



General Fisheries Assessments on the Fond du Lac
Reservation, Summer 2008: Joe Martin, Lost, Pat Martin,
Perch, Simian, Sophie, and West Twin Lakes

Sean Thompson, Adam Thompson, and Brian D. Borkholder

Fond du Lac Resource Management
1720 Big Lake Road
Cloquet, MN 55720
218-878-8004

Fond du Lac Resource Management Division, Technical Report #44

March 2009

Introduction

The Fond du Lac Resource Management Division (FDLRM) has recently taken an active role in monitoring fish communities from lakes within the boundaries of the Fond du Lac Reservation. The purpose of these surveys was to collect base line data of the fish populations, including growth rates, age distribution and catch rates, and to monitor levels of mercury in fish. This data will help gain further insight into the fish communities and be used for future management decisions.

The fish assessment surveys were completed during the summer of 2008. Gear locations for Lost, Pat Martin, Perch, Simian and Sofie Lakes were established by FDLRM in 2008; gear locations for Joe Martin and West Twin Lakes were based on previous Minnesota Department of Natural Resources (MNDNR) surveys. Trap net locations were selected based on characteristics of the shoreline such as points, bays and weed edges; gill nets were generally set in the deeper parts of the lake. Both trap nets and gill nets were set according to the MNDNR Lake Survey Manual (1993).

All fish sampled in the gear were measured to the nearest mm. Bony structures were collected from five fish per cm group. Scales were collected from fish smaller than 150 mm and dorsal fin rays were collected from fish larger than 150 mm. Otoliths were collected from fish used for mercury testing.

Fish smaller than 150 mm were aged by counting annuli on scales viewed under a microfiche reader (Borkholder 1996 and 1997). Spines from fish larger than 150 mm were cleaned using bleach to remove the layer of skin on the bone. Spines were set in epoxy resin and sectioned (0.3 to 0.5 mm thick) using a Buehler Isomet™ low speed bone saw. Spines were examined using a microfiche reader. Annual rings were counted (McFarlane and Beamish 1987), and marked on overhead transparency sheets. Each spine's annuli were digitized into a computer using the DisBCal89 program (Frie 1982). DisBCal89 was used to back-calculate length-at-age estimates, using no transformation and standard intercepts provided by Duluth Area Fisheries (John Lindgren, MNDNR, personal communication).

For individual fish sacrificed for mercury testing, sagittal otoliths were dissected from the inner ear of the fish (Bruesewitz et al., 2002). For most species, the otoliths were broken in half perpendicular to the longest axis. The unbroken end of the otolith was placed into a block of clay, and the broken plane coated with immersion oil. The otolith was then examined under a dissecting microscope using a fiber optic light to identify and count annuli. Otoliths dissected

from northern pike were prepared as were the dorsal fin spines, embedded in epoxy resin and sectioned using the low speed bone saw.

The purpose of ageing fish is to identify age frequency distribution and strong and weak year classes. Growth data was compared to the MNDNR length-at-age area average for each species (John Lindgren, MNDNR, personal communication). This data helps managers gauge growth rates from fish communities within Fond du Lac compared to populations elsewhere in the region.

Stock density indices are used to quantify the size structure of a population. Proportional stock density (PSD) was first proposed by Anderson (1976 and 1978), and is simply a measurement of the proportion of the fish observed larger than a predetermined “quality” length divided by the number of fish observed larger than a predetermined “stock” length. For walleye, “stock” length fish are those larger than 10.0 inches (254 mm), and “quality” length fish are those larger than 15.0 inches (381 mm). Gabelhouse (1984) proposed further separating “quality” fish into “preferred” (walleye > 20.0 inches), “memorable” (walleye > 25.0 inches), and “trophy” length fish (walleye > 30.0 inches), and calculating a relative stock density (RSD), or proportion, for each category. For example, RSD S-Q is the proportion of walleye in the sample between “stock” length (10.0 inches) and “quality” length (< 15.0 inches), divided by the total number of walleye sampled larger than 10.0 inches. Values are available for all recreational sport fishes, and differ by species. In this survey, we used the following values:

Species	Length (inches)				
	Stock	Quality	Preferred	Memorable	Trophy
Bluegill	3.1	5.9	7.9	9.8	11.8
Black Crappie	5.1	7.9	9.8	11.8	15.0
Largemouth Bass	7.9	11.8	15.0	20.0	24.8
Northern Pike	13.8	20.8	28.0	33.8	44.1
Pumpkinseed	3.1	5.9	7.9	9.8	11.8
Walleye	10.0	15.0	20.0	25.0	30.0

As a population, band members catch and consume fish at a greater rate than the general or sport fishing public. In 2000, the Fond du Lac Band, in a partnership with the Grand Portage Band and the Minnesota Department of Health, collected multiple species of preferred fishes from the St. Louis River to be analyzed for mercury and PCBs, and a subset of the collection was

also analyzed for toxaphene and a suite of pesticides (also known to be present in fish tissues from Lake Superior). Analytical results indicated that the toxaphene and pesticides residues were low or at non-detect levels for the Fond du Lac fish analyzed. In 2001, Fond du Lac expanded our fish collection to seven additional on-reservation lakes: Perch Lake, Sofie Lake, Joe Martin Lake, Pat Martin Lake, Lost Lake, West Twin Lake, and Simian Lake; all of which are popularly fished by band members. Through that project, and with assistance from the Minnesota Department of Health, the Band built fish advisory development capacity, community-based outreach capacity, and facilitated fish contaminant data sharing between the state and the Band.

In 2008, fish were resampled from the same lakes that were sampled in 2001, as it is important to track trends in fish tissue data over time. Recent legislation requiring reductions in mercury emissions from coal-fired power plants in the State may have a detectable effect (reductions in fish tissue concentrations), but proposed new and expanded discharges (air and water) related to mining and power generation near the Reservation and in the Ceded Territories may also have a detectable effect (increases in fish tissue concentrations). Also, the EPA recently approved a State-wide mercury TMDL for Minnesota, but many lakes and river reaches (including the St. Louis River and reservation lakes) were excluded from that TMDL, as the fish tissue mercury concentrations would still not achieve the criterion after full implementation.

This data will be used to update FDL's fish contaminants database, and will be used in waterbody assessments to determine >fishable= status (attainment of designated use, or impairment). If this new data represents a significant change from the last round of sampling, our fish consumption guidelines for Band members will be updated.

Discussion for each lake surveyed in 2008 will follow as separate chapters.

Literature Cited

- Anderson, R.O. 1976. Management of small warm water impoundments. *Fisheries* 1(6):5-7, 26-28.
- Anderson, R.O. 1978. New approaches to recreational fishery management. pp 73 - 78 in G.D. Novinger and J.G. Dillard, editors. *New approaches to the management of small impoundments*. NCD-AFS, Spec Pub. 5, Bethesda, MD.
- Anderson, R.O., and A.S. Weithman. 1978. The concept of balance for coolwater fish populations. *American Fisheries Society Special Publication* 11:371-381.

- Borkholder, B.D. 1997. Autumn Assessments of Walleye Young-of-the-Year and Yearling Fish in Seven Lakes in the Minnesota 1854 Ceded Territory. Fond du Lac Reservation Resource Management Technical Report, No. 17. Cloquet, MN.
- Borkholder, B.D. 1996. Walleye Young-of-the-Year and Yearling Assessments on Eight Lakes from within the 1854 Ceded Territory of Minnesota. Fond du Lac Ceded Territory Technical Report, No. 12. Cloquet, MN.
- Bruesewitz, R.E., T. Jones, and B. Borkholder. 2002. Comparison of aging structures from walleye at Mille Lacs and Ann Lakes, Minnesota. MN Department of Natural Resources, Section of Fisheries, Completion Report F-29-R(P)-20, Area 220, Study 4, Job 537.
- Frie, Richard V. 1982. Measurement of fish scales and back-calculation of body lengths using a digitizing pad and microcomputer. *Fisheries* 7(5):5 - 8.
- Gabelhouse, D.W., Jr. 1984. A length-categorization system to assess fish stocks. *North American Journal of Fisheries Management* 4:273-285.
- McFarlane, G.A., and R.J. Beamish. 1987. Validation of the dorsal spine method of age determination for spiny dogfish. Pages 287 - 300 *in* R.C. Summerfelt and G.E. Hall, eds. *Age and Growth of Fish*. Iowa State University Press, Ames, Iowa.
- Minnesota Department of Natural Resources. 1993. Manual for Instructions for Lake Survey. Section of Fisheries, Special Publication No. 147.