

# Patterns of Fish Growth along a Residential Development Gradient in North Temperate Lakes

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## ABSTRACT

Residential development of lakeshores is expected to change a variety of key lake features that include increased nutrient loading, increased invasion rate of nonnative species, increased exploitation rates of fishes by anglers, and alteration of littoral habitats. All of these factors may alter the capacity of lakes to support productive native fish populations. Fourteen north temperate lakes were surveyed to examine how growth rates of two common fish species (bluegill sunfish, *Lepomis macrochirus*; largemouth bass, *Micropterus salmoides*) varied along a residential development gradient. Size-specific growth rates for both species were negatively correlated with the degree of lakeshore residential development, although this trend was not statistically significant for largemouth bass. On average, annual growth rates for bluegill sunfish were 2.6 times lower in heavily

developed lakes than in undeveloped lakes. This effect of lakeshore development on fish growth was not size specific for bluegills between 60 and 140 mm in total length. An index of population production rate that accounted for both the size-specific growth rate and the size distribution of fishes showed that bluegill populations were approximately 2.3 times less productive in highly developed lakes than in undeveloped lakes. Our results suggest that extensive residential development of lakeshores may reduce the fish production capacity of aquatic ecosystems.

**Key words:** bluegill sunfish; largemouth bass; coarse woody debris; riparian management; littoral habitat; lakeshore development; fish production; fish growth.

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