

## Population dynamics of juvenile steelhead and coho salmon in Michigan's Lake Superior tributaries, 1982-97

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*Abstract.*—This study was initiated because fisheries managers were concerned, and anglers were complaining, that steelhead *Oncorhynchus mykiss* populations in Lake Superior tributaries were declining during the late 1970s and early 1980s. Juvenile steelhead and coho salmon *Oncorhynchus kisutch* population dynamics were monitored in 305-m linear sections of three streams tributary to Lake Superior (Chinks Creek, Little Garlic River, Chocoday River) during 1982-97 to provide data that could be used to evaluate trends in annual steelhead and coho salmon reproduction relative to time, parental stock size, and exogenous factors such as precipitation and air temperature. Resident salmonine populations were present in Chinks Creek (brook trout *Salvelinus fontinalis*) and Chocoday River (brook trout and brown trout *Salmo trutta*) during the study period. Abundance of age-0 steelhead decreased in study sections on Chinks Creek and the Chocoday River at Beckman Road, abundance of age-1 steelhead decreased in the Little Garlic River, age-0 brown trout decreased in the M-94 section of the East Branch of the Chocoday River, and age-1 and older brook trout and brown trout decreased in the Beckman Road section of the Chocoday River. Only age-1 coho salmon in Chinks Creek increased. Density of juvenile steelhead in Chinks Creek during 1982-97 was generally higher than in 1967-74, but in Little Garlic River it was lower. Coho salmon densities were higher than in 1968-74 in both streams. Relocation of the study section in Chinks Creek may be the reason for decreased abundance of age-0 steelhead there during 1982-97. Habitat degradation is believed responsible for decreased abundance during of age-0 steelhead in the Beckman Road section of the Chocoday River during 1985-97, for decreased age-1 abundance in the Little Garlic River during 1982-97, and for decreased age-0 and age-1 steelhead in Little Garlic River between 1967-74 and 1982-97. I concluded that increased abundance of steelhead was responsible for decreased densities of brook trout and brown trout in the Chocoday River. Steelhead and coho salmon spawning runs were adequate to provide carrying capacity of juveniles in Chinks Creek and Little Garlic River but not in the Chocoday River. Age-0 coho salmon abundance in the tributaries could not be used to predict that cohort's contribution to the Lake Superior sport fishery, nor was contribution to the sport fishery an index of parental stock size that could be used to predict age 0 abundance. No relationships between juvenile populations and precipitation or air temperature were found. Continued juvenile population monitoring is recommended.

Various species of non-native salmonines have been introduced into Lake Superior during the past 100 years. The two most successful introductions have been the steelhead *O. mykiss*

in 1895 (MacCrimmon 1971) and the coho salmon *O. kisutch* in 1966 (Peck 1970).

Steelhead is a common name for rainbow trout in the Great Lakes and the anadromous rainbow trout in the Pacific Ocean and