An Evaluation of Lake Trout Suppression in Yellowstone Lake, Yellowstone National Park

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Introduced lake trout (*Salvelinus namaycush*) threaten to extirpate native Yellowstone cutthroat trout (*Oncorhynchus clarkii bouvieri*) from Yellowstone Lake, Yellowstone National Park. A National Park Service gill netting program has removed nearly 400,000 lake trout from Yellowstone Lake since 1995. Lake trout population size has not been estimated; therefore, it is difficult to determine the proportion that has been removed. Our objectives were to (1) examine catch as a function of effort to determine if the suppression program has caused lake trout abundance to decline, (2) determine if certain population metrics have changed over time as a function of harvest, and (3) develop age-structured models to determine the level of mortality required to cause population growth rate to decline below 1.0 (replacement). Catch has continued to increase as a function of effort, indicating lake trout abundance is increasing. Population metrics were not clearly indicative of a response to harvest, but were comparable to North American lake trout populations where harvest has occurred. Results from an age-structured matrix model determined the rate of population growth was 1.1 given the current rate of fishing mortality and that population growth rate would be 1.3 in the absence of fishing mortality. The current rate of population growth is positive; however, it is slower than it would be in the absence of lake trout suppression. Fishing mortality needs to increase by at least 10 percent to reduce population growth rate below 1.0 in the future.