

## Introduction

Michigan Department of Natural Resources (MDNR), Fisheries Division surveyed fish populations and angler catch and effort at Michigamme Reservoir, Iron County, Michigan from April 2001 through February 2002. This work was part of a new, statewide program designed to improve assessment and monitoring of fish communities and fisheries in Michigan's largest inland lakes. Known as the Large Lakes Program, it is currently scheduled to survey about four lakes per year over the next ten years (Clark et al. 2004).

The Large Lakes Program has three primary objectives. First, we want to produce consistent indices of abundance and estimates of annual harvest and fishing effort for important fishes. Initially, important fishes are defined as species susceptible to trap or fyke nets and/or those readily harvested by anglers. Our hope is to produce statistics for important fishes to help detect major changes in their populations over time. Second, we want to produce abundance estimates and sufficient growth and mortality statistics to be able to evaluate effects of fishing on special-interest species which support valuable fisheries. This usually involves targeting special-interest species with nets or other gears to collect, sample, and mark sufficient numbers. We selected walleye *Sander vitreus* and northern pike *Esox lucius* as special-interest species in this survey of Michigamme Reservoir. Finally, we want to evaluate the suitability of various statistical estimators for use in large lakes. For example, we applied and compared three types of abundance and two types of exploitation rate estimators for walleyes and northern pike in this survey of Michigamme Reservoir.

The Large Lakes Program will maintain consistent sampling methods over lakes and time. This will allow us to build a body of fish population and harvest statistics to directly evaluate differences between lakes or changes within a lake over time. Because Michigamme Reservoir was one of the first lakes to be sampled under the protocols of the program, we were sometimes limited in our ability to make valid comparisons in this report. For example, most types of quantitative comparisons between catch per effort in our netting operations and

those of most other surveys would not be valid. Our netting targeted walleyes, northern pike, and other spring spawners during spawning. Most past netting surveys occurred later in the year. Of course, as our program progresses we will eventually have a large body of netting data collected under the same conditions in the future. The first report in this series was on Houghton Lake (Clark et al. 2004), and was written as a model for future reports in the program.

## Study Area

Michigamme Reservoir is located in Iron County, Michigan. It was created in 1941 when Wisconsin-Michigan Light and Power Company (Wisconsin Electric Power Company) built Way Dam. The reservoir watershed is 645 square miles. The reservoir was created to store spring runoff, to supplement low flows, and for power generation. Reports of the reservoir surface area vary from source to source. Hazzard (1943) reported 8,000 acres, Humphries and Green (1962) estimated 5,220 acres, Laarman (1976) reported 7,000 acres, Michigan Digital Water Atlas<sup>1</sup> (2003) reported 4,892 acres, and Wisconsin Electric Power Company (1999) reported 6,400 acres at full pool. Wisconsin Electric funded a study to examine storage as it related to probable maximum flood that involved determining the surface area of Michigamme Reservoir with remote sensing and photogrammetry (Joe Kick, Wisconsin Electric Power Company, personal communication). Their methods provided contours accurate to 2 ft, which likely resulted in the most accurate estimate of total surface area. In our Large Lakes Program, we want to compare various measures of productivity among lakes, such as number of fish per acre or harvest per acre, so a measure of lake size is fairly important. Therefore, in our analyses we will use the Wisconsin Electric Power Company estimate of 6,400 acres as the size of Michigamme Reservoir.

The Reservoir is fed by the Deer, Fence, and Michigamme rivers, and Margeson and Clark's

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<sup>1</sup>A statewide program conducted by MDNR, Fisheries Division, Lansing to develop computerized maps and reference data for aquatic systems in Michigan.