

# Changes in Fish Community after Invasion and during Control of Alien Fish Populations in Mizoro-ga-ike, Kyoto City

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## Abstract

Information was obtained on changes over a 30-year period in a fish community after invasion of alien fish species in Mizoro-ga-ike, a natural pond of nine hectares in area located in Kyoto City, and then an investigation done on changes over five years in populations of two alien fishes, largemouth bass (*Micropterus salmoides*) and bluegill sunfish (*Lepomis macrochirus*) while the local government took measures to control their populations. The species richness of the native fish community of the pond decreased from 14 species in the 1970s to six species in the 2000s: i.e., more than half of the native species became extinct during those 30 years. On the other hand, the percentage of alien species increased from 7.7% in 1972 to 50.0% in 2002. A population control program using net fishing and spawning redd destruction was implemented by Kyoto City in 1998. This resulted in an effective decrease in population estimates for *M. salmoides* from 84 in 1998 to several in 2002. Those for *L. macrochirus*, on the other hand, showed only a gradual decrease from 9,500 in 1999 to 5,400 in 2002 after the start of population control. Although the population of 1+ cohorts (one year old) of the species did not decrease distinctively after 1999, those of 2+ and 3+ cohorts decreased constantly. Population estimates of *Channa argus* based on a mark and recapture method resulted in a decrease from 540 in 1998 to 220 in 2002 in spite of no efforts to control on species. Causal relationships of alien fish invasion to changes in the fish community in Mizoro-ga-ike and the effects of the control measures on alien fish populations were examined.

**Key words:** alien fish, fish community, *L. macrochirus*, Mizoro-ga-ike, *M. salmoides*, population control