

FOND DU LAC
RESOURCE MANAGEMENT DIVISION



INTEGRATED RESOURCE MANAGEMENT PLAN

2018



Fond du Lac: Resource Management 2017 Integrated Resource Management Plan

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Signatory page

Prepared By: _____ Date _____
Fond du Lac Resource Management Director

Concurrence By _____ Date _____
Minnesota Agency Superintendent Bureau of Indian Affairs.

Approved By: _____ Date _____
Fond du Lac Reservation Business Committee, Chairman
Resolution Number _____ Dated _____

Approved By: _____ Date _____
Midwest Regional Director Bureau of Indian Affairs

Vision Statement

The Fond du Lac Resource Management Division is committed to the management, conservation, and sustainability of the natural resources of the Fond du Lac Band in order to protect the environment on the Fond du Lac Reservation and within its treaty areas. The Resource Management Division will use the tools of research, education and outreach with Band Members, partners and stakeholders to accomplish these goals.

Executive Summary

The purpose of the Fond du Lac Band's Integrated Resource Management Plan (IRMP) is to manage the Band's resources effectively for future generations. The IRMP will be used to address current and future management options. It was developed by a group of individuals dedicated to the protection, enhancement, and management of Fond du Lac's resources.

The IRMP contains information about the Band's past and current management activities and identifies resources that need additional management. As required by the National Environmental Policy Act (NEPA), the IRMP contains alternatives for resource management that are based on the management objectives. Management activities range from *no action* to *full implementation*, and the alternatives presented reflect that range. **The objectives that can be completed under each alternative are displayed in a table located at the end of discussion on alternatives.**

Public input was solicited on the draft document, which included a variety of management alternatives. Comments obtained from the community and tribal government were incorporated into the final document, and the hearing process provided a basis for the formulation and selection of the preferred alternative.

Each resource is described in a narrative that was developed in the following format:

- **Description** of the affected environment
- **Background** for that resource
- **Issues, concerns, and opportunities** for that resource
- **Goals and objectives** for that program, with different management alternatives

The final chapter is a summary of the alternatives. The preferred alternative is identified for each resource.

An important purpose of this document is to guide resource managers. Objectives are specific guides for each resource. The objectives should be reviewed frequently and updated as needed. The maximum period before review and update is ten years. All project work will be documented. The Fond du Lac Band is committed to the expansion and development of programs to successfully manage the Reservation's natural resources.

Maps are also included in this plan as a visual aid and resource management tool.

Summary of Preferred Alternatives:

Cultural/Traditional

Alternative 1: The Tribal Historical Preservation Office (THPO) will continue to exercise its authority under the National Historic Preservation Act by participating in consultation with federal agencies on projects that may affect cultural resources significant to the Fond du Lac Band. The office will be staffed by a full-time Tribal Historic Preservation Officer, and another .33 FTE to assist with grant and policy issues.

Wild Rice

Alternative 2: Maintain existing On-Reservation management and restoration activities while improving wild rice harvest opportunities by conducting monitoring and restoration projects in the Ceded territories. 2 additional FTE needed. Staff time would be evenly divided between On-Reservation and Ceded Territory manoomin management.

Water and Wetlands

Alternative 3: Increase program staffing to include additional FTE to allow proper separation of regulatory review and project development assistance. Pursue Treatment as a State (TAS) for additional USEPA-delegated authorities under the Clean Water Act (CWA) sections 303(d), 402, and 404. Establish comprehensive tribal CWA regulatory program for reservation water and wetland resources. Include additional FTE with hydrology/modeling expertise to provide tribal capacity for these aspects of water resource management and protection. Also increase program staffing to include seasonal technicians to assist with routine monitoring programs, in-house sample processing and analysis.

Fisheries

Alternative 3: Increase program staffing to include a full-time worker for the Lake Superior Program, and develop a strategy and a Harvest Management Plan for harvest on Lake Superior, conduct surveys within Lake Superior, and establish harvest monitoring programs for Lake Superior.

Land Resources

Alternative 3: Compact or contract the Fee to Trust function from BIA and add one additional FTE to focus exclusively on the Fee to Trust process. This would eliminate the need to join the Fee to Trust Consortium.

Forestry

Alternative 1a: Ecological Silviculture with a “No Harvest Zone”
Under this alternative:

- A portion of the Culture Preservation District will remain open to timber harvest.
 - A limited harvest zone will be established in areas that are within a quarter mile of the wild rice lakes, the St. Louis River, and within the Cultural Preservation District.
- In 2008 annual timber harvest levels were set at 4,300 cords. At that time the Fond du Lac Band controlled 25,087 acres. Now the Fond du Lac Band controls 42,480 acres. The new annual harvest levels should increase proportionally for lands acquired outside the no-harvest zone. When the forest inventory is up-to-date the annual harvest levels will be recalculated based on current principles (outside the no-harvest zone, and using extended rotation ages).
- Harvesting old aspen and birch will be the focus of forest management efforts.
- Wildlife and traditional native products will be an important consideration in management.
- Northern hardwoods will be managed on an all-aged basis, for diversity.
- Red and white pine stands will be managed with an extended rotation (125+ years).
- More emphasis will be placed on regenerating paper birch.
- Most tree planting will be to enhance natural regeneration.
- Only roads identified as part of a permanent road network will be maintained.

Wildlife

Alternative 3: Add an additional full time wildlife biologist to allow focus on developing and implementing wildlife habitat projects on and near the Reservation, and assisting with field research and population surveys on a year round basis. Program would consist of a full time wildlife and assistant wildlife biologist and associated program support.

Air Quality

Alternative 2: Expand current program by hiring one additional FTE. Continue to assert tribal sovereignty by pursuing Class I Redesignation.

Conservation/ Enforcement:

Alternative 2: Expand the program to include increased Band member harvest opportunities in Minnesota waters of Lake Superior. This will require the development of a Harvest Management Plan and monitoring program for Lake Superior.

Recreational Resources

Alternative 3: Carry out ATV plan outlined in alternative #2, plus work on developing other recreational activities such as water access.

Energy Resources and Management

Alternative 2: Follow the Strategic Energy Plan and capital development project.

1. Introduction

This document is the Integrated Resource Management Plan (IRMP) for the Fond du Lac Band of Lake Superior Chippewa. The Code of Federal Regulations (CFR) requires the development of management plans wherever there is forest land (25 CFR §163.11). The IRMP incorporates management activities for additional resources as well. Resources and objectives are identified in the selected alternatives. Cooperation between the Band and the Bureau of Indian Affairs is necessary to fulfill the intention of the IRMP. The Bureau of Indian Affairs authorized and encouraged the development of Integrated Resource Management Plans, and both the Band's governing body and the Bureau of Indian Affairs Midwest Regional Director must approve the final IRMP.

In developing the IRMP, consideration was given to the National Environmental Policy Act (NEPA). This document will serve both as an Integrated Resource Management Plan and an Environmental Assessment for the Fond du Lac Reservation (authorized by 40 CFR §1500.4 (o), §1500.5(I), §1506.4). However, specific projects or activities that are addressed within this document must follow NEPA compliance procedures and regulations whenever federal dollars are used. This document will make environmental and legal compliance at the tribal and federal level more expedient.

Public Involvement

The Fond du Lac Band of Lake Superior Chippewa has approximately 4,200 enrolled members. As a part of NEPA scoping requirements, the Band is required to gather public opinion on natural resources and the environment.

The IRMP was developed through a cooperative effort of Fond du Lac natural resource managers in wildlife, wild rice, water, fisheries, forestry, lands, energy, conservation/enforcement and cultural resources. It considers all the resources that are important to Fond du Lac Band members. By consolidating all resources under one plan, and by developing an Internal Project Review Process (see pages 12-14), the document is designed to identify and resolve potential conflicts between resource management activities.

In addition, the Fond du Lac Resource Management Division conducted a series of public meetings to garner input from Tribal members. Two meetings were held with Elders' groups on the Reservation. An open meeting, widely advertised by newspaper and in electronic format, was also conducted to allow all Band members the opportunity to listen to and ask questions of resource managers. These three public meetings attracted about 50 tribal members and copies of their questions are included in Appendix B of this report. Finally, the program managers have shared draft copies of this report with the Reservation Conservation Committee. This committee has the responsibility to help set management strategy and to provide guidance to the program.

This Integrated Resource Management Plan is intended to be a guide for Fond du Lac management. It will provide goals and objectives for present and future resource managers, and will provide a framework for project activity planning and decision-making. It will also help resource managers and/or the Reservation Business Committee in the planning of a specific project.

Methodology and Organization of the Plan

Due to significant program expansion within the division and an increase in resource management responsibilities, an updated IRMP is essential for enhancing coordination, internal review, efficiency and cooperation between programs. This updated plan will enable the division to consider ways to combine staffing and financial planning to achieve common goals, identify and resolve conflicting goals, and identify common objectives that may achieve multiple resource management goals.

The plan is ordered by chapters intended to identify and compile goals and objectives within each resource category; to analyze, classify and organize stated goals in the Alternative table; and to identify any contradictory program goals and provide a process for resolving those inconsistencies. This framework (see **XXXXXX**) integrates the separate management plans and defines an internal review protocol for projects that impact other resource management efforts.

The planning process used for this plan is outlined in *A Tribal Executive's Guide to Integrated Resource Management Planning*, which includes procedures developed by the Bureau of Indian Affairs–Office of Trust Responsibilities. The Fond du Lac Resource Management Division will implement the objectives of the preferred alternatives up to available funding levels. The plan will be reviewed by the Fond du Lac Band and the Bureau of Indian Affairs to ensure compliance and revision as often as necessary. Annual reviews are anticipated, although a longer time frame may be appropriate for many programs.

Origins and History

The Fond du Lac Reservation was established under the 1854 Treaty with the United States Government. It is one of six Chippewa Indian Reservations in the State of Minnesota organized under the Minnesota Chippewa Tribe (MCT), Section 16 of the Act of June 18, 1934 (48 Stat. 984).

Description of Affected Environment

The Fond du Lac Reservation is located in east central Minnesota, about 20 miles west, southwest of Duluth (see map on page **XX**). The exterior boundary encompasses **101,109** acres, of which **42,480** acres are either Trust land or Fond du Lac Band fee land.

The eastern boundary of the Reservation is adjacent to the city of Cloquet, which has population of 12,111 (2016) and is a key trade center in the area. The major employers in the region are the Fond du Lac Reservation, Saapi Fine Paper Co. and USG Interiors. The community of Brookston is located on the northern boundary, and the Sawyer community is located near the southern boundary.

Topography

The elevation on the Reservation varies from 1,200 feet along the St. Louis River to 1,600 feet at the Arrowhead Lookout Tower near Martin Lake. The topographic features vary from rolling hills in the northwest and along the St. Louis River to level and predominantly wetlands in the eastern and southern section. About four percent of the land area within the Reservation can be classified as steep.

Geologically, the Fond du Lac Reservation is part of the Laurentian peneplain and occupies the western part of the Superior Upland. Soil types range from very poorly drained organic soils to well-drained soils with gravel, sandy loam subsoil.

Two major river systems drain the Fond du Lac Reservation. The St. Louis River is the predominate drainage for the Reservation. A small section of the Reservation, around Wild Rice Lake in the south, is drained by the Moosehorn River, which drains into the Kettle River to the south.

Climate

Northern Minnesota, which encompasses the Fond du Lac Reservation and the 1854 Ceded Territory, has a continental climate with extremely variable weather conditions that lead to four distinct seasons. Temperatures range from possible extremes of -50 degrees Fahrenheit to +100 degrees Fahrenheit. Mean annual temperature is about +40 degrees Fahrenheit, with winter temperatures averaging zero to +10, and summer temperatures around +70 degrees.

Mean annual precipitation is about 30 inches, two thirds of which falls during the period of May to September. Snowfall average ranges from about 86 inches annually in Duluth to 42 inches in Grand Marais. The growing season or time between killing frosts in the northeastern part of the state averages about 155 days, with variations from 124 days to 195 days in specific locations.

Climate change

Observed changes

Minnesota's climate has warmed by approximately three degrees in the northern part of the state since 1895. The three 10-year periods from 1985-2015 were the warmest on record. Ice cover on Lake Superior has declined by 76 percent since the early 1970s.

The rate of warming is faster than national and global trends, and is largely fueled by warmer temperatures during the winter and at night. Major rain events—those that produce at least two and one-half inches of rain—are more common than 50 years ago.

Projected changes

Average temperatures in the 1854 Ceded Territory are expected to increase by as much as 3-5 degrees Fahrenheit by 2050. The number of days with temperatures below freezing may decrease over the same period of time.

Minnesota lies at the intersection of three major ecosystems: the prairie, the boreal forest and the deciduous forest. Species at the edges of each ecosystem are the most vulnerable to a changing climate. Possible consequences of a warming climate include:

- More frequent extreme heat events may lead to increased heat-related morbidity and mortality among area residents.
- Culturally important archaeological resources could be exposed due to erosion from heavy rain events, allowing them to be damaged, degraded or lost.
- Warmer temperatures are likely to give invasive aquatic species a competitive advantage over culturally important plants like wild rice. Many other plants and animals will face similar challenges.
- Established treaty rights to hunt, fish and gather may be compromised as resources shift away from reservations and ceded territories where those rights were originally reserved.
- Animals such as moose that are at the extreme southern edge of their natural range may move north, away from the 1854 Ceded Territory and the Fond du Lac Reservation.

How climate change could affect the resources managed by the Resource Management Division is addressed in each program section. For a more thorough examination of climate change and its effects on northern Minnesota, see the *Climate Change Vulnerability Assessment and Adaptation Plan: 1854 Ceded Territory Including the Bois Forte, Fond du Lac, and Grand Portage Reservations* on the Fond du Lac website:

(<http://www.fdlrez.com/RM/downloads/1854CededTerritoryClimateAdaptationPlan.pdf>).

Resource Management Division Internal Project Review Process

a. Scope

- a. This internal project review process shall apply to qualifying projects conducted by Resource Management Division programs within the boundaries of the Reservation and to qualifying projects outside the Reservation where a Division program has a major role in providing financing, planning and execution of a project.
- b. This is an internal Resource Management Division process only and is not intended to substitute for reviews required by federal agencies or by other divisions, programs or committees as established by the Reservation Business Committee.

b. Projects qualifying for an internal review

- a. Projects that have the potential to disturb known or suspected cultural resources.
- b. Projects with the potential to significantly alter current or future plant and animal communities on more than one acre of land or in any water body.
- c. Previously reviewed projects where the objectives, methods, location or amount of area impacted have substantially changed since the initial comment period.
- d. Projects requiring a permit under the land use, wetlands or other ordinance established by the Reservation Business Committee.
- e. Projects requiring an Army Corps of Engineers permit or an Environmental Assessment or Environmental Impact Statement under federal NEPA requirements.
- f. Every five years for ongoing projects that met any of the initial criteria for review. Examples include blueberry burns, rice lake vegetation control, and beaver dam removals on drainage ditches.
- g. Projects that the division director determines that need a review.

c. Projects generally not qualifying for an internal review

- a. Survey, inventory, research and monitoring activities unless they otherwise meet the criteria for projects requiring a review.
- b. Prescribed fire or timber operations conducted around residential and commercial areas for the primary purpose of protecting life and property, unless they have the potential to impact cultural resources. However, advance notice of these projects will be given to other Division programs and to the Conservation Committee in a timely fashion.
- c. Annual determinations of rice lake openings, hunting and fishing season and bag limits and methods of take.
- d. Individual harvest of forest products for personal, non-commercial use where the vegetative cover is not significantly altered. Examples include cutting deadwood for firewood and gathering birchbark.
- e. Burning permits for individuals on private property

- f. Roadside ditch mowing, and similar routine maintenance of rights of way of established roads and trails.

- d. **Reviewing Programs**
 - a. The following programs will be given notification of projects meeting the criteria for review. Notification will be in writing via email or inter-office mail.
 - i. Conservation
 - ii. Cultural Resources
 - iii. Environmental
 - iv. Fisheries
 - v. Forestry
 - vi. Natural Resources
 - vii. Water
 - viii. Wildlife

- e. **Details Required for Review**
 - a. Project proposals must be in writing and contain the following information:
 - i. Lead Division program(s) and Project Leader(s)
 - ii. Objectives
 - iii. Methods used to accomplish the objectives.
 - iv. Identification of whether project work will be done by Division staff, private contractor or an outside agency.
 - v. Project timeline.
 - vi. Anticipated results and benefits
 - vii. Detailed project map
 - b. Project proposals shall be posted online in the Company folder with the necessary link provided to all reviewing programs.

- f. **Timeline for Review**
 - a. Following notification and posting of the written project proposal, there shall be a 30 day comment period for all projects unless all programs involved in the review process consent to a shorter time period for an individual project. The comment period for an individual project also may be shortened or extended at the discretion of the Division Director.
 - b. A site visit with the lead program(s) may be requested by reviewing programs during the comment period.
 - c. Programs failing to make comments within the 30-day review period or failing to request an extension of the comment period shall be considered to have no objection to the project proceeding as proposed.
 - d. If there are no unresolved issues following the conclusion of the comment period, projects will be presented to the Conservation Committee for review and comment.
 - e. Following review and comment by the Conservation Committee, the Division Director shall determine if a project may proceed as described

or if it requires further review and approval from other divisions, programs or committees or the Reservation Business Committee.

g. Requirements for Comments

- a. Formal comments by reviewing programs must be made in writing and posted in the same Company folder as the project proposal before the conclusion of the 30- day review period.
- b. The Project Leader(s) for each proposed project shall be required to keep all formal comments on file for future reference.
- c. The Project Leader(s) is not required to address comments not made in writing within the 30-day review period. The Project Leader(s) is not required to address formal comments made by a reviewing program that are clearly outside the generally recognized jurisdiction of that program.

h. Dispute Resolution Process

- a. In the event of a disagreement over a project proposal, programs shall attempt to reach an acceptable compromise during the 30-day comment period or within five working days following the conclusion of the comment period. This shall include at least one formal meeting chaired by the Division Director.
- b. If a mutually agreeable compromise cannot be reached between programs, the advice and comment of the Conservation Committee will be sought at their first available monthly meeting.
- c. Following the input of the Conservation Committee, the Division Director shall make the final determination of how to resolve differences and proceed with a proposed project.

i. Exceptions to the Internal Review Process

- a. In exceptional circumstances where initiation of a project is time sensitive, the Division Director may decide to bypass all or part of this internal review process. However, all programs listed in section IV will immediately be notified of this decision and provided with the project proposal information as described in Section V. The project, the decision and the reasons for bypassing all or part of the review process will be presented to the Conservation Committee at its next monthly meeting.

j. Revisions to Review Process

- a. In recognition that a formal internal review process is a new process for the Division, experience in its implementation may dictate a need to make revisions to the above process. These revisions should be undertaken as needed with the input of program staff, the Division Director and any appropriate natural resource advisory committees.

2. Natural Resources

A. Cultural Resources

A1. Description of the Resource

Fond du Lac Cultural Resources are any product of human activity, or any object, place, site or structure given significance by human activity or belief. Fond du Lac Cultural Resources include a wide range of properties that are significant to Fond du Lac’s culture, tradition, archaeology, history and current way of life. The table below provides examples of the types of Fond du Lac Cultural Resources.

Cultural Resource Category	Description/Examples
Historic Village	Historic village sites usually located on lakes and streams such as Fond du Lac Village on the St. Louis River within the external boundary of Fond du Lac Reservation.
Historic Encampment	Seasonal campsites such as Fond du Lac Campsite located at the mouth of Mission Creek and nearby Islands within the St. Louis River. In the fall, camps were established near wild rice beds. In the spring, wigwam camps were located near sugar bushes.
Archaeological Site	Subsurface sites where archaeological artifacts have been observed such as those found at Fond du Lac Village (e.g., ceramics, metal circa 1860-1900).
Cultural Landscape	Large-scale properties often comprised of multiple, linked features that form a cohesive geographic area or place with cultural and historical meanings associated with them through generations of practice. In addition to the physical/ground components, visual and audio aspects are often important to how they are defined. For example, an indigenous landscape used for ceremonial practices may be adversely affected by the presence of structures that impede a view shed or by noise interrupting an otherwise quiet area. The landscape surrounding a specific site or place can be as critical to cultural practices as the central feature. Cultural landscapes may include Traditional Cultural Properties, culturally significant plant communities, ceremonial sites, or culturally significant topographic features. Spirit Island and the former Ojibwe villages, trading posts, and quarry sites along the St. Louis River represent a Cultural Landscape.
Historic District	A geographic area of former activity considered valuable for historical, architectural, and/or cultural significance. For example, Fond du Lac Village.
Historic Trail/Portage	Historic “Indian Trails” and portages such as the “Indian Portage” within the external boundary of the Fond du Lac Reservation or the Grand Portage of the St. Louis River—the portage evolved from a combination of indigenous footpaths, early trade and exploration routes.
Artifact	Evidence of or objects made by a human being that have historical or cultural interest. These may include lithics (stone tools, chipped stone artifacts), ceramics, and other created objects. The collection of artifacts on display at the Fond du Lac Cultural Center and Museum include arrowheads, pipe bowls, copper hide scraper, Knife River flint, hand-made baskets, cradleboard, moose-hide drum, buckskin beaded jackets, beaded purses, armbands, belt, and more.

Cultural Resource Category	Description/Examples
	Trees with birch bark peels, pine pitch harvest sites, sugar bush activity, wild rice pits, and stones aligned in a circle to hold wigwams in place may also be considered artifacts.
Historic Structure/Site	Historic structures/sites may include historic foundations, historic buildings, wild rice pits, cellar depressions, and other structures. Examples include the structural foundations surveyed at Fond du Lac Village and the 1854 St. Mary and Joseph's historic log Church/Missionary School in Sawyer.
Burial location	Marked and unmarked Fond du Lac burial sites/cemeteries within the external boundary of the Fond du Lac Reservation, FDL cemeteries held in Tribal Trust (e.g., Indian Hill Cemetery), and mounds such as the mounds at Big Lake.
Traditional Cultural Property (TCP)	<p>Locations eligible for inclusion on the National Register of Historic Places because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. TCPs include locations where natural resources have traditionally been gathered for food, medicine, or spiritual, ceremonial, and traditional uses.</p> <ul style="list-style-type: none"> • Spiritual/Ceremonial sites (e.g., Lac Lake) • Wild rice lakes (e.g., Perch Lake, Dead Fish Lake, Rice Portage) • Sugar bush camps (e.g., ditch banks) • Plant gathering sites (e.g., Hardwood Lake) • Fisheries/spearing and netting sites (e.g., Perch Lake) • Hunting grounds (e.g., Perch Lake) • Quarry sites (e.g., Chambers Grove) • Recreation sites (e.g., Old LaCrosse Field)
Usufructuary Site	Locations in the Ceded Territories where the Band retains usufructuary/Treaty Rights today regarding harvesting, hunting, trapping.
Historic Photographs/Recordings	<p>Historic Photographs: Fond du Lac Cultural Center and Museum maintains historic documents and photographs. Additionally, the Fond du Lac Historical Society maintains historical photographs, and documents the names of people and locations of photographs. The photographs currently reside in a lockable cabinet in the Resource Management building.</p> <p>Elder Interviews: Elder recordings are used to gather traditional, historical, cultural, geneology and other important information passed through the oral tradition that is associated with Anishinaabe life ways. A database of archived voice and video recordings is established on Fond du Lac secure server directory.</p>
Intangible Cultural Resources	Includes knowledge and customs, language, ceremonies, stories, religion, spirituality, symbols, music, dance, drama, manners and customs relating to food, clothing, shelter, occupation, and tradition which may be indispensable for understanding Anishinaabe life ways.

A2. Background

Fond du Lac is a living community of Anishinaabe that existed historically and continues to the present. The community shares cultural practices, customs, and beliefs that are embedded in the community's history and are important in maintaining cultural identity and values. Through oral tradition and practice, shared cultural

customs, practices and beliefs are passed down through the generations. These shared cultural values are associated with tangible places. These tangible places and objects constitute Fond du Lac's Cultural Resources, indicated by physical evidence of past human activity and include cultural, archaeological, and historic properties and elements or areas of the natural landscape that have traditional cultural significance important for maintaining Anishinaabe ways of life among the Fond du Lac community.

Historically, Ojibwe people used native plants for food, pharmaceuticals, dyes, tools, construction, and basketry. New developments have resulted in many substitutes to replace these traditional native plants. However, many Chippewa people continue to harvest and use native plants in the traditional manner. Traditional resources include maple sugar, berries, medicinal plants, birch bark and basswood bark gathering sites, and native plants that require protection. Historically, forests provided have provided the Chippewa with food, shelter and even transportation. These uses continue with activities such as wild rice harvesting, basket making, birch bark crafting, and maple sugar collecting. Ash, oak, and willows are used for basketry; sumac is used for ceremonial pipe stems. Retaining sugar bush sites is important to local residents.

Protection of Cultural Resources

Preservation of Cultural Resources is governed by the following laws:

- Compliance with the Antiquities Act of 1906
- Historic Sites Act of 1935
- Executive Order 13007
- National Historic Preservation Act of 1966, as amended
- Archaeological and Historic Preservation Act of 1974
- Native American Graves Protection and Repatriation Act of 1990
- Archaeological Resources Protection Act of 1979
- Executive Order 11593 also provides necessary guidance on protection and enhancement of cultural resources
- Minnesota Statutes sections 138.31-138.42 require licensure for field archaeology undertaken on all lands or waters owned, leased by or subject to the paramount right of the state or its subdivisions as well as on lands impacted by publicly-funded development projects
- Only professional archaeologists meeting the Secretary of the Interior's Standards for Archaeology (36 CFR Part 61) may be licensed to conduct such investigations in the State of Minnesota.
- Minnesota Private Cemeteries Act (Minnesota Statutes section 307.08)

Fond du Lac Ordinances that protect cultural resources

#6/10, As Amended 5/6/14 Bylaws of the Fond du Lac Cultural Resources

Advisory Review Board: The Fond du Lac Cultural Resources Advisory Review Board consists of seven (7) enrolled FDL Band members that provide the Reservation Business Committee and Tribal Historic Preservation Officer (THPO) with

cultural/historic preservation guidance. The board reviews the Tribal Historic Preservation Program Plan and Register of Cultural Properties, administered by the Tribal Historic Preservation Officer.

#03/14 – Preservation of Cultural Resources: The 1992 amendments to the National Historic Preservation Act included provisions for Tribes to assume responsibilities of the State Historic Preservation Officer on Tribal Lands, and established the Tribal Historic Preservation Office; the National Park Service administers the national THPO program. In 2014, FDL established the Tribal Historic Preservation Office, administered by the THPO. The THPO administers the Tribal program of federal assistance for historic preservation at FDL and administers the Tribal Historic Preservation Plan and the Register of Cultural Properties. The THPO also provides public information, education and training, and technical assistance in regard to historic preservation.

- **Tribal Historic Preservation Program:** Emphasizes the importance of identifying and protecting Fond du Lac Cultural Resources that are eligible for inclusion in the Fond du Lac Register of Cultural Properties because of their association with cultural and oral practices, beliefs, and ways of life embedded in the history of the Fond du Lac community, and are important to maintaining the continuity of the community's traditional beliefs and practices.
- **Fond du Lac Register of Cultural Properties:** A repository of information stored in a database that includes the name, location, and other information about Fond du Lac's Cultural Resources. The Fond du Lac Register of Cultural Properties defines eligibility for historic preservation, indicates cultural resources to protect from adverse change and potentially harmful acts, encourages awareness and recognition to help protect Fond du Lac cultural resources and is utilized by Fond du Lac Tribal Historic Preservation Office to identify and preserve cultural resources for all levels of planning and development.
- **#05/10, Amended Tribal Environmental Policy Ordinance:** Requires Resource Management to conduct an environmental compliance review for all major Band actions; the TEPO requires a cultural assessment by the Tribal Historic Preservation Officer to ensure cultural resources are taken into consideration at all levels of planning and development.

Additional Protective Measures

- **Fond du Lac Cultural Preservation Zone:** A buffer of approximately 300 feet surrounding rivers and up to ½ mile surrounding lakes within FDL Reservation—utilized to ensure project activities/major Band actions do not occur within the Cultural Preservation Zone.
- **Professional Surveys:** Fond du Lac has hired professionals to conduct various surveys that provide additional information in regard to cultural resource sites within the external FDL Reservation boundary and/or in land held in Tribal Trust. Electronic surveys/reports are posted to a secure Fond du Lac server

directory and a hardcopy of the survey is stored in a lockable cabinet in a lockable room in Resource Management building.

- **Digital burial mapping:** All marked and known unmarked burial locations within Fond du Lac cemeteries were mapped by the THPO in 2016 using a high-end Global Navigation Satellite System device to capture accurate coordinates.
- FDL promotes the following for the purpose of succession development of the traditional culture: Ojibwe language program, Thirteen Moons Program, Powwows, demonstration garden.

A3. Issues and Concerns

- Protecting known sites; looting of cultural artifacts
- Obtaining information about historic properties of religious and cultural significance to Band members is important for their protection; however, sharing information with outsiders on resources that comprise cultural identity and food sovereignty is carefully considered by Band members because history has shown the information may be misused and exploited at the expense of the individual, tribe or resource.
- Within the Ceded Territory, cultural resources such as sugar bush stands and traditional fisheries are being lost or substantially altered, sometimes inadvertently, with increasing frequency due to development pressures. Pipeline corridor development (increases invasive species, fragments the forest, impacts animal migration and browse patterns), St. Louis River shoreline development, threat by proposed discharges from mining projects upstream of the Reservation, all potentially impact cultural resources on Fond du Lac Reservation as well as the Ceded Territories.
- Efforts are on-going to protect cultural resource sites through Section 106 of the National Historic Preservation Act, which requires Federal agencies to consider the effects of their actions on historic/cultural properties that are listed or meet eligibility criteria for listing on the National Register of Historic Places.
- Climate change, weather pattern changes, annual precipitation and temperature changes have the potential to impact viability of wild rice waters, plant harvesting and hunting sites.

A4. Opportunities

Tribal/Cultural Tourism provides an opportunity to perpetuate Anishinaabe cultural voice and expression, promote environmental stewardship and awareness, while sharing and disseminating authentic history. According to the U.S. Department of Commerce, International Trade Administration, National Travel & Tourism Office, between 2007 and 2015, the number of visitors to Indian Country increased from 693,000 to more than 1.9 million (a 180% spike). By 2020, 2,303,108 million international visitors to Indian Country are anticipated, which translates to 48,642 U.S. jobs and \$10.1 billion in direct spending to the U.S. supported by international visitors

to Indian County (see <http://www.trade.gov/mdcp/pdfs/projects/AIANTA-2016.pdf>). There may be potential partnering opportunities with various agencies.

A5. Goals, Objectives

- Continue Section 106 consultation with Federal agencies.
- Continue cultural assessment under Fond du Lac Tribal Environmental Policy Ordinance to ensure Cultural Resources are taken into consideration at all levels of planning and development within the external boundaries of the Fond du Lac Reservation.
- Continue administering the Fond du Lac Tribal Historic Preservation Plan, and continue updating the Fond du Lac Register of Cultural Properties with sites significant to FDL Band members.
- Partner with Fond du Lac Tribal College, Historical Society and other professionals to assist with Band member interviews as they relate to Cultural Resources, Traditional Cultural Properties, and areas where usufructuary rights are practiced today within the Ceded Territories.
- Research museum inventories, on-line auctions, historical societies for repatriation of Fond du Lac cultural property.

B. Manoomin (Wild Rice)

B1. Description of the Resource

There are five primary manoomin producing waterbodies on the Fond du Lac Reservation. Primary manoomin producing waterbodies can be defined as those waterbodies that support growth of manoomin to a degree that makes them of interest for human harvesting activities in most years. The total area on which manoomin is currently present on these lakes is approximately 843 acres. Seasonal variability in acreage is to be expected given the unique biological characteristics of manoomin. The average manoomin producing acreage on the individual lakes are:

- **Aatawemegokokaaning** (Perch Lake) 392 acres
- **Mashkiigwaagamaag** (Mud Lake) 141 acres
- **Chi-awasonigaming** (Rice Portage Lake) 161 acres
- **Naawonigami zaaga'igan** (Jaskari Lake) 75 acres
- **Zhaaganaashiins Odabiwining** (Deadfish Lake) 74 acres

These lakes are all within the **Asini-ziibi** (Stoney Brook) Watershed, which is tributary to the St. Louis River.

Manoomin is also present in **Beke-zaagidawaag** (Side Lake), **Gaagiizhikikaag** (Cedar Lake), **Manoomini-zaaga'iganing** (Wild Rice Lake), **Chi-wizo-zaaga'iganing**

(Simian Lake), and **Chi-maanakikii-zaaga'igan** (Hardwood Lake). Beke-zaagidawaag and Chi-maanakikii-zaaga'igan are within the Asini-ziibi Watershed. Gaagiihikikaag and Chi-wizo-zaaga'iganing are within the Chi-wizo-ziibi (Simian Creek) Watershed. Manoomini-zaaga'iganing is the headwaters of the Moosehorn River, a tributary of Akiko-ziibi (Kettle River).

B2. Background

The density of manoomin varies from season to season, as the ecology of manoomin growth is related to cycles of plant decomposition, the number of growing days, and available nutrients. Manoomin is susceptible to damage from seasonal climactic events such as above average precipitation, drought, high winds, and hail.



Photo 1: Manoomin

The majority of the manoomin on the Fond du Lac Reservation is in the Asini-ziibi Watershed. Beginning in 1916, the Asini-ziibi Watershed was adversely affected by the creation of a network of judicial ditches. These judicial ditches drastically altered the hydrology of the watershed, resulting in the loss of over 500 acres of manoomin habitat. The lower water levels that resulted from the judicial ditching allowed competing vegetation to encroach on areas that at one time supported manoomin. Manoomin in other sub-watersheds of the Fond du Lac Reservation is in decline as well. The reason for this decline is primarily due to higher water levels, caused by road construction that creates less than ideal hydrologic function and beaver activity.

Restoration Efforts to Date

The Fond du Lac Natural Resources Program is responsible for the manoomin management, enhancement, and restoration activities on the Fond du Lac Reservation. The general manoomin management practices consist of:

- Utilization of four water control structures (dams) to seasonally optimize water levels for manoomin growth
- Clearing of obstructions from river and ditch network channels to allow for adequate and timely drainage of water following precipitation events
- Beaver dam and beaver population management.

Two technicians work full time on water level management and data collection. The Reservation employs a “ditch crew,” two individuals responsible for debris removal, beaver dam removal, and trapping of nuisance beavers. The Natural Resources Program Manager coordinates these activities with habitat restoration activities.

The restoration of the primary manoomin producing lakes on Fond du Lac is contingent upon restoring the lakes to their historic elevations and thus mimicking a more natural annual hydrological cycle. The implementation of the *Rice Portage Wild Rice and Wetland Restoration Project* resulted in the construction of four water control structures. These four structures are located at the outlet of Aatawemegokokaaning, the outlet of Chi-awasonigaming, an impoundment that is upstream of Zhaaganaashiins Odabiwining (commonly known as “Upper Deadfish”), and at the outlet of Zhaaganaashiins Odabiwining. These structures are used to restore the water level to historic elevation and improve hydrologic function throughout the watershed.



Photo 2: Sedge mat cutter

The restoration of hundreds of acres of manoomin habitat has required the use of mechanical vegetation removal methods. The mechanical removal of competing vegetation is achieved using a sedge mat cutter and two aquatic harvesters. The sedge mat cutter is a barge with two five-foot hydraulically powered cutting blades that provide the initial cut of competing vegetation.



Photo 3: Aquatic harvester

The aquatic harvesters are barges outfitted with sickle bar cutters and a conveyor belt system that picks up the plant material cut by the sedge mat cutter and delivers it to an offloading site onshore.

The manoomin lakes are aerially photographed annually to monitor production and aid in restoration planning efforts.

A description of the manoomin lakes on the Reservation is as follows:

Aatawemegokokaaning (Perch Lake)

Aatawemegokokaaning had abundant manoomin stands for many years. Archeological evidence and lake sediment core analysis suggest wild rice has been present for over 2,000 years. Approximately 392 acres of this 657-acre lake had extensive manoomin stands. A concrete dam was constructed on the lake outlet in 1936 in an attempt to minimize the negative impact of the judicial ditching in the watershed, but by the 1960s it had fallen into disrepair and was essentially non-functional. For several decades lake level was stagnant, which allowed perennial species (in particular pickerelweed) to become the dominant vegetation in approximately 300 acres that historically supported manoomin.

A new water control structure was built in 1998 at the outlet of this lake. In 2001, an intensive pickerel weed removal effort was begun utilizing the sedge mat cutter to uproot this nuisance weed, followed by removal of plant material with the two aquatic harvesters. Over the course of a decade, the entire manoomin producing portion of the lake was given this treatment two times at a minimum, several areas received up to four treatments. Manoomin density in restored areas was initially high, but after 3-5 years, pickerel weed became dominant again. From past experience, it is apparent that a rotational schedule of plant removal will be needed until such time as the seed bank of the pickerel weed is exhausted. The planned rotation of plant removal will consist of approximately 75 acres cut annually. Coinciding with vegetation management, lake levels will be intentionally brought to flood stage (approximately 2 feet higher than average summertime level) every 4 years. The rationale behind this is that perennial species will be stressed and diminished by the higher lake level over the majority of the basin, providing manoomin with a competitive advantage in the years following a flood stage year. Monitoring, mapping, and assessments of this project will be conducted.

Naawonigami zaaga'igan (Jaskari Lake)

This 75 acre manoomin lake is located downstream of Aatawemegokokaaning. It was also plagued by the colonization of pickerel weed as well as other perennial vegetation. Efforts to remove this problem weed with the same methods used on Aatawemegokokaaning were performed, as well as the construction of an access landing for restoration equipment in 2008. Approximately 15 acres of manoomin habitat was restored, primarily near the outlet of the lake. Annual monitoring and maintenance cutting for plant removal will be conducted on this lake due to the resiliency of pickerel weed. Lake level fluctuation for variability will coincide with similar fluctuation in the lake level of Aatawemegokokaaning.

Chi-awasonigaming (Rice Portage Lake)

The drainage of this lake resulted in the reduction of the original 634-acre lake to only about 161 acres of open water on which manoomin could grow. The remainder of the lake bottom was exposed or very shallow, and competing vegetation overtook those areas. A water control structure was placed at the outlet of the lake in 1998 to regulate water levels. The restored areas are monitored, mapped, and assessed each year. As of 2017, approximately 39 acres have been restored to manoomin habitat using the cookie cutter and harvesters. This restoration method is time consuming due to the nature of the vegetation being removed, and current water levels. If water levels are raised one to two feet, which would aid restoration, the existing manoomin beds would be rendered unproductive. At the current water level, the vegetation removal forms floating mud flats that are re-colonized by cattails, sedges, etc. The restoration plan for this lake is currently under review.

Zhaaganaashiins Odabiwining (Deadfish Lake)

The manoomin stands on this 74-acre lake were commonly flooded and destroyed by the judicial ditch system that allowed the summer rains to flow rapidly into the lake. Deadfish Lake drains a large area, so a 74-acre impoundment was created upstream

of Deadfish Lake to minimize water level bounce. A water control structure was also placed at the outlet of Deadfish Lake to moderate lake level fluctuations. This combination of structures has allowed Deadfish Lake to become a reliable lake for manoomin harvest and is preferred by Elders due to its ease of access and productivity.

Mashkiigwaagamaag (Mud Lake)

This lake is located on a side channel of the ditch system, upstream of Chi-awasonigaming. The 141-acre lake can have abundant manoomin stands; however, the ditched outlet is an ongoing management issue. After two decades of low and stable water level management, the near shore perimeter of this lake was being overtaken by horsetail and water lilies. The lake also generally produced a thin density manoomin crop. Beginning in 2006, the ditched outlet of this lake was sand bagged in the open water portion of the year at a level that is one foot higher than past management levels. Over the next five years, water levels were managed at this higher level, but manoomin growth remained minimal.

Lake sediment coring indicated a dense plant layer was atop a large amount of dormant manoomin seed. Further aquatic plant surveys indicated a robust submerged pondweed community dominated the basin, likely as a result of lower water levels. To expose the dormant seed, airboat dragging of the lake bottom was performed in 2013 (specially crafted tiller-like arms attached to the rear of the airboat). The following season manoomin was present at high density, allowing for the first significant harvest there in 20 years. 2015 produced similar results. 2016 production was minimal, the suspected cause of this was poor germination. In fall 2016 another intensive substrate disturbance plot of 41 acres was completed using logging chains dragged behind the airboat. Measurement of the treatment plot's productivity will be conducted to assess the effectiveness of this change.

Manoomini-zaaga'iganing (Wild Rice Lake)

This lake historically produced a harvestable manoomin crop, but higher water levels caused by road building and beaver dams have reduced the density of manoomin in this lake. Water levels are currently managed by the placement of two Clemson pond levelers through culverts under Highway 210, beaver trapping, and dam removal. These efforts, combined with several thousand pounds of reseeded over several years initially resulted in higher densities of manoomin, but productivity did not persist. Water shield has become the dominant plant in the basin. Alternatives such as airboat mowing have proven to be ineffective given the nature of the plant. Water shield is thin and bows out of the way of the cutting apparatus of the airboat because of the wake created by the airboat as it travels. Alternative plant control methods will continue to be examined and water level management is planned to continue on this waterbody.

Gaagiizhikikaag (Cedar Lake)

This lake currently supports a remnant amount of manoomin. Until the 1970s, this lake supported manoomin, and was the place that beginner rice harvesters were sent to learn. Currently, water levels are too high to support a large amount of manoomin. In

2007, a test plot was seeded with 200 pounds of wild rice seed, as part of a long-range plan to conduct beaver dam removal to lower water levels. Minimal manoomin growth resulted. The FDL Environmental Program Office of Water Protection is partnering with the US Army Corp of Engineers (USACE) to explore hydrologic modeling and potential solutions to high water levels that may be inhibiting manoomin growth.

Beke-zaagidawaag (Side Lake)

This small lake produces a consistent crop of manoomin, but is virtually inaccessible. The land around the lake is privately owned, and the stream that drains it is commonly un-navigable due to its small size and the presence of beaver dams. No active management or official harvest declaration is made for this lake. Aerial photography is conducted to monitor manoomin growth.

Chi-maanakikii-zaaga'igan (Hardwood Lake)

Currently a remnant population of manoomin is present on this lake, and it is not harvested. The outlet of this lake is a judicial ditch that is severely overgrown and plugged by beaver activity. The present water levels are not conducive to manoomin growth. This lake is extremely remote and difficult to access. Tribal members who are advisors to the Natural Resources Program on manoomin issues have expressed interest in exploring management options for this lake. Those options entailed reseeding of manoomin and water level lowering achieved by reopening the judicial ditch outlet. Given its remoteness, reseeding was performed as an experiment in 2015. Favorable results were achieved from the reseeding. The management of the outlet is undesirable given the remote nature of the lake and the fact that the outlet ditch is an artificial drainage channel. Establishment of manoomin at the current lake level is the desired option. Future reseeding efforts will be conducted to further establish wild rice beds at the appropriate depth and substrate type in the basin.

B3. Issues, Concerns and Opportunities

Issues

- The ineffectiveness of current mechanical methods for the restoration project on Chi-awasonigaming.
- Manoomini-zaaga'iganing continues to produce a thin crop of manoomin, despite its potential for higher yields.

Concerns

- Aquatic invasive species are of great concern due to their persistence once introduced. While there are no known invasive species in our manoomin lakes, the risk is high given the uses of these lakes by waterfowl hunters and manoomin harvesters.
- Climate change—weather pattern changes, annual precipitation, and temperature changes—all may impact the viability of the manoomin lakes.

Opportunities

- The current trend of land purchasing, land use planning, and increased resource management capability affords long term protection for portions of the manoomin lake watershed that were unavailable in the past.
- Increased Resource Management Division staff and capabilities allow for opportunities to partner with other agencies and organizations to restore, protect, and enhance manoomin growth throughout the Ceded Territories.

B4. Goals and Objectives

- At a minimum, maintain the current program and management.
- Increase vegetation treatment acreage per annum.
- Increase funding levels for investment in additional equipment, personnel, and training to maximize management identified in the above “Opportunities” section.

C. Water and Wetlands

C1. Description of the Resource

Fond du Lac Environmental Program staff working on water protection issues include a Water Projects Coordinator, a Water Regulatory Specialist, a Watershed Specialist, a Wetlands Specialist, and a Ground Water Protection Specialist, all of whom comprise the Fond du Lac Office of Water Protection (FDLOWP).

The Fond du Lac Reservation includes abundant freshwater resources, with over 3,000 acres of lakes (828 acres of wild rice waters), nearly 44,000 acres of wetlands, and 96 miles of rivers and streams. The St. Louis River, the largest U.S. tributary to Lake Superior, borders the Reservation to the north and east, and approximately 95% of the waters of the Reservation lie within its watershed. A small, south-central portion of the reservation lies within the Moosehorn/Kettle/St. Croix River watershed (Mississippi River basin). All of the waters within the Reservation are in relatively good ecological condition, with minimal direct adverse human impacts (with several noted exceptions). There are no known or permitted industrial or municipal point source discharges to the waters, except to the St. Louis River (upstream and downstream of the reservation).

C2. Background

Surface Waters

By 1998, the Fond du Lac Environmental Program developed and the Reservation Business Committee adopted a Water Quality Standards (WQS) ordinance

(<http://www.fdlrez.com/government/ords/12-98ord.pdf>) for the surface water resources of the Reservation, setting contaminant criteria and designating uses for 24 lakes and eight streams within the boundaries, and identifying Outstanding Reservation Resource Waters. The Band had been granted Treatment as a State (TAS) authority in 1996 by the U.S. Environmental Protection Agency (USEPA), under Section 303(c) of the federal Clean Water Act (CWA), enabling it to enact and enforce such standards. The USEPA approved Fond du Lac's water quality standards in December 2001.

As a critical tool for implementing these standards, the Environmental Program designed a comprehensive Water Quality Monitoring Plan. Initially a rigorous three-year baseline monitoring project measuring the physical, chemical and biological

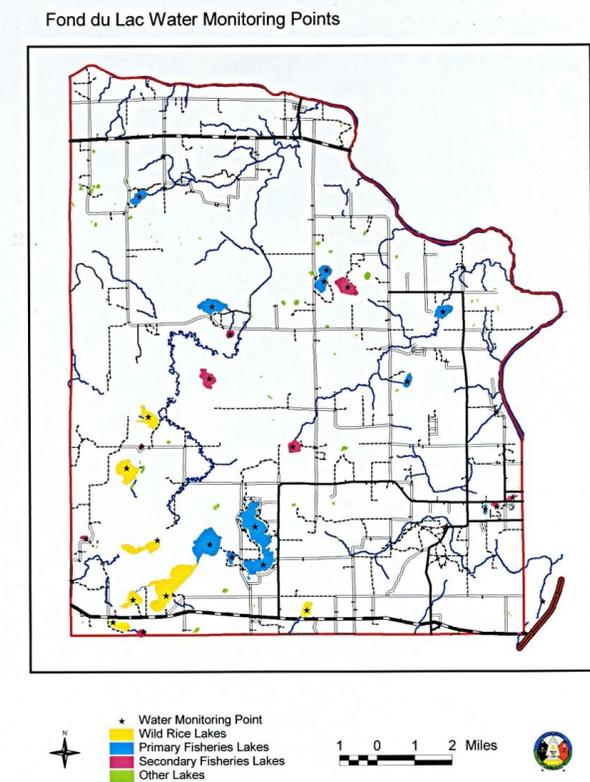


Figure 1. Fond du Lac Water Monitoring Points

quality of 24 lakes and eight streams located within the exterior boundaries of the Reservation, it has since been modified to reflect an ongoing status and trends program. Protecting human health requires monitoring for indicators that measure the safety of eating fish or other aquatic wildlife, or of swimming and boating. Conserving ecosystems requires indicators of diverse, healthy aquatic plant and animal communities, and indicators are also needed to assure that water quality and sediment conditions can maintain those biological communities. The Water Quality Monitoring Plan was designed to assess indicators for both human health and aquatic life.

This comprehensive database on Fond du Lac surface waters will also permit the FDLOWP to develop numerical biocriteria to replace the narrative biocriteria currently in the tribal WQS. The data is also utilized to assess and report on the condition of these water

bodies and their attainment of designated beneficial uses, and to update the nonpoint source assessment and management plan.

As the program has matured, pursuing CWA Section 303(d) (Impaired Waters) program authorization will be the next step. The process includes applying for TAS and ultimately establishing the assessment methodology, listing and reporting any beneficial use impairments, and addressing those impairments either through implementing TMDLs or watershed restoration plans.

Nonpoint source impacts, such as shoreline development and the accompanying potential for increased nutrient inputs (septic discharge and lawn chemicals), turbidity and erosion are factors that could affect reservation water quality. As an example, Big Lake, the most heavily developed recreation lake and a popular fishery, has more than 200 homes and seasonal cabins along its shoreline, each with individual septic systems that may or may not be functioning well or in compliance with existing ordinances. The development of a casino/hotel complex in 1994, adjacent to Otter Creek, could degrade the quality of this designated trout stream via impervious surface runoff from parking lots and rooftops during storm events, carrying toxic chemicals and road deicing salt, and contributing heated runoff to a thermally sensitive stream.

In 2004, the FDLOWP completed its first Nonpoint Source Assessment Report and Management Plan and successfully applied for TAS to administer a CWA Section 319 (nonpoint source) program. The FDLOWP received its first base program funding in 2005 and is using that support along with competitive project funding from USEPA, the Natural Resource Conservation Service (NRCS), and other sources to implement several projects under the following categories: hydromodification, timber harvesting, roads and urban development.

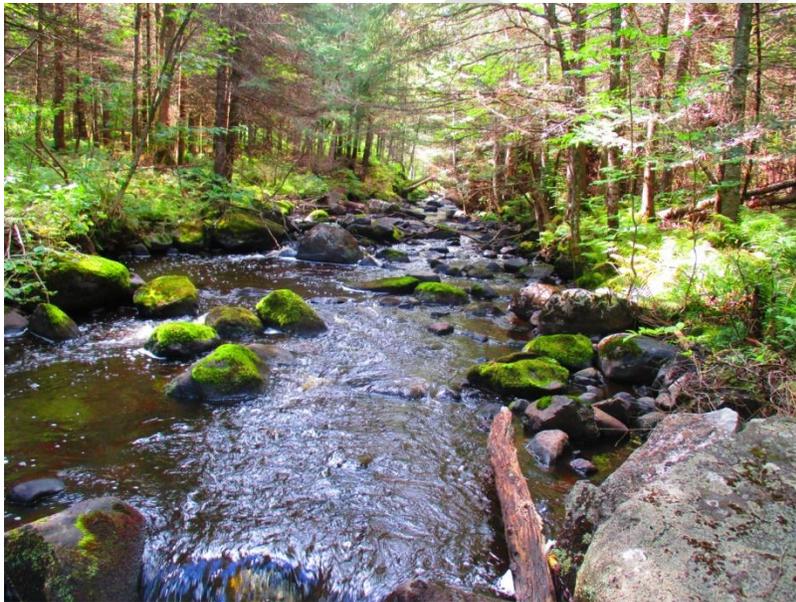


Photo 4: Fond du Lac Creek

Other nonpoint source restoration projects completed in recent years include a culvert replacement on Martin Branch (restoring connectivity in a trout stream), a bridge replacement constructed over Fond du Lac Creek after a 500-year storm event in June 2012 washed out an undersized perched culvert, and a successful alum treatment in Third Lake, which dramatically diminished internal phosphorus cycling that was driving

heavy algal blooms and degrading water quality. All of these projects included substantial post-monitoring data that demonstrated their effectiveness. Additionally, data was collected one summer on two “green” features of the LEED-certified Resource Management Division building: the green roof over the entrance portico, and the rain garden outside the north face of the building. Data demonstrates that both features are effectively moderating rainfall infiltration and improving water quality in runoff.

The FDLOWP also has identified **aquatic invasive species (AIS)** as a major concern for protecting the Reservation's water resources. The nonpoint source program provides for broad education and outreach to the Reservation community and affected stakeholders, in order to minimize nonpoint source impacts to Fond du Lac water resources. A new staff person will soon be hired to develop an invasive species management plan for the reservation (terrestrial and aquatic), and as grant funds are secured in the future, implement the plan.

Historical **hydrological modifications** to many of the Reservation's wild rice lakes in the upper Stoney Brook watershed occurred with the development of the judicial ditch drainage system early in the twentieth century. Currently, active restoration and management is underway to optimize the hydrologic regime of the wild rice lakes and reduce competing native vegetation that has been favored by the altered hydrology. In addition to the routine water quality monitoring program, FDLOWP staff conduct annual stand density and biomass measurements to track trends in the condition of the wild rice beds.

The FDLOWP has secured two USEPA National Environmental Information Exchange Network grants to facilitate a Region 5 Tribal Consortium and shared wild rice/water quality database. The primary objective of the first grant was to establish standard methods for collecting wild rice productivity data across tribal waters in the upper Great Lakes, and to be able to share knowledge and experience in wild rice monitoring, management and restoration. The second grant, beginning October 2017, will enable Region 5 tribes to continue to maintain contractor technical support for the regional database, which will soon include continuous hydrologic data capability, additional data analysis tools, and will include more tribes and intertribal agencies within the region. This framework provides support for managing and restoring wild rice, a significant cultural and subsistence resource, across its much-diminished geographic range.

The Resource Management Division also completed a major surface and groundwater hydrologic study of the Stoney Brook watershed in partnership with NRCS and the U.S. Geological Survey (USGS). We are currently in the process of updating and refining the surface water hydrologic model for the watershed, working with USGS. Ultimately, a Stoney Brook Watershed Management Plan will be developed to prioritize multiple resource management objectives, including wild rice production and stream and wetland restoration. The FDLOWP also partnered with the US Army Corps of Engineers (USACE) to create a hydrologic model for the Cedar Lake/ Simian Creek watershed, identifying best options for improving discharge at the outlet of Cedar Lake and expanding wild rice habitat within the lake.

Atmospheric deposition of **mercury** is of particular concern in this boreal forest and wetland ecoregion, as biochemical and landscape-level processes enhance mercury availability to the aquatic food chain, bioaccumulating to levels that are hazardous to top predators and humans. Ambient sulfate concentrations in the streams and lakes of this ecoregion are generally quite low (< 5 ppm), but sulfate loading from upstream

mining operations can overcome sulfate limitations in the microbial community that efficiently methylates mercury. Landscape disturbance (timber harvest, forest fires, peatland ditching, other human development) can greatly accelerate mercury runoff within the watershed. Consequently, fish caught in Reservation waters can be dangerously high in tissue mercury content. Mercury criteria for the Band's WQS were calculated under an assumed fish consumption rate that is much higher than either the state of Minnesota or the Great Lakes region assumes for the general population, as some Band members still consume fish at a subsistence level in their diets.

The FDLOWP has completed several projects that assessed contaminant levels (mercury, PCBs and lead) and characterized sediments of twelve Reservation lakes and the St. Louis River. In 2001, Fond du Lac partnered with the Minnesota Department of Health to collect and analyze fish tissue from lakes and the St. Louis River (preferred fishing waters), using the data to develop specific fish consumption advisories. In 2008 and again in 2015, more gamefish were sampled and analyzed for mercury, providing data that can help interpret trends in mercury in fish as regional, national and global efforts are made to reduce mercury emissions. Results from the analysis were used to develop updated fish consumption advisories for the Fond du Lac Reservation.

In 2016, Fond du Lac collaborated with the 1854 Treaty Authority, the Bois Forte and Grand Portage Bands to conduct a **climate change** vulnerability assessment and develop strategies for building resilience to adverse effects to important cultural/natural resources in the 1854 Ceded Territory and the participating tribal reservations (<http://www.fdlrez.com/RM/downloads/1854CededTerritoryClimateAdaptationPlan.pdf>) The vulnerability assessment identified water quality and quantity, along with several key fish species, wetlands and wild rice, as being relatively likely to be impacted by climate change. The vulnerability was assessed by looking at species' or ecosystems' sensitivity as well as their ability to adapt to projected changes in climate; detailed and customized strategies were then developed. Adaptation actions fall into one of five categories: collaboration; conservation, preservation and maintenance; education; monitoring and assessment; and restoration. FDLOWP is now beginning to incorporate these strategies into grant work plans and program implementation.

Ground Water

Confined sand and gravel aquifers are the major source of drinking water for the Reservation, as described in the USGS report *Water Resources of the Fond du Lac Indian Reservation, East Central Minnesota*. However, the crystalline bedrock aquifer underlying the glacial drift has progressively become a more significant source of domestic water supply.

The primary ground water objectives of the FDLOWP are to ensure the protection of valuable ground water resources through the continued closures of abandoned wells, the delineation of protection zones for wells contributing to community water systems,

and the implementation of a wellhead protection plan and source water protection plan for the Reservation.

Fond du Lac has used funds from several U.S. Department of Agriculture Environmental Quality Incentives Program grants, as well as USEPA funds, to properly seal more than 100 abandoned drinking water wells. However, there are still an undetermined number of abandoned wells that will need to be properly closed to protect the Reservation's ground water resources. As funding becomes available, Fond du Lac will continue to seal abandoned wells, keeping accurate records of closure activities and georeferencing the locations of all abandoned wells and their status (sealed or in need of closure). This geographic information will be incorporated into the Resource Management Division's GIS database. The FDLWP will continue to coordinate abandoned well closure activity with the Forestry Program, contractors and/or the Fond du Lac Public Works Department (Water/Wastewater), and georeferencing of well locations as an integral part of ground water protection for the Reservation.

While some areas of the Reservation are hooked up to the city water supply, and private wells serve most of the Reservation homes, four community water systems supply drinking water to the homes in those residential areas. Data gathered from multiple sources was used to model groundwater flow patterns and rates, calculate time of travel, and delineate protection zones around the four community water systems. Delineation of wellhead protection areas for these community water systems was the first step in the development of a comprehensive Wellhead Protection Plan for the Reservation.

When the data and analysis and modeling for the wells serving the four community water systems was completed, these wellhead protection zones were mapped and made available to other Reservation programs and departments whose activities could impact ground water quality. Since that project was completed, there have been new wells drilled to



Photo 5: FDL Groundwater Specialist Cristina Weske collecting data at a groundwater monitoring site.

serve these residential areas. The ground water protection zones and Wellhead Protection Plan need to be updated to reflect this.

The FDLOWP also prepared a Ground Water Protection Plan and a Source Water Protection Plan for the public drinking water sources on the Reservation. The Ground Water Protection Plan included a contaminant inventory and data from targeted ground water sampling, and concluded that the Reservation's ground water resources were of high quality. The purpose of the Source Water Protection Plan is to protect the quality of Fond du Lac's drinking water by identifying and managing potential sources of contamination and threatening activities that occur within the source protection area. It is a working document that will be routinely reviewed and updated to remain current, active and viable.

Since these plans were developed, the FDLOWP partnered with Carlton County, Minnesota Department of Natural Resources, and the Minnesota Geologic Survey to create a geologic atlas of the reservation. This atlas provides essential information for sustainable management of ground water resources, defining aquifer properties and boundaries, connection of aquifers to the land surface and surface water features, and a broad range of information about geology, mineral resources (including sand and gravel), and natural history. It includes a water well database, geologic maps showing properties and distribution of sediments and rocks, water levels in aquifers, direction of ground water flow, water chemistry and sensitivity to pollution. The atlas is used to support decisions about monitoring, well location, and environmental review. It can also be used to conduct hydrogeological risk assessments of facilities/operations which have a discharge to groundwater, particularly those located in defined Source Water Protection areas, to determine if such facilities/operations may be adversely impacting groundwater resources.

The FDLOWP has coordinated with the tribal Water/Wastewater department (Public Works) in the development and utilization of a septic system database (SepticAssist), which contains as-built plans and maintenance records for individual septic treatment systems at reservation housing, in a GIS framework. We are also working with Public Works to develop a baseline ground water monitoring program, in order to gain a refined understanding of the reservation's ground water resources and the critical information needed to protect drinking water sources. Additionally, we are working with the Elders Concerns Group to identify and map notable spring sources, which have been used traditionally for drinking water and/or ceremonial purposes. These springs will be mapped in an internal geodatabase, to protect their location from unwanted trespass or exploitation, but also to flag for protection from other planned resource management activities such as timber harvest or road maintenance.

Wetlands

Wetlands are defined as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (U.S. Army Corps of Engineers. 1987. Wetlands Delineation Manual). The Fond du Lac Reservation boundary encompasses **101,153** acres, of which 43,264 (43%) are wetlands. These wetlands consist of forested (67% – black spruce, tamarack, or black ash dominant; includes bogs), scrub shrub (29% – alder or willow dominant), emergent (3% – sedge, reed canary grass, or cattail dominant; includes wild rice lakes), and aquatic bed/open water (< 1% – coontail dominant). Many wetlands on the Reservation have been degraded due to human activities, particularly by ditching, road construction, agricultural and silvicultural runoff, and commercial and residential development.

The Environmental Program has a Wetlands Conservation and Protection program that has been active since October of 1998. A Wetlands Protection and Conservation Plan was adopted by the Reservation Business Committee in October 2000. The plan was expanded, updated and adopted by the Reservation Business Committee in February 2006 to become the Fond du Lac Joint Comprehensive Wetlands Protection and Management Plan. The adoption of this plan led to the development and adoption by the Reservation Business Committee of the Fond du Lac Wetlands Protection and Management Ordinance in June 2006. Since then, the FDLOWP has reviewed, processed and granted 78 Exemption Certificates and 27 Wetland Activity Permits. Staff have also conducted 10 pre-application meetings, and investigated 11 violations, seven of which were voluntarily restored by the violator.

Map 5 - Fond du Lac Wetland Types

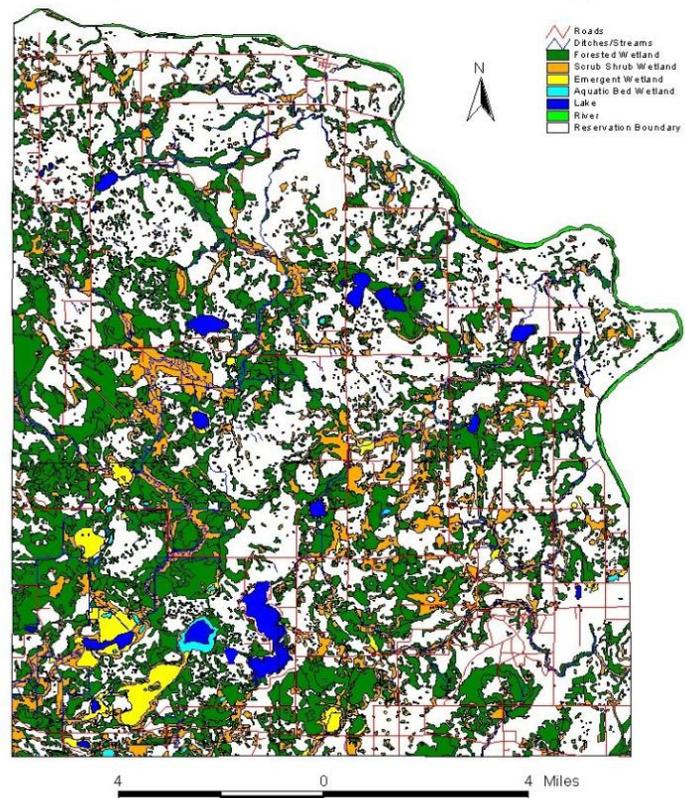


Figure 2. Fond du Lac Wetland Types

Through a USEPA Direct Implementation Tribal Cooperative Agreement, several FDLOWP staff have obtained credentials through the USEPA to conduct wetland permit inspections on the agency's behalf. Tribal inspectors serve as the "eyes and ears" of the USEPA by conducting inspections and submitting reports. The USEPA

then determines the appropriate follow up if any violations of permit conditions are encountered during an inspection. To date, only three inspections have been conducted on the reservation.

Through a USEPA Wetlands Program Development Grant, the FDLOWP worked with a contractor to develop a Comprehensive Wetlands Assessment and Monitoring Plan (CWAMP). This plan was finalized in 2009 and implementation began in 2010. A Quality Assurance Protection Plan was updated and approved by USEPA in 2015,

which defines our wetland assessment methods and standard operating procedures. Wetland study sites are monitored and assessed by subwatershed on a 5-year cycle.

Through another USEPA Wetlands Program Development Grant, a Wetland Restoration Plan was developed and implementation began in 2013. This plan identified restorable wetlands through aerial photography and GIS analysis. A GIS-based Wetland Functional Analysis was also conducted to aid in the prioritization of wetland restoration efforts and other natural resource management efforts.

Through another USEPA Wetlands Program Development Grant, a Black Ash Management Research Pilot Project was initiated in the face of the eminent invasive emerald

ash borer (EAB) threat to ash species. The project focused on underplanting existing black ash stands with several other tree species to determine which species had the potential to replace the function of black ash in the landscape once EAB begins to kill them.

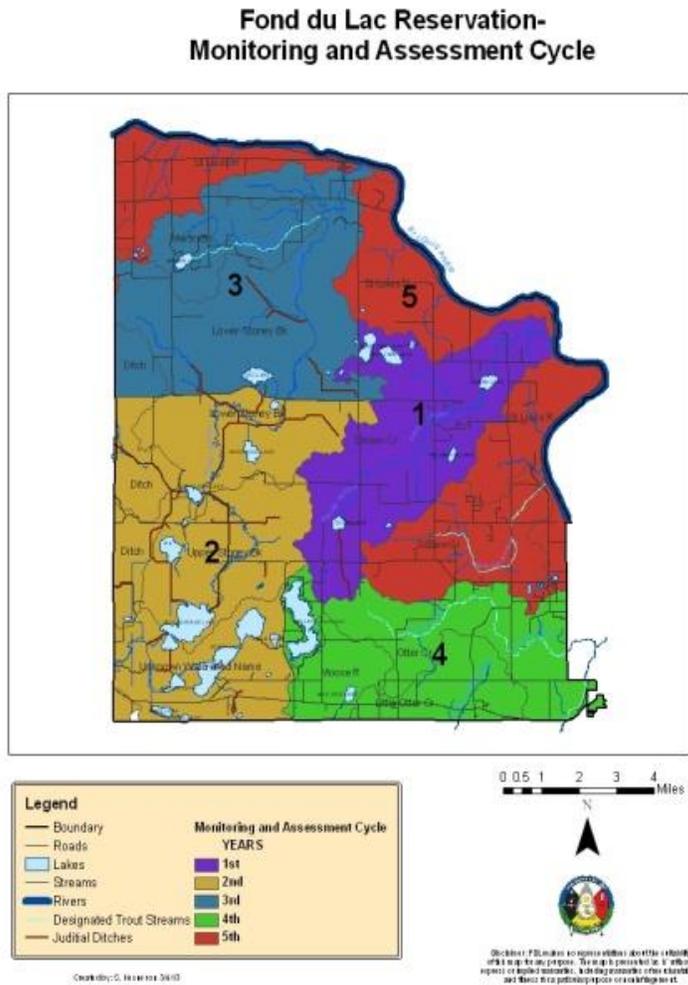


Figure 3 Fond du Lac Monitoring and Assessment Cycle

Through another USEPA Wetlands Program Development Grant, a Black Ash Management Research Pilot Project was initiated in the face of the eminent invasive emerald ash borer (EAB) threat to ash species. The project focused on underplanting existing black ash stands with several other tree species to determine which species had the potential to replace the function of black ash in the landscape once EAB begins to kill them.

The FDLOWP had updated its National Wetland Inventory (NWI) for the Reservation using existing aerial photography in 2009. That version is now out of date and has been replaced with new state of Minnesota data. Minnesota conducted an update to the NWI from 2009-2014, which included obtaining new photography for the analysis and incorporating Light Detection and Ranging (LiDAR).



Figure 4. Fond du Lac Reservation Wetland Restoration Prioritization

C3. Issues, Concerns, and Opportunities

The following represent the various issues, concerns, and opportunities regarding water and wetlands resources on the Reservation (note: this is not an exhaustive list):

- The Fond du Lac Office of Water Protection should maintain our existing robust water quality monitoring program, and continue to collect physical, chemical and biological data from other Reservation water bodies (beyond the routine monitoring program) as a baseline characterization of those resources.
- The St. Louis River is threatened by proposed discharges from new and expanding taconite and sulfide mineral mining projects upstream of the

Reservation. The Fond du Lac OWP is tracking the environmental review and permitting processes for many of the projects, and providing significant input to tribal positions on those decisions and/or any proposed mitigation.

- Similarly, the reservation and the 1854 Ceded Territory is at risk for impacts from the construction and operation of numerous petroleum product and gas pipelines. The Fond du Lac OWP tracks the environmental review and permitting, as well as any construction and mitigation, for several major pipeline projects and provides input to decisions.
- Proposed reductions from some large regional mercury air emissions sources may result in lower mercury fish tissue concentrations, but there is uncertainty about the impacts to mercury in fish from the new mining discharges, and from climate change. Fond du Lac needs to continue to monitor fish tissue periodically to track trends in mercury concentrations, and provide information to the community on safe fish consumption guidelines.
- Nonpoint source impacts continue to be the major source of adverse effects to Reservation water resources. The FDLWP should continue to update and implement the Nonpoint Source Management Plan, seek funding where necessary, and take actions to restore lakes and streams that have been adversely impacted.
- Construction of a wastewater collection and treatment system to serve the entire Big Lake community (tribal and non-tribal properties), while politically complicated and relatively expensive, would provide the most effective means for protecting Big Lake from nutrient enrichment and pathogens from failing septic systems. This project has recently secured grant and low-interest loan funding from state and federal sources, and is moving into the next phase of engineering design and ordinance development by the sanitary district created to manage wastewater collection and treatment.
- Fond du Lac water quality standards need to be periodically updated to incorporate new federal criteria, and any reservation-specific criteria derived from monitoring and research efforts.
- Specific wetland water quality standards should be incorporated into the existing Reservation water quality standards.
- Wetland biological assessment methods and monitoring should be developed to assess the health of vernal pools, aquatic bed and emergent wetlands that are not wild rice lakes within the Reservation.
- Degraded wetlands have been identified through analysis of aerial photography and GIS analysis but need on-site evaluation for possible restoration.
- A Wetland Reserve Program should be developed for the protection of existing wetlands.
- Clean Water Act Section 402 and 404 permitting programs could be established, further advancing the Band's regulatory authorities and demonstrating sovereignty.
- A sweet grass (*Hierchloe odorata*) habitat restoration project could be conducted.
- The extent and condition of cedar swamps (Northern white cedar *Thuja*

occidentalis) should be evaluated. The forest inventory has identified cedar on FDL owned lands. This is a possible area of collaboration with forestry.

- Development of an Ash Management Plan is needed to mitigate the effects of the invasive emerald ash borer.
- Collaborate with Invasive Species Coordinator on establishing a project to monitor and control wetland invasive plants.
- Develop a Storm Water Ordinance to further protect surface waters on the Reservation.
- Continue extensive participation on local, regional, national, and binational technical and policy work groups that focus on water and wetland resource management, restoration and protection.

Specific to the 1854 Treaty Authority/FDL Climate Change Adaptation Plan

Wild rice:

- Consult with federal and state agencies on the development and enforcement of water quality standards.
- Coordinate management and restoration efforts among tribal, federal, state, county, and non-governmental entities.
- Investigate and understand differences in tribal traditional management approaches versus other management techniques.
- Protect remaining populations of wild rice, regardless of density.
- Conduct water level management for the long-term benefit of wild rice.
- Prevent the introduction of invasive species.
- Invest in additional research into the ecology of wild rice, which may help the development of more adaptation strategies.

Other culturally significant aquatic plants:

- Enhance collaboration with local, county, state, and federal wetland management organizations to identify, monitor, and track wetlands throughout the region.
- Use traditional practices such as fire to encourage culturally significant plants on the landscape and clear undergrowth.
- Utilize best practices for managing invasive species.
- At a minimum, within 50 feet of the wetland maintain 50 percent crown cover to help maintain the water and soil temperatures
- Work across property boundaries to respond to and limit the spread of invasive species that have the potential to outcompete native vegetation.
- Investigate the need for building water control structures to maintain historic water levels in wetlands (especially for sweet grass).
- Maintain and restore wetland ecosystems, which are important locations for culturally significant plants.

Water quality:

- Consult and cooperate with federal, state, and local water resource managers on policy and permitting issues within or affecting the 1854 Ceded Territory and reservations.
- Review, comment, and consult on projects within or affecting the 1854 Ceded Territory or reservations (e.g., industrial, land-use).
- Advocate for no more wet-tailings storage at hard rock mines, and investigation of better storage and treatment technologies.
- Work with federal and state partners, conservation groups, private landowners, and others to preserve or restore wetlands ecosystems in buffer zones along rivers, lakes and reservoirs for flood control and water quality management.
- Restore degraded (from ditching/hydrological modifications) peatlands functions and values by reestablishing natural hydrology, reforestation and subsequent conservation and/or paludiculture (wet cultivation of marshland). This includes both conserving all reasonably intact peat swamps and preventing further degradation of already degraded peatlands.
- Encourage more mitigation projects for impacted surface waters, other than wetlands. Ensure that mitigation remains within the 1854 Ceded Territory and within the affected watershed.
- Continue to compile the data that could inform adjusting the management of the peak and storage capacity at reservoirs to minimize mercury methylation.
- Monitor fish mercury concentrations periodically to determine trends and inform consumption advisories. Long-term fish tissue data in Minnesota suggests that climate change may be contributing to increased mercury concentrations in commonly consumed fish species.

Water quantity:

- Work with federal and state partners on water appropriation enforcement.
- Support local land use agencies in the adoption of ordinances that protect the natural functioning of groundwater recharge areas.
- Invest in and utilize green infrastructure to help control runoff, capture and infiltrate stormwater, and reduce water demand. Some common green infrastructure practices include bio-retention areas (rain gardens), low impact development methods, green roofs, swales (depressions to capture water) and the use of vegetation or pervious materials instead of impervious surfaces.
- Maintain and restore stream connectivity (avoid channelization, improve road-stream crossings, culverts, dams, etc.).
- Monitor hydrology (e.g. lake levels, stream stage and discharge, groundwater levels).
- Work with the state and USGS to undertake groundwater resource studies in the 1854 Ceded Territory and on reservations.
- Continue to use hydrologic models to predict discharge and loading, determine ecological flows, and plan for future water supply.

Wetlands:

- Work with federal and state colleagues to update the National Wetland Inventory for the 1854 Ceded Territory and reservations.
- Partner with the Minnesota Board of Water and Soil Resources to implement conservation easements or soil and water conservation grants.
- Actively pursue the use of conservation easement or covenants to protect restored wetlands. As part of this, advocate for changes in laws to make conservation easements or covenants in perpetuity as opposed to 30 years.
- Create a wetland banking program and require mitigated wetlands to remain within the watershed and 1854 Ceded Territory.
- Explore the feasibility of creating limits on what can be gathered from the boreal wetlands: consider creating an ordinance limiting biomass harvesting.
- Restore plant communities that fit site conditions or promote vegetation sources that fit current and expected project site conditions (in some cases this may mean selecting sources from south of projects rather than north of projects).
- Eliminate or slow the spread of invasive species between Lake Superior and inland waters by continuing to: ensure that equipment or waders used in Lake Superior are not used in any inland water or wetlands; washing boats and other equipment after use; educating community and visitors on procedures for eliminating spread of invasive species; and organizing community events to physically or chemically eradicate invasive species.
- At a minimum, within 50 feet of the wetland 1) maintain 50 percent crown cover to help maintain the water and soil temperatures and 2) leave 5-15 dead standing trees for insect and bird habitat and avoid removing rotting stumps.
- At a minimum, within 150 feet of the wetland 1) avoid clear cutting and be more selective about harvest, 2) avoid skid trails, 3) minimize use of heavy equipment, and 4) limit ruts deeper than 6 inches below ground level.
- Advocate for the creation of a national reference set of wetlands to be monitored and ensure some are located in our region.
- Combine all the historical data that exists (from monitoring and assessments) and use it to model projected changes in wetland location and conditions. This includes projections of what existing boreal wetlands could transition to in a climate-altered future. This information will be useful to help with current and future wetland management.
- Model where the most vulnerable wetlands are and which might be most resilient to climate-related impacts. Based on the results, focus conservation on the most resilient wetlands.
- Resize new and existing culverts (e.g., retrofits) to ensure they can handle projected changes in precipitation.

C4, Goals and Objectives

- Continue to protect surface and ground water/drinking water resources of the Reservation.

- Maintain current water quality monitoring programs and extensive long-term datasets.
- Develop nutrient and biological criteria for surface waters.
- Periodically update Reservation-specific fish consumption guidelines.
- Successfully construct and operate a wastewater collection and treatment system for the Big Lake community.
- Continue to implement the tribal nonpoint source management plan.
- Complete and implement the Stoney Brook Watershed Management Plan.
- Seek funding to implement lake and stream restoration projects, as identified.
- Continue to actively participate in environmental review and permitting for mines and other industrial projects upstream of the Reservation and within the 1854 Ceded Territories, in order to raise awareness of tribal concerns and treaty rights, and protect critical resources.
- Continue to press for mercury emissions reductions, both at the state and national level.
- Apply for TAS for a Clean Water Act Section 303(d) program (Impaired waters)
- Implement a CWA Section 303(d) program through waterbody assessment and listing of impaired waters, and development of Total Maximum Daily Loads or watershed restoration plans
- Continue to facilitate EPA Region 5 Tribal Consortium for sharing wild rice, water quality and hydrology data across tribal lands in the upper Great Lakes.
- Develop shoreline protection guidelines for development occurring on Reservation lakes.
- Delineate zones of wellhead protection for community water systems on the Reservation.
- Continue to seal abandon drinking water wells to protect aquifers.
- Establish and implement a ground water monitoring program for the reservation.
- Continue administration of the Wetland Protection and Management Ordinance; revise the ordinance as needed.
- Continue application efforts for TAS for the Wetlands Regulatory Program.
- Continue investigation of assumption of Clean Water Act Section 404 permit authority on the Reservation.
- Continue implementation of the Comprehensive Wetland Assessment and Monitoring Plan; maintain and update the plan as needed.
- Continue the administration of the Wetland Restoration Plan.
- Develop and implement an invasive plant monitoring and management plan.
- Develop a Wetland Reserve Program.
- Develop, gain Reservation Business Committee approval, and implement a Storm Water Ordinance.
- Begin application efforts for TAS for a Storm Water Regulatory Program.
- Investigate assumption of Clean Water Act Section 402 permit authority on the Reservation.
- Increase staff to allow proper separation of regulatory review and project development assistance.

D. Fisheries

D1. Description of the Resource

The majority of the lakes on the Fond du Lac Reservation are small, shallow bodies of water, more suitable for growing wild rice than for the management of any significant fisheries. Many of these lakes do have fish, however, with populations consisting primarily of northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), panfish (*Lepomis sp.*), yellow perch (*Perca flavescens*), and bullhead (*Ameiurus sp.*). Due to relatively shallow water, high abundance of aquatic macrophytes, and substrates composed predominantly of decaying organic matter, many of these Reservation lakes are incapable of supporting any naturally reproducing populations of walleye (*Sander vitreus*). These lakes are, however, conducive to the production of northern pike, panfish, largemouth bass, and bullhead but are also subject to frequent winterkill.

Most of the lakes on the Reservation do have some type of public access, though most are strictly carry-in accesses. Big Lake and West Twin Lake do have public boat access.

The fishery of the St. Louis River is by far the most important one for residents of the Reservation. At least four game fish species can be found in appreciable numbers; northern pike, walleye, smallmouth bass (*Micropterus dolomieu*), and channel catfish (*Ictalurus punctatus*). The channel catfish fishery remains the highest priority of Fond du Lac Band members who regularly use the St. Louis River's fishery resources. Access to the St. Louis River, both by boat and shoreline, is not limited.

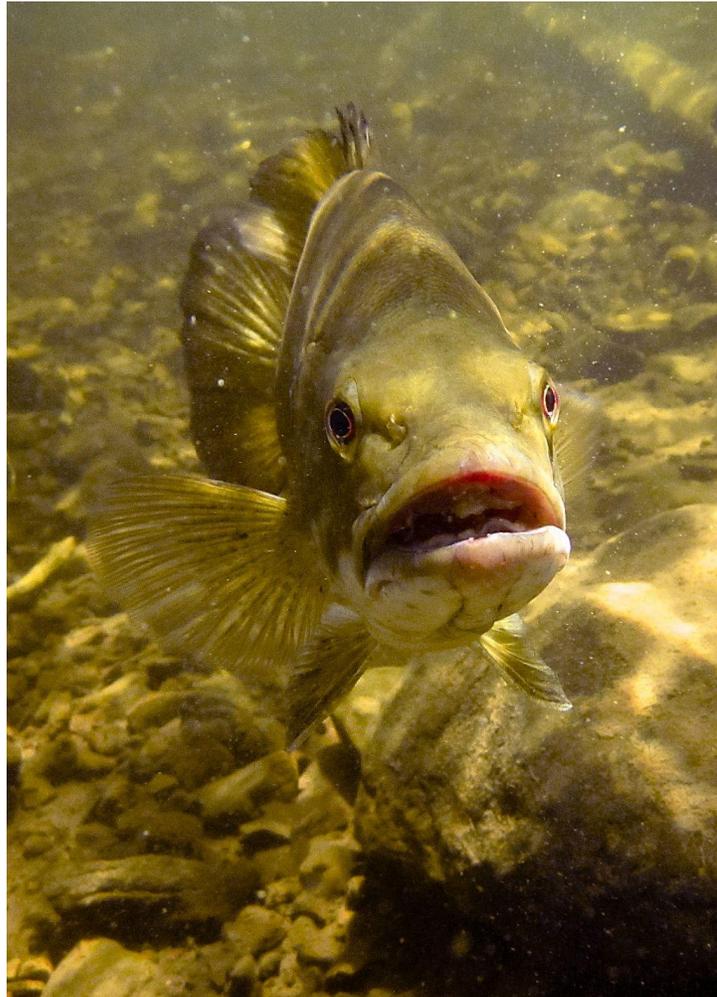


Photo 6: Smallmouth bass

D2. Background

Stocking of walleye fry and fingerlings has been attempted in both Big Lake and West Twin



Photo 7: Stocking lake sturgeon fry into the St. Louis River

Lake. Repeated stockings have failed to produce populations capable of supporting themselves through natural reproduction. Data does suggest that at least some stocked individuals have survived and contributed to a marginal fishery, though evidence of natural reproduction has not been observed. Both lakes lack significant spawning habitat. Walleye are also reported in Lost Lake. While numbers do not appear to be significant, at least some successful natural reproduction must be occurring, as no records indicate this lake has been stocked in the recent past.

Stocking of lake sturgeon eggs and fry into the upper St. Louis River to reintroduce lake sturgeon into the watershed is ongoing. The species was identified by the Band as a priority for management actions. A plan to develop a hatchery to raise sturgeon fry and fingerlings was considered, but deemed too expensive to be practical.

Of the many streams within the boundaries of the Reservation, several have been reported as historically having resident, self-reproducing trout populations. Very little data is present to suggest that there are still significant numbers of brook and brown trout present in such creeks as Big and Little Otter Creeks, Martin Creek, Fond du Lac Creek, and Stoney Brook. Beaver activity, the subsequent warming effects on the waters behind beaver dams, and habitat alterations (e.g., culverts) have probably lead to the decline in these trout populations. The Fond du Lac Natural Resource Program and the U.S. Fish and Wildlife Service have both stocked brook and brown trout eggs and fingerlings in the past, which has probably resulted in several of these populations continuing to survive in low numbers. It is unlikely that natural reproduction is contributing to any of the populations.

Much can be done to improve the trout populations on the Reservation. Stream improvements and the removal of beaver and their lodges and dams may improve habitat for resident trout populations. Stocking may need to be a part of future

management activity, but needs to be part of a Restoration Management Plan. In addition, regular assessments need to be performed following any stocking efforts. Due to inadequate staffing, river and stream surveys have not been conducted in recent years.

The fisheries in the 1854 and 1837 Ceded Territories are numerous and diverse, from small trout streams in the Superior National Forest, to lakes such as Mille Lacs that are capable of sustaining large walleye populations, to the salmon and trout of Lake Superior. Walleye and northern pike appear to be the most important species to Band members, and are relatively abundant throughout both of the Ceded Territories. A high priority for Band members has historically been a concentrated subsistence harvest at Mille Lacs Lake, where a regular spring harvest season occurs. However, these activities have been curtailed in recent years due to a decline in walleye populations. At the same time, additional harvest opportunities were instituted in the 1854 Ceded Territory.

The Resource Management Division currently has access to a pool of several technicians who devote their efforts towards fisheries, wild rice, forestry, and wildlife issues. The on-Reservation manager oversees the entire on-Reservation Program, concentrating on natural resource issues as they arise.

The Resource Management Division currently has one full time fisheries biologist in the Ceded Territory Program, with access to and cooperation from the technician pool. The focus of the Ceded Territory Fisheries Program is on walleye assessments and population monitoring, including both spring adult and autumn age-0 recruitment surveys. Additional assessment work has been done in the past on local rivers and streams.

Climate change/ Invasive species

Changing climate conditions will likely produce changes in abiotic conditions that may have an effect on the fishery and aquatic resources both on the Fond du Lac Reservation and within the Ceded Territories. Projected warming air may result in decreased ice cover or duration of ice cover, increasing water temperatures through the longer growing seasons, possibilities of lower water levels due to higher rates of evaporation, and the subsequent effects these conditions may have on the local fishery resources.

Ice cover is important for a variety of reasons. Ice and snow cover reflect the sun's energy back into the atmosphere. Without ice cover, the water absorbs this energy and warms. Shorter winters and less ice cover may result in subsequently warmer water temperatures than historically observed.

Disappearing Cold-Water Fish Species - Scientists modeled and projected changes that may be observed in the distribution of fish species under a 2xCO₂ climate in the United States. Cold-water fish habitat is projected to persist in deep lakes in the 1854

Ceded Territory and in Lake Superior. Within the 1837 Ceded Territory, lake trout, burbot, and inland cisco are already at the southernmost edge of their natural range. Any warming will likely push the distributions of these species out of the 1837 Ceded Territory and north into only the 1854 Ceded Territory.

Lake Superior - Lake Superior has long been the coldest of the Great Lakes. Its frigid waters have helped defend it from some invasive species that have plagued the other Great Lakes. Warming water and decreasing ice may threaten the habitat of some of the Lake's iconic fish species. Research shows shrinking ice cover in winter is warming Lake Superior faster than previously thought. Forecasts suggest climate change could make Lake Superior more productive for native fish in the short term. But an increase in invasive species could ultimately offset any gains.

Inland Lakes - Warm-water and cool-water fish habitat within the Ceded Territories of Minnesota is likely to increase over the next century. Good-growth periods are projected to benefit these fish species under current climate models. While a warmer climate might extend the growing season for cool-water fish species such as walleye and northern pike in Ceded Territory lakes, conditions in midsummer may become too warm for those species to feed and grow in the shallowest of 1837 Ceded Territory lakes. Fish that are stressed due to warm temperatures or a lack of cool-water refuges are more susceptible to disease and hooking mortality. This may be true for shallow lakes in the southern Ceded Territory, such as Mille Lacs, but these results may not apply for the northern lakes. Minnesota Department of Natural Resources (MNDNR) reports that while these southern populations may become stressed and less populations will still be very good in these lakes. Of note, the world record walleye

was caught in Tennessee, a state with much warmer temperatures and much longer growing seasons than Minnesota.

Inland Lakes and Streams

Cool Water Species (Walleye and Northern Pike) – For Central and Northern Minnesota, except for the shallowest of lakes, cool water species are not expected to be adversely impacted by



Photo 8: FDL Fisheries Biologist Brian Borkholder measures and tags a walleye as part of a population density study

warming climate. In fact, the longer growing seasons and increased primary productivity may be beneficial to most populations, especially in the 1854 Ceded Territory of Minnesota. However, because these game fish depend on cold-water prey species such as tullibee in some, but not all populations, the temperature shift could cause cascading effects that are difficult to predict within these specific lakes.

The Mille Lacs Lake walleye population has experienced a recent decline in the walleye population (2009 – 2013). This decline is largely attributable to a variety of factors, including, but not limited to, harvest management, competition with other predators, and zebra mussels.

Cold Water Species (Lake Trout and Cisco) –Scientific reports estimate that lake trout and cisco could be lost in 30 to 40 percent of inland lakes in Minnesota. Shallow lakes in central and south-central Minnesota appear to be the most vulnerable, due to a loss of deep-water cool habitat with adequate oxygen. Lakes in the 1854 Ceded Territory, especially the deeper ones, will be vital for the long-term survival of lake trout for the Fond du Lac Band.

Cisco are more tolerant of elevated water temperatures than lake trout, but are very sensitive to changes above 20°C. Cisco are found in about 600 lakes, mostly in two ecoregions of Minnesota: the northern lakes and forests region and the central hardwood forests region. In order to survive, cisco require sufficiently cold temperatures and enough dissolved oxygen. Cisco begin to experience oxythermal stress when the dissolved oxygen drops to approximately 3.0 mg/L.

There are no lake trout or cisco populations within Fond du Lac Reservation lakes.

Stream Trout – With the exception of some North Shore tributaries, stream trout are not abundant on the Fond du Lac Reservation or within the Ceded Territories. Beaver and habitat alterations (e.g. culverts) have had more of an impact on trout populations over the past century than has a warming climate. Trout do have lower thermal requirements, so any warming of streams may adversely affect their survival. Where they do persist in low numbers, they may also be affected by the longer growing seasons changing reproductive timing and the availability of food resources and prey items.

Lake Sturgeon – Within the Ceded Territories of Minnesota, lake sturgeon currently exist in Lake Superior, the St. Louis River adjacent to the Fond du Lac Reservation, and the Kettle River system. Lake sturgeon have thermal requirements that may actually benefit from longer growing seasons under warming conditions. Their native range extends as far south as Louisiana and Mississippi. Climatic variability and lengthening of seasons may, however, disrupt the timing of sturgeon reproduction and length of optimal fish growth periods as environmental cues shift and warming waters affect stream ecological processes and ecosystem health.

Warm Water Species (Bass, Sunfish, and Yellow Perch) – Under a warming scenario, bluegill, sunfish, smallmouth and largemouth bass, and yellow perch

populations may begin to expand in northern lakes. In some cases this change would be to the detriment of species like walleye and pike due to increased competition. An increase in yellow perch abundance and distribution would likely benefit predators such as northern pike and walleye. FDL Resource Management Division is already seeing and documenting a community shift in several lakes in the 1854 Ceded Territory, as largemouth bass expand across the Ceded Territory. The longer growing season will greatly benefit these warm water species.

Non-Natives – While not conclusive, the general expectation is that changing climate could result in more suitable temperatures for non-native aquatic species to invade or expand their range and compete with local species for food sources.

Invertebrates (i.e. Fish Food) - Climate change may lead to a disruption in the timing of either the seasonal leaf fall, insect egg hatching, or both. This would amount to a separation of the invertebrate larvae from their food supply. There's some evidence of timing changes for a variety of plant and animal communities in the spring, including emergence dates for several mayflies and other prey insects targeted by fishes. These changes may be impacting the trophic balance if predators and prey species no longer overlap spatially or temporally as they once did.

Invertebrate larvae, like fish species, commonly have a thermal preference zone. Being cold-blooded, warmer temperatures lead to faster growth and development. Exceed this thermal preference, and growth and survival declines. Warmer winter stream temperatures are known to lead to earlier spring-summer hatches. The timing of these hatches can be very important to the survival of many game and non-game fish species.

Lake Superior

Walleye - Within Lake Superior, thermal habitat for coolwater fishes has been increasing. One estimate suggests that suitable thermal habitat for walleye has increased by 223 square miles over the last 40 years. Historically, walleyes were restricted to the warmer waters near shore and in shallow bays and estuaries, such as the St. Louis Bay. As thermal habitat has expanded, so have the walleye populations. But interestingly, several reports suggest that growth rates have subsequently declined due to higher densities of walleye and increased competition for limited food resources.

Lake Trout - Within Lake Superior, the deep-water, "fat" lake trout type (siscowet), may lose thermal habitat as Lake Superior warms. The lean version of the lake trout, however, would gain thermal habitat if the Lake continues to warm. Biologists have documented that lean lake trout are becoming more abundant recently, perhaps in part due to warming water temperatures. What is less known, however, is how an increasing lean lake trout population will interact with the Pacific salmon present in the Lake, and how competition for food resources will be partitioned between the lake trout and salmon species.

North Shore Tributaries – Effects of a warming climate are being noted in north shore streams that feed into Lake Superior, used by native brook trout and introduced Pacific Salmon species. As the air and water warm, evaporation increases resulting in adults difficult. Subsequent evaporation and warming may result in lower survival of young trout and salmonids that are using these North Shore streams as nursery habitat. However, climate models also predict higher precipitation for northern Minnesota and the Lake Superior basin, which may offset the water lost to evaporation.

Lake Sturgeon – Within Lake Superior, lake sturgeon inhabit relatively shallow water bays and river mouths. As suggested with walleye above, thermal habitat for lake sturgeon within Lake Superior may be increasing, and thus may actually benefit lake sturgeon due to longer growing seasons and increasing production of preferred prey species.



Photo 9: Lake sturgeon fingerling

Non-Natives – As Lake Superior continues to warm, it becomes vulnerable to invasive species that already have invaded the other Great Lakes, as well as becoming vulnerable to new invasions. Warmer temperatures may allow for invasive species already present to become a bigger problem, especially sea lamprey. Sea lamprey are already present in the lake and historically have preyed mostly upon lake trout. Commercial fishermen and biologists are reporting an increase in sea lamprey scarring on other species, including herring, whitefish, and lake sturgeon.

D3. Issues, Concerns, and Opportunities

Many of the issues, concerns and opportunities that were identified for the fisheries section of the 2008 Integrated Resource Management Plan are still applicable:

- Routine Monitoring of the Fisheries and Habitat
 - Spring and fall electrofishing surveys for walleye
 - Summer net assessments of lakes
 - River and stream surveys for trout and non-game fishes
 - Habitat surveys in conjunction with fish assessments

- Restoration of lost / declining fisheries
 - In-stream habitat improvements
 - Lake shore habitat improvements
 - Stocking programs
- Mercury and other heavy metals in contaminated fish
 - Public education
- Spread of exotics (including, but not limited to, Ruffe, Carp, Round Goby, Rusty Crayfish, Chinese Mystery Snail, Zebra mussel, Eurasian Watermilfoil, Spiny Waterflea, and Viral Hemorrhagic Septicemia [VHS])
 - Public education
- Increase Harvest Opportunities
 - Spring spearing / netting seasons for walleye
 - Fall netting for walleye and other game fishes
 - Netting opportunities in Lake Superior

While many of these activities are ongoing, some actions have not been fully implemented due to funding and staffing shortages. Those shortages are expected to continue for the foreseeable future.

D4. Goals and Objectives

Goal: Develop a long-term database for the fisheries of the Fond du Lac Reservation and the 1854 and 1837 Ceded Territories so that management decisions can be based upon current data.

- Progress has been made towards this goal. Fisheries staff is currently working with computer programmers to develop a single data housing location for future fisheries biologists.
- Perform regular assessments of the fisheries and aquatic habitat to build long-term data sets.
- Cooperate with and coordinate activities with other agencies, i.e., Minnesota Department of Natural Resources and the 1854 Treaty Authority. This occurs regularly.
- Identify fish stocks and populations that might benefit from supplemental stocking or reintroduction, both on-Reservation and within the Ceded Territories.

Goal: Provide greater harvest opportunities:

- Off-Reservation spearing and netting activities in the 1854 Ceded Territory have been on-going since 2014.
- Provide opportunities on Lake Superior for harvest by Band members.
- Monitor increased harvest to prevent any over-exploitation of stocks.

E. Land Resources

E1. Description of the Resource

History

Under the terms of the Treaty of 1854, the Fond du Lac Reservation was established at a size of at least 100,000 acres. The original 1858 survey encompassed about 125,000 acres, but the boundaries of the new reservation excluded important wild rice lakes. Federal officials were notified of the discrepancy, and in 1860 a new survey was done that included the rice lakes and Big Lake. However, this survey reduced the overall acreage of the reservation to just a few hundred acres over the lower limit specified in the 1854 treaty. The loss of 25,000 acres was explained by the federal government as a value for value trade, rather than an acre for acre trade.

The Allotment Act of 1889 allocated from 80 to 160 acres to heads of household. Roughly 818 parcels totaling approximately 32,720 acres were allotted to 469 individuals on the Fond du Lac Reservation. In 1908, Congress passed the Burke Act, which stated that an Indian person who had white ancestors was considered competent in the white world and could sell his land without BIA approval. Many individuals claimed white heritage and sold their lands, reducing Indian ownership of Fond du Lac Reservation land to about 8,000 acres by 1934.

The Indian Reorganization Act (Wheeler-Howard Act) of 1934, which returned the authority to manage their own assets to the Indians, began the turn-around in tribal ownership as tribes were given the power to purchase back their lands.

Land Base

Fond du Lac Reservation encompasses 101,109 acres within the original 1860 boundaries. The total acreage of the 1860 boundaries and land owned by Fond du Lac in fee or trust outside the original boundary totals 102,642 acres.

Indian owned land totals 42,480 acres and is broken down as follows:

1. **Band and Tribal lands** – 26,577 acres, including the Fond du Luth Casino in downtown Duluth, the Black Bear Casino Resort complex, investment properties, islands in the St. Louis River, a cemetery, and conservation land along the east bank of the St. Louis River.
 - I. 14,860 acres in trust (10,319 FDL, 4,541 Minnesota Chippewa Tribe [MCT])
 - II. 11,717 acres in fee status
2. **Allotment lands** – 15,903 acres of land classified as allotment or heirship land. Nearly all allotments have multiple owners with fractionated interests. There are

a total of 33,454 interests. These interests may be the Band or Tribe, individual tribal members or non-Indians with fee interests. The fee interests are a particular problem, as BIA does not track them. The fee owner is expected to record their interest with the county. This often does not happen, so the county is not tracking the ownership of the fee interests.

Allotment interests are broken down as follows:

1. 15,531 individual interests
 - a. 620 individual fee interests
 - b. 14,911 individual trust interests
2. 3,727 estate interests
 - a. 618 estate fee interests
 - b. 3,109 estate trust interests
3. 14,198 FDL/MCT interests
 - a. 4,246 Cobell purchased interests
 - b. 9,738 other purchased interests
 - c. 217 MCT interests

These allotment interests have 2,354 different owners, two of which are FDL/MCT. Among these 2,354 owners, there are 575 estates.

Of the 387 allotment parcels, 278 have 50% or more interests owned by FDL/MCT. Of the 278 parcels, 121 parcels have 75% or more interests owned by FDL/MCT. FDL/MCT have ownership interests in all but 25 allotment parcels.

Fond du Lac band members can lease two to five acres for homes and agriculture activities. There are a total of 622 leases on trust and allotment lands.

Other major landowners within the Reservation are:

1. The University of Minnesota, which owns 3,271 acres at its Cloquet Forestry Center.
2. The state of Minnesota owns 13,356 acres, which are under the management of Carlton County and St. Louis County.
3. Private landowners own 37,148 acres.

E2. Issues, Concerns, and Opportunities

- Allotments generally are highly fractionated, which means that any activity other than hiking, hunting, fishing, and gathering requires permission from 50% of the ownership interests. It is possible to get permission, but it can be difficult. Seventy-two percent of the allotments have over 50% FDL/MCT ownership. This means that FDL/MCT controls development of these allotment parcels. However, any development or income producing activity requires that all

owners are afforded the opportunity to receive rent or other income from the parcel.

- The 2,354 different owners with 19,248 interests (as of 2017) make for a paperwork headache. The average ownership interest encompasses an equivalent 2.99 acres. There are 2.73 acre equivalents per owner. At 2017 land prices, the average land value per owner is about \$2,730. There are many landowners with less than 0.1% interest in a parcel. This translates to less than \$40 value to the owner.
- Purchasing procedures for allotment land that is in trust and that is in fee status have different procedures, with fee status purchases more complicated than trust purchases.
- Nearly all of the 11,717 acres in fee status are available to put into trust. This process takes, on average, four to five years. Fond du Lac has aggressively purchased fee land over the past 6 years, which has caused a significant increase in taxes.
- Recently, BIA formed a Fee to Trust Consortium dedicated to only fee-to-trust. Currently, four tribes participate in the consortium – Mille Lacs, Shakopee, Ho-Chunk, and Oneida. For each tribe participating in the consortium, BIA provides two dedicated employees, who handle fee-to-trust and environmental paperwork. It generally takes about 9 months for the consortium to process fee-to-trust applications from beginning to decision.
- Land leasing for homes, recreation, businesses, and farms is a major activity on Fond du Lac controlled land. Managing the 622 leases is a major activity of the Land Information Department. Management includes lease creation, land surveys, and land ordinance and lease enforcement.

E3. Goals and Objectives

- The BIA has a program of Purchase at Probate. FDL has been aggressively participating in the program for the past 2 years and has taken part in about 300 probates – initial hearings or reopened settled probates. No interests have been purchased as of yet, since the probates have not been decided or an order to purchase has not been received. Also, approximately half of the 300 probates are reopened cases are not eligible for purchase at probate.
- There are 4,541 acres owned in trust by MCT. Even though Fond du Lac has traditionally managed these lands as if they are owned in trust by Fond du Lac, there are limitations to Fond du Lac's rights to these lands. The Hearsh Act regulations do not allow Fond du Lac to manage these lands under Hearsh Act procedures. These lands should be transferred to Fond du Lac.

- Participate in the Fee to Trust Consortium at a cost of \$215,000 annually per contract period of 4 years. The amount of work done by the consortium varies greatly by year. When there is less work and less costs, BIA returns the unused monies. There is also a withdrawal procedure.
- The Land ordinances are confusing, incomplete, contradictory, and out-of-date. Congress created the Hearth Act, which allows tribes to write and manage leases on tribal trust land without BIA approval once they have BIA approved ordinances and leasing procedures. Currently there is a project to rewrite and update the ordinances in connection with obtaining Hearth Act approval. This is needed in order to improve land management and expedite leasing procedures.
- Streamlining land purchase procedures is greatly needed.

F. Forestry

F1. Description of the Resource

Fond du Lac Forestry's mission is to manage FDL's natural resources sustainably to achieve the needs and desires of the Band, while maintaining ecosystem health and integrity and fulfilling federal trust responsibility. The forest will be managed to maintain or increase the biodiversity of the forest. Timber harvests, tree planting, prescribed burns, and mechanical treatments are tools the forestry program can and does use to help achieve these goals.

Below is a list of the major roles and responsibilities of the Fond du Lac Forestry program.

Forest Management

- 44,500+ acres, 9 full-time staff, up to 4 seasonal staff
- Forest Health / Diversity / Cultural Resources / Economics
- Timber Sales / Tree Planting / Selective Thinning / Timber Stand Improvement
- Forest Research

Land Management

- Wildlife Habitat Management in Collaboration with FDL wildlife manager
- Prescribed Burns
- Invasive Species Mitigation

Wildfire

- Fight Wildfires
- Fire Prevention: Fuels Reduction and Education

Community Service / Other

- Community Woodlot
- Hazard Tree Removal

- Emergency Response
- Right-of-Way / Land Clearing

Organizational Overview

Fond du Lac Forestry Organizational Chart

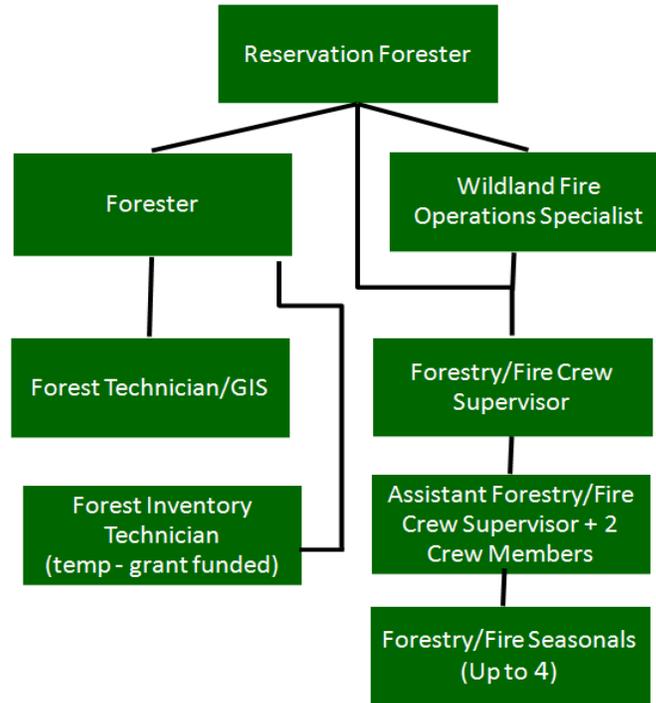


Figure 5: Forestry Organizational Chart

Under the Band’s Self-Governance Compact, the Fond du Lac Reservation Business Committee assumed responsibility for the Forestry Program from the Bureau of Indian Affairs on October 1, 1997. All timber sales, forest development projects, and prescribed burn plans must still be approved by staff at the MN Agency in Bemidji, MN and the BIA’s Regional Office in Bloomington, MN.

F2. Background

The Fond du Lac Band owns about 44,500 acres of land within the Reservation boundary. Of this, about 28,000 acres is forested. The majority of FDL forests are dominated by aspen, a fast growing sun loving tree species . Other cover types include several thousand acres of northern hardwoods (a mix of sugar maple, basswood, and yellow birch), red pine, black ash, and swamp conifers (a mix of black spruce, northern white cedar, and tamarack).

Forests are managed on the Fond du Lac Reservation to improve the health and vigor of the forest and associated ecosystems. This includes maintaining diverse wildlife habitat, maintaining or increasing biodiversity, maintaining and increasing culturally important species such as paper birch, white cedar, sugar maple and blueberries.

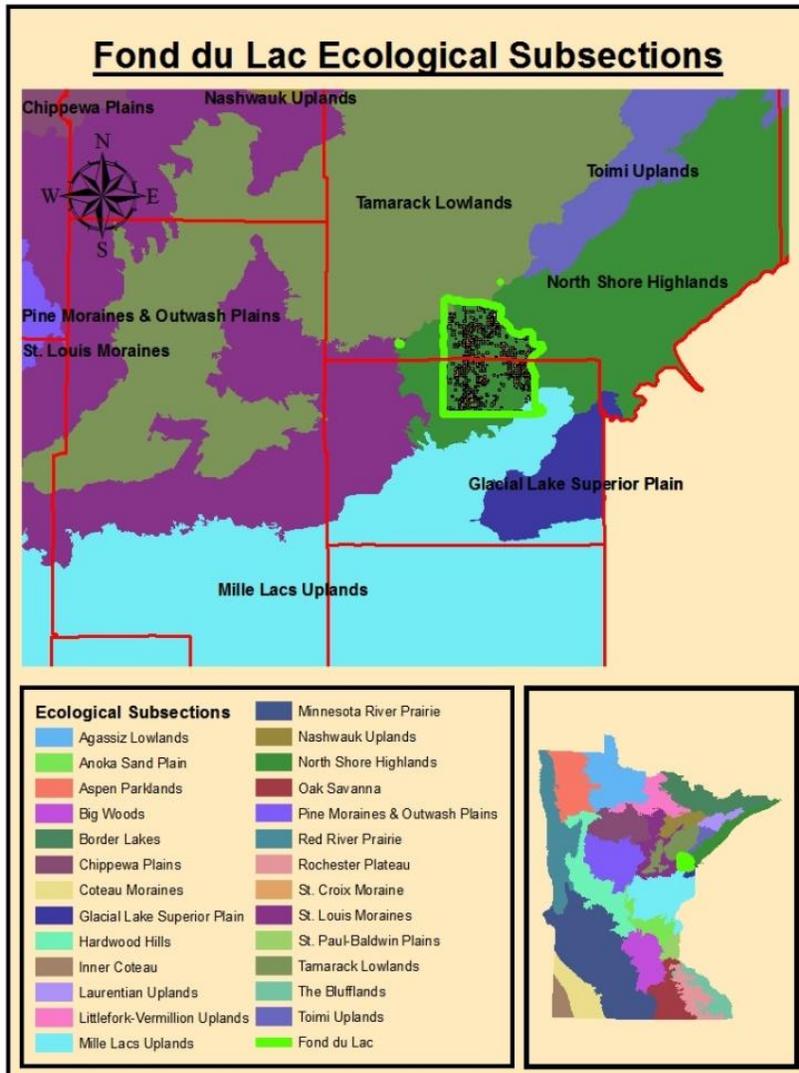


Figure 6: Ecological Subsections

Timber sale design utilizes an Ecological Classification System (ECS) to assist in understanding how to grow trees well suited to soil moisture and nutrient qualities, and to mimic natural successional patterns. This system is mapped and classified at a variety of landscape levels.

The majority of the Fond du Lac Reservation is within the North Shore Highlands Subsection, which lies within the Northern Superior Uplands section. The Northern Superior Uplands largely coincides with the extent of the Canadian Shield in Minnesota and is characterized by glacially scoured bedrock terrain with thin and discontinuous deposits of coarse loamy till (soil) and numerous lakes and wetlands.

The second level of this system is called the Native Plant Community (NPC). and varies from 1-30 acres in size. From the NPC found at a given site, foresters and technicians are able to determine the likely soil nutrient and soil moisture regime of the site, the historic vegetation likely present on the site, what the successional pathway of a given stand of trees is, and what tree species are best suited for the site.

Pre-European settlement Forests - What Fond du Lac's forests and other lands may have looked like before extensive European Settlement

Using notes written by land survey crews in the late 1800s and early 1900s, Minnesota DNR ecologists have been able to reconstruct likely forest composition of pre-European settlement vegetation.

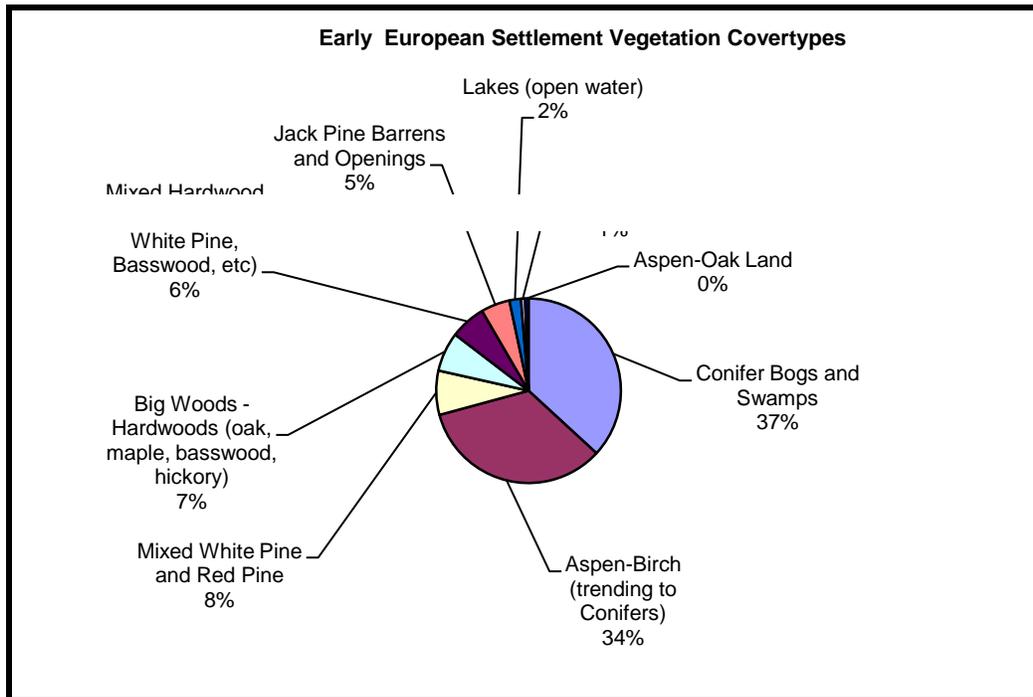


Figure 7: Early Settlement Vegetation Relative Abundance

The covertypes reconstructed from the survey notes are quite different than the covertypes categories FDL Forestry and most regional forestry departments use today, which makes direct comparison difficult. But there are patterns that can be seen. Aspen and birch made up over a third of the land base in the past and make up about half of the land base today. The amount of conifer bogs and swamps is substantially less today, and the number and distribution of upland conifer species (like white, red, and jack pine) present in the past was probably quite a bit greater than the number and distribution of upland pine species today.

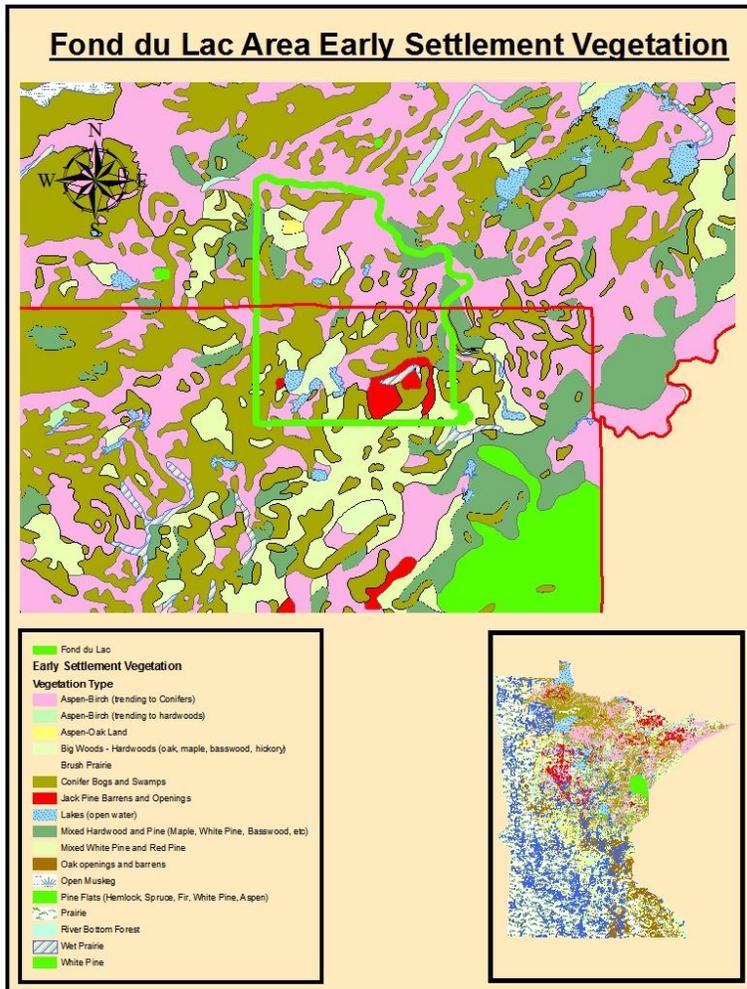


Figure 8: Early Settlement Vegetation Map

Conifer swamp lands were lost when the region had a judicial ditching system (drainage ditches) installed in the early 1900's and those swamps were essentially drained or greatly reduced in size and extent.

Fires no longer burn, periodically, across large swaths of the landscape. The last large fire on the Fond du Lac Reservation was the October 1918 fire, which was actually a collection of several fires that burned down the towns of Cloquet, Moose Lake, Kettle River and 35 other communities, and killed more than 450 people. Nearly 250,000 acres was burned, including many acres of the Fond du Lac Reservation.

That fire shaped the species composition, size, and age of the forests around the Fond du Lac Reservation.



Figure 9: 1918 Fire Map

Logging History

As the United States was developing as an industrial nation, lumbermen looked westward to the Minnesota territories' vast northern coniferous forests, and its prized white pine. Some of the richest stands of white pine were on the Fond du Lac Reservation. Loggers gained access to the southern portion of Minnesota's coniferous forest through the Treaty of 1837. The 1854 Treaty opened much of the Arrowhead region of Minnesota to logging.

Summary of Timber Harvest before 1950		
Pre-1925 (estimated)	17,000,000 Board Feet	60% White Pine
1925 to 1948 (estimated & records)	800,000 Board Feet (\$5,200 value)	2% White Pine
1948 to 1949	1,000 Board Feet (\$10 value)	No White Pine

The above is taken from a 1949 report prepared for a presentation by former Agency forester L.W. Chisholm

Most of the volume removed up to 1925 was cut before the Act of June 25, 1910, which set forth the basis for harvesting Indian timber under sustained yield management and established policies to make this possible. The focus of early logging was the highly valued old growth white pine trees that were depleted by 1924.

Harvesting of the re-growth, mostly for pulpwood, has continued to be a way of life for some in northern Minnesota. Originally, it supported a forest of aspen, birch, eastern white pine, red pine, jack pine, black spruce, white spruce, balsam fir, tamarack, and northern white cedar. Logging and fires, however, have altered the character of the forest. The alteration has resulted in a reduction of the conifer component of the forest.

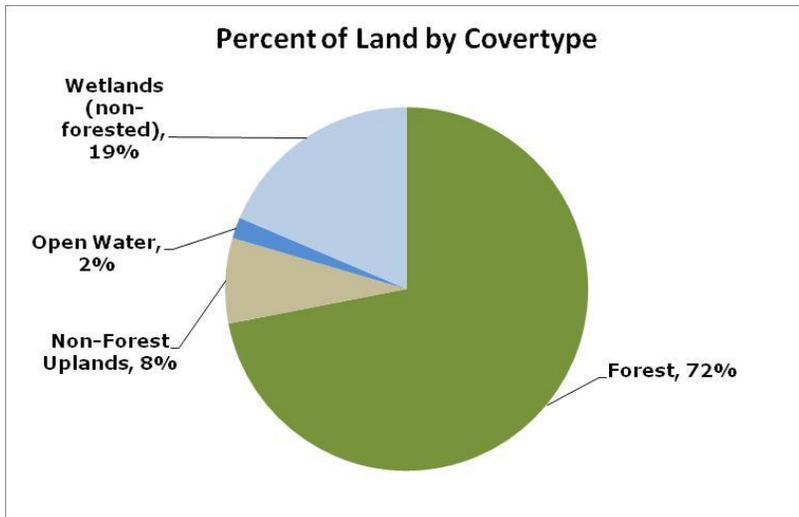


Figure 10: Percent of Land by Covertype

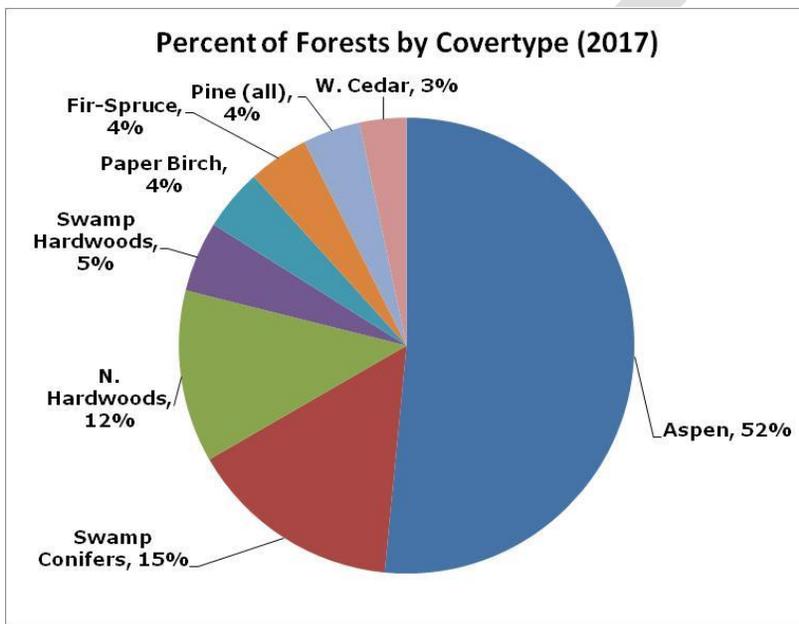


Figure 11: Percent of Forests by Covertype (2017)

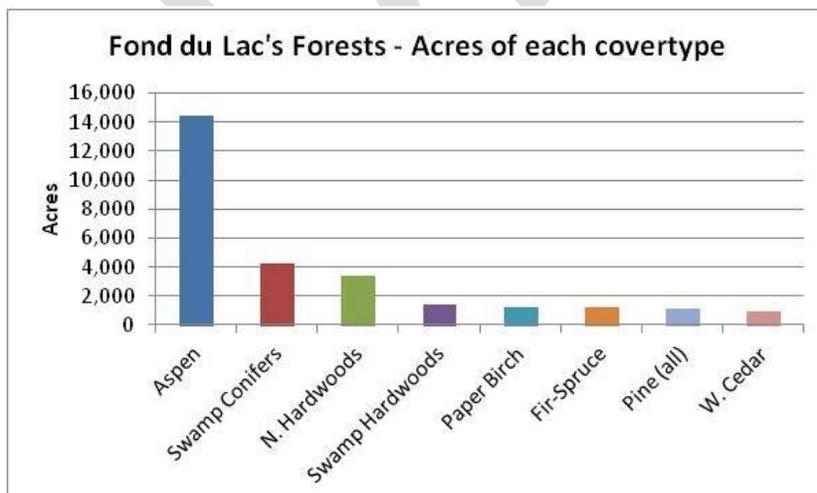


Figure 12: Fond du Lac's Forests – Acres of each covertype.

Figures 11 and 12 summarize the composition and land area of Fond du Lac's Forests.

Timber Sales

Timber sales on Fond du Lac lands strive to achieve a sustainable balance between the needs and desires of the Band, economic constraints or opportunities, and ecological concerns and opportunities. Examples include providing a source of income to landowners, regenerating a declining species, improving wildlife habitat and increasing the growth rate and form for longer lived species like white pine and sugar maple.

Every sale has a written set of objectives and a silvicultural prescription. In addition, cultural resources, surface and ground water, and naturally occurring flora and fauna are protected by following best management practices.

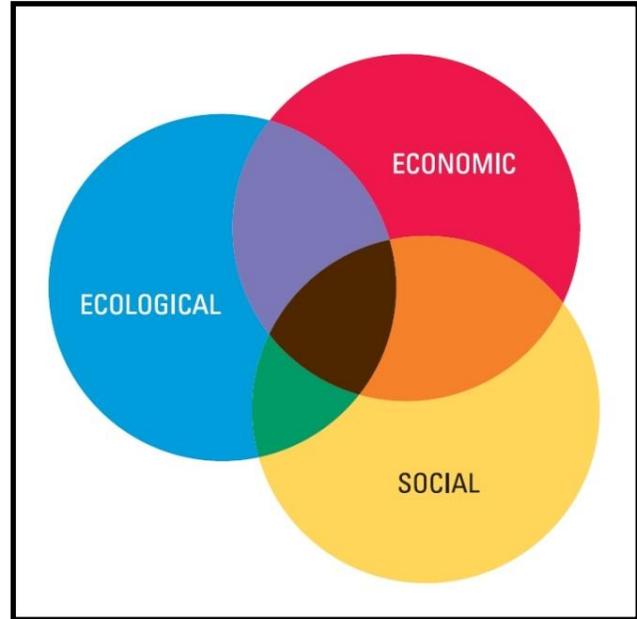


Figure 13: Balancing Economic, Ecological and Social

Timber Markets around the Reservation

Company	Location	Primary Products Used
Minnesota Power	Mountain Iron	Wood Chips
Numerous small sawmills	Cloquet area	Mixed hardwood and sawtimber
SAPPI	Cloquet	Aspen, Spruce
Savanna Pallet	McGregor	Aspen, Hardwoods
Verso	Duluth	Spruce, fir, aspen
UPM - Blandin	Grand Rapids	Aspen, Spruce, Balsam Fir

Figure 14: Local Mills

Historically, most timber sales on Fond du Lac are sold on a sealed bid basis and are advertised to loggers by newspaper, website, and direct mailing. The Fond du Lac Timber Sale Policy, approved in October of 2004, states that Band members will be given preference on all timber sales occurring on Tribal or Band lands. On sales taking place on allotment land, allottees are given the option to offer Band preference or not. When Band preference is chosen, only bids received from Band member loggers are considered. If there are no Band-member bids, the timber sale can be re-advertised on the open market.

Cultural Forestry Resources

Sugar Bush

Fond du Lac has inventoried nearly 3,000 acres of Fond du Lac-owned forested stands that are dominated by sugar maple larger than 8" in diameter. An additional 600 acres of sugar maple dominated stands smaller than 8" in diameter have been mapped. There are also 1,000 acres of red maple dominated stands currently mapped.

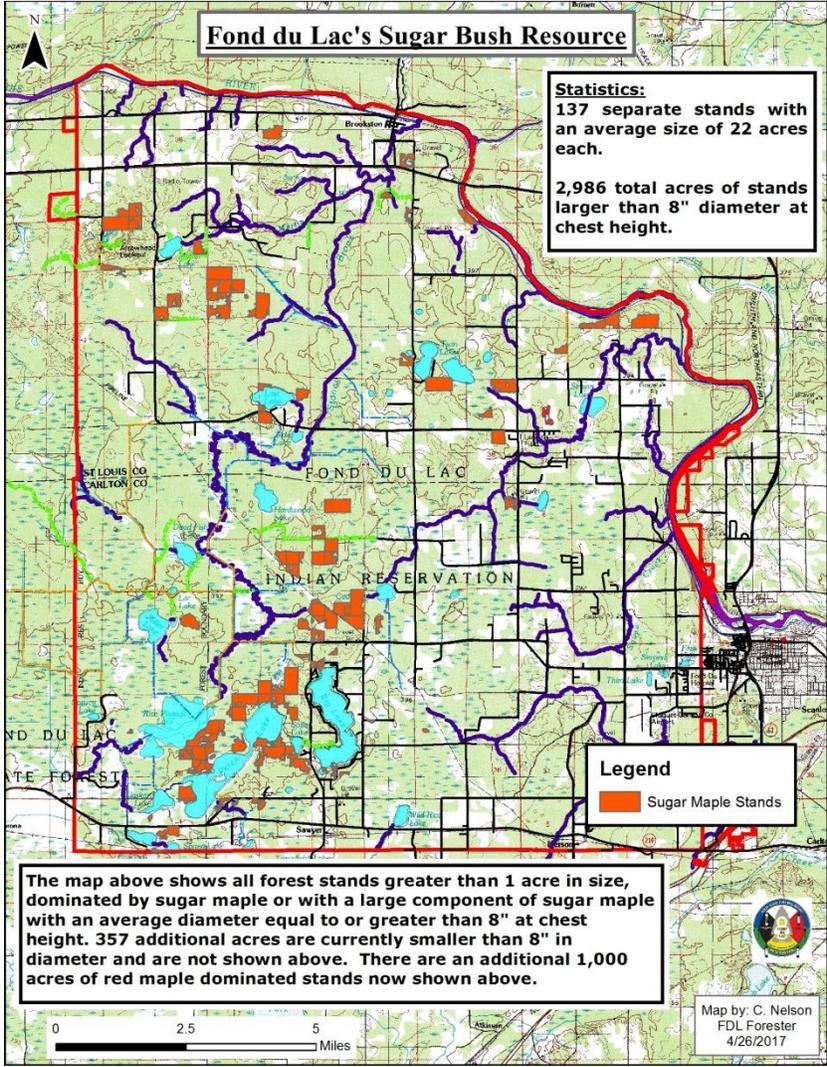


Figure 15: Fond du Lac's Sugar Bush Resource

Prior to European settlement, Fond du Lac's forests were roughly 13% northern hardwood stands, meaning they had a strong sugar maple component. Today that number is mostly unchanged.

Forest management in sugar maple stands has largely been hands-off to date, but active management is an option in the future. Tree disease, invasive species, climate

change and deer browse are four concerns. Managed forests are healthier forests and forest management can remove diseased trees, thin crowded trees so remaining trees grow faster and are healthier, have larger crowns that produce more sap, and can provide more sunlight to seedlings and saplings. Ultimately, the goal is to manage forests so they can be tapped sustainably for a long time into the future.

Fond du Lac Forestry has been actively managing mixed aspen-northern hardwood forests to push them towards being less aspen dominated and more northern hardwood dominated. The results of past projects have been to take stands that were 80% aspen and 20% other species and turn them more into a 50/50 mix. In another few decades, the stands will ultimately become dominated by northern hardwoods with just a minor component of aspen.

Northern White Cedar

Northern white cedar is a very long-lived native coniferous species formerly much more common than it is today. The biggest threat to the continued presence of white cedar across Fond du Lac is white tailed deer that preferentially browse young seedlings and saplings.

Fond du Lac Forestry will be implementing more cedar planting projects around the Reservation and will be fencing planted seedlings to protect them from deer and hare browse. The goal is to assure cedar trees exist for a long time into the future.

Paper Birch

Paper birch is a short-lived pioneer species, often dying when it is 60-80 years old. This means that much of the paper birch that established after the 1918 fire is now old or has been harvested for timber.

Using soil scarification along with timber harvesting is a reliable tool to regenerate paper birch on the Reservation into the future. Timber sales in the summer can sometimes prepare the same type of seedbed that fires can. Timber sales conducted in the winter allow birch to sprout back prolifically from the stump and to re-grow a new, young clump of trees.

Recently Fond du Lac Forestry has implemented selectively thinned clumps of birch stump sprouts. This assures that each uncut stem receives more sunlight, nutrients and water, while also growing more quickly to a size that paper birch bark gatherers may find more useful.

Non-timber forest products

FDL Forestry has begun to manage forestlands for additional non-timber species. For example, at least 10 blueberry patches have been identified and many of them were burned successfully to increase production for Band members. In addition, wild leeks,

raspberries, medicinal plants, and wild mushrooms exist in the forest and steps are taken to protect them

In the future, mapping these communities on the Reservation may provide us with data and may help to inform future management decisions to make sure gatherers will find what they are looking for long into the future.

Reforestation

Timber sales are designed and implemented in such a way that reforestation often occurs naturally.

Tree planting is done where natural regeneration is inadequate, when non-forested areas (e.g. old fields) are being converted to forested areas, or when there is a desire to add species that aren't naturally present or abundant.

Every year, Fond du Lac forestry plants trees, typically to boost the conifer and oak composition of the forest. A portion of the revenue received in many timber sales typically is used to pay for the cost of tree planting when done to enhance a site.



Photo 10: Tree Seedlings

Climate Change

The Fond du Lac Reservation may be more sensitive to climate change due to its location. The southern edge of the Northern Superior Uplands ecological section is characterized by boreal tree species like aspen, paper birch, balsam fir, and white spruce. These species rapidly decrease in abundance south of the Reservation.

Fond du Lac Forestry is implementing two forest management strategies to help mitigate negative effects from climate change: where possible, continue to grow culturally valuable species for as long as we can successfully do so, and to start to plant species that are predicted to do well (e.g. oak, red maple, sugar maple, white pine) even as more vulnerable species fare worse

Below is a summary of which tree species we may expect to increase or decrease in the coming decades.

Climate Change Possible Forestry Impacts at Fond du Lac

Species Likely to Decrease	No Change
Balsam fir	Burr oak
Balsam poplar	
Black spruce	May Increase
Quaking aspen	American basswood
Tamarack	American elm
White spruce	American hornbeam
	Black cherry
Species That May Decrease	Boxelder
Black ash	Eastern red cedar
Northern white cedar	Eastern white pine
	Green ash
Mixed Results	Ironwood
Bigtooth aspen	Northern pin oak
Jack pine	Red maple
Northern red oak	Silver maple
Red pine	Sugar maple
Yellow birch	White oak

SOURCE: Handler et al. 2014. Minnesota forest ecosystem vulnerability assessment and synthesis. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. GTR-NRS-133. www.nrs.fs.fed.us/pubs/45939

Invasive Species, Insects and Disease, Storms, and Trespass

Numerous insects, tree diseases, and invasive non-native plant species threaten the health and diversity of trees across the Reservation. In addition to invasive species, large storms, fires, and unauthorized timber cutting are also concerns.

Currently, insects that are potential threats to Fond du Lac’s forests include the emerald ash



Photo 11: Emerald Ash Borer

borer and gypsy moth. Many more forest pests exist, but generally don't pose a significant risk to any given species or species mix. Since 2006, emerald ash borer detection traps have been distributed around key areas but no insects have been recovered as of late 2017.

The Forestry program, in collaboration with the Wetlands program, has also been actively researching other species' potential to be planted into black ash depressional wetlands as replacement species. The overall goal is to keep forested wetlands forested, as well as to preserve the hydrological balance.

FDL Forestry has been treating the invasive plant species buckthorn and wild parsnip for several years.

Fire Management

In 1997, the Fond du Lac Band assumed responsibility for fire pre-suppression and initial attack in the protection of all Trust lands within the Reservation. The Fond du Lac Band and the Bureau of Indian Affairs – Minnesota Agency agree that it is their joint responsibility to adequately manage and protect forested lands and other natural resources on trust lands. And we have developed a Wildland Fire Management Plan that provides programmatic direction in managing wildland fire on tribal lands, The Wildland Fire Management Plan ([see appendix X](#)) has been used as a guide for development of site-specific projects for certain fire management activities, such as prescribed burns and other fuel reduction methods. For the remaining state, county, and private lands within the Fond du Lac boundaries, the Minnesota Department of Natural Resources provides protection.



Photo 12: Prescribed Fire

FDL also has an ongoing wildland fuel reduction program in wildland urban interface and hazardous fuels. Prescribed burning and mechanical treatments are used and are often integrated with silvicultural or wildlife habitat objectives. As a result, Fond du Lac has received recognition as a state "Firewise" community since 2003, the first community in the state of Minnesota and the second Indian community in the Nation to hold this title.

Related Management Activities

Community Service

Traditionally, Fond du Lac Forestry has provided a number of services to Fond du Lac Band members, including removing hazard trees; establishing woodlots for firewood and for funeral ceremonies; providing the shade canopy of alder and willow at the

pow-wow grounds; providing information about allotment locations; and using prescribed burns around individual homes to reduce fire danger.

Forest Roads:

Forest roads on the Reservation are owned and maintained either by MN DNR, the Reservation, County or the township in which they are located. They may be used for recreational purposes such as hunting or as access roads for timber harvests. In general, forest access roads on Fond du Lac fall in three categories:

1. Ditchbank roads
2. Abandoned township or county roads
3. Roads constructed for timber harvest

Fond du Lac has nearly doubled its land ownership since the 2008 IRMP. Now Fond du Lac controls much of the lands accessed by certain forest roads. These roads are important for more than just timber access. They serve the band by accessing areas for gathering hunting and recreation. Currently, much of the forest roads are only maintained during a timber harvest event. Between timber harvest events these roads may deteriorate to the point where they are inaccessible for gathering, hunting and recreation. Forestry should consult with FDL Public Works and FDL planning to access forest roads and determine whether the roads should be added to the BIA road inventory.

Fond du Lac Forestry must also consider the impact on wetlands, cultural resources, aesthetics, and rare plants and species habitats in maintaining or closing forest roads. As a result of conflicting interests, road access sometimes becomes challenging and contentious.

F3. Issues, Concerns and Opportunities

Issues and Concerns

A wide range of forestry related issues and concerns exist at Fond du Lac, including:

- Significant ash decline (mortality) is occurring in some black ash forested wetlands and emerald ash borer may add to the problem.
- Allotment ownership is still highly fragmented despite recent buy-back programs, which causes management challenges.
- Protection of sacred / archeological sites needs to be monitored.
- Soil compaction is an ongoing concern.
- No road and trail policy currently exists to address vehicle access or wetland concerns.
- Invasive plant and insect species including buckthorn, worms, garlic mustard, emerald ash borer, and gypsy moth may adversely affect Fond du Lac's natural resources.

- Birch decline is an ongoing concern that will increase with climate change and with the aging of existing birch stands.
- Staff time is often monopolized serving individual short-term needs at the expense of the forest, larger population of Band members, and future generations.
- As Fond du Lac's land base has more than doubled in the past 15 years while staff size and budget has remained nearly flat, some of these collateral duties may need to be analyzed, re-prioritized, and a greater emphasis placed on managing forests.

Opportunities

A well-run Fond du Lac forestry program could:

- Balance social and ecological needs and desires of the Band while providing wood products in a sustainable manner.
- Monitor and research emerald ash borer, and keep up to date on current efforts by other agencies.
- Continue working with the Tribal Historic Preservation Officer to protect archeological, cultural, and sacred sites.
- Continue following Best Management Practices as outlined in the Site-Level Forest Management Guidelines book.
- Monitor forest health and keep current with Department of Natural Resources monitoring and research efforts.
- Use pre-European settlement vegetation as a guideline for future vegetation composition (covertypes).
- Keep current with research regarding climate change.
- Continue regeneration efforts to assure tree regeneration is adequate.
- Delineate native plant communities on all forested upland sites
- Open paper birch bark harvesting to Band members before timber sales where birch will be harvested.
- Use sustainable forestry management practices to enhance habitat for both game and non-game wildlife.

F4. Goals and Objectives

Goal - Manage forest resources in a manner that produces a healthy forest. There will be an emphasis on managing forest lands according to habitat type or native plant communities, while considering forest diversity and wildlife habitat.

Objectives to meet the goal:

- Design timber sales and forest development projects to enhance wildlife habitat and diversity.
- Where appropriate, reintroduce fire to meet this goal.

Goal - Visual Best Management Practices will be utilized when practiced near areas of special concern such as lakeshore, home sites, and parks.

Objectives to meet the goal:

- Identify potential limited access areas for the protection of cultural, recreational, water and wildlife features.
- Identify and maintain special use areas such as sugarbush camps and areas for gathering of sacred and natural plants.
- Follow the St. Louis River Plan.

Goal - Reduce fire risks in Urban Interface.

Objectives to meet the goal:

- Reduce fuel loading by prescribed fire or mechanical treatment.
- Public education.
- Be prepared for wildfires during the fire season.
- Encourage housing in less fire prone areas.

G. Wildlife

G1. Description of the Resource

The large rural areas of forest, fields and wetlands on the Fond du Lac Reservation support relatively abundant and diverse populations of wildlife. Most historical wildlife species are still present and some historically absent species such as wild turkeys are present and increasing. Changes in land ownership patterns have accelerated in recent years. Large industrial forestlands are now absent on the Reservation and county ownership has been decreasing as their lands have been returned to FDL ownership. In the foreseeable future, the FDL Band and small private landowners are going to be the largest ownerships on the Reservation. This will present both challenges and opportunities to maintain and enhance Reservation wildlife.

In spite of past drainage practices, the FDL Reservation retains one of the best wetland complexes in the surrounding area. The highlight of this complex are the six wild rice lakes in the southwest corner of the Reservation which attract large numbers of nesting and migratory waterfowl and support numerous other wetland associated species. Current wetland management plans support the maintenance and enhancement of these lakes and associated wildlife species. Other wetlands are abundant as well and described in Section C.

The 1854 and 1837 Ceded Territories are used by Fond du Lac Band members exercising traditional hunting, fishing and gathering rights under the Treaties of 1854 and 1837. All of Fond du Lac's moose harvest, most of the deer harvest and much of

the furbearer and small game harvest occurs off the Reservation in the Ceded Territories. Much of the 1854 Ceded Territory can be characterized as boreal or near boreal forest and containing species such as moose and lynx that are found at more northern latitudes. Much of the 1837 Ceded Territory is a mix of hardwood forests and agriculture and contains species more characteristic of southern latitudes such as wild turkey and ring necked pheasants. The FDL Reservation is located approximately in the transition zone where the landscape and wildlife species change from one to the other.

G2. Background

Originally, the primary focus of the Wildlife Program was to assist the Band with exercising treaty hunting and trapping rights in a culturally significant and biologically sustainable manner. This included recommendations for annual hunting and trapping seasons, collection and reporting of harvest data and liaison with other state, federal and tribal natural resource agencies. Fond du Lac was the first Minnesota tribal agency to implement online and phone registration of hunter harvested animals such as deer, bear and turkey. In addition, program responsibilities included wildlife population surveys and research and habitat management. Wildlife research has become an increasingly important focus of the program as tribal interest in moose population decline, wolf management and elk restoration has increased. Related to research, an increasing amount of time is spent on wildlife population surveys. In an effort to maintain and enhance wildlife populations, such as moose, habitat management efforts have become increasingly important as well. Research and habitat management have required additional liaison work with other government agencies as well as Fond du Lac Resource Management Division programs. Wildlife diseases such as Avian Influenza and Chronic Wasting Disease are a topic of increasing interest and potential concern and may become critical if outbreaks are discovered locally.



Photo 13: FDL turkey hunter

Moose

Moose are a priority species for the FDL Band for subsistence hunting purposes. Interest in moose and moose hunting by tribal members remains high. The Wildlife Program has been actively involved in moose research, annual population surveys and habitat management. Past research has focused on understanding causes and rates of mortality. Current research includes tracking changes in moose numbers over

time in response to landscape level habitat changes. The program annually contributes funding and logistic support to the annual moose survey. Habitat management efforts include collaboration with federal, county, tribal and nonprofits to pursue funding for moose habitat improvements and liaison with the US Forest Service on forest management planning. The FDL Band has taken a position against the proposed listing of moose under the Endangered Species Act and is working to ensure federal listing as a threatened or endangered species won't become necessary.



Photo 14: Bull moose near Swamp River in the 1854 Ceded Territory

Wolves

Wolves are a culturally significant species for many band members and interest in wolf populations and their impacts on other important species, such as moose and white-tailed deer is high. The Wildlife Program has worked with federal and state agencies on wolf management and research. Wolf research is conducted to better understand local population dynamics, and their influences on other tribal wildlife resources. Recently efforts by the Wildlife Program and the Minnesota Department of Natural Resources to track and understand wolf population dynamics in and around the FDL Reservation have increased. This has resulted in increased collaboration

between FDL and the DNR on wolf research. Tribal interest in wolf research and management is likely to remain high as wolves go back and forth between federal protection and state and tribal management. While the FDL Band has recognized that in certain limited situations it may be necessary to kill wolves causing damage or threatening human safety, the Band has opposed any general hunting or trapping of wolves.

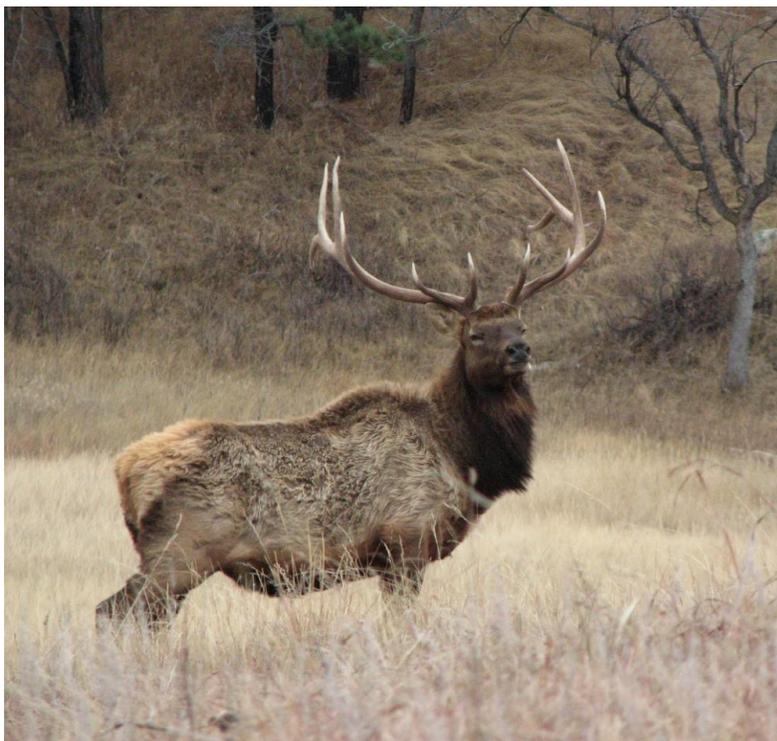


Photo 15: Researchers are exploring the possibility of reintroducing elk in some areas of the 1837 and 1854 Ceded Territories.

Elk

Elk were a species historically native to most of Minnesota including the 1837 and 1854 Ceded Territories and the FDL Reservation. Past over hunting and conversion of habitat to urban and agriculture have reduced elk populations in Minnesota to two remnant herds in the far northwest, outside of where FDL members can exercise rights retained under the treaties of 1837 and 1854. The FDL Band in partnership with the Rocky Mountain Elk Foundation and the University of Minnesota have undertaken research to explore the feasibility of restoring elk to portions of the 1837 and 1854 Ceded

Territories and the FDL Reservation. Elk restoration is being pursued as a means to return a native species and as a means to ensure wildlife populations are adapted to pending climate change. If suitable habitat and public support for elk restoration can be found, the Wildlife Program will seek to move ahead with next steps in the process of restoring an elk population. In addition to restoring a traditional species to for the FDL Band, elk are adaptable to a wide range of habitats and climates and may prove to be an important species to restore in the face of pending climate change.

Other Wildlife

White-tailed deer remain the single most important wildlife species for FDL members. Because interest in deer populations and deer hunting remains high, population and habitat management for deer remains a priority for the Wildlife Program. Fond du Lac tribal hunters take about 25-30% of their total deer harvest on the Reservation and most of the rest from the immediate surrounding area.

Bear are common on the Reservation and throughout most of the Ceded Territories; however, many Band members choose not to hunt bear for reasons of clan kinship. The average annual Band bear harvest by tribal members is usually zero to six animals. State-licensed hunters take several bears annually from the Reservation.

The wild rice lakes and numerous streams and beaver ponds on the Reservation support abundant waterfowl populations. In addition, large numbers of waterfowl pass through the Reservation during the spring and fall migrations. During fall waterfowl seasons, many tribal and state-licensed hunters hunt the Reservation's wetlands. Mallards, teal, wood duck, ringnecks, coots and Canada geese are common in the hunter's bag. Trumpeter swans are increasingly observed on area lakes as well. Abundant geese and swan populations may have significant negative impacts on wild rice production.

Other species traditionally hunted and trapped and important to FDL members include ruffed grouse and snowshoe hare. A few Band members harvest a small number of snapping turtles for personal use. As wild turkeys increase locally and in the Ceded Territories, interest in turkeys and turkey hunting can be expected to increase as well. Although interest in trapping by FDL members in recent years has stagnated and may be declining, furbearers such as beaver, mink, fox and otter remain abundant. Bobcat numbers have increased over time across much of their range in Minnesota and are relatively abundant on the FDL Reservation. However, little information on bobcat ecology and influences on their populations from Minnesota are available. Marten and fisher numbers may be declining with habitat changes and changes in predator populations.

The Canada lynx is listed as threatened by the federal government in the 1854 Ceded Territory and the gray wolf is listed as threatened throughout its Minnesota range, which includes all of the Reservation and 1854 and 1837 Ceded Territories. Moose have been petitioned for listing with a decision due in 2019. Bald eagles enjoy special protection under the Bald Eagle Protection Act. The use of eagle feathers and body parts and the federal regulations surrounding their possession remain an issue for many tribal members.

G3. Issues, Concerns, and Opportunities

- Wildlife and their habitat consistently ranked high in importance for Band members on past natural resource related surveys. Current anecdotal observations and public input indicate hunting and hunters will lead much of the wildlife program's focus.
- Fond du Lac has invested substantial capital in arguing for the recognition and meaningful exercise of their hunting and gathering rights under the Treaties of 1854 and 1837.
- Band members utilize wildlife such as deer, moose grouse and hare primarily for subsistence purposes. Other species of wildlife (eagles, wolves and bear,

etc.) hold particular spiritual and cultural significance for many FDL members and must be considered.

- Wildlife populations, good wildlife habitat and public access for hunting, trapping and related activities are still abundant within the Reservation and Ceded Territories. However, threats such as the loss of public lands or access to them and large landscape alterations such as proposed new mining activities will impact wildlife resources and the abilities of FDL members to exercise their treaty rights.
- Ongoing vegetation management, wildlife population management and other land use management practices by private landowners and especially by government agencies (counties, MN DNR and the US Forest Service) require ongoing project review and consultation for potential impacts to treaty rights and wildlife resources.
- At this time remaining issues with the 1854 Treaty case appear to be close to being settled. However, new political or legal challenges to the meaningful exercise of treaty rights are possible. In addition, experience with the 1837 Treaty indicates the nature and extent of treaty rights and how they are exercised will change as wildlife populations, technologies, cultural practices and other influences evolve. This will require ongoing consultations with tribal members and other agencies.
- National trends indicate youth participation rates in outdoor oriented activities, including hunting, trapping and other wildlife related activities, is declining and tribal trends may mirror this national trend.
- Impending climate change will likely affect northern species such as moose, lynx and marten at the southern edge of their range on the Reservation and the Ceded Territories. Climate change will also impact southern species such as turkeys or opossum at the northern end of their range. Still other species may find their numbers or preferred habitat altered. More research needs to be done to predict these changes and develop management strategies to address them.
- Once identified, management strategies for addressing climate change need to be implemented.
- Tribal wildlife resources and the demand for them will not remain static. Continued research into these changes and professional development of tribal wildlife managers will be required.
- Current resources devoted to the wildlife program are inadequate to fully address all of the issues and concerns for wildlife or take advantage of many of the opportunities.

G4. Goals

Goal - Help the Band develop and implement sound conservation strategies for their wildlife resources.

- Work with Fond du Lac Conservation Enforcement, advisory committees and the Reservation Business Committee to develop and implement seasons and bag limits and other harvest strategies as needed to ensure long-term resource

protection.

- Collect and analyze hunter and trapper harvest data for trends and reporting purposes.
- Coordinate with other Fond du Lac Resource Management Division programs, other state, county and federal agencies and private landowners to create and take advantage of opportunities to develop and implement wildlife habitat projects for species important to tribal members.
- Target research in ways that will improve understanding of the ecology and population dynamics of wildlife as necessary and enhance tribal wildlife management capabilities.
- Continue and expand wildlife population monitoring surveys to track changes over time.
- Research and develop strategies to adapt to pending climate change.

Goal - Ensure that treaty rights and the recreational and subsistence needs of Band members are met and maintained for future generations.

- Coordinate and liaison with the Reservation Business Committee, advisory groups and other Fond du Lac programs, federal and state agencies and legal representatives to ensure that plentiful opportunities are maintained and developed for Band members to enjoy a meaningful exercise of treaty rights and access wildlife resources for subsistence and recreational use.
- Coordinate with other Fond du Lac Divisions and Resource Management Division programs and other public and private landowners and agencies to ensure that the quality and quantity of wildlife habitat and wildlife populations are maintained and enhanced.
- Promote opportunities to recruit and retain tribal youth into hunting, trapping and other wildlife related activities.

H. Air Quality

H1. Description of the Resource

The Fond du Lac Air Quality Program works to protect Reservation air resources and the health and well being of Band members living on and off the Reservation. The Air Program currently consists of two full-time employees -- an Air Coordinator and an Air Quality Technician.

Clean air is important to Band members for health and aesthetic reasons. Asthma, COPD, and other health conditions can be exacerbated by poor air quality. The protection of plants and animals that are vulnerable to air pollution is also important. The Air Program focuses on air resources on the Reservation, in the 1837 and 1854 Ceded Territories, and in cities in Minnesota where there are large Native populations.

H2. Background

Sources of air pollution of concern to Fond du Lac come from both on and off the Reservation. On-Reservation sources consist of four natural gas pipelines and one associated pumping station, dirt and gravel roads, gas stations, and construction and pipeline maintenance equipment. Highway I-35 also runs adjacent to the Reservation, bringing with it emissions from several thousand vehicles per day. Off-Reservation sources include a nearby pulp and paper mill, and a ceiling tile manufacturing facility. Several taconite (iron ore) mines are located within 100 miles of the Reservation, and the cities of Duluth and Minneapolis/St. Paul (20 and 120 miles away, respectively) have many industrial facilities.

The Duluth/Superior area is also home to several large sources of air pollutants: an aircraft manufacturer, a lime plant and associated mineral plant, an oil refinery, a municipal steam production plant, a power plant, and a foundry, plus a robust rail and shipping industry. Emissions from commercial marine vehicles have been found to contribute substantial emissions of Volatile Organic Compounds (VOCs) and nitrous oxides (NOx), however quantification of these emissions is still underway. This area is considered to be of importance due to the large Native population in the area and to the proximity of Spirit Island, which was recently returned to Band ownership and holds great cultural significance to the Band.

The heart of the ambient air program is Fond du Lac's monitoring program, which tracks ambient levels of ozone, fine particulate, and mercury deposition (both in precipitation and leaf litter). In the past, the program has monitored nitrous oxides, dioxins, hydrogen sulfide, and acid deposition. However, these monitors have been discontinued due to collection of sufficient data or lack of funding. All monitoring is done in cooperation with the Minnesota Pollution Control Agency and/or the U.S. Environmental Protection Agency. All data collected in cooperation with these agencies is made available to the scientific community to aid in research and pollution control endeavors.

In January 2004, FDL was granted status by the USEPA as the air quality regulatory authority on the Reservation through the USEPA's Tribal Authority Rule. The Band submitted an application demonstrating its authority and ability to adequately manage such a program. In 2003 an air emission inventory was completed, summarizing emissions both on-Reservation and up to five miles off-Reservation. The inventory was updated in 2008 and is currently being updated with 2013 emissions data. The inventory shows from what facilities and source categories most local emissions are coming and will show Fond du Lac where to focus future regulatory activities or where additional monitoring might be needed.

Of particular concern to Fond du Lac are the "mercury in fish" consumption advisories common in the area. Mercury is a neurotoxin that builds up in the food chain and can be especially harmful to brain development in human fetuses. Research indicates that the primary source of mercury in the aquatic environment is atmospheric deposition,

primarily from power plants and industrial facilities that burn coal. Since fish is an important food source for many people residing on the Reservation, mercury contamination is a public health concern. Protection of wild rice and other food



Photo 16: Mercury deposition collection site

sources from mercury uptake is also a health and cultural concern. Also of importance is the role that sulfate loading plays in the conversion of mercury to methylmercury in freshwater bodies. Studies have shown that the reaction occurs to a greater degree in the presence of sulfate. This is a concern because of the presence of sulfate in the effluent from the taconite mines in the ceded territories. The methylization of mercury is what causes it to bioaccumulate in fish and thus be consumed by humans and animals farther up the food chain.

Regulations and Policy Participation

Another important part of the Fond du Lac Air Program is policy participation. The USEPA's policy of tribal self-governance allows tribes to apply under the Tribal Authority Rule to be considered the primary air quality authority in areas where the tribe exercises jurisdiction and wishes to administer an air quality program. A tribe must apply for authority over each

separable section of the Clean Air Act. Fond du Lac has authority for Treatment as an Affected State under the Tribal Authority Rule. As a result, Fond du Lac has the right to be consulted on the issuance of state and federal permits to local off-Reservation sources of air contaminants. Any comments that Fond du Lac makes on these permits must be considered in the review process. The Band often asserts tribal sovereignty by reading federal and state rulemaking proposals or reviewing draft air permits and Environmental Impact Assessments and Statements, and providing comments on their potential impact on the Band. Staff members also participate on phone calls and/or webinars related to these issues. Fond du Lac participates in the National Tribal Air Association (NTAA) as a member tribe. Additionally, the Band's Air Coordinator serves as the Region 5 alternate on the NTAA Executive Committee and previously served for six years on the USEPA's Clean Air Act Advisory Committee.

The Fond du Lac School Board has adopted a no-idling policy at Reservation schools. No-idling signs have been placed at bus loading areas. The Air Program is exploring the possibility of expanding this policy Reservation-wide. The Band is also writing an

application to receive Volkswagen Settlement funds to replace dirty on-road diesel with cleaner alternatives.

Finally, staff members conduct tribal outreach activities, through such events as the annual Health Fair, the Ojibwe School, articles in the Fond du Lac monthly newspaper, and the Resource Management Division's annual Taking Care of Things Gathering. There is a link on the Band's website where people can find weather and air quality information, including air quality forecasts.

Climate Change

Air program staff participated in writing a Climate Change Vulnerability Assessment and Adaptation Plan for the 1854 Ceded Territories and the Fond du Lac Reservation. Results of this document were conveyed to Band members through a series of articles in the Fond du Lac newspaper. Relevant committees (Elders' Concerns, Conservation, and Land Use Committees) were approached and informed through power point presentations.

H3. Issues, Concerns, and Opportunities

In 2010, the USEPA updated the National Ambient Air Quality Standards for NO_x and sulfur dioxide, based on the latest scientific health studies. These standards became more stringent and were averaged over shorter time frames, meaning that some facilities will need to re-evaluate their impact on ambient air quality levels. The Band is concerned with how these new standards will impact areas of interest for the Band. These include the Reservation itself, the 1854 and 1837 Ceded Territories, and areas with high populations of Native people, such as the city of Duluth. Duluth is located about 20 miles from the Reservation and is home to about 2,000 Native people, many of whom live in an area called the Central Hillside. Due to the unique topography of Duluth (700 foot elevation over three miles plus the affects of the huge water mass of Lake Superior), frequent inversions take place in this location, trapping pollutants near ground level. Additionally, several industrial facilities are located nearby, in both Wisconsin and Minnesota, meaning that the cumulative impacts of all of these sources may not be considered by either of the two states. Emissions from mobile sources (railroads, shipping traffic) are not well quantified at this time, meaning that total emissions are probably underestimated. A recent study conducted by St Louis County (where Duluth is located) has shown that people living in the Central Hillside area have a life expectancy that is 11 years less than people living in more affluent areas of Duluth. Together, these facts create a situation which the Band is continuing to study.

The Band is considering whether to pursue reclassification of the Reservation to Class I air quality. This would give the Band more authority over its own air quality and gives the Band the option of setting Air Quality Related Values that could protect species of interest to the Band. For instance, Fond du Lac may want to protect fish from harmful levels of mercury bio-accumulation, protect wild rice and fishing waters from acid deposition, or safeguard cultural resources.

Although clean air alone may not provide recreational opportunities, it is important when considered with other activities. People with asthma or other respiratory problems are not always able to participate in physical activities to the full extent that they may wish, particularly outdoor activities. Dirty air makes such respiratory conditions worse. Visibility limitations or objectionable odors caused by polluted air may lead to a loss of enjoyment of many outdoor activities, such as hiking, picnicking, or cross-country skiing. Deposition of acid or mercury in Reservation water bodies may cause damage to fish habitat or lead to fish consumption advisories. High concentrations of some pollutants in the air may also damage plants, some of which may be important in traditional food, spiritual, and medicinal uses.

H4. Goals and Objectives

Goal: Air Quality Monitoring

- Continue sample collection and site maintenance
- Continue data compilation and analysis
- Decide whether to maintain monitoring level, add monitors, or remove monitors
- Make policy and permitting recommendations based on monitoring data

Goal: Class I Redesignation

- Inform Reservation Business Committee on Class I options
- Consider the adequacy of Reservation air quality standards alone to maintain good air quality
- Consider the development of criteria to evaluate the level of adverse impacts on Air Quality Related Values

Goal: Policy Participation

- Review and comment on Federal Register and state policy listings
- Participate in conference calls to obtain information on proposed rules
- Attend meetings and conference calls for other policy groups as needed

Goal: Outreach Activities

- Educate Band members about the importance of good air quality and the effects of climate change through articles in the tribal newspaper, participation in the annual Health Fair, or the Annual Taking Care of Things Gathering and through programs at the tribal school.
- Other areas of special interest may include smoking cessation, asthma awareness, efficient wood burning, and discouraging the use of burn barrels.
- Expand no-idling policy as directed by the RBC.

Goal: Expand staffing

- If funds can be found, the Band would like to increase staff to three FTE. Grant opportunities will be monitored to see if this is a possibility.

3. Socio-Economic Resources

A. Conservation/Enforcement

A1. Description of the Resource

The Fond du Lac Reservation encompasses slightly more than 100,000 acres in two counties, St. Louis and Carlton. The 1854 Ceded Territory encompasses 6.2 million acres and the 1837 Ceded Territory encompasses 3.2 million acres. The vastness of these areas presents numerous challenges for the enforcement of Conservation Code regulations.

A2. Background

The Fond du Lac Reservation Conservation Officers are in charge of the enforcement of On-Reservation Codes and the 1854 and 1837 Ceded Territory Codes, monitoring of game limits, seasons, and all illegal activities. Presently, there are seven full time Conservation Officers and one Chief Conservation Officer employed by FDL. They work both within the exterior boundaries of the Reservation and within the Ceded Territories.

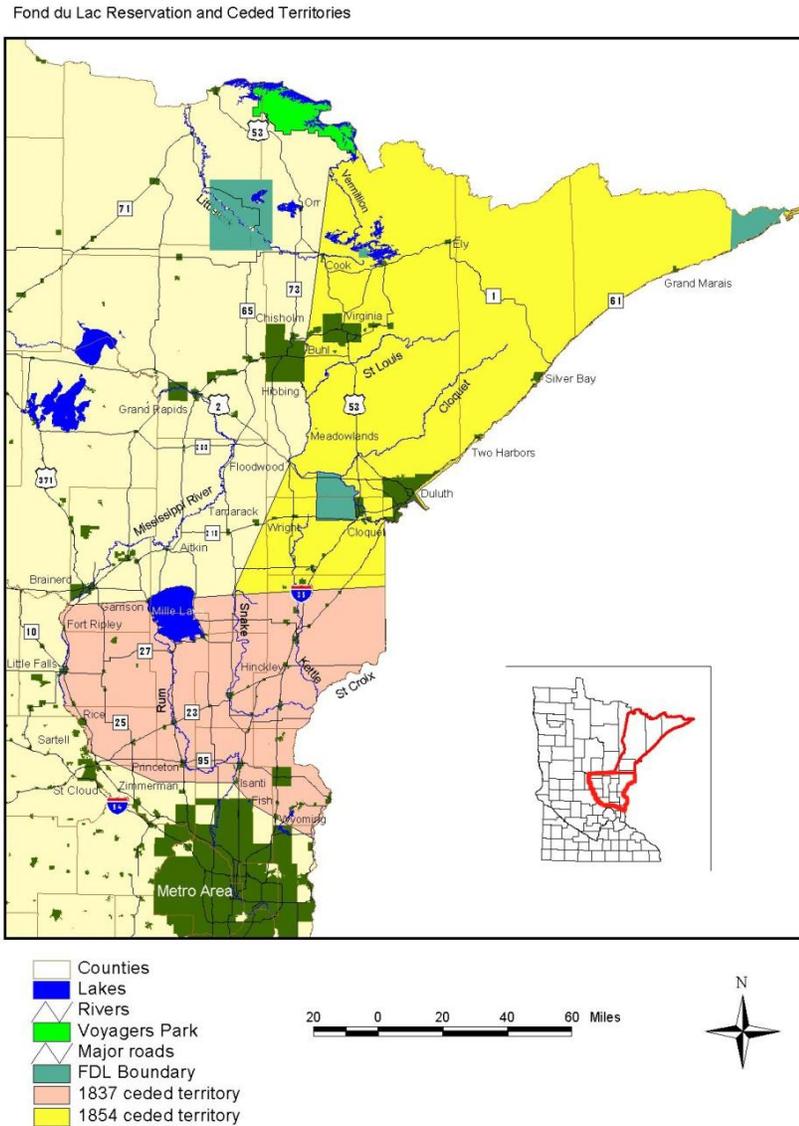


Figure 16: Ceded Territory Map

A3. Issues, concerns, and opportunities

- Secure adequate funding to assure the ability to replace equipment like radios, vehicles, ATVs, and boats as needed. Damaged or outdated equipment can pose serious safety threats to officers in the field.
- Coordinate with state of Minnesota on enforcement for non-Indians in 1837 and 1854 Ceded Territories.
- Training of new Conservation Officers and refresher training for Conservation Officers currently working for Fond du Lac, as needed.
- Development and enforcement of new rules and regulations proposed for the Conservation Code.

A4. Goals and objectives

- Teach annual gun safety courses for Reservation youth to ensure that they have proper training to safely engage in traditional hunting practices.
- Continue to respond to nuisance animal concerns. Companion animals are live trapped and brought to Friends of Animals Humane Society shelter in Cloquet. Wild animals are live trapped and relocated.
- Enforcement of ordinances, regulations, and rules in the 1837 and 1854 Ceded Territories, with consideration given to environmental protections such as water quality standards, wetland fill concerns, wellhead protections, pesticide use regulations, and air quality standards on the Reservation.
- Many of these rules, regulations and ordinances are currently under civil jurisdiction, but should also be enforceable in the tribal court system. Other legal questions involve jurisdiction over private land within the Reservation. Preliminary discussions on these issues have been initiated by an outside legal firm.

B. Recreational Resources

B1. Description of the Resource

The major outdoor recreational attractions on the Fond du Lac Reservation are its woods, waters and wildlife. The region's large public land base enhances its potential for outdoor recreation activities. The Ditchbank area in the western portion of the Reservation, the St. Louis River valley, and many lakes provide most of the outdoor recreation areas within the Reservation boundaries.

The primary recreational activities that Band members enjoy include fishing, hunting, snowmobiling and ATV riding. Other activities include cross-country skiing, camping, canoeing, boating, horseback riding, swimming, picnicking, and hiking.

Recreational activities and the associated areas that are currently managed by the Fond du Lac Band are fairly limited. The Band has several community parks

(playgrounds) in housing developments, a small nature/interpretive trail behind the Fond du Lac Ojibwe School, two beach access properties on Big Lake, a campground on Big Lake and an 18-hole golf course that is part of the Black Bear Casino Resort complex. In addition, there are many informal trail networks that exist as a result of forestry practices and land uses across the Fond du Lac Reservation. The primary user groups for these trails are ATV and snowmobile riders.

Management of recreational facilities by the Resource Management Division is very limited. Division staff maintains the landings on the wild rice lakes within Fond du Lac Reservation boundaries. The Resource Management Division also co-manages the nature trail with the Fond du Lac Ojibwe School.

Since 2008, the Fond du Lac Band has made substantial investment in Kiwenz Campground on the north end of Big Lake, including construction of a bathhouse, boat ramp, beach improvements and power for campers. The Fond du Lac Resource Management Division managed the campground for a number of years, but those responsibilities were turned over to the newly formed FDL Public Works Department in 2016.

B2. Issues, Concerns, and Opportunities

- From an economic standpoint, there is the opportunity to expand recreational trails near the casino, and perhaps in other areas, by linking into existing state and county trail networks, especially snowmobile and ATV trails.
- **XXX** miles of trails on Fond du Lac lands have been identified and mapped using GPS. A complete inventory of these trails should be conducted to determine suitability for snowmobile, ATV and other uses.
- Research the development of water access points along the St. Louis River and selected lakes.
- FDL has been working with the City of Cloquet on recreational trails near the east boundary of Fond du Lac. Currently cross country ski trails are co-managed by the city and Fond du Lac.
- The City of Cloquet is exploring the possibility of developing mountain bike trails in the same area as the cross country ski trails. This may be an opportunity to co-manage a mountain bike trail system

C. Energy Resources and Management

C1. Description of the Resource

The Fond du Lac Reservation is located in a region of North America that has a cold, harsh climate and high energy costs. Every year, the Band and its members spend thousands of dollars on natural gas, propane gas and electricity to heat, light and power its public facilities and residences.

The Reservation also encompasses many natural energy resources. Fond du Lac lands contain high ridge lines, large forestry tracts, access to moving rivers and streams, all of which contain latent potential for renewable energy power generation. As a result, Fond du Lac is incorporating energy efficiency and renewable energy into the design and construction of all of its future buildings, which will lower life cycle maintenance and operation costs. These buildings will be used to educate the community about energy efficiency and will assist in efforts to expand sustainable development on the Fond du Lac Reservation.

C2. Background

Fond du Lac has a history of commitment to energy efficiency and passive solar design, as evidenced by 25 energy efficient homes developed in 2003 by working with local utility Minnesota Power reviewing plans, adding energy efficiency measures and conducting blower door tests. In addition, the Reservation Business Committee approved a resolution in February of 2007 that ratified the Kyoto Protocol and pledged that Fond du Lac will obtain 20 percent of its electricity from renewable energy resources by 2020. Shortly after that, a strategic energy plan was drafted.

In 2010, the Fond du Lac Band built the first Leadership in Energy and Environmental Design (LEED) building in Carlton County. The Resource Management Division building has a 12 kW solar electric system on the roof and many other energy efficient components. In addition, a 3 kW solar electric system was installed at the Ojibwe School powwow grounds, and a 1,000 kW solar electric system was constructed in the Black Bear Casino Resort gravel pit. FDL adopted the Minnesota Residential Building and Energy Code in 2012.

The Fond du Lac Band partnered with Minnesota Power in 2012 to conduct energy audits on commercial buildings, resulting in the installation of lighting measures to reduce their energy use by 15%. In 2016, Fond du Lac hired an energy services company to conduct an investment grade energy audit on all commercial buildings. Upgrades identified in the audit will be completed in 2017, with results expected to reflect a 24% reduction in energy use.

FDL has benchmarked commercial buildings and plans to start benchmarking residential buildings, conducting residential energy audits and making energy improvements. Alternative energy site reviews are being conducted as part of the planning process for building new LEED and zero-net energy residential homes. Plans for the energy efficient homes include solar electric systems to provide power.

Wind Assessment

Fond du Lac Environmental Program staff installed a 20-meter anemometer tower on April 8, 2004, north of the Black Bear Casino Resort. The National Renewable Energy Laboratory also suggested installing two 50-meter anemometer towers, which will provide the wind speed monitoring data necessary to determine the feasibility of a wind project. As of October 1, 2017, the two 50-meter stations had been in operation for a full two years. The data from both sites are currently being analyzed and a wind resource evaluation report is being prepared for the Band. The report will characterize the quality of the wind resources at the two locations to determine if a commercial wind energy venture is feasible.



Photo 17: Anemometer tower

Biomass Energy

The Fond du Lac Band has land resources of approximately 42,480 acres. The Band manages its timber land under a long-term sustainable management plan, developed through an extensive process that included broad tribal member input and support. The primary goals of this plan are sustainable timber harvesting and cultural and wildlife enhancement.

Currently, forest growth on the Band's lands has a much higher economic value for pulp and saw logs than for biomass fuel. At the same time, management for the higher value uses identified does produce some wood waste that serves as biomass fuel stock. Fond du Lac currently supplies Sappi Fine Paper and Minnesota Power cogeneration power plants with a biomass supply of wood chip waste. As the cost of fossil fuel increases, a shift of designated use to biomass fuel may occur for pulp and saw logs.

A Sawyer Community Center Wood Chip District Heating system utilizing self-sourced wood chips will be developed. It is expected to displace 15,108 gallons of propane per

year by meeting about 90% of the heating requirements of the Community Center building. The alternative fuel system is expected to improve air quality by removing 96 tons of carbon dioxide per year.

Solar Energy

FDL has been working on finding funding for the installation of five different types of photovoltaic (PV) systems, ranging from a total house PV system in a zero net energy home to a cost-efficient retrofit system in an existing home. As of August 2017, four residential 3kW solar electric power systems and one solar electric hot water system had been installed. The costs related to each system type will be used to develop a business model guide for application of such systems to various system levels and budgets. The research will generate performance data that supports design needs that can be duplicated in future applications.



Photo 18: Solar array in reclaimed gravel pit near the Black Bear Casino Resort

Outreach

The Energy Project Manager/ Environmental Specialist and Electrical Engineer give solar education tours to schools and Band members.

C3. Issues, Concerns and Opportunities

- Energy audits
- Benchmark Band- owned buildings
- Cost of energy efficient upgrades
- Tribal utility feasibility
- Future fleet energy supply
- Access utilities on the Fond du Lac Reservation to lower energy cost
- Finance renewable energy projects

C4. Goals and Objectives

Goal: Develop a Strategic Energy Plan and update it yearly

- Draft a Tribal energy vision, mission, and goals
- Assess energy use and the potential for resource management
- Develop an action plan to achieve the energy goals

Goal: Establish a Fond du Lac Utility

- Establish Fond du Lac Utilities
- Form an Energy Committee
- Analyze energy regulatory capacity

Goal: Wind Energy

- Identify potential wind turbine sites
- Collect met station data from two prime locations
- Interconnection feasibility

Goal: Solar Energy

- Analyze sites for potential solar photovoltaic and thermal systems
- Monitor and maintain existing solar sites

Goal: Energy Load Assessment of Buildings

- Work with Minnesota Power and natural gas vendor to collect baseline billing profiles
- Conduct site visits to gather energy information on each building
- Enter and analyze data for model buildings load and peak demand
- Meet with representatives about building efficiency and utility needs

Goal: Biomass Project 1.7 MMBTU/500,000 KW Unit

- Evaluate equipment needs for chipping and hauling of biomass slash
- Design building and equipment to utilize wood chip fuel
- Build and commission biomass building

4. Alternatives for Resource Programs

Alternative 1 (Considered a no action or status quo alternative)

This alternative will continue to meet the current level of activity on the Reservation. However, it falls short of the goals and objectives that were identified in the planning process. The Band does not have programs in place that meet the current needs of some resources. Therefore, the long-term management efforts include programs not currently in place.

Impacts from this alternative:

There would likely be a shortfall in management needs. Some resources are not funded or are funded well below the level needed to meet objectives.

Cultural/Traditional: The Tribal Historical Preservation Office will continue to exercise its authority under the National Historic Preservation Act by participating in consultation with federal agencies on projects that may affect cultural resources significant to the Fond du Lac Band. The office will be staffed by a full-time Tribal Historical Preservation Officer, with another .33 FTE to assist with grant and policy issues. **This is the preferred alternative.**

Manoomin (Wild Rice): Maintain existing program of water level management and restoration activities with the primary focus being the On-Reservation manoomin lakes. 75% of staff time that is dedicated to manoomin is dedicated to On-Reservation manoomin lakes.

Water and Wetlands: The program will continue with existing staff of five FTEs maintaining routine surface water, ground water and wetlands monitoring programs and existing USEPA-delegated authorities under the CWA. Restoration projects and wetland conservation program are dependent upon outside funding. Technical review and comments on proposed projects that affect reservation or treaty-protected resources will continue, as staff time allows.

Fisheries: The program will continue with one full-time fisheries biologist concentrating efforts in the Ceded Territories, with assistance from Resource Management Division technicians. Routine monitoring programs in the 1854 Ceded Territory will continue, and staff will continue to pursue harvest opportunities in Lake Superior.

Land Resources: Maintain the current process and staffing for the Fee to Trust function.

Forestry: Under this alternative:

- Harvest rates will be set at 4,500 cords per year, subject to change based on land acquisition and re-calculation of sustainable allowable cut calculations.
- The Cultural Preservation Zone will be excluded from the allowable cut calculations.
- Forest development practices would remain the same. Site conversion or plantation management would remain the focus of forest development. The amount of forest development accomplished remains dependent on funds and the availability of suitable sites. Mechanical release of the seedlings will remain the primary means of controlling unwanted vegetation. Herbicide use will be an optional release method.
- Roads built to access timber sales will not be closed but will not be maintained. Roads will be seeded with vegetation when timber sale activity is completed to prevent erosion and provide browse for deer.
- Timber harvest in the Cultural Preservation District will be limited to selection harvest or free thinning. This will minimize the negative

aesthetic impacts of any management activity. Roads will be closed (bermed or gated) to prevent vehicle traffic.

- Even-age timber harvests will continue where natural resource and forest management is permitted.
- Other resources will be protected.

Table 1: Alternative I breakdown of harvest

Covertime	Rotation Age	Annual Allowable Cut in Cords
Aspen	65	2,761
Paper Birch	65	337
Northern Hardwood	75	723
Pine/Spruce Plantations	125	161
Swamp Conifers	90	179
Swamp Hardwoods	90	244
Fir/Spruce	55	128
White Cedar	No ACC	--
Natural Pine	No ACC	--
Total AAC		4,533

Wildlife: This alternative will continue to meet very basic program goals on the Reservation and in the Ceded Territories. However, the Band does not have adequate staff in place to address all of the wildlife related goals and objectives identified above. As compared to other natural resource agencies with similar wildlife responsibilities in northeast Minnesota, the program is understaffed. The Wildlife Program has a single full time wildlife biologist with some field assistance available at certain times of the year.

Air Quality: Maintain staffing at current levels. Maintain current monitoring levels and current level of participation in regulatory issues.

Conservation/ Enforcement: The program continues with eight conservation officers and an administrative assistant enforcing existing On-Reservation and Ceded Territory Conservation Codes.

Recreational Resources: Currently the Resource Management Division does not manage recreational activities.

Energy Resources: Continue current operations with existing level of employees.

Personnel to implement this alternative:

Resource	Number of Employees	Resource	Number of Employees
Cultural/Traditional	X	Wildlife	X
Wild Rice	X	Air Quality	X
Water/Wetlands	X	Conservation/Enforcement	X
Fisheries	X	Recreation	X
Land Resources	X	Energy Resources	X
Forestry	X		

Approximate costs to implement this alternative:

This alternative allows for the continuation of current management activity. The cost would be the current budget. If the current program is underfunded., additional funding could allow the management activity to expand to the level prescribed in this alternative’s objectives.

Alternative 2: Expansion & Improvement of Current Programs

Generally expand program to accommodate greater opportunities. Management activity in the ceded territories will increase and require more workers.

Impacts from this alternative:

Cultural/Traditional: Expand the THPO program to include a total of 2.33 FTEs to encompass the development and implementation of tribal cultural tourism.

Wild Rice: Maintain existing On-Reservation management and restoration activities while improving wild rice harvest opportunities by conducting monitoring and restoration projects in the Ceded territories. 2 additional FTE needed. Staff time would be evenly divided between On-Reservation and Ceded Territory manoomin management. Additional funding required for staff, equipment, maintenance, fuel, and travel costs. **This is the preferred alternative.**

Water and Wetlands: Increase program staffing to include seasonal technicians to assist with routine monitoring programs, in-house sample processing and analysis. Seek supplemental funding to support additional

(collaborative) monitoring and assessment of resources in 1854 Ceded Territory.

Fisheries: Increase program staffing to include full time worker for the on-Reservation program, develop a strategy for on-Reservation fisheries, conduct river and stream surveys, and establish monitoring programs in the 1837 Ceded Territory.

Land Resources: Join the BIA Fee to Trust Consortium, which would reduce the time for the fee to trust process from several years to approximately nine months.

Forestry: Ecological Silviculture with a “No Harvest Zone”

Under this alternative:

- A portion of the Cultural Preservation District will remain open to timber harvest.
- A limited harvest zone will be established in areas that are within a quarter mile of the wild rice lakes, the St. Louis River, and within the Cultural Preservation District.
- Harvest rates will be set at 4,300 cords.
- The harvest could be temporarily accelerated and over-mature timber harvested within the next ten to twenty years before most of it dies.
- The Minnesota Department of Natural Resources Native Plant Community Field Guide will be used to determine habitat types and successional pathways, and to help the forest managers make management choices.
- Harvesting old aspen and birch will be the focus of forest management efforts. The rotation age will be set at 65 years and diversity may be increased by introducing white pine, white spruce, red oak and other hardwoods into relatively pure aspen stands.
- Wildlife and traditional native products will be an important consideration in management.
- Northern hardwoods will be managed on an all-aged basis, for diversity.
- Red and white pine stands will be managed with an extended rotation (125+ years). The pine types will be regenerated primarily using the shelter wood method. Fire will play a role in pine regeneration.
- More emphasis will be placed on regenerating paper birch.
- Most tree planting will be to enhance natural regeneration.
- Only roads identified as part of a permanent road network will be maintained.

Table2: Alternative Ila breakdown of harvest

Covertype	Rotation Age	Annual Allowable Cut in Cords
Aspen	65	2,430
Paper Birch	65	387
Northern Hardwood	75	829
Pine/Spruce Plantations	125	0
Swamp Conifers	90	217
Swamp Hardwoods	125	294
Fir/Spruce	125	107
White Cedar		--
Natural Pine		--
Total AAC		4,264

This is the preferred alternative.

Wildlife: Add an additional full time wildlife biologist. Another full time wildlife employee would greatly improve the program’s ability to meet the goals and objectives identified above. Develop a dedicated funding stream for wildlife to allow freedom from federal budgets and for FDL to establish its own wildlife related priorities and not those of granting agencies. Add a full time assistant wildlife biologist to permit focus on developing and implementing wildlife habitat projects on and near the Reservation where most band members live, and assisting with field research and population surveys on a year round basis. Program would consist of a full time wildlife and assistant wildlife biologist and associated program support. **This is the preferred alternative.**

Air quality: Expand current program by hiring one additional FTE. Continue to assert tribal sovereignty by pursuing Class I Redesignation. **This is the preferred alternative.**

Conservation/ Enforcement: Expand the program to include increased Band member harvest opportunities in Minnesota waters of Lake Superior. This will require the development of a Harvest Management Plan and monitoring program for Lake Superior. **This is the preferred alternative.**

Recreation: Develop ATV plan including but not limited to inventory of ATV trails, Completing plan to manage trails, develop ATV regulations based on plan. Seek funding to carry out alternative.

Energy Resources: Follow the Strategic Energy Plan and capital development project. **This is the preferred alternative.**

Personnel to implement this alternative:

Resource	Number of Employees	Resource	Number of Employees
Cultural/Traditional	X	Wildlife	X
Wild Rice	X	Air quality	X
Water/Wetlands	X	Conservation/Enforcement	X
Fisheries	X	Recreation	X
Land Resources	X	Energy Resources	X
Forestry	X		

Alternative 3: Reprioritize Program Directives

In certain programs, there is the opportunity to develop new strategic directions for the managers. Those programs with clearly defined alternative strategies are outlined below.

Impacts from this alternative:

Cultural/Traditional: No third alternative was developed for this resource.

Wild Rice: No third alternative was developed for this resource.

Water & Wetlands: Increase program staffing to include additional FTE to allow proper separation of regulatory review and project development assistance. Pursue TAS for additional USEPA-delegated authorities under the CWA: 303(d), 402, and 404. Establish comprehensive tribal CWA regulatory program for reservation water and wetland resources. Include additional FTE with hydrology/modeling expertise to provide tribal capacity for these aspects of water resource management and protection. Also increase program staffing to include seasonal technicians to assist with routine monitoring programs, in-house sample processing and analysis. **This is the preferred alternative.**

Fisheries: Increase program staffing to include a full-time worker for the Lake Superior Program, and develop a strategy and a Harvest Management Plan for harvest on Lake Superior, conduct surveys within Lake Superior, and establish harvest monitoring programs for Lake Superior. **This is the preferred alternative.**

Land Resources: Compact or contract the Fee to Trust function from BIA and add one additional FTE to focus exclusively on the Fee to Trust process. This would eliminate the need to join the Fee to Trust Consortium. **This is the preferred alternative.**

Forestry: Implement Ecological Forestry with a “No Harvest Zone”
Under this alternative:

- Forest management activities will be very limited in the Cultural Preservation Zone. Forest management may occur to correct a forest health concern or wildfire hazard. Management activities may also occur if active management is needed to meet diversity goals.
- The Cultural Preservation Zone will not be included in Annual Allowable Cut calculations.
- Harvest rates will be set at 3,400 cords per year but would be adjusted as land is acquired and forest inventory is updated.
- The remainder of outcomes will be the same as in Alternative IIa.

Table: 3 Alternative IIb breakdown of harvest

Covertime	Rotation Age	Annual Allowable Cut in Cords
Aspen	65	1,900
Paper Birch	65	269
Northern Hardwood	75	525
Pine/Spruce Plantations	125	164
Swamp Conifers	90	215
Swamp Hardwoods	125	101
Fir/Spruce	125	187
White Cedar		--
Natural Pine		--
Total AAC		3,361

Wildlife: No alternative 3 was developed for this resource.

Air Quality: No Alternative 3 was developed for this resource.

Conservation/Enforcement: No Alternative 3 was developed for this resource.

Recreation: Carry out ATV plan outlined in alternative #2, plus work on developing other recreational activities such as water access. **This is the preferred alternative.**

Energy Resources: Conduct geothermal, wind and hydroelectric assessments to help the Band determine the optimal path to energy independence.

Personnel to implement this alternative:

Resource	Number of Employees	Resource	Number of Employees
Cultural/Traditional	X	Wildlife	X
Wild Rice	X	Air quality	X
Water/Wetlands	X	Conservation/Enforcement	X
Fisheries	X	Recreation	X
Land Resources	X	Energy Resources	X
Forestry	X		

References

1. Protecting the Waters for Future Generations Sept 2006
2. Fond du Lac: Land Use Ordinance Feb 2007
3. A Guide to Habitat Types of the Fond du Lac Reservation 2005
4. FdL Water Quality Standards Ordinance 2001
5. FdL Nonpoint Source Assessment Report 2004
6. Joint Comprehensive Wetland Protection & Management Plan Feb. 2006
7. FdL Wetlands Protection & Management Ordinance June 2006
8. MN. DNR Field Guide to Native Plant Communities
9. Sustaining MN. Forest Resources: Voluntary Site Level Guidelines
10. FdL Fire Management Plan
11. FdL Forest Management Plan

Appendices

Appendix X

Definitions: Acronyms in Document

AQRV's	Air Quality Related Values
ATV	All Terrain Vehicles
BIA	Bureau of Indian Affairs
BMPs	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Requirements
CWA:	Clean Water Act
CWAMP	Comprehensive Wetlands Assessment & Monitoring
ECS	Ecological Classification Systems
EPA	Environmental Protection Agency
FDL	Fond du Lac Band
GWPP	Ground Water Protection Plan
IRMP	Integrated Resource Management Plan
ILCA	Indian Lands Consolidation Act
NEPA	National Environmental Policy Act
NPC	Native Plant Community
NWI	National Wetlands Inventory
NRCS	Natural Resources Conservation Service
ORR	Outstanding Reservation Resource Waters
OWP	Office of Water Protection
RBC	Reservation Business Committee
SWPP	Source Water Protection Plan
TAS	Treatment as State
TAR	Tribal Authority Rule
TIP	Tribal Implementation Plan
USGS	United States Geological Survey
USDA	United States Dept. of Agriculture
VHS	Viral Hemorrhagic Septicemia
WQMP	Water Quality Monitoring Program