Abstract

This 13-year study (1978-91) documented long-term trends in abundance of wild resident and juvenile anadromous salmonids in a Lake Superior tributary following simultaneous stream-bank debrushing, in-channel placement of brush bundles, beaver (*Castor canadensis*) trapping, and beaver dam removal. Physical habitat conditions for salmonids improved in the 1,067-m treatment zone following application of these techniques (54% increase in mean depth and 8% decrease in mean width), but salmonid population responses included both positive and negative results from a management perspective. Densities of age-0 brown trout (*Salmo trutta*) and steelhead (anadromous rainbow trout, *Oncorhynchus mykiss*) increased from too few to estimate before treatment (1978) to averages of 1,035/km and 466/km, respectively, during the 9-year posttreatment period. Age-1 brown trout abundance increased steadily throughout most of the posttreatment evaluation but declined sharply the last year. Numbers of age-1 steelhead also improved slightly. The steelhead and some of the brown trout were anadromous presmolt; hence the stream's smolt-producing capacity was enhanced during most of the posttreatment period. However, numbers of age-2 and older brown trout declined following the treatment, presumably because of increased angler harvest. A low population of native brook trout (*Salvelinus fontinalis*) did not benefit from the treatment, nor did a newly established population of coho salmon (*Oncorhynchus kisutch*), which fluctuated considerably for reasons independent of the treatment. Despite the mixed results of this study, these techniques showed enough promise for enhancing presmolt abundances to warrant further testing, either separately or combined, on other low-gradient, anadromous salmonid streams having dense alder canopies and poor natural reproduction.