Fond du Lac Reservation
Office of Water Protection

Tribal Report under Section 305(b), Clean Water Act

submitted to:
U.S. EPA Region 5
Water Division
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April 2004

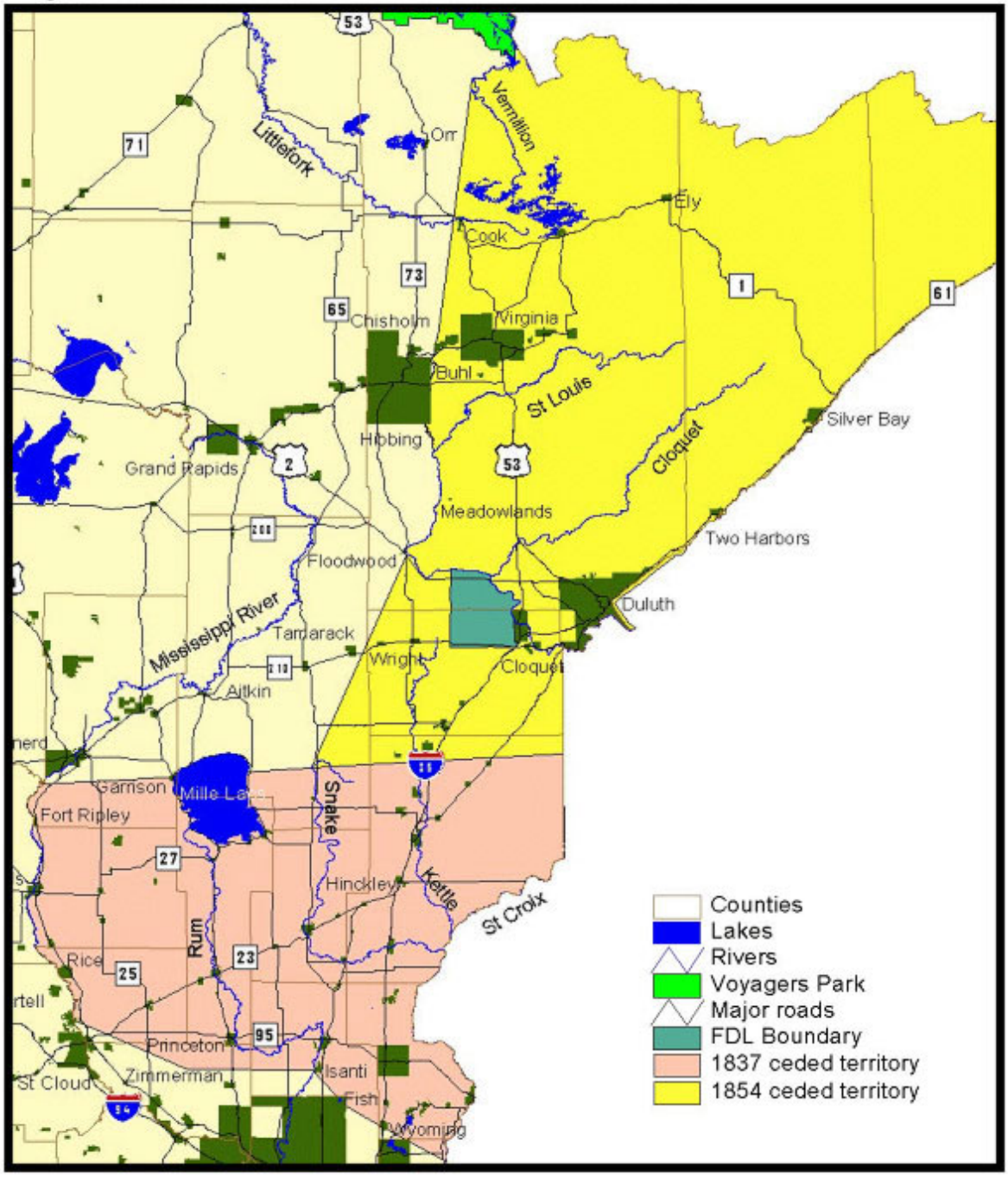
Introduction

The Fond du Lac Reservation Environmental Program has developed and implemented a broad-based tribal water quality protection program that includes federally approved water quality standards, a comprehensive monitoring program designed to assess the health of reservation lakes and streams, and protection plans for wetlands and ground water resources. The Clean Water Act establishes a process in §305(b) by which states and tribes prepare a report describing the status of surface and ground water quality in their jurisdiction. The U.S. Environmental Protection Agency (EPA) compiles the data from these reports, summarizes them, and transmits this information to Congress as a nationwide analysis of water quality. This 305(b) process is the principal means by which we can evaluate whether reservation waters are meeting our water quality standards, the progress made in maintaining and restoring water quality, and the extent of remaining problems.

Fond du Lac has been implementing its water quality monitoring strategy (WQMP, 1998; revised 2002) for the lakes and streams of the reservation since 1999, with a three year baseline data collection effort followed by our ongoing modified core monitoring program. The WQMP includes sampling physical, chemical and biological parameters tailored to the waterbody type, such as fisheries lakes, wild rice lakes, and trout streams. Our surface water quality monitoring is conducted under the field and laboratory standard operating procedures defined in our Quality Assurance Project Plan, according to the established data quality objectives and decision rules. Additional data used to develop this report comes from associated monitoring projects, including sediment quality assessments, toxicity studies, and fish tissue analysis, all of which have approved Quality Assurance Project Plans.

This report represents Fond du Lac's first endeavor at using the data generated by our monitoring projects to describe the extent to which reservation lakes and streams support their designated uses (Table 1.1). We also identify the pollutants or stressors causing impairment of these designated uses, and where possible, the sources of these stressors. Ground water programs and impacts are also described. The 305(b) report presents the results of a careful assessment of the raw data, for which a comprehensive Microsoft Access database has been developed to store the quality-assured data and to facilitate data analysis.

Figure 1: Fond du Lac Reservation and Ceded Territories



Description of Tribal Water Quality Programs/Issues of Concern

The Fond du Lac Reservation, established by treaty with the United States Government in 1854, is located in east central Minnesota near Cloquet (population 10,000), approximately 20 miles southwest of Duluth and Lake Superior. The Fond du Lac Band of Lake Superior Chippewa has over 3900 enrolled members, of whom nearly 1900 members live on the Reservation. The Fond du Lac Band is governed by a five member council referred to as the Reservation Business Committee (RBC).

The water resources of the 101,000-acre reservation include nearly 44,000 acres of wetlands, 96 miles of streams, and over 3000 acres of lakes, of which more than 1500 acres are designated wild rice waters. A 20-mile reach of the St. Louis River, the largest U.S. tributary to Lake Superior and on the state of Minnesota's 303(d) list for mercury impairment, forms the northern and eastern boundaries of the reservation. Confined sand and gravel aquifers are the major source of drinking water to the Reservation, as described in the USGS report *Water Resources of the Fond du Lac Indian Reservation, East Central Minnesota*, but the crystalline bedrock aquifer underlying the glacial drift has progressively become a more significant source of domestic water supply.

Currently, the Fond du Lac Office of Water Protection (OWP) is routinely collecting physical, chemical and biological data on 23 lakes and 6 streams on the reservation, and has developed a water quality database that will provide the foundation for decision-making on waterbody assessments and identifying restoration needs. Additionally, two sediment quality assessments (with a comprehensive sediment quality database) have been funded through EPA's Great Lakes National Program Office, and a fish contaminant study funded through EPA's Coastal Environmental Management Program led to the development of reservation-specific fish consumption guidelines. These additional projects supplemented our water quality monitoring and assessment of the aquatic resources of the reservation, and the relative implications for human health and aquatic life.

In the most recent Tribal Environmental Agreements (TEAs) between Fond du Lac and U.S. EPA Region 5, surface and ground water protection are identified as the number one tribal environmental priority. Water quality has consistently been expressed as a priority by band members, as expected for a culture that has historically relied upon aquatic resources (wild rice, fish, wildlife and waterfowl) for subsistence. Specific water quality concerns are focused upon toxic contaminants, particularly mercury, which were historically discharged into the St. Louis River from industrial sources and continue to precipitate out of the atmosphere from more remote sources (coal-fired power plants, taconite mining, and the pulp/paper industry). These contaminants persist in the sediments of lakes and streams, and bioaccumulate in the aquatic food chain. Waterbodies in this Northern Lakes and Forests ecoregion are especially vulnerable to mercury contamination, since the microbial methylation of mercury to its bioavailable form is greatly enhanced in wetlands, and most of our lakes and streams have a significant wetland component to their watersheds. Tribal members as a population rely upon fish as a major constituent of their diet, to a greater extent than does the general or sport-fishing population, and

mercury contamination of fish harvested from reservation and ceded territories waters is a serious public health concern.

Table 1. Atlas Table (Inventory of Tribal Water Resources)

Factor/Resource	Value
Reservation population (total residents, tribal and non-tribal; U.S. Census 2000 data)	3,728
Reservation surface area (acres)	101,392
Total miles of rivers and streams	96
Number of sampling points on rivers or streams	16
Number of inland lakes/reservoirs/ponds (>10 acres)	23
Acres of inland lakes/reservoirs/ponds	3,433
Number of sampling points on inland lakes/ reservoirs/ponds	27
Acres of wetlands	43,873.2

The reservation contains seven productive wild rice lakes which tribal members annually harvest by hand, a traditional cultural practice which dates back many centuries. Historical land uses within reservation watersheds, including logging, land development, road building, and the creation of a judicial ditch system (a failed attempt to impose crop agriculture on the reservation), have in some areas substantially altered the natural watershed functions. Considerable beaver activity in the Stoney Brook watershed, in the absence of trapping pressure and incentives, interferes with critical wild rice lake level management (water level fluctuation is one of the most significant factors affecting natural stands of wild rice). More complete knowledge of the water quality and hydrology, sediment characteristics, nutrients and biotic communities of these lakes is essential to the management and protection of this cultural and subsistence resource. Band members and tribal resource managers are concerned about widely diminishing stands of natural wild rice (as opposed to commercially grown paddy rice), and Fond du Lac staff actively participate in regional interagency wild rice meetings and research efforts.

Extensive lakeshore development on the largest recreational/fisheries lake of the reservation, Big Lake, has led to shared tribal and non-tribal concerns about recreational water quality, which may be impaired by nutrient loading and fecal coliform from failing septic systems. Relatively small-scale livestock operations and illegal shoreline alterations threaten attainment of beneficial uses for some waterbodies. In general, with no permitted dischargers currently impacting reservation waters, the major threat to reservation surface water quality is from nonpoint sources: erosion and sedimentation, hydrologic alterations, atmospheric deposition, and nutrient loadings. With this understanding, our water quality program is now highly focused on documenting and monitoring these impacts, investigating potential remedial actions and seeking funding to implement them, and working to establish policies to minimize and control sources.

On the reservation, significant wetlands acreage has been lost through the judicial ditch system, and fragmentation by roads and other development. Wetlands are now recognized as some of the most productive and diverse ecosystems in the world, serving as habitat for waterfowl, wildlife, fish, and many species of wild plants. On Fond du Lac, wetlands provide habitat for many threatened, endangered, rare or sensitive animal species, and also support a great variety of plants which are harvested for food and traditional medicines. These wetlands provide opportunities for subsistence hunting, trapping and gathering, activities which are crucial to protecting the heritage of the band. Our Wetlands Specialist has updated the NWI coverage for the reservation, developed and finalized a Wetlands Conservation and Protection Plan, initiated a reservation-wide culvert inventory and GIS coverage to better define hydrologic connections, and is developing a GIS coverage for potential mitigation and restoration projects.

OWP staff has provided oversight, record-keeping, grant funding, and GPS mapping of over 60 sealed abandoned wells, crucial to the protection of the drinking water supply. Our Ground Water Specialist investigated ground water impacts from old dump sites, and coordinated a targeted hydrogeologic study of the reservation to better characterize the underlying aquifers. To date, she has completed a Source Water Assessment and Ground Water Protection Plan; a more general Source Water Protection Plan for the reservation is in development. OWP staff has provided significant environmental oversight, monitoring and technical support for the recently constructed Black Bear Golf Course.

Table 2. Surface Water Resources and Use Designations (from Fond du Lac Surface Water Monitoring Quality Assurance Project Plan, Rev. 6, 2003)

Category	Code	Location	Designated Uses
Wild Rice Lakes:	101	Bang (Long) Lake	B, C2, D1, D2, E1, F, G, H
	104	Deadfish Lake	B, C2, D1, E1, F, G, H
	108	Jaskari Lake	B, C2, D1, E1, F, G, H
	112	Miller (Mud) Lake	B, C2, D1, E1, F, G, H
	114A	Perch Lake	B, C2, D1, E1, E2, F, G, H
	115	Rice Portage Lake	B, C2, D1, E1, E2, F, G, H
	124	Wild Rice	B, C2, D1, E1, F, G, H
Fisheries Lakes:	102A & B	Big Lake	B, C2, D1, D2, F, G, H
	110	Lost Lake	B, C2, D1, D2, F, G, H
	111	Martin (Joe Martin) Lake	B, C1, C2, D1, D2, E2, F, G, H
	113	Pat Martin Lake	B, C2, D1, E1, F, G, H
	114B	Perch Lake	(see above under Wild Rice Lakes)
	118	Simian Lake	B, C2, D1, E1, F, G, H
	119	Sofie Lake	B, C2, D1, F, G, H
	122	Third Lake	B, C2, D1, D2, F, G, H
	123A & B	West Twin Lake	B, C2, D1, D2, E1, F, G, H
Other Lakes:	103	Cedar Lake	B, C2, D1, E1, F, G, H
	105	East Twin Lake	B, C2, D1, E1, F, G, H
	106	First Lake	B, F, G, C2, D1, H
	107	Hardwood Lake	B, C2, D1, E1, F, G, H
	109	Lac Lake	B, C2, D1, E2, F, G, H
	116	Second Lake	B, E1, C2, D1, F, G
	117	Side Lake	B, D1, E1, F, G, H, C2
	120	Spring Lake	B, C2, D1, E1, F, G, H
	121	Spruce Lake	B, C2, D1, E1, F, G, H
Trout Streams:	204A & B	Otter Creek	B, C1, D1, E2, F, H, G
	207A & B	Stoney Brook	B, C1, C2, D1, F, G, H
Other Subwatershed Drainage Streams:	202A & B	Fond du Lac (Squaw) Creek	B, C1, D1, F, H, G
	203A & B	Martin Branch	B, C1, D1, E2, F, H, G
	205A & B	Simian Creek	B, C2, D1, F, H, G
Other Streams:	201	Annamhasung Creek	B, C2, D1, F, H, G
	206	Spring Creek	B, C2, D1, F, H, G
	208	St. Louis River	B, C2, D1, D2, E2, F, G, H

Key - Designated Uses

A	Public Water Supply	D2	Secondary Contact Recreational
B	Wildlife	E1	Cultural, Wild Rice Areas
C1	Aquatic Life, Cold Water Fisheries	E2	Cultural, Aesthetic Waters
C2	Aquatic Life, Warm Water Fisheries	F	Agricultural
C3	Aquatic Life, Subsistence Fishing	G	Navigation
D1	Primary Contact Recreational	H	Industrial

Description of Monitoring Programs

The Fond du Lac WQMP and Surface Water Quality Monitoring QAPP describe the overall lake and stream monitoring strategy, data quality objectives, and the field and lab SOP's that are followed. In general, our lake monitoring is organized by designated uses, with sampling frequencies tiered according to priority of usage (predetermined through consultation with the FDL Natural Resources Program, the FDL fisheries biologist, the FDL Conservation Department, and a band member survey of reservation fisheries habits and preferences). Priority fisheries lakes are sampled monthly from May-October, with a temperature/oxygen profile measured in mid- to late winter under the ice cover, providing us with some measure of temporal or seasonal variation. Lesser-priority fisheries lakes (less desirable fish communities, inhibited access) are sampled annually in mid-summer to provide a "snapshot" of ecological conditions, which can also be compared over time as our database grows. Wild rice lakes are sampled monthly from May-October, with an annual sediment sample collected for nutrient analysis (TKN, TP, total solids and total volatile solids) and iron. Sulfate is also measured in the water column in order to evaluate against the wild rice water quality criterion (<10mg/liter). The following parameters are included in our monitoring program:

1. Total Phosphorus (TP)
2. Ortho Phosphorus (OP)
3. Total Kjeldahl Nitrogen (TKN)
4. Nitrite + Nitrate
5. Ammonia Nitrogen
6. Total Suspended Solids
7. one annual toxic metals analysis: Arsenic, Cadmium, Chloride, Chromium, Copper, Lead, Nickel, Selenium, Zinc
8. Total Alkalinity
9. Total Hardness
10. Color (true and apparent)
11. Depth profile of: temperature, dissolved oxygen, pH, specific conductance, turbidity (at 1-foot intervals)
12. Secchi transparency
13. Zooplankton vertical tows (153-micron mesh plankton net; preserved in ethanol)
14. Targeted beach monitoring for *E. coli* (Colilert system)
15. Sulfate (in wild rice lakes)

In priority fisheries lakes, Chlorophyll *a* and algal community scans are performed on samples collected in the first spring sampling event, midsummer (late July-early August), and in October (fall turnover). Fish community data is added as available from tribal Fisheries Biologist (via electroshocking and trap netting), from Minnesota Department of Natural Resources surveys, and through our collection activities for fish tissue contaminant study.

In our initial baseline monitoring project, six reservation streams were sampled at multiple stations from headwaters reaches to their confluence with the St. Louis River, in order

to determine permanent future monitoring sites, and to provide data to aid the OWP in defining reference conditions for reservation streams. The Revised Rapid Bioassessment Protocol (1999) worksheets are used for habitat assessments, and the same water quality parameters are measured as for lakes. Rather than a depth profile for temperature, DO, pH, and conductivity, a single grab sample is taken at each stream sampling event; secchi transparency is not measured. Standardized effort kick net samples of benthic macroinvertebrates are collected. Periphyton samples are collected from rocky substrate in order to measure primary productivity (standing stock). With the assistance of the tribal Fisheries Biologist and Natural Resource technicians, we have collected fish community data by electroshocking the study reaches annually in midsummer.

Contingent upon the §404 permitting process for the Black Bear Golf Course, the Fond du Lac OWP developed a monitoring plan for the construction phase and during operation and maintenance of the completed course. This targeted monitoring plan (reviewed and approved by the US Army Corps of Engineers, and provided to EPA Region 5) includes monitoring wells installed to enable us to measure ground water impacts (water levels, nutrients, pesticides) within the golf course and the adjacent wetland buffer area, and an additional upstream monitoring site established on Otter Creek to determine potential surface water impacts (temperature, turbidity, nutrients, pesticides, biological impairment).

The Fond du Lac OWP used two GLNPO-funded sediment projects, "Sediment Quality Assessment of Reservation Lakes" and "Phase II Sediment Quality Assessment" to establish sediment quality benchmarks for key indicators to supplement our water quality monitoring data. Sediments from twelve reservation lakes were collected and analyzed for total mercury, particle size distribution, total solids, and organic carbon content. A subset of the sediment samples collected from each lake was also analyzed for PCBs and lead levels, and toxicity tests (10-day growth and survival of *Chironomus tentans* and *Hyalella azteca*) were performed on sediments from half the study lakes. In the Phase II study, archived sediments from the initial lakes project were analyzed for methylmercury concentrations, and twelve additional sediment samples were collected from the St. Louis River to be analyzed for the same suite of physical and chemical parameters. Samples from four of those sites were also collected for the identical toxicity tests, and results from both studies have been stored in a Microsoft Access database, modeled after the EPA's National Sediment Inventory database. Quality Assurance Project Plans were developed and approved by GLNPO for both projects.

Additionally, the FDL OWP has partnered with the Minnesota Department of Health to collect fish from the St. Louis River and seven reservation lakes to be analyzed for mercury, and PCBs; a limited number of fish were also analyzed for toxaphene/organochlorine pesticides levels. MDH assisted FDL in calculating fish consumption guidelines tailored to the reservation community. A Quality Assurance Project Plan was developed and approved by EPA Region 5 for the collection and analysis of fish tissue.

The Fond du Lac Wetlands Specialist has identified a set of potential reference wetlands for each of the wetlands classifications. We will be initiating a baseline wetlands monitoring

program next year (pending funding), and subsequent 305(b) reports will include assessments of wetlands' health and functional status.

Description of Assessment Methods

Assessments of use support for Fond du Lac are based upon the individually identified lakes and streams in our tribal Water Quality Standards. Our WQS define threshold criteria for toxic contaminants and pathogenic bacterial levels (*E. Coli*), and narrative standards for excessive nutrients and biological criteria which will establish action levels. These standards are essentially derived from procedures contained in the Final Water Quality Guidance for the Great lakes System, 40 CFR parts 132 and 136, and Minnesota Rules, Chapters 7050 and 7052, deviating from these criteria only in that a more protective level of fish consumption (60 g/day) is assumed for Fond du Lac. The purpose of meeting water quality standards is to protect the beneficial uses associated with the standards. Based upon the assessment of the water quality data and other relevant information compared to the standards for a given pollutant or water quality characteristic, the beneficial use may be **fully supported, partially supported**, or **not supported**.

As the triennial review of our tribal water quality standards will be in progress in FY '04, we will be focusing on developing numerical biological and nutrient criteria to refine the narrative standards that appear in our original water quality ordinance. A classification system for lake and stream types will be established, and the corresponding reference conditions defined and calibrated. In accordance with the EPA Nutrient Criteria Technical Guidance Manual (EPA-822-B00-001), we will first determine the physical classification of our lakes and streams, establish reference conditions for the different classes, and use both causal and response variables in combination to yield the most definitive and comprehensive criteria. We will draw upon the state of Minnesota's ecoregional approach, acknowledging that waterbodies in this Northern Lakes and Forests (NLF) ecoregion are generally lower in nutrients, and exhibit a narrower range of nutrient conditions than would be encountered in a larger, more diverse geographic area. As the frequency distribution of the trophic condition of our reservation waters may not represent the entire continuum, we can refer to the state's ecoregional database to compare our lake and stream data to the larger dataset. Until we have adopted specific nutrient and biological criteria to our tribal WQS, however, we will need to rely upon comparisons with Minnesota's NLF trophic condition ranges and our own stream habitat data for purposes of this report. Biological community (taxonomic) data will only be used as part of the "best professional judgment" component of our evaluation.

For this report, all data collected since 1998 under the framework of our surface water quality monitoring program, Black Bear Golf Course monitoring project, sediment quality assessment projects, and fish tissue analysis project will be used, along with best professional judgment of OWP staff, to determine attainment. It is important to recognize the value and necessity of including best professional judgment as a legitimate step in the impairment assessment process. Professionals, including staff that take samples in the field, perform the analytical procedures, and analyze the data, must have the latitude to interpret the information within the context of their site-specific knowledge and experience with the factors that influence

water quality. Without this step, assessments could result in an incorrect impairment decision.

The concentrations of some pollutants in surface waters and ground water may be below standard analytical detection limits. Monitoring data for such pollutants often consists of a series of "less-than" values, and must be carefully reviewed. "Less-than" values, even if greater than the standard, will not be considered an exceedance of the standard, and will be considered a data point for the purposes of the assessment. Best professional judgment will be used in the assessment of these data, taking into account such information as:

- the relative number of less-than values compared to the number of "detects,
- the extent the "detects" are above the detection limit,
- the magnitude of the difference between the detection limit, the chronic standard and the expected ambient concentrations,
- information from data in other media such as fish tissue or sediment data.

Surface waters are assessed for aquatic life use support to determine if they are of a quality needed to support the aquatic community that would be found in the lake or stream under natural conditions. Two types of data are used in the assessments: water chemistry data, and biological and habitat data. Water chemistry samples are evaluated against the tribal WQS, as minimal requirements needed to support aquatic life. Determinations of use support are based upon the frequency of exceedence of the "chronic" standards applicable to a given water class.

For conventional parameters such as DO, pH and turbidity, levels of support are defined as: **fully supporting** - fewer than 10% of the samples exceed the standard; **partially supporting** - 10-25% of the samples exceed that standard; **not supporting** - more than 25% of the samples exceed the standard. The 10% and 25% exceedance thresholds for conventional pollutants are based on EPA guidance (1997), and Fond du Lac feels they are appropriate because none are toxic in the traditional sense. All are subject to periodic 'exceedences' due to natural causes, such as increased turbidity after a storm event. These potential pollutants are also natural characteristics of surface waters, and indigenous aquatic organisms have long adapted to cope with their fluctuations. The extent of these natural exceedences will be considered using best professional judgment as part of the assessments.

As there are no permitted/regulated discharges to waters of the Reservation, any causes or sources of impairment are by definition nonpoint pollutant sources. For waterbody-specific assessments (Table 9), those lakes and streams identified with "partial-support" status all have conspicuous nonpoint source category impairments such as hydromodification (roads, ditches, culverts), heavy development (failing septics, nutrient/pathogen sources), or agriculture (livestock access to shoreland, nutrient enrichment) in their watersheds. Monitoring data (physical, chemical, biological, habitat) corresponded to these visual observations of watershed conditions, but the severity of these nonpoint source impacts was not enough to warrant a "non-support" decision, when reviewed by Fond du Lac staff.

Since none of the samples analyzed for toxics has exceeded any of the associated standards, no non-attainment use support determinations in this report were decided by these

data**.** Although the toxics data did not indicate any exceedences of our water quality criteria, these data were considered a line of evidence for determining full beneficial use support.

Where OWP staff believed that a lake or stream was impacted by habitat degradation, the waterbody is judged to be "partially supporting" aquatic life use, even if chemistry data indicated "full support". The rationale for this decision is that routine water column sampling may miss problems that are non-chemical in nature. The Rapid Bioassessment Worksheet scores were used to make an aquatic life use determination based upon habitat quality. All the habitat parameters on the worksheets are evaluated and rated on a numerical scale of 0 to 20 (highest) for each sampling reach. The RBP protocols call for the rankings to be totaled and then compared to a reference condition to provide a final habitat ranking. As we have not yet defined reference condition for reservation streams, we will use the upper 25th percentile (cumulative score >150) as the threshold to determine habitat to be fully supporting. The second quartile (100 <cumulative score <150) represents 'partially supporting' stream habitat, and any sampling reaches with a cumulative score less than 100 will be considered non-supporting.

Biological community data (benthic macroinvertebrates and fish in streams; zooplankton and algae in lakes) provides an additional layer of information to be used for best professional judgment of status, in this initial report. Fond du Lac is in the process of developing numerical biological criteria in its trienniel water quality standards review, and future §305(b) reports will evaluate aquatic life use support on the basis of biological indices. Algae and zooplankton samples from Reservation lakes have consistently shown diverse, healthy assemblages, with the exception of moderate summer cyanobacteria blooms in Third Lake, indicative of nutrient enrichment. There is a small horse farm adjacent to Third Lake, with no exclusion from one of the pastures to the lakeshore. Previously, the landowner was storing manure and soiled stable bedding in a pile less than 50' from the lake, but is currently practicing better manure management.

Generally, benthic invertebrate assemblages from Reservation streams have consistently included high proportions of EPT taxa ("EPT" is an abbreviation for Ephemeroptera + Plecoptera + Trichoptera, or mayflies, stoneflies, and caddisflies). A high EPT ratio is considered indicative of good water quality and habitat, with the exception of wetland headwaters and channelized reaches (naturally low diversity, dominated by amphipods, isopods, and gastropods). The Martin Branch benthic samples, at a monitoring station immediately downstream of a collapsed culvert, indicate impacts from this obvious habitat degradation (low numbers, low diversity).

Our narrative water quality standards protect aesthetic and aquatic life beneficial uses from eutrophication (particularly lakes), and impairment of the biological communities. To incorporate our narrative standards in primary contact/recreational use support determinations, nutrients (primarily phosphorus), secchi depth, and chlorophyll *a* data are evaluated as indicators of nonpoint source pollution, and a fisheries lake is considered to be partially supporting if more than 10% of the observations of an indicator exceed the ecoregional (NLF) expectation. The Minnesota phosphorus criterion used to determine full support of primary contact recreation and

aesthetic beneficial uses in fisheries lakes is TP < 30ug/liter, which corresponds to a Carlson's Trophic State Index (a common numerical index related to nutrient enrichment) of 53. At this concentration of TP, we would expect chlorophyll *a* measurements to equal about 10ug/liter. Secchi disk measurements on highly stained lakes (>50 PtCo units) may not be an accurate determinant for calculating the Carlson's TSI, as low secchi transparencies do not necessarily correlate with high chlorophyll *a* measurements. Therefore, secchi transparency will be evaluated using best professional judgement in conjunction with the other nutrient/productivity parameters, but alone will not constitute a use support determination for either clear or 'stained' lakes. Our monitoring plan does not include any scenarios for measuring only secchi depth in a lake or pond, but rather includes a suite of traditional limnological parameters, all of which can be incorporated in an aesthetic or aquatic life beneficial use attainment determination.

Primary contact/recreational use support determinations will also rely upon *E. coli* data. We have sampled all primary fisheries lakes at least once, and completed a summer season of targeted beach monitoring for two lakes (Big Lake, West Twin Lake) that have public accesses and are heavily used recreational lakes. Our criterion for *E. coli* defines the limit for both primary and secondary contact recreational use as 126 organisms/100 ml, using the geometric mean of five samples collected in a thirty-day period. When fewer than five samples are collected in a month, densities of *E. coli* shall not exceed 235 organisms/100 ml in any single sample.

Wild rice lakes tend to exhibit higher mean TP concentrations than deeper fisheries lakes, without developing the associated nuisance algal blooms (chlorophyll *a* > 20ug/liter), as their primary production capacities are dominated by shallow rooted vegetation. We will not be using Carlson's TSI calculations to determine use attainment in wild rice waters. Instead, we focus on observed productivity (plant density, viable seed production), using quantitative measures such as stem counts, harvest weights, and changes from historical conditions; and comparisons with our WQS sulfate criterion.

We will consider fish tissue contaminants and consumption advisories under the section of this report describing public health concerns. Our tribal water quality standards do not include "fish consumption" as a distinct beneficial use, so for this report, the fish tissue data and consumption advisories developed for reservation waterbodies are evaluated separately from other water quality data. Our summary tables of use support, and causes and sources of impairment, will reflect assessments of the water quality data as defined to this point.

Table 3. Individual Use Support Summary, Streams

Use	Miles Fully Supporting	Miles Partially Supporting	Miles Not Supporting	Miles Unassessed
Aquatic life	53.4	13.2	-	29.4
Primary contact recreational	-	-	-	96

Table 4. Individual Use Support Summary, Lakes

Use	Acres Fully Supporting	Acres Partially Supporting	Acres Not Supporting	Acres Unassessed
Aquatic life	875.7	538.9	-	-
Primary contact recreational	875.7	523.2	-	-
Secondary contact recreational	875.7	523.2	-	-
Cultural: Wild Rice	1555	113.7	-	-
Cultural: Aesthetic	8.7	-	-	-

Table 5. Summary of Stream Miles Impaired by Various Pollutants/Stressors

Cause Category	Miles: Major Impairment	Miles: Moderate/Minor Impairment
Flow Alterations	11.85	
Other Habitat Alterations (streambed, riparian)		1.0

Table 6. Summary of Lakes Impaired by Various Pollutants/Stressors

Cause Category	Acres: Major Impairment	Acres: Moderate/Minor Impairment
Flow alterations		113.7
Nutrients		538.9
Pathogens		523.2
Shoreland modifications		15.7

Table 7. Summary of Stream Miles Impaired by Various Source Categories

Source Category	Miles: Major Impairment	Miles: Moderate/Minor Impairment
Channelization	11.85	
Roads/culverts	1.0	

Table 8. Summary of Lake Acres Impaired by Various Source Categories

Source Category	Acres: Major Impairment	Acres: Moderate/Minor Impairment
Non-compliant septics; other urban runoff		523.2
Livestock		15.7
Hydromodification		113.7

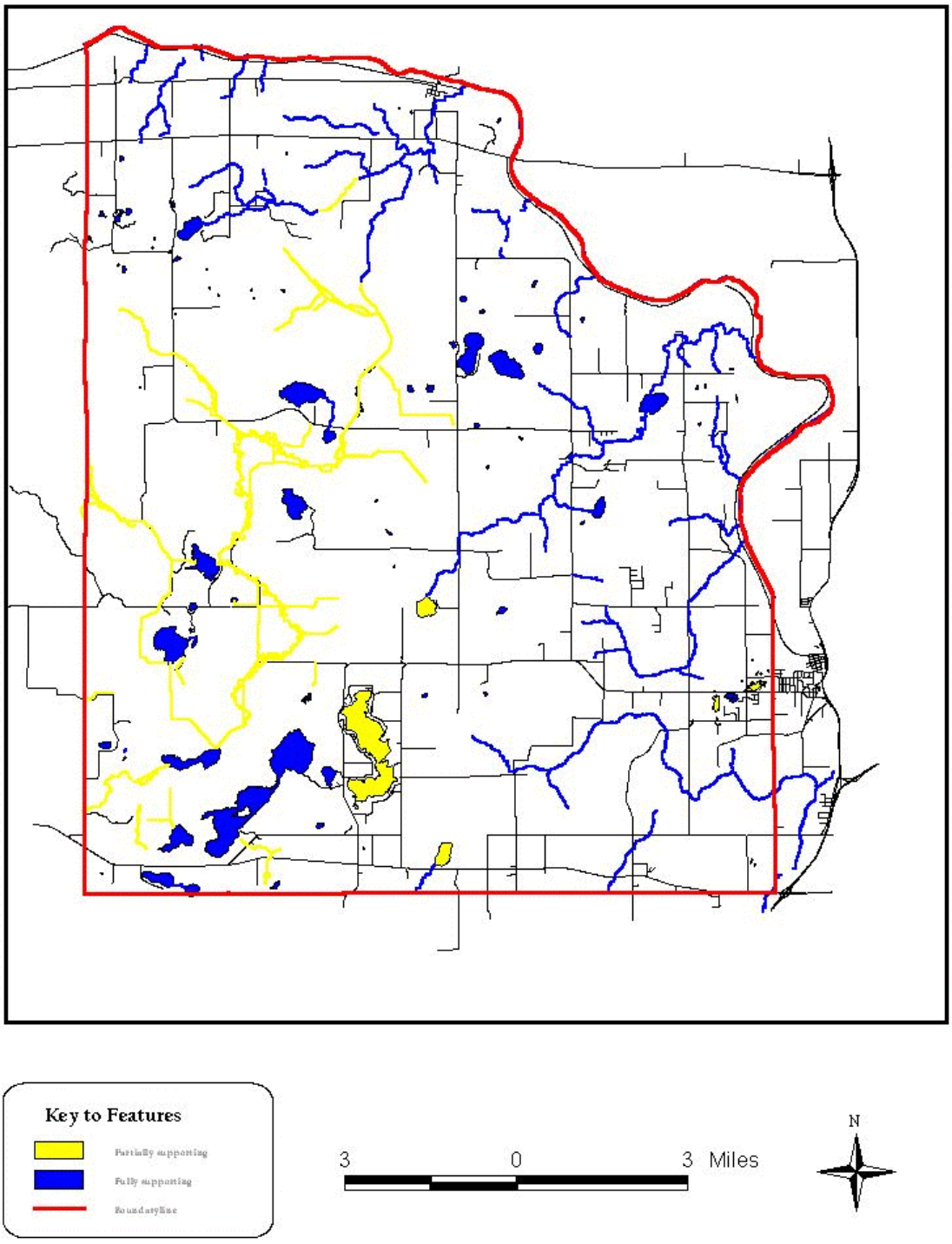
Table 9. Waterbody-Specific Assessment Data for 305(b) Reporting

Waterbody Name	ID	Description	Total Size	Size Impaired	Designated Uses	Degree of Use Support	Causes	Sources	Type of Assessment	Comments
Bang Lake	101	entire lake	59.0 ac		Aquatic life Wild Rice	FS FS			monitored	
Big Lake	102	entire lake	523.2 ac	523.2 ac	Aquatic life Primary contact	PS PS	nutrients, pathogens	septics; shore alteration	monit., beach; septic survey	WWTP under study
Cedar Lake	103	entire lake	59.1 ac	59.1 ac	Aquatic life Wild Rice	FS PS	water level	unknown	monitored	watershed study
Deadfish Lake	104	entire lake	107 ac		Aquatic life Wild Rice	FS FS			monitored	
East Twin Lake	105	entire lake	80.7 ac		Aquatic life Wild Rice	FS FS			monitored	
First Lake	106	entire lake	15.7 ac	15.7 ac	Aquatic life Primary contact	PS PS	nutrients, sediments	roads; shore alteration	monitored	property owner contacted
Hardwood Lake	107	entire lake	94.6 ac		Aquatic life Wild Rice	FS FS			monitored	
Jaskari Lake	108	entire lake	81.5 ac		Aquatic life Wild Rice	FS FS			monitored	
Lac Lake	109	entire lake	8.7 ac		Aquatic life Aesthetic	FS FS			monitored	
Lost Lake	110	entire lake	137.2 ac		Aquatic life Primary contact	FS FS			monitored	
Joe Martin Lake	111	entire lake	67.6 ac		Aquatic life Primary contact	FS FS			monitored	
Miller Lake	112	entire lake	154.5 ac		Aquatic life Wild Rice	FS FS			monitored	

Waterbody Name	ID	Description	Total Size	Size Impaired	Designated Uses	Degree of Use Support	Causes	Sources	Type of Assessment	Comments
Pat Martin Lake	113	entire lake	35.5 ac		Aquatic life Primary contact	FS FS			monitored	
Perch Lake (North Basin)	114A	entire north basin	255.9 ac		Aquatic life Primary contact	FS FS			monitored	
Perch Lake (South Basin)	114B	entire south basin	400.1 ac		Aquatic life Wild Rice	FS FS			monitored	
Rice Portage Lake	115	entire lake	640 ac		Aquatic life Wild Rice	FS FS			monitored	
Second Lake	116	entire lake	14.9 ac		Aquatic life	FS			monitored	
Side Lake	117	entire lake	18.3 ac		Aquatic life Wild Rice	FS FS			monitored	
Simian Lake	118	entire lake	80.7 ac		Aquatic life Primary contact	FS FS			monitored	
Sofie Lake	119	entire lake	35.5 ac		Aquatic life Primary contact	FS FS			monitored	
Spring Lake	120	entire lake	26.0 ac		Aquatic life	FS			monitored	
Spruce Lake	121	entire lake	12.6 ac		Aquatic life	FS			monitored	
Third Lake	122	entire lake	14.5 ac	14.5 ac	Aquatic life Primary contact	PS PS	nutrients, sediments	livestock	monitored	need manure management ; Phos. sequest.
West Twin Lake	123	entire lake	120.4 ac		Aquatic life Primary contact	FS FS			monitored	
Wild Rice Lake	124	entire lake	54.6 ac		Aquatic life Wild Rice	FS PS	water level	culverts	monitored	installed pond levelers; wild rice

Waterbody Name	ID	Description	Total Size	Size Impaired	Designated Uses	Degree of Use Support	Causes	Sources	Type of Assessment	Comments
										reseeding
Annamhasung Creek	201	res. bound. to Stoney Br.	1.92 mi	1.92 mi	Aquatic life	PS	habitat degraded	Channeliza-tion	monitored	
Fond du Lac Creek	202	headwaters - St. Louis R.	6.57 mi		Aquatic life	FS			monitored	
Martin Branch	203	Joe Martin L. to Stoney Br.	4.33 mi	1.0 mi	Aquatic life	PS	habitat degraded	roads, culverts	monitored	secured EQIP $$ to restore
Otter Creek	204	headwaters - res. bound.	10.47 mi		Aquatic life	FS			monitored	
Simian Creek	205	headwaters -St. Louis R.	9.89 mi		Aquatic life	FS			monitored	
Spring Creek	206	headwaters -Martin Br.	2.99 mi		Aquatic life	FS			evaluated; GIS	
Stoney Brook	207	headwaters - St. Louis R.	16.0 mi	9.93 mi	Aquatic life	PS	habitat degraded	Channeliza-tion	monitored	
St. Louis River	208	res. boundary	21.8 mi		Aquatic life	FS				

Figure 2. Use Support on the Fond du Lac Reservation



Description of Public Health Concerns

Fond du Lac considered the Minnesota Pollution Control Agency *Guidance Manual for Assessing the Quality of Minnesota Surface Waters* (Jan. 2003) in our treatment of fish tissue data. According to the guidance, in the context of water quality standards, support of the aquatic life beneficial use means that the concentrations of toxicants in the water must be low enough that: a) the aquatic community is healthy, diverse and reproducing and b) the fish and other aquatic organisms are safe for people and wildlife to eat. In the context of the 305(b) report, however, the acceptability of fish for human consumption is considered a beneficial use separate from aquatic life use support. This is because the two uses are assessed independently; i.e., a waterbody may be impaired for one but not the other. Toxicants may be at levels that have no ill effects on aquatic life (fully supporting), but due to bioaccumulation, the fish are not safe to eat (impaired). Also, very different data and protocols are used in the assessments.

We have not collected water column data for mercury, so there are no comparisons to be made with our WQS criterion. However, our fish tissue and sediment quality data both indicate a level of impairment due to mercury concentrations. When our sediment mercury values are compared to Level I Sediment Quality Targets (SQTs) for the St. Louis River AOC (Crane et al 2000, final report to GLNPO, USEPA 905/R-00-008), 27 samples exceeded the Level I SQTs or threshold effect concentrations. None of our samples exceeded the Level II SQTs, or a probable effects concentration for mercury of 1.1 mg/Kg. We also compared our mercury data to the ecoregional sediment concentrations reported for Minnesota lakes (Heiskary 1996: *Lake Sediment Contaminant Levels in Minnesota: Part of a Series on Minnesota Lake Water Quality Assessment*), and while only 3 lakes in the Northern Lakes and Forests ecoregion were part of that study, 65 of our samples (64%) exceeded the average mercury concentration of 0.1 mg/Kg for NLF lakes.

Toxicity tests demonstrated that sediment collected from each of the test sites did not cause statistically significant reduced survival of *Hyalella* or *Chironomus* when compared to laboratory control sediment organism survival. Also, sediment collected from each site caused statistically significant reduction in *Chironomus* growth when compared to the laboratory control sediment, but growth in each of these sites was still greater than the EPA minimal growth requirements. Taken together, these two lines of evidence from the sediment assessment projects suggest that mercury concentrations are high enough to potentially impair aquatic life, but not at a level that is consistently detected by traditional toxicity test methodology.

The more significant concern for mercury is bioaccumulation. Even though current sediment mercury concentrations are not causing excess mortality or significantly reduced growth in benthic organisms, mercury is still being transferred up the aquatic food web. The nature of mercury deposition - local, regional, national and global pools of atmospheric mercury transported via precipitation - ensures that aquatic organisms will continue to bioaccumulate mercury. Fond du Lac has been monitoring mercury in precipitation weekly for over six years, and have measured an annual deposition rate of 1650 ng/l (2002 data, representative).

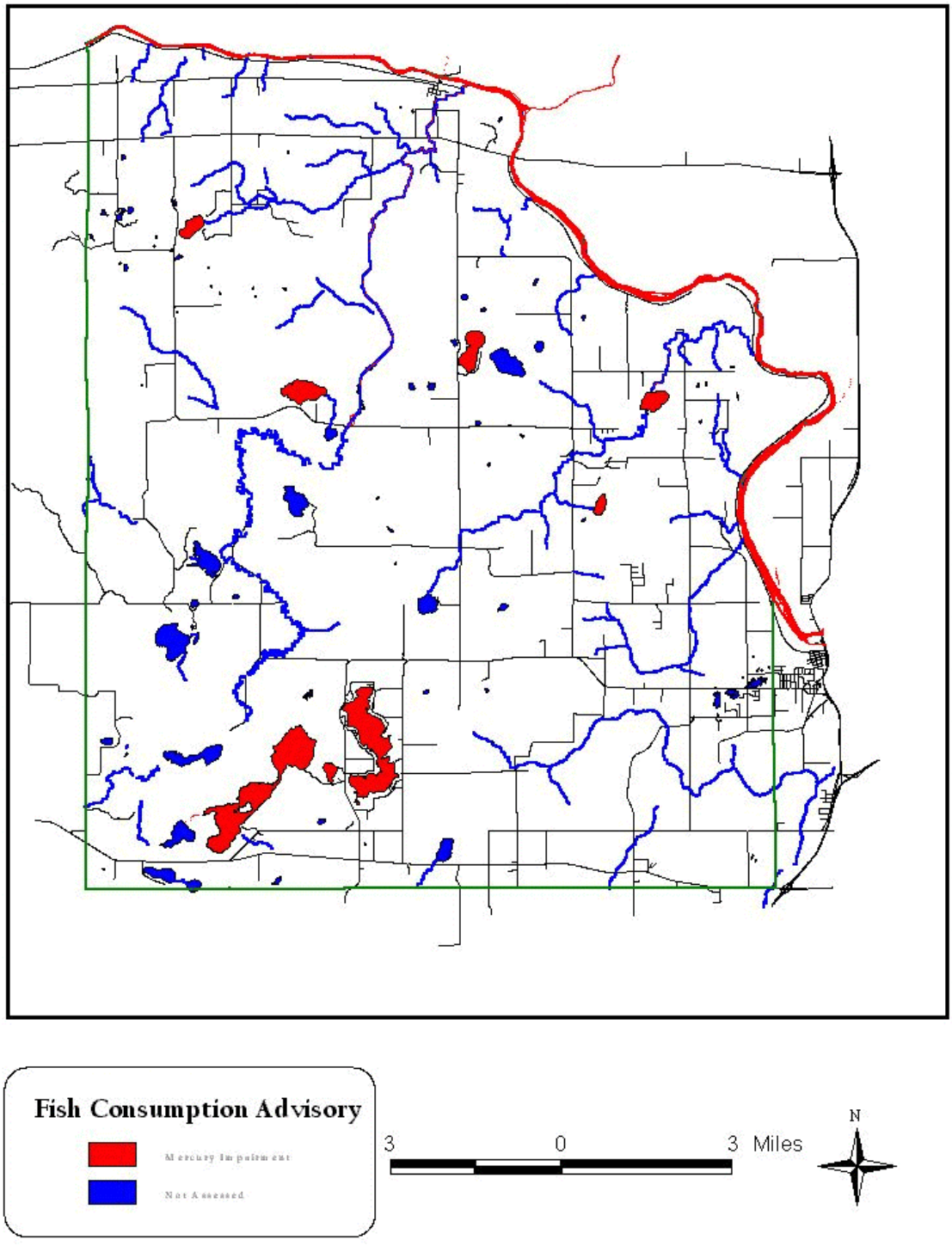
The Fond du Lac OWP collected over 70 fish (walleye, northern pike, smallmouth bass,

channel catfish, bluegill sunfish, black crappie) that represent species of fish that band members commonly catch and consume from reservation waters. We targeted our fish collections towards waterbodies that are preferred on-reservation fishing waters: the St. Louis River, Joe Martin Lake, Lost Lake, West Twin Lake, Pat Martin Lake, Simian Lake and Perch Lake. Additionally, the state of Minnesota had fish tissue data from Big Lake. The Minnesota Department of Health assisted us with data analysis and the risk assessment calculations, leading to a series of recommendations for the safe consumption of fish for both the general tribal population and the more sensitive population (children & women of childbearing years). Essentially, we encourage band members to eat fish often, as is culturally vital, but to avoid larger fish that feed higher on the aquatic food chain. Our fish consumption guidelines recommend for the general population: unlimited consumption of panfish (sunfish, crappie), perch and bullheads, but one meal a week of all sizes of other species, and one meal per month of commercial fish such as shark, swordfish, tile fish and king mackerel. For the sensitive population, the recommendations are adjusted as such: one meal per week of panfish, perch and bullheads, one meal per month of walleyes < 20", northern pike < 30", and all sizes of other species. We suggest that this population simply ***does not eat***: walleyes > 20", northern pike > 30", or the previously mentioned commercial species. A separate guide (*An Expectant Mother's Guide to Eating Minnesota and Fond du Lac Fish*) further explains the unique risks posed by mercury exposure to the developing fetus, and includes recommendations about the consumption of canned tuna, still the most commonly consumed fish in many households.

All of these fish consumption guidelines are driven by measured concentrations of mercury in the fish tissue. Other potential contaminants of concern (PCBs, toxaphene, and organochlorine pesticides) were ruled out for fish from reservation waters. Fond du Lac concurred with the state of Minnesota in 2002 to include reservation reaches of the St. Louis River on the state's 303(d) list, on the basis of mercury fish consumption advisories. Given that known quantities of mercury continue to be deposited on reservation watersheds, the high potential for methylation of mercury in our ecoregion, and our understanding of sediment-associated mercury in reservation waterbodies, Fond du Lac will continue to experience a significant and continuous risk of exposure to mercury through consumption of fish for the foreseeable future.

This situation poses a troublesome dichotomy: on the basis of traditional water quality data assessments, a preponderance of Fond du Lac lakes and streams are meeting their defined beneficial uses. However, the ubiquitousness of mercury deposition ensures that Fond du Lac band members will remain at risk for neurological and developmental impacts from environmental mercury exposure. Tribal members are increasingly exercising treaty fishing rights in this region, increasing their seasonal fish consumption, and thereby increasing their exposure to this environmental contaminant. As related health and nutritional studies continue to reveal the substantial health benefits of eating fish, especially as it relates to specific tribal health issues such as diabetes and cardiovascular disease, it is critical for Fond du Lac to emphasize the need for mercury emissions controls at the national and international level.

Figure 3. Mercury Impairment in Fond du Lac Waters



Ground Water Quality Assessments

Through a grant from the Administration for Native Americans, Fond du Lac was able to hire a Ground Water Specialist and GIS Specialist, and conduct ground water investigations on the reservation. Three sites were studied via monitoring wells and potable well sampling to determine if any of the sites needed additional investigation or clean-up, and to determine the relative human health risks of these sites.

Four wells were installed at an abandoned Carlton County (Perch Lake) dump to determine if ground water contamination was a threat to nearby housing. Soil samples were taken from the soil borings when the wells were installed. Potable wells within one mile of the site were also sampled with the permission of the homeowners. All of the wells and the soil samples were analyzed for compounds that are typically found at dump sites and landfills (metals, anions, cations, nitrate, nitrite, polycyclic aromatic hydrocarbons, pesticides, polychlorinated biphenyls, diesel range organics and volatile organic compounds). No contamination was detected in the soil borings, monitoring wells, or potable wells above the EPA Maximum Contaminant Levels for any of the compounds sampled. Manganese was detected at levels above the secondary drinking water standard. This is a common problem on the reservation in wells completed in the glacial till, and it is likely that the problem is not associated with the dump.

One well was installed and sampled near the new Fond du Lac Ojibwe School because the site was the former location of a furnace factory and had the potential to be a brownfield site. The well was sampled once for the same list of contaminants used at the Perch Lake Dump Site. No compounds were detected above the EPA MCL's for any of the compounds sampled. Manganese was detected at levels above the secondary drinking water standard, and again, this common problem is likely not associated with the furnace factory. Several VOC compounds were detected at very low levels, close to the detection limit (chloroethane, methylene chloride, and dichlordifloromethane). The detections are well below EPA drinking water standards; their source is unknown.

Three wells were installed near the intersection of Highway 210 and University Road, near an illegal dump site that was cleaned up within the past five years. The wells were sampled once for the same list of contaminants used as Perch Lake dump site. No contaminants were detected above EPA MCL's for any of the compounds sampled. Manganese was detected at levels above the secondary drinking water standard, but again, is not likely associated with the illegal dump site. Phenanthrene (a PAH compound) was found at low levels in one of the wells, but as no other compounds were found at the site, the source is unknown.

The Ground Water Specialist has developed on-site laboratory capabilities to analyze band members' potable wells as requested for bacteria (total coliform and *E. coli*), nitrates, iron and manganese. She has developed fact sheets for well maintenance and disinfection, and communicated with the tribal community about maintaining safe drinking water.