The establishment of Asian carp within the Upper Mississippi River System (UMRS) has prompted numerous studies on the possible effects they may have within the aquatic food webs they invade. Most of this work has focused on the effects of Asian carp on plankton communities, while other research has shown that catch rates and relative body condition of native planktivores have declined due to possible competitive interactions with Asian carp. Based on these impacts on different food web components, this study sought to determine if Asian carp are influencing the fish community structure and composition in an ecosystem (the La Grange Reach of the Illinois River), which harbors some of the highest densities of Asian carp.

The Long Term Resource Monitoring Program (LTRMP), an element of the U.S. Army Corps of Engineers Upper Mississippi River Restoration–Environmental Management Program (UMRR-EMP) has been monitoring fish, water quality, and vegetation throughout the UMRS since the early 1990s. LTRMP staff at the Illinois Natural History Survey’s Illinois River Biological Station (INHS-IRBS) have been using these long-term data to understand ecological processes and responses over time and how they relate to natural and anthropogenic changes the river has undergone. Here, we used fish community data from the La Grange Reach of the Illinois River from 1993 to 2013 to investigate possible changes in fish community structure and composition in relation to the establishment of Asian carp. Annual catch per unit effort (CPUE) was calculated for each species for each LTRMP gear (electrofishing, fyke netting, hoop netting) and river strata (main channel, side channel, and backwaters) in addition to weighted poolwide means calculated among strata for electrofishing and minifyke netting. Annual community data were analyzed as pre-establishment (1993–1999) and post-establishment (2000–2013) of Asian carp, using 2000 as the year of establishment based on the previously published work from past IRBS staff.

For most gears and river strata, significant differences in the fish communities...
were observed, indicating a change in community structure and composition coinciding with the establishment of Asian carp (see illustration). In general, centrarchid sportfish (largemouth bass, white bass, and crappie) were found to be less abundant after the establishment of Asian carp whereas gar, bowfin, and grass carp were more abundant. Temporal trends emerged among years as pre-establishment communities tended to be more similar to one another while post-establishment communities exhibited higher between-year variability. Years immediately following the establishment (2000–2004) also tended to be more similar to pre-establishment communities, indicating a transitional period as Asian carp densities were increasing over time.

Collectively, we observed strong differences in the fish community in relation to the establishment of Asian carp. Numerous fish species seem to be affected negatively by Asian carp establishment while some fishes are now more abundant. Other biotic and abiotic factors may be contributing to these differences, but changes in community structure were evident corresponding to Asian carp establishment. Long-term monitoring will continue to inform ecologists about the potential ecosystem responses resulting from the establishment of Asian carp. A peer-reviewed manuscript of these results is currently being drafted.

Rich Pendleton and Levi Solomon (INHS)