

Action Plan For Aquatic Research At Voyageurs N.P.

By Larry W. Kallemeyn

Approximately 85,000 acres of Voyageurs National Park's 219,000 total acreage is covered by water; over 95 percent of the water area is occupied by Lake Kabetogama and those portions of Rainy, Namakan, and Sand Point Lakes that lie within the park. In addition to the four main lakes, there are 26 smaller lakes, ranging in size from 20 to 740 acres. Small impoundments created by beaver dams also are abundant.

Most activities in the park center on the large lakes; recreational fishing is the principal visitor activity. Approximately 800,000 personhours are expended on the fishery annually with walleye, northern pike, sauger, and smallmouth bass being the principal species harvested.

Resources Issues

Regulated lake levels and acid precipitation have been identified as resource problems in the park's Resource Management Plan. Lake levels in the large lakes in Voyageurs NP are controlled by a dam at the outlet of Rainy Lake and by two dams on the outlet of Namakan Reservoir that control the water level in Namakan, Kabetogama, and Sand Point Lakes. Because portions of all the lakes except Kabetogama lie in Canada, the dams and lake levels are regulated by the International Joint Commission (IJC). From 1909 to 1980 the average annual water level fluctuation in Rainy Lake was 3.6 feet; on the other lakes it was 9.3 feet. Estimated "natural" fluctuations for this same period would have averaged 6.7 feet for Rainy Lake and 6.4 feet for Namakan Reservoir. Thus it appears the present method of using larger than normal fluctuations on the Reservoir to maintain artificially low fluctuations on Rainy Lake could be having an adverse impact on the aquatic ecosystem.

Due to the low buffering capacity of the park waters, acid precipitation, which has been documented in the park, definitely has the potential for an adverse affect on the park's flora and fauna. Alkalinity readings in most of the park lakes are less than 20 mg/liter, which indicate the lakes have a limited capacity for neutralizing the acids that enter from the atmosphere.

The recreational use of the fishery resource was not specifically addressed when the Resource Management Plan was written in 1981. However, results of creel censuses conducted in 1977 and 1978 by the Minnesota Department of Natural Resources and in 1981 by Voyageurs NP personnel have shown that the fishery is intensive enough to have a significant impact on the fish community. The fishery is concentrated on the large species such as the walleye and northern pike, and the selective removal of these key predators probably is having an additional indirect influence on the other members of the fish community.

Aquatic Research Program

Research relating to these issues conducted prior to 1983 was restricted by a lack of funds and manpower. During the winter of 1982-83 an aquatic research Action Plan was developed and added to the Management Plan. It called for addressing simultaneously the three resource issues. For each of the broad areas of investigation, specific research elements were identified and it was decided whether Voyageurs NP researchers or contractors would do the work. This plan was used to obtain additional

funding from the Midwest Region's Science Office and the NPS Significant Resource Problems program.

The investigation dealing with the impact of water regulation has five research elements (1) a study of the hydrology of Namakan Reservoir and Rainy Lake and analysis of the impact of fluctuating water levels on (2) the littoral biota, including the vegetation and benthic organisms, (3) the fish community with special emphasis on the walleye and northern pike, (4) shore and marsh nesting birds, and (5) beaver and muskrat colonies.

The hydrology study is being conducted by the NPS Water Resources Field Support Lab; the CPSUS at Michigan Technological University and the University of Tucson are doing the benthos, beaver and muskrat, and bird studies. The littoral vegetation work is contracted to the University of Minnesota, Duluth. Research personnel from Voyageurs NP are carrying out the fishery study and coordinating the other work involved. Technical support for portions of the fisheries investigation is being provided by the Minnesota Department of Natural Resources.

If the studies show that the current water management program is having an adverse impact, the research approach should help the Park Service devise useful recommendations to the IJC for alternative regulatory systems. Should the IJC then make some change, the data collected in these studies will serve as baseline information against which we can evaluate the new regulatory system's impact.

The emphasis with regard to acid precipitation has been to encourage work by other agencies, since the park lacks equipment or facilities for conducting detailed studies in that area. Completed work includes a water quality and zooplankton study funded by the NPS Midwest Region's Science Office, and a water quality and precipitation chemistry study conducted by EPA. Currently the USGS and Minnesota Pollution Control Agency are monitoring water quality and pre-

cipitation chemistry in the park. The NPS/CPSU at Michigan Technological University in FY 1984 will begin monitoring a small watershed in the park for conducting a time-trend analysis of stream discharge and pH. Park personnel's involvement in the acid rain program consists of assisting these other agencies in monitoring some basic limnological parameters, e.g., water temperature, pH, dissolved oxygen, conductivity, alkalinity, transparency, and zooplankton composition and abundance.

Because of the potential impact of the recreational fishery on the fish community as well as its importance to park visitors, a program to collect and analyze fish harvest data was begun in the spring of FY 1983. The program's principal objective is to estimate accurately the annual harvest and fishing pressure and to obtain growth and mortality estimates for the various fish species. Through a cooperative agreement, funding is being supplied to the Minnesota Department of Natural Resources to measure fishing pressure and harvest on the four major lakes in the park. In addition, park personnel are testing an aerial census as another means of monitoring fishing pressure. They also are testing a postal creel card as a means of measuring fishing harvest and pressure on the park's 26 similar lakes.

The various studies being conducted in this program complement each other in that data collected in one study can be used to good advantage by researchers conducting another study. This is particularly true of the data that are being collected in the studies dealing with the impact of the water management on the fish community and the recreational fishery. When completed the results of the program should provide a broad spectrum of information resource personnel can use in managing the park's aquatic resource.

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