The Illinois River is a very productive, floodplain river system; however, its natural biological productivity has changed through floodplain disconnection, excess nutrient loading, and invasive fish species introductions. As just one example, Common Carp (Cyprinus carpio) directly and indirectly degrade aquatic ecosystems through benthic foraging behaviors.

Currently, floodplain restoration efforts are intended to improve the natural health of the Illinois River and other rivers worldwide. Thompson and Flag lakes at The Nature Conservancy’s (TNC) Emiquon Preserve serve as one example and have experienced increased Common Carp relative abundances since restoration. Management of Common Carp is critical for maintaining healthy aquatic ecosystems and piscicides, such as rotenone, are not 100% effective. For example, a floodplain restoration project known as Hennepin and Hopper Lakes near Hennepin, Illinois experienced Common Carp survival after a rotenone application to eradicate them during the initial restoration. Due to rapid population growth of Common Carp, Hennepin and Hopper lakes experienced major declines in aquatic macrophyte densities and waterfowl use shortly after restoration. In addition to a rotenone treatment, biomanipulation of the Largemouth Bass (Micropterus salmoides) population has been tested at the Emiquon Preserve and results suggested that they do not select Common Carp as a prey type.

We hypothesized that hypoxia-tolerant native fishes such as Bowfin (Amia calva) and Gar (Lepisosteus spp.) can control Common Carp through direct predation. During 2010–2012, we conducted a comparative study at TNC’s Emiquon Preserve, Illinois; Reelfoot Lake, Tennessee; and four southeastern Wisconsin lakes by examining the diets of the most abundant native piscivorous fishes in these aquatic ecosystems including Bowfin, Spotted Gar (Lepisosteus oculatus) and Largemouth Bass to test our hypothesis and whether specific fish community characteristics were correlated with Common Carp relative abundances.

Reelfoot Lake is similar to TNC’s Emiquon Preserve in that it is shallow, a former floodplain lake that is disconnected from its mainstem river, and has non-native fish species such as Common Carp. However,
the native macrophyte and fish communities of Reelfoot Lake appear to have co-existed with Common Carp for >150 years. The Wisconsin lakes were similar to TNC’s Emiquon Preserve and Reelfoot Lake because Common Carp were part of the fish community. Similar to Reelfoot Lake, the native fish communities in the Wisconsin lakes have also co-existed with Common Carp for many years.

We collected all fishes using a pulsed-DC boom electrofishing boat and protocols based on the Long Term Resource Monitoring Program (LTRMP). Diets were extracted from Bowfin, Spotted Gar, and Largemouth Bass using nonlethal gastric lavage and stomach removal techniques. We collected 1,385 piscivorous fish diets from all study systems and only found 6 Common Carp in the Emiquon Preserve Largemouth Bass diets, all with lengths <100 mm. Bowfin, Spotted Gar, and Largemouth Bass displayed opportunistic feeding behaviors, consuming a variety of other prey items based on availability. Our results provided no direct evidence to suggest that Bowfin, Spotted Gar, and Largemouth Bass can control Common Carp through direct predation. Nevertheless, Common Carp may be limited in some of these ecosystems through other pathways associated with the presence of Bowfin, Spotted Gar, Largemouth Bass, and Bluegill (Lepomis macrochirus) as part of the fish species assemblage. In our study, relative abundances of Bowfin, Spotted Gar, Largemouth Bass, and Bluegill always exceeded those of Common Carp in ecosystems where negative effects from this invasive species were not pronounced. The information gained from this research will be useful at the Emiquon Preserve and for future floodplain restoration projects aiming to limit Common Carp population growth.

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