

INTRODUCTION

The most recently published classification of Wisconsin trout streams by the Department of Natural Resources (1980) lists 2,674 streams having a combined length of approximately 9,560 miles. Those streams designated as Class I constitute 37% (3,536 miles) of the total mileage. These are streams which are by definition "high quality trout water, having sufficient natural reproduction to sustain populations of wild trout at or near carrying capacity. Consequently, streams in this category require no stocking of hatchery trout."

Nearly all of these Class I streams contain wild brook trout (*Salvelinus fontinalis*) and approximately 33% (1,168 miles) contain wild brown trout (*Salmo trutta*). Although these streams rank among the most valued of natural resources in Wisconsin, only three published reports provide quantitative data on both angler use of Class I trout streams and rates of angler exploitation (percentage of age I+ or II+ trout harvested). Such data are vital to assess present restrictions on harvest and angling quality and as baseline data to develop rational management strategies to meet anticipated future demands on the trout resource of the state.

Hunt, Brynildson, and McFadden (1962) found that exploitation of brook trout in Lawrence Creek, a central Wisconsin stream, varied from 1%

to 65% during a 6-year period (1955-60) in which three different combinations of experimental fishing regulations were tested. Fishing pressure ranged from 137 to 495 hours/acre, with an average of 323 hours/acre.

Three of the important management implications derived from that study were: (1) brook trout mortality due to angling was an inverse density dependent factor, i.e., any increase in angling effort brought about a proportionately greater depletion of a sparse brook trout population than of a dense population; (2) normal statewide regulations then in effect (6 in. minimum length; bag limit of 10) would not prevent overharvest of brook trout if sufficient angling effort were applied; and (3) these regulations were providing little protection since few anglers kept brook trout smaller than 6 in. during the two fishing seasons it was legal to do so, and few anglers were skillful enough to catch 10 or more trout/trip.

In another investigation of wild brook trout populations and the sport fishery, Hunt (1979) found that exploitation in three study zones of the Little Plover River (also a Class I stream in central Wisconsin) varied from 6% to 55%. Average exploitation for all three zones during three fishing seasons was 25%. Angling effort in these zones ranged from 46 to 437 hours/acre and averaged 252 hours/

acre.

Lowry (1971) did not compute exploitation of wild brown trout as part of his investigation of the benefits of trout habitat improvement in McKenzie Creek in northwestern Wisconsin, but from creel census data included in his report, we calculated that anglers removed approximately 43% of the age II and older trout during the 1963 fishing season. Angling mortality accounted for approximately 4 out of 5 age II+ trout that died during the April-October period, i.e., total mortality was 55%. Angling effort amounted to 189 hours/acre that season.

The present study was initiated on four Class I trout streams in central Wisconsin in 1975 to: (1) quantify population densities, age-specific abundance, biomass, growth, and survival rates of wild brown trout; (2) determine fishing pressure and exploitation rates, and assess the impact of the latter on the size and age structure of the brown trout populations; and (3) characterize the sport fisheries on Class I trout streams. Scarcity of such data for wild brown trout fisheries in Wisconsin was the primary reason for focusing field work on this species. Central Wisconsin was selected because a large share of the state's most popular and best quality brown trout streams are located there.