from the lockchambers of Ohio River navigational dams from 1957 to 2001. To date, 377 lockchamber rotenone events have been conducted, resulting in the collection of nearly three million fishes, representing 116 taxa, in 19 families. We observed significant temporal trends in Ohio River fish populations riverwide at the assemblage, guild, and species levels. In all, 40 of the 116 taxa collected in the lockchamber surveys changed significantly over time. Sixteen species did not change. Sixty species could not be analyzed either because of incomplete data or insufficient abundance. Modified index of well-being (MIWB) scores and changes in guild structure indicated significantly ($p < 0.05$) improving fish assemblages throughout the Ohio River. Quantile regression of the abundance of individual species by year revealed significant declines ($p < 0.05$) in populations of several pollution-tolerant species (e.g., *Ameiurus* spp., *Carassius auratus*) with time, while some intolerant species (e.g., *Moxostoma macrolepidotum*, *Hiodon tergisus*) have increased in recent years. Fish assemblage metrics that would be expected to decrease with improving conditions in the Ohio River (percent tolerant individuals, percent non-indigenous individuals, and percent detritivore individuals) also declined ($p < 0.05$). These changes coincide with marked improvement of the water quality in the Ohio River over the last 50 years, particularly in the aftermath of the Clean Water Act (1972).