Fond du Lac Reservation

Joint Comprehensive Wetland Protection and Management Plan

Fond du Lac Reservation – Office of Water Protection
Carlton County – Planning and Zoning
St. Louis County – Planning Department
City of Cloquet – Public Works

16 January 2006

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INTRODUCTION

WHAT IS A JOINT COMPREHENSIVE WETLAND PROTECTION AND MANAGEMENT PLAN?

Simply put, a Joint Comprehensive Wetland Protection and Management Plan (Joint-CWPMP) is a plan that outlines ways to protect and conserve wetlands in a certain geographic area. These plans often identify the resource(s) of the area, identify current protections, and give recommendations to benefit the resource(s). Although this Plan is being developed with the cooperation of Carlton County and St. Louis County, and the City of Cloquet, this Plan is primarily designed to address the needs and concerns of the Fond du Lac Band of Lake Superior Chippewa and therefore primarily addresses those needs and concerns specific to the Fond du Lac Indian Reservation regarding wetlands.

TERMINOLOGY

All terms that are in need of defining, can be found in the Appendix section at the end of this Plan.

PARTICIPATION

The following agencies, organizations, and groups participated in the development of the FDL-Joint CWPMP:

- Fond du Lac Reservation Business Committee
- Fond du Lac Conservation Committee
- Fond du Lac Legal Department
- Fond du Lac Reservation Resource Management Division
    - Environmental Program
    - Forestry Program
    - Natural Resources Program
    - Wildlife Program
    - Fisheries Program
- Environmental Protection Agency
    - Headquarters, Washington, D.C.
        - Office of Wetlands, Oceans, and Watersheds
    - Region 5, Chicago, IL
- Minnesota Department of Natural Resources
    - Ecological Services
    - Waters
- Minnesota Board of Water and Soil Resources
- Minnesota Department of Transportation

United States Department of Agriculture
    Natural Resources Conservation Service
United States Department of Health and Human Services
    Indian Health Service
        Bemidji Area Office
United States Department of the Interior
    Bureau of Indian Affairs
    United States Fish and Wildlife Service
        National Wetland Inventory
United States Army Corps of Engineers
    St. Paul District
    Two Harbors Field Station
Carlton County, Minnesota
    Planning and Zoning
St. Louis County, Minnesota
    Planning Department
    Public Works Department
City of Cloquet, Minnesota
Soil and Water Conservation Districts
    Carlton County SWCD
    South St. Louis County SWCD

FUNDING

The development of this Joint CWPMP is an update to the Fond du Lac Wetland Protection and Conservation Plan (FDL-WPCP) completed in October of 2000. The FDL-WPCP was funded by an Environmental Protection Agency Wetland Grant (Grant Number CD 985868010). Additional financial assistance was received by the Fond du Lac Reservation Business Committee through the Resource Management Division. This Joint CWPMP was developed in part through an EPA 106 Surface Water Grant (Grant Number I-97505402).

LIVING DOCUMENT

The Fond du Lac Reservation Joint Comprehensive Wetland Protection and Management Plan is designed as a living document and will be reviewed and updated as necessary to conform to the vision of the Fond du Lac Band of Lake Superior Chippewa.

RESERVATION BACKGROUND AND RESOURCES AFFECTING WETLANDS

HISTORIC SETTING

The Fond du Lac Indian Reservation was established by the Treaty of 1854 (known as the Treaty of LaPointe) with the United States Government (10 Stat. 1109). This treaty reserved certain rights for the Fond du Lac Band and also established the Bois Forte and Grand Portage Indian Reservations.

GEOGRAPHIC SETTING

The Fond du Lac Reservation lies in Northeastern Minnesota approximately 20 miles west of Duluth, Minnesota (population 82,000) and the extreme western tip of Lake Superior. The eastern edge of the Reservation is located in the City of Cloquet, Minnesota (population 11,000)(see **Map 1 – Fond du Lac Reservation Location**). Nearly half (47.2% or 47,818.7 acres) of the 101,401.1 acres of the Reservation occurs in southern St. Louis County, while the southern portion (52.8% or 53,582.4 acres) occurs in northern Carlton County. The St. Louis River borders the Reservation's northern and northeastern boundary and a portion of its eastern boundary (see **Map 2 – Fond du Lac Reservation Overview**).

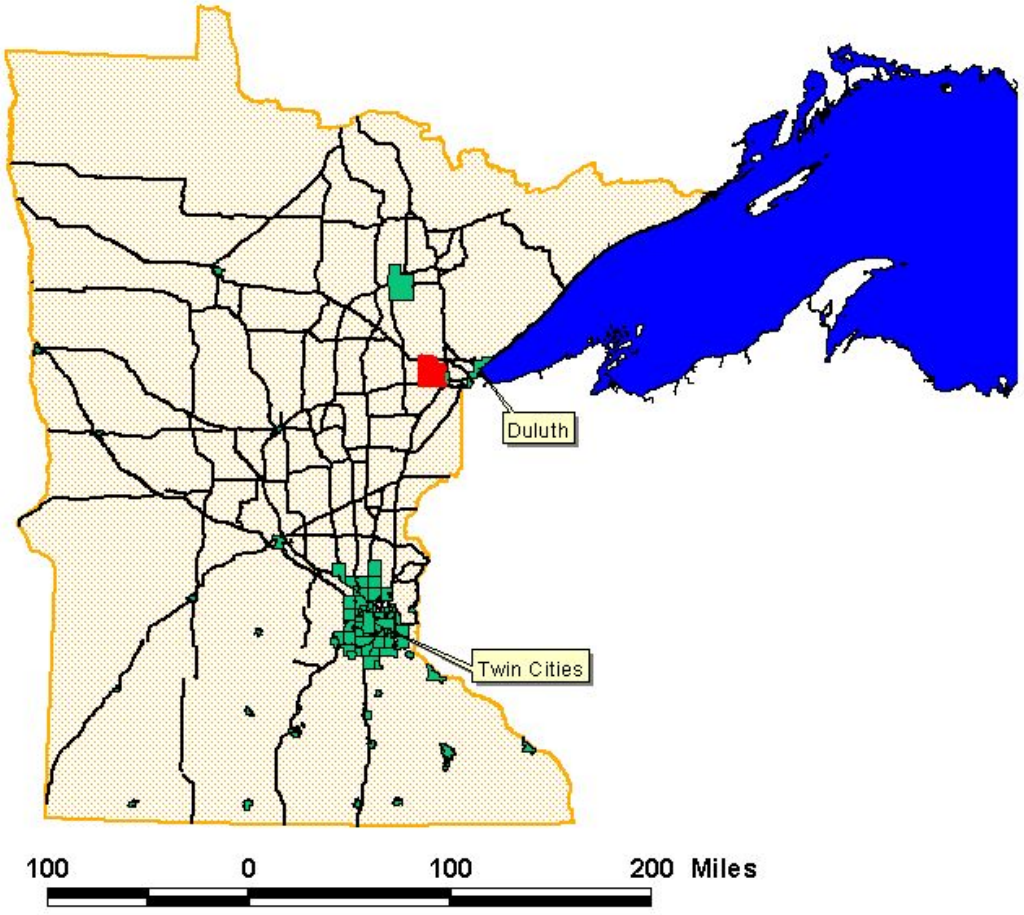
TOPOGRAPHY

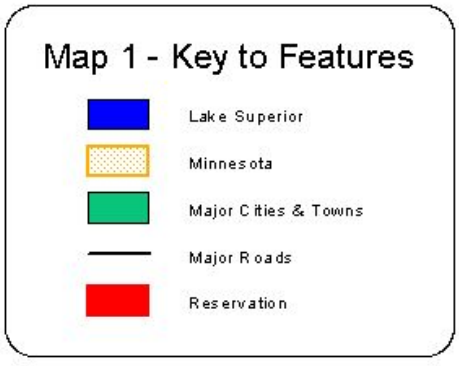
Elevations on the Reservation range from 1140 feet above sea level along the St. Louis River to 1,610 feet at the Arrowhead Lookout Tower near Joe Martin Lake in the northwestern portion of the Reservation. The majority of the southern and eastern portions of the Reservation are level, while areas adjacent to the St. Louis River and the northwest portion of the Reservation are dominated by rolling hills.

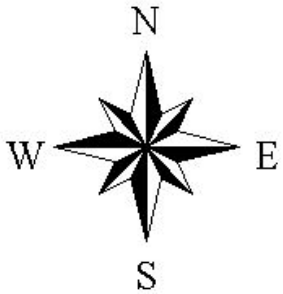
CLIMATE

The Fond du Lac Reservation is dominated by a cool temperate climate. Winters are usually severe with occasional periods of intense cold, while summers are mild with occasional hot spells. The low average temperature in January is 9.4^{O} F and the high average temperature in July is 66.7^{O} F. Temperature extremes range from 100^{O} F to -40^{O} F (FDL-NRMP, 1990). Humidity levels average in the 70 percentile RH. The mean annual precipitation for the area is 31 inches (Ruhl, 1989). Of this 31 inches, an estimated 12 inches results in runoff, while 19 inches is lost through evapotranspiration (Ruhl, 1989).

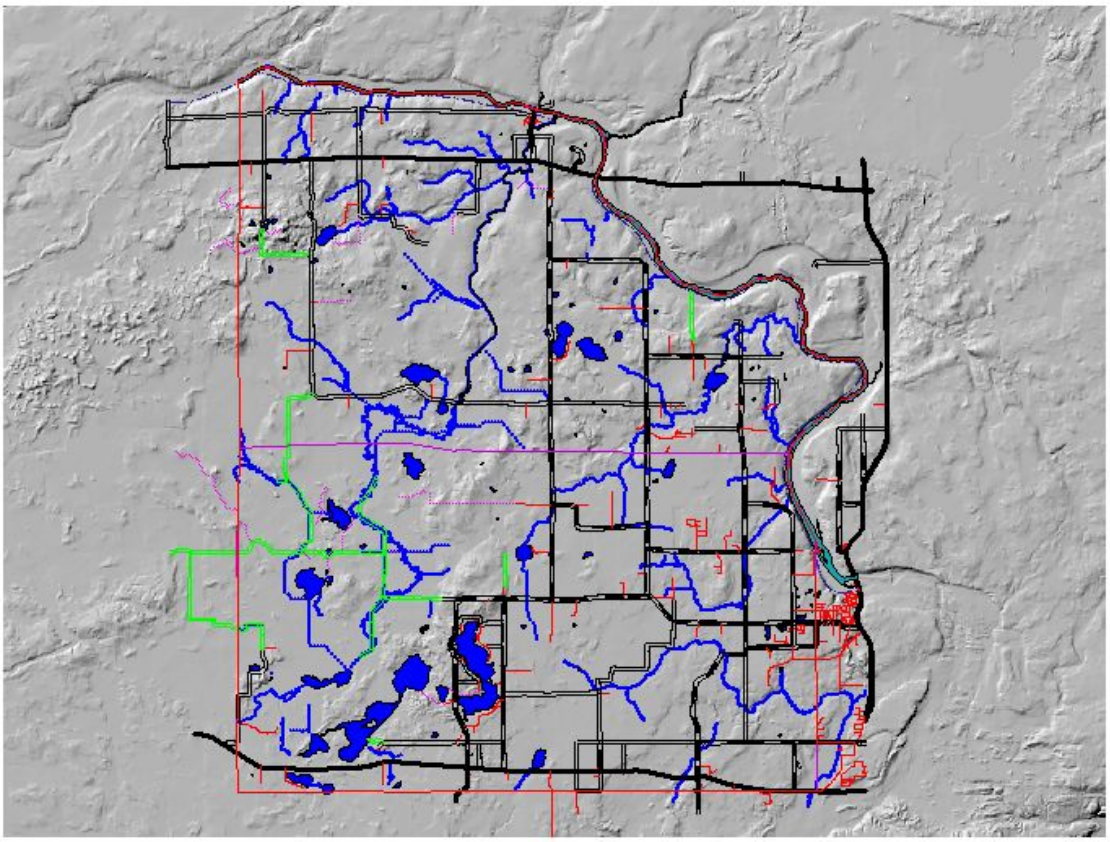
Map 1 - Fond du Lac Reservation Location







Map 2 - Fond du Lac Reservation Overview



6 0 6 12 Miles

Map 2 - Key to Features

- Reservation Boundary
- County Line
- St. Louis River

Roads

- First class
- Secondary
- Light Duty
- Residential
- Minimum Maintenanc
- Forest
- Railroad Service
- Streams
- Lakes
- Ditches

N W E S

HYDROLOGY

Approximately 95% of the Fond du Lac Reservation occurs in the St. Louis River Watershed (Minnesota Major Watershed Unit #3). The remaining 5% of the Reservation drains (via the source of the Moosehorn River) into the Kettle River Watershed (Minnesota Major Watershed Unit #35). In addition, 13 sub-watersheds have been identified on the Reservation. All of them, save one (Big Lake Watershed), are part of the St. Louis River Major Watershed. The largest of these sub-watersheds is the Stoney Brook Watershed consisting of 29,185.3 acres.

Table 1 - FDL Waters, Acreages, and Designated Uses, lists all the major water bodies that occur on the Reservation along with their total acreage and designated uses. The designated uses, taken from the Fond du Lac Water Quality Standards, are explained as follows:

A. Public Water Supply: A stream, reach, lake or impoundment specifically designated by the Reservation Business Committee as suitable to provide an adequate supply of drinking water for the continuation of the health and well-being of the residents of the Fond du Lac Reservation.

B. Wildlife: All surface waters capable of providing a water supply, vegetative habitat and prey for the support and propagation of wildlife located within the Fond du Lac Reservation.

C. Aquatic Life:

C1. Cold Water Fisheries: A stream, reach, lake or impoundment where water temperature, habitat and other characteristics are suitable for support and propagation of cold water fish and other aquatic life, or serving as a spawning or nursery area for cold water fish species. Examples of cold water fish include brook trout and rainbow trout.

C2. Warm Water Fisheries: A stream, reach, lake or impoundment where water temperature, habitat and other characteristics are suitable for support and propagation of warm water fish and other aquatic life, or serving as a spawning or nursery area for warm water fish species. Examples of warm water fish species include large mouth bass and bluegills.

C3. Subsistence Fishing (Netting): That portion of the Fond du Lac Reservation necessary to provide a sufficient diet of fish in order to sustain a healthy, current, on-Reservation population, including any stream, reach, lake or impoundment where spearing, netting or bow fishing is allowed as provided under applicable Band conservation laws.

TABLE 1 – FDL WATERS, ACREAGES, AND DESIGNATED USES														
WATER	**AC**	**DESIGNATED USE(S)**												
		A	**B**	**C1**	**C2**	**C3**	**D1**	**D2**	**E1**	**E2**	**F**	**G**	**H**	**P**
LAKES														
Bang	59.0		●		●		●	●	●		●	●	●	
Big	523.2		●		●	●	●	●			●	●	●	
Cedar	59.1		●		●		●		●		●	●	●	
Dead Fish	107.0		●		●		●		●		●	●	●	●
East Twin	113.0		●		●		●		●		●	●	●	
First	15.7		●		●			●			●	●	●	
Hardwood	94.6		●		●		●		●		●	●	●	
Jaskari	81.5		●		●		●		●		●	●	●	●
Joe Martin	67.6		●	●	●		●	●		●	●	●	●	
Lac	8.7		●		●		●			●	●	●	●	
Lost	137.2		●		●	●	●	●			●	●	●	
Miller (Mud)	154.5		●		●		●		●		●	●	●	●
Pat Martin	35.5		●		●	●	●		●		●	●	●	
Perch	647.9		●		●	●	●		●	●	●	●	●	●
Rice Portage	111.2		●		●		●		●	●	●	●	●	●
Second	14.9		●		●			●	●		●	●		
Side	18.3		●		●		●		●		●	●	●	
Simian	80.7		●		●	●	●		●		●	●	●	
Sofie	35.5		●		●	●	●				●	●	●	
Spring	26.0		●		●		●		●		●	●	●	
Spruce	12.6		●		●		●		●		●	●	●	
Third	14.5		●		●	●	●	●			●	●	●	
West Twin	120.4		●		●	●	●	●	●		●	●	●	
Wild Rice	54.6		●		●		●		●		●	●	●	●
STREAMS														
Annamhasung	N/a		●		●		●				●	●	●	
FDL Creek	N/a		●	●			●				●	●	●	
Martin Branch	N/a		●	●		●	●			●	●	●	●	
Otter Creek	N/a		●	●		●	●			●	●	●	●	
Simian Creek	N/a		●		●		●				●	●	●	
Spring Creek	N/a		●		●		●				●	●	●	
St. Louis River	N/a		●		●	●	●	●		●	●	●	●	
Stoney Brook	N/a		●	●	●	●	●				●	●	●	
OTHER														
All other waters	N/a		●		●			●			●	●	●	

D. Recreation:

D1. Primary Contact Recreational: The recreational use of a stream, reach, lake or impoundment involving prolonged contact and the risk of ingesting water in quantities sufficient to pose a health hazard. Examples are swimming and water skiing.

D2. Secondary Contact Recreational: The recreational use of a stream,

reach, lake or impoundment in which contact with the water may, but need not, occur and in which the probability of ingesting water is minimal. Examples are fishing and boating.

E. Cultural:

E1. Wild Rice Areas: A stream, reach, lake or impoundment, or portion thereof, presently, historically or with the potential to be vegetated with wild rice.

E2. Aesthetic Waters: A stream, reach, lake or impoundment which has been determined by the Reservation Business Committee to possess exceptional beauty or be significant to the preservation or exercise of the traditional value system of the Fond du Lac Band of Lake Superior Chippewa, which may include but is not limited to primary (direct) contact with water or the preservation of wetlands for the maintenance of traditional medicinal plants.

F. Agricultural: The water quality is adequate for uses in irrigation and livestock watering.

G. Navigation: The water quality is adequate for navigation in and on the water.

H. Commercial: The water quality is adequate for use(s) as commercial water supply for business processes.

P. Designates that this water is a Potential Outstanding Reservation Resource Water.

It should be noted here that several of the lakes listed in Table 1 have been classified as wetlands including First Lake, Lac Lake and Spring (Long) Lake (classified as aquatic bed wetlands), and Deadfish Lake, Miller (Mud) Lake, Second Lake and Side Lake (classified as emergent wetlands)(see Wetlands - Classification section below). Only six lakes on the reservation have maximum depths over 15 feet. These lakes are Big, Lac, Joe Martin, Spruce (Spirit), Third, and West Twin. A number of the shallower lakes on the Reservation are subject to winter fish kills.

As stated above, the St. Louis River dominates the northern and northeastern boundary of the Reservation, as well as a portion of the eastern boundary. The St. Louis River borders approximately 20 miles along the reservation. The average flow of the St. Louis River as recorded at the data station in Scanlon, Minnesota (5 miles east of the Reservation) is 1,050 cubic feet per second (cfs).

In addition to the St. Louis River, the Reservation is drained by several streams. The

longest of these is Stoney Brook which begins its course at Spring Lake and meanders considerably northward for approximately 16 miles to Brookston, Minnesota where it empties into the St. Louis River. However, Stoney Brook's original course has been altered considerably by the judicial ditch system. Ruhl (1989) reports the mean average discharge of Stoney Brook as 82 cfs. Simian Creek runs from Cedar Lake in the lower central portion of the Reservation for approximately 10.5 miles northeast to the St. Louis River. Its annual discharge is 9.3 cfs (Ruhl, 1989). Fond du Lac Creek (still listed as "Squaw Creek" on some maps) runs for approximately 6 miles in the east-central portion of the Reservation, while Otter Creek runs for approximately 8 miles, mostly through the University of Minnesota's Forestry Center in the south-eastern portion of the Reservation. Both of these also empty into the St. Louis River, although Otter Creek does not empty into the river until it has traveled approximately four additional miles outside of the eastern Reservation boundary. Fond du Lac Creek has an average annual flow rate of 11 cfs, while Otter Creek's is 20 cfs (Ruhl, 1989).

Drainage patterns on the Reservation have been impacted considerably by the construction of a 47-mile judicial ditch system. This ditch system, which was constructed from 1916 to 1921, drains a number of the wild rice lakes (Deadfish, Rice Portage, Perch, Jaskari, and Miller Lakes) and other lakes (Bang, Cedar, and Hardwood Lakes), as well as numerous adjacent wetlands. In addition, this ditch system also attempted to alter the flow of Stoney Brook for much of its course. The main intent of this system was to drain wetlands for agriculture. However, this project
was never a success and nearly all the farms established to take advantage of this newly created agricultural land failed. Part of this failure stemmed from the fact that during ditch construction excavated material was side cast to create "ditchbanks". Although these ditchbanks were necessary for the excavation equipment to conduct the ditch construction, they also functioned as dikes to prevent true drainage of the adjacent wetlands. However, these dikes did alter the natural hydrology of these wetlands, and therefore, degraded these wetlands considerably.

In 1999, construction began on a system of water control structures to regulate the flow of water into and out of several of the wild rice lakes. This effort is an attempt to restore these lakes to their historical levels. Four of these water control structures were in place in 1999. They include the following: 1) Outlet from Rice Portage Lake, designed to increase the water level in the lake and increase the lake's overall size to its historical level; 2) Outlet from Deadfish Lake, designed to increase and control the water level in the lake to prevent flooding of the wild rice beds; 3) Outlet from Perch Lake, designed to control water levels in the lake and the discharging of water from Perch Lake to Jaskari Lake; and 4) Impoundment northwest of Deadfish Lake (Upper Deadfish Watershed), designed to hold back water resulting from large rain events to eliminate bounce in Deadfish Lake.

Refer to **Map 3 - Fond du Lac Water Resources** for locations of lakes, rivers, streams, and drainage ditches found on the Reservation.

GEOLOGY AND SOILS

The bedrock geology of the Fond du Lac Reservation is composed of the Thomson Formation. This formation is a metasedimentary unit of Proterozoic age that contains layers of slightly to moderately metamorphosed slate, graywacke, and siltstone, with slate being the dominant (Ruhl, 1989). Although the thickness of the Thomson Formation varies widely, the upper weathered layer consists of a 3-50 foot zone of soft, smooth rock (Ruhl, 1989).

Much of the geology of the Fond du Lac Reservation is a result of glacial outwash and till. The outwash consists of stratified sand and gravel found mainly in the southeastern portion of the reservation. The till contains unstratified, unsorted materials in sizes from clays to boulders. Glacial drift in the morainal areas of the reservation consists mostly of till. Alluvium is present mostly along stream channels and pre-glacial drainages (Ruhl, 1989).

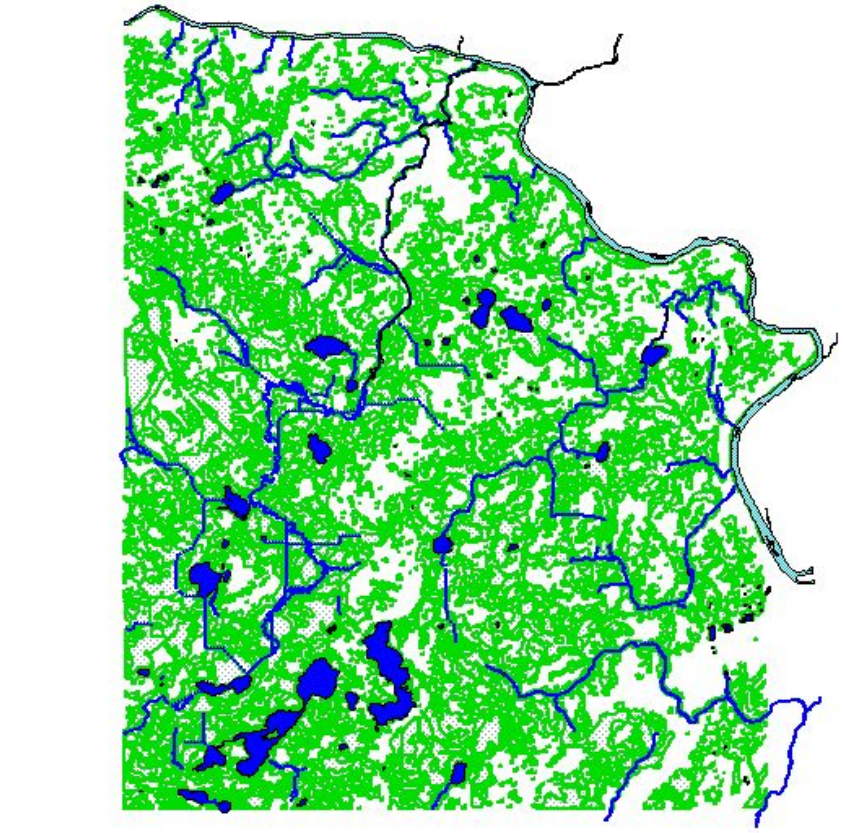
The soils of the southern half of the Fond du Lac Reservation have been determined from a soil survey conducted in 1964-72 and issued in 1978 (Soil Conservation Service, 1978). Unfortunately, no soil survey has been completed in St. Louis County, and therefore, soil data is limited for the northern half of the Reservation. Upland soils in the St. Louis County portion of the Reservation (totaling approximately 28,691 acres) are dominated by soils in the Normana series (totaling approximately 14,345 acres). Hydric soils in the St. Louis County portion of the Reservation (totaling approximately 19,127 acres) are dominated by organic soils in the Tacoosh series (totaling approximately 11,954 acres). Upland soils (totaling 23,391.46 acres) on the Reservation in the Carlton County portion are dominated by Ahmeek loam (Carlton County Soil Survey 21, 21c & 21e totaling 8,411.76 acres). Hydric soils (totaling 22,481.51 acres) on the Carlton County portion of the Reservation are dominated by Greenwood peat (Carlton County Soil Survey 549 totaling 4,756.90 acres). Nearly all of the “wetland” soils in the Carlton County portion are muck or peat. However, the hydric soil acreage total reported for the Carlton County portion of the Reservation also includes all water.

LAND USE

The Fond du Lac Geographic Information System (GIS) identifies 14 land use categories (totaling 101,400.49 acres)(see **Map 4 - Fond du Lac Land Use**). These land use categories, acreages (listed from largest to smallest), and explanatory notes are as follows:

1. *Wetlands-bogs* - This is the largest land use with a total of 23,027.437 acres (22.71% of all land uses). These lands are wetlands that are dominated by the

Map 3 - Fond du Lac Water Resources



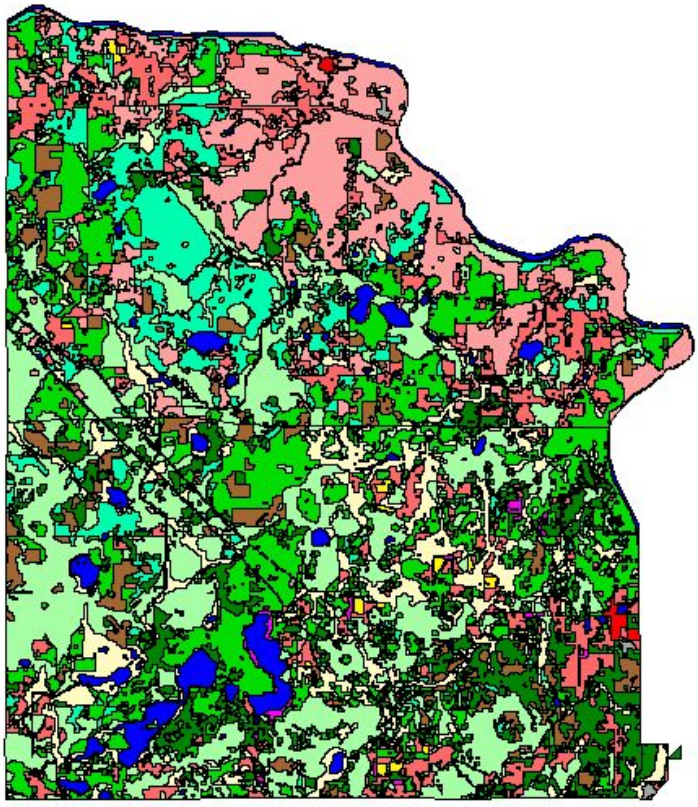
5 0 5 10 Miles

Key to Features

- Lakes
- St. Louis River
- Streams
- Ditches
- Wetlands

N W E S

Map 4 - Fond du Lac Land Use



5 0 5 10 Miles

FDL Land Use

FDL Land Use

- Coniferous forest
- Cultivated land
- Deciduous forest
- Farmsteads and rural residences
- Forest cut-overs
- Grassland
- Gravel pits and open mines
- Mixedwood forest
- Open water
- Other rural developments
- Shrubby grassland
- Urban/industrial (cities & towns)
- Wetlands - bogs
- Wetlands - marsh and fens

N W E S

presence of Sphagnum moss species, but also include Tamarack and Black Spruce tree species.

2. *Deciduous forest* - This land use category includes all lands that are dominated by deciduous trees. The total for this use is 18,833.981 acres (18.57% of all land uses).

3. *Shrubby grassland* - This land use includes all land dominated by woody species other than trees, but mixed with grasses and other understory plants. This use totals 12,307.321 acres (12.14%).

4. *Grassland* - This use category totals 9,972.050 acres (9.83%) and includes all grassland that is dormant or used for grazing and/or haying.

5. *Mixedwood forest* - This land use category includes all forest land with a combination of coniferous and deciduous tree species. This use totals 9,580.981 acres (9.45%).

6. *Coniferous forest* - This category totals 9,143.580 acres (9.02%) and includes all forestland dominated by conifers (pine, spruce, fir, cedar, and some tamarack and spruce not included in the bogs). All pine plantations are also included in this use.

7. *Wetlands-marsh and fens* - This category includes all emergent wetlands and some other wetlands totaling 8,893.064 acres (8.77%).

8. *Forest cut-overs* - This land use category includes all forested areas that were recently clear cut. The total acreage for this category is 4,281.821 acres (4.22%).

9. *Open water* - This category includes all lakes, some open water wetlands, the St. Louis River, and portions of Stoney Brook and Simian Creek. This use totals 3,922.795 acres (3.87%).

10. *Other rural developments* - This category includes some housing areas including Danielson Road, Scotty Drive, housing and cabins surrounding Big Lake, a portion of Enbridge and Great Lakes Gas pipelines, and the Carlton County Airport totaling 486.377 acres (0.48%).

11. *Cultivated land* - This category, totaling 370.062 acres (0.37%), includes lands that are used for cultivated crops, but does not include grazing or haying lands included in #4 - Grassland.

12. ***Farmsteads and rural residences*** - This category includes all farm home areas (but not crop, grazing, or haying lands) and other residences in rural settings for a total of 271.684 acres (0.27%).

13. ***Urban/industrial (cities and towns)*** - The populated areas of Brookston and the City of Cloquet are included in this use category for a total of 177.180 acres (0.17%).

14. ***Gravel pits and open mines*** - This category includes eight gravel pits for a total of 132.148 acres (0.13% of all land uses).

WETLANDS

INVENTORY

A comprehensive wetland inventory (known as the National Wetland Inventory or NWI), conducted by the United States Fish and Wildlife Service (USFWS), was completed on the Fond du Lac Reservation in the 1980s. This inventory was based on aerial photographs taken in November, 1978 for the Brookston, Brookston NW, Iverson, Martin Lake, and Sawyer quadrangles and May, 1979 for the Cloquet and Saginaw quads. A digitized version of this inventory was updated by Fond du Lac to reflect changes in road construction through wetlands using 1991 black and white digital ortho quad photographs (DOQs). This updated inventory was completed in the Summer of 2000. Fond du Lac is now partnering with the USFWS to use the reservation for a pilot study to determine the best method(s) in updating the NWI in forested wetland systems. The methodology developed in this pilot study will then be applied to the entire state of Minnesota in updating their NWI. This pilot study began with the update to the NWI for the Cloquet quad in 2004.

The Fond du Lac Reservation contains 4,662 individual wetland entities based on the Cowardin Classification System (see Classification section below). These wetlands total 43,873.2 acres or 68.55 square miles. Therefore, the Reservation is 43.4% wetlands. When the acreages from the 39 lakes and the St. Louis River on the reservation are add on, the result is 46,054.5 acres. This means that surface water resources comprise 45.55% of the Reservation.

It should be noted here that a number of lakes on the Reservation are not really lakes as defined by the Cowardin Classification System. To be a true lake that portion of water must be at least 6.5 feet in depth. Therefore, all of Miller, Wild Rice and Deadfish Lakes, and portions of Bang, Jaskari, Perch and Rice Portage Lakes are emergent wetlands (wild rice is an emergent wetland plant).

CLASSIFICATION

The NWI uses what is commonly called the Cowardin Classification System (Cowardin, *et al.*, 1979). This system uses a hierarchal classification to group wetlands (and other waters) by their dominant vegetation and water depth (see definition in Appendix). **Table 2 - Cowardin Wetlands** gives an overview of the classification coding used for wetlands.

Four main wetland classes within the Palustrine Ecological System exist on the Reservation (see **Map 5 - Fond du Lac Wetland Types**). The first, and most dominant are Forested Wetlands (PFO). These wetlands occupy 66.2% of all wetlands found on the reservation (2,244 entities totaling 29,029 acres). Most of these wetlands have

TABLE 2 – COWARDIN WETLANDS

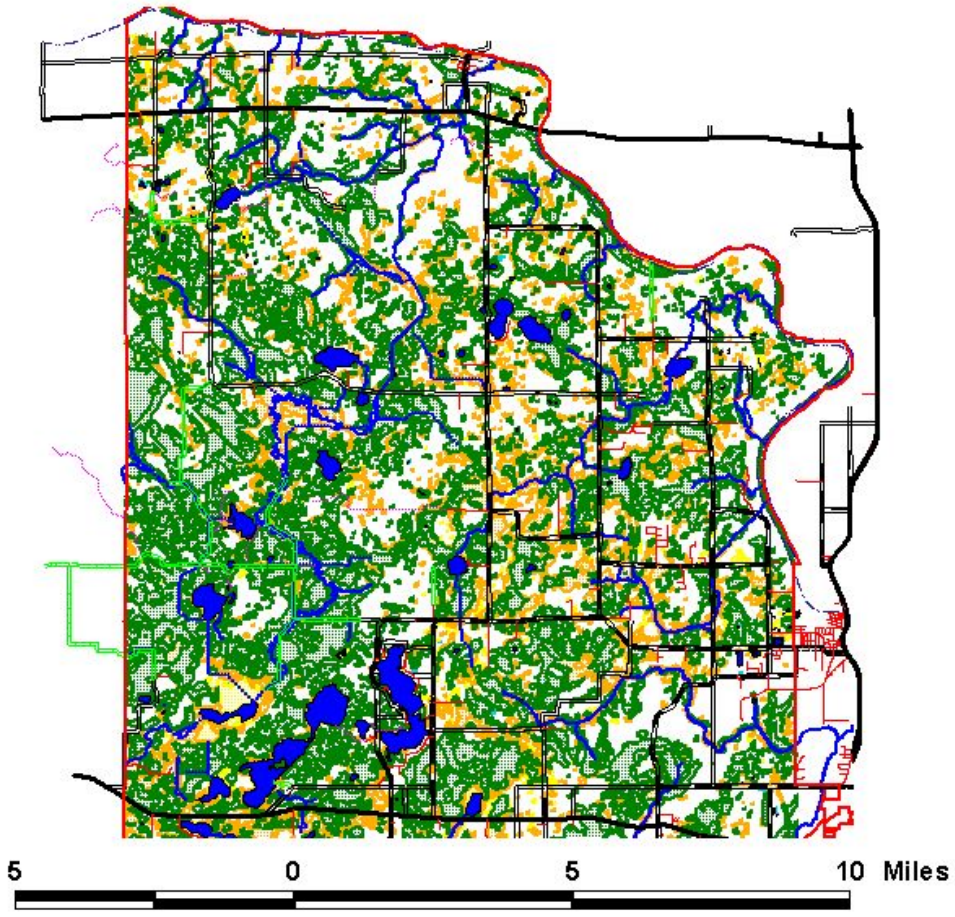
ECOLOGICAL SYSTEM

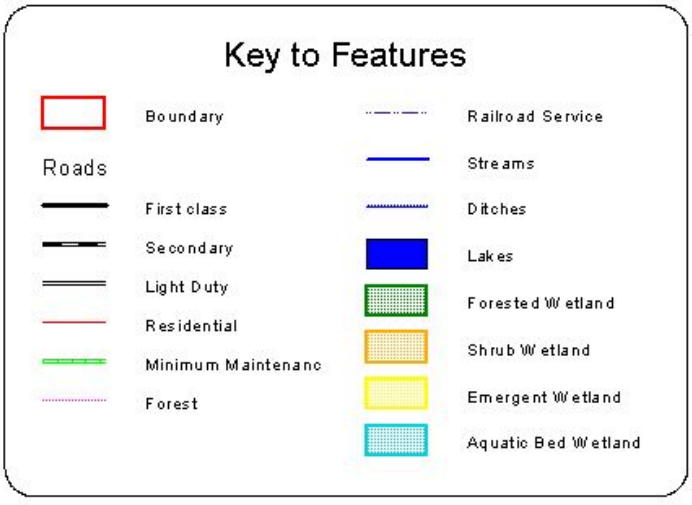
Class

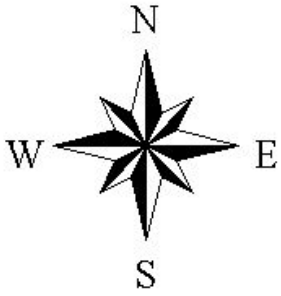
subclass

P – PALUSTRINE	P - PALUSTRINE
RB – Rock Bottom 1 – bedrock 2 – rubble	EM – Emergent 1 – persistent 2 – non-persistent 3 – narrow-lf non-persistent 4 – broad-lf non-persistent 5 – narrow-lf persistent 6 – broad-lf persistent
UB – Unconsolidated Bottom 1 – cobble-gravel 2 – sand 3 – mud 4 – organic	SS – Scrub-Shrub 1 – broad-lf deciduous 2 – needle-lf deciduous 3 – broad-lf evergreen 4 – needle-lf evergreen 5 – dead 6 – deciduous 7 – evergreen
AB – Aquatic Bed 1 – submergent algal 2 – submergent vascular 3 – submergent moss 4 – floating-leaved 5 – floating 6 – unknown submergent 7 – unknown surface	FO – Forested 1 – broad-lf deciduous 2 – needle-lf deciduous 3 – broad-lf evergreen 4 – needle-lf evergreen 5 – dead 6 – deciduous 7 – evergreen
FL – Flat 1 – cobble-gravel 2 – sand 3 – mud 4 – organic 5 – vegetated pioneer 6 – vegetated non-pioneer	OW – Open Water (unknown) Note: This designation is no longer used.
ML – Moss-Lichen 1 – moss 2 – lichen	

Map 5 - Fond du Lac Wetland Types







Black spruce (*Picea mariana*) as the dominant vegetation. However, Northern white cedar (*Thuja occidentalis*), Tamarack (*Larix laricina*), and Black ash (*Fraxinus nigra*) can also be found in these wetlands. Various species of Sphagnum moss (*Sphagnum* species) can also be found in nearly all of these types of wetlands. The largest complexes of these wetlands can be found west and southwest of Miller Lake, and west and southeast of Deadfish Lake.

Second, are the Scrub Shrub Wetlands (PSS). These wetlands are dominated by alder (*Alnus* species) and willow (*Salix* species). Twenty-seven point nine percent (27.9%) of all the wetlands on the Reservation are scrub shrub wetlands (1,989 entities totaling 12,248.5 acres). These wetlands are most commonly associated with the edges of streams and the flood plains of streams and rivers. On the reservation, they are most common along the edge of Stoney Brook, Fond du Lac Creek, Otter Creek, and many of the drainage ditches. Scrub shrub wetlands can also be found surrounding parts of Perch, Cedar, Deadfish, and Rice Portage Lakes.

Third, Emergent Wetlands (PEM) compose 5% of all the wetlands found on the Reservation (334 entities totaling 2,209.8 acres). Wild rice (*Zizania palustris*), Cattail (*Typha latifolia*) and Woolgrass (*Scirpus cyperinus*) dominate these wetlands. These wetlands are most commonly the wild rice lakes of Deadfish, Mud, Rice Portage, Jaskari and southern Perch.

Fourth, and lastly, Aquatic Bed Wetlands (PAB) consist of less than 1% of all wetlands on the Reservation (0.9%) (95 entities totaling 385.9 acres). Nearly all of these wetlands were originally classified as Open Water (POW), but this classification is no longer used in the Cowardin System. The aquatic bed wetlands on the Reservation are dominated by Coontail (*Ceratophyllum demersum*) and Yellow water lily (*Nuphar* sp.). On the reservation, the majority of these wetlands are small, open (non-woody) “bog lakes” with floating moss mats on their edges. The east side of Miller Lake has numerous wetlands of this type in various sizes. However, there are several larger Aquatic Bed wetlands that were once classified as lakes including First Lake, Spring Lake and a large portion of the north end of Perch Lake.

Within all of these four classes of wetlands, a preliminary analysis of the wetlands on the Reservation identified 12 primary wetland types (consisting of classes and subclasses). It should be noted that the combination of classes and subclasses within the Palustrine Ecological System allows for a total of 50 different wetlands (without considering type of water regime). However, with the recently completed wetland inventory on the Reservation, the number has been upgraded to 18 wetland classes and subclasses on the Reservation as follows:

1. Forested (PFO) - Forested wetland in which the dominant tree species or type is unknown.

2. Forested, Broad-leaved Deciduous (PFO1) - Forested wetland in which the

tree species is primarily Black ash (*Fraxinus nigra*).

3. Forested, Needle-leaved Deciduous (PFO2) - Forested wetland in which the dominant tree is Tamarack (*Larix laricina*).

4. Forested, Needle-leaved Evergreen (PFO4) - Forested wetland in which the tree species is primarily Black spruce (*Picea mariana*).

5. Forested, Deciduous (PFO6) - Forested wetland in which the dominant species of deciduous tree is unknown (broad-leaved vs. needle-leaved).

6. Scrub Shrub (PSS) - Wetland dominated by shrub species but their type is unknown.

7. Scrub Shrub, Broad-leaved Deciduous (PSS1) - Wetland dominated by broad-leaved deciduous shrubs such as Alder (*Alnus* species) or Willow (*Salix* species).

8. Scrub Shrub, Broad-leaved Evergreen (PSS3) - Wetland dominated by broad-leaved evergreen shrubs such as Labrador-tea (*Ledum groenlandicum*) or Bog laurel (*Kalmia polifolia*).

9. Scrub Shrub, Needle-leaved Evergreen (PSS4) - Wetland dominated by needle-leaved evergreens such as stunted Black spruce (*Picea mariana*).

10. Scrub Shrub, Evergreen (PSS7) - Wetland dominated by evergreen shrubs but the species is unknown.

11. Emergent (PEM) - Wetland dominated by emergent plant species but the dominant species or type is unknown.

12. Emergent, Persistent (PEM1) - Wetland dominated by emergent plant species that are persistent.

13. Emergent, Narrow-leaved Non-persistent (PEM3) - Wetland dominated by non-persistent emergent plant species such as sedges (*Carex* sp.).

14. Emergent, Broad-leaved Persistent (PEM6) - Wetland dominated by broad-leaved persistent emergent plants such as Common cattail (*Typha latifolia*).

15. Aquatic Bed, Submergent Algal (PAB1) - An open-water wetland dominated by submerged algae species.
16. Aquatic Bed, Submergent Vascular (PAB2) - An open-water wetland dominated by submerged, non-algal plants such as Coontail (*Ceratophyllum*

demersum).

17. Aquatic Bed, Floating-leaved (PAB4) - An open-water wetland dominated by floating-leaved plants such as Bullhead lily (*Nuphar variegata*) or Lesser duckweed (*Lemna minor*).

18. Aquatic Bed, Unknown Surface (PAB7) - An open-water wetland in which the dominant plant species is unknown.

The Cowardin Classification System classifies wetland habitats. Another system developed by the U.S. Fish and Wildlife Service is used in Minnesota and classifies wetland basins (USFWS, 1956). This system (commonly referred to as “Circular 39") places these wetland basins into eight types as follows:

1. Type 1 - Seasonally flooded basin or flat. This wetland type, often called a vernal pool or forest pond, is characterized by soil covered with water or is waterlogged during a short period of the growing season (usually spring). The rest of the time the soil is well drained. Vegetation will vary greatly depending upon the duration of flooding, but Black ash (*Fraxinus nigra*) and Marsh marigold (*Caltha palustris*) are usually the most common plants. Because of their small size (usually less than one acre, often less than 1/10th of an acre), these wetlands have not been mapped by the National Wetland Inventory. Only after extensive field surveys could these wetland types be mapped on the Reservation. However, they are identified in areas of timber sales.

2. Type 2 - Wet meadow. This wetland type does not have standing water, but the soil is either saturated or has water only a few inches below its surface. Wet meadows are dominated by wetland grasses and sedges (*Carex* and *Scirpus* species) and are commonly found on the fringes of other wetland types especially shallow marsh wetlands.

3. Type 3 - Shallow marsh. This wetland type can range from saturated soil to water 6 inches in depth. Cattails (*Typha* species), sedges (*Carex* and *Scirpus* species), wetland grasses, and other emergent plants dominate shallow marshes. This wetland type commonly fringes lakes and slow moving streams and rivers.

4. Type 4 - Deep marsh. This wetland type has a range of water inundation from 6 inches to 3 feet. Deep marshes share many of the same plants seen in shallow marshes, including cattails (*Typha* species) and sedges (*Carex* and *Scirpus* species). In more open water areas of this wetland type, coontail (*Ceratophyllum demersum*), water-milfoil (*Myriophyllum* species) and duckweed (*Lemna* species) are common. Deep marshes are often found in the center of a basin surrounded by shallow marsh.

5. Type 5 - Shallow open water. This wetland type has inundation up to 10 feet in depth and includes shallow ponds and reservoirs. Vegetation is similar to that found in the more open water deep marshes, but other emergents and floaters such as water lily (*Nuphar* and *Nymphea* species) and pondweeds (*Potamogeton* species) are also common.

6. Type 6 - Shrub swamp. This wetland type usually has saturated soil during the growing season, but often is flooded in the spring. The dominate vegetation is of course shrub species such as alder (*Alnus* species), willow (*Salix* species) and dogwood (*Cornus* species). Shrub swamps usually occur along sluggish streams and rivers.

7. Type 7 - Wooded swamp. This wetland type has saturated soil or water within a few inches of the surface. Tree species such as Tamarack (*Larix laricina*), Black spruce (*Picea mariana*), Northern white cedar (*Thuja occidentalis*), Red maple (*Acer rubra*), Black ash (*Fraxinus nigra*), and Balsam fir (*Abies balsamea*) dominate these wetlands. Most wooded swamps are found in flood plains, along sluggish streams, old river oxbows, or ancient lake basins.

8. Type 8 - Bogs. This wetland type is usually dominated by saturated organic soils with acidity and covered by a layer of sphagnum moss. Besides the mosses, bogs are also frequently dominated by Tamarack (*Larix laricina*), Black spruce (*Picea mariana*), Bog birch (*Betula pumila*), and Labrador tea (*Ledum groenlandicum*). These wetlands occur mostly in ancient lake basins, but can also occur along sluggish streams and flat uplands.

The Minnesota Wetlands Conservation Plan (version 1.0, 1997) used in preparation for the Minnesota Wetland Conservation Act (WCA) also includes two additional wetland types to Circular 39 as follows:

1. Riverine - Wetlands that are contained in natural or artificial channels periodically or continuously containing flowing water.

2. Industrial/Municipal - Artificially flooded impoundments identified on National Wetland Inventory maps with the water regime K (artificial).

The wetlands on the Reservation have not been formally classified using the Circular 39 types. However, determining the wetland type of a given wetland on the Reservation would not be difficult if that information was needed.

The St. Paul District of the U.S. Army Corps of Engineers has recently proposed using the wetland plant communities described in Eggers and Reed (1997) for the purpose of

determining in-kind/out-of-kind mitigation. This document identifies 15 wetland plant communities found in Minnesota and Wisconsin. However, only 11 of these wetland plant communities are found on the Fond du Lac Reservation as follows:

1. Shallow Open Water – This plant community is dominated by long-petioled floating leaf plants such as water lilies (*Nymphaea* and *Nuphar*) and pondweeds (*Potamogeton*), free-floaters such as duckweed (*Lemna*), and rooted submergents such as milfoils (*Myriophyllum*) and coontail (*Ceratophyllum demersum*). Water is always present and depths can be up to 6.5 feet (generally 3-6 feet).

2. Deep Marsh – This plant community is dominated by tall-stemmed emergent plants such as cattail (*Typha*) and bulrush (*Scirpus*), long-petioled floating leaf plants such as water lilies (*Nymphaea* and *Nuphar*) and pondweeds (*Potamogeton*), free-floaters such as duckweed (*Lemna*), and rooted submergents such as milfoils (*Myriophyllum*) and coontail (*Ceratophyllum demersum*). Water is always present and depths range from 6 inches to 3 or more feet.

3. Shallow Marsh – This plant community is dominated by tall-stemmed emergent plants such as cattail (*Typha*) and bulrush (*Scirpus*), various grasses (*Phalaris*, *Phragmites*, and *Zizania*), sedges (*Carex*), and rushes (*Juncus*), and non-persistant emergents such as smartweeds (*Polygonum*), arrowheads (*Sagittaria*) and bur-reeds (*Sparganium*). This plant community can be saturated or inundated up to 6 inches during the growing season.

4. Sedge Meadow – This plant community is dominated by sedges (*Carex*), but also includes bulrush (*Scirpus*), various grasses (*Calamagrostis*, *Glyceria*, and *Agrostis*), rush (*Juncus*), aster (*Aster*), and goldenrod (*Solidago*). Generally sedge meadows have saturated soils, but can be inundated in the spring.

5. Fresh (Wet) Meadow – This plant community is dominated by grasses, especially reed canary grass (*Phalaris arundinacea*), joe-pye weed (*Eupatorium maculatum*) and boneset (*Eupatorium perfoliatum*), aster (*Aster*), goldenrod (*Solidago*), and meadow-rue (*Thalictrum*). The soil of this plant community is usually saturated but may be inundated early in the growing season.

6. Open Bog – This plant community is dominated by Sphagnum moss (*Sphagnum*), but leatherleaf (*Chamaedaphne calyculata*), Labrador tea (*Ledum groenlandicum*), bog rosemary (*Andromeda glaucophylla*), and cottongrass (*Eriophorum*) are present as well. Open bogs can also contain stunted trees (less than 6 inches dbh) such as bog birch (*Betula pumila*), tamarack (*Larix laricina*), and black spruce (*Picea mariana*). The moss mat is usually saturated to the surface.

7. Coniferous Bog – This plant community is dominated by Sphagnum moss (*Sphagnum*), tamarack (*Larix laricina*), and black spruce (*Picea mariana*). The mature trees are over 6 inches dbh. Cranberry (*Vaccinium oxycoccos*), leatherleaf (*Chamaedaphne calyculata*), Labrador tea (*Ledum groenlandicum*), bog rosemary (*Andromeda glaucophylla*), and cottongrass (*Eriophorum*) are also present. The moss mat is usually saturated to the surface.

8. Shrub-Carr – This plant community is dominated by tall shrubs such as willow (*Salix*) and red-osier dogwood (*Cornus stolonifera*). Sedges (*Carex*) and Aster (*Aster*) are also prevalent. The soil is usually saturated to the surface, but can be inundate up to 6 inches in the spring and after rain events.

9. Alder Thicket – This plant community is dominated by alder (*Alnus*). Other plant species include elderberry (*Sambucus*), meadowsweet (*Spiraea alba*), and various ferns (*Osmunda*, *Onoclea*, and *Dryopteris*). This plant community usually has saturated soils, but inundation can occur in the spring.

10. Hardwood Swamp – This plant community is dominated by black ash (*Fraxinus nigra*), red maple (*Acer rubrum*), alder (*Alnus*), and balsam poplar (*Populus balsamifera*). The understory can contain ferns (*Osmunda*, *Onoclea*, and *Dryopteris*), sedges (*Carex*), and marsh marigold (*Caltha palustris*).

11. Coniferous Swamp – This plant community is dominated by northern white cedar (*Thuja occidentalis*) and tamarack (*Larix laricina*). Various ferns (*Osmunda*, *Onoclea*, and *Dryopteris*) and sedges (*Carex*) are also prevalent. The soil is usually saturated to the surface, but can be inundated early in the growing season.

WATER REGIMES

Numerous water regimes exist in the Palustrine System of wetlands. However, only two of these are found in any significant numbers on the Reservation. The dominant wetland water regime on the Reservation is saturated (B) (see definition in Appendix A). Over 87% of all the wetlands on the Reservation have a saturated water regime. This stands to reason since almost all forested and scrub shrub wetlands in the area have a saturated soil condition. An additional approximately 9%, have a Seasonally Flooded/Saturated (E) water regime. Some of the scrub shrub wetlands and many of the emergent wetlands on the Reservation experience this type of water regime. Only one other water regime consitutes more than 1% of the total wetland water regimes represented on the Reservation. The Saturated/Semipermanent/ Seasonal (Y) water regime is found in 1.51% of the reservation wetlands. However, this water regime is no longer used in the Cowardin System and has not yet been changed in the updating of the Reservation's inventory. The Permanent (H) water regime is found mainly in aquatic

bed wetlands on the Reservation, but since this wetland type is found in less than 1% of all the wetlands on the Reservation, this water regime too, constitutes less than 1% of all water regimes on the Reservation. **Table 3 - Cowardin Modifiers** lists the water regimes and other modifiers used to code wetlands.

CRITERIA AND INDICATORS

There are three criteria used to determine the presence of a wetland at a given site. These criteria have been incorporated into numerous wetland definitions, including those used by the United States Army Corps of Engineers (USACE) and the United States Fish and Wildlife Service (USFWS).

1. *Wetland Hydrology* - Wetland hydrology is considered the "driving force" in wetland formation (National Research Council, 1995). In other words, without the hydrology the other two criteria would not develop in a given location. The indicators of wetland hydrology include drainage patterns, drift lines, sediment deposition, watermarks, stream gage data, historic records, flood predictions, and visual observation of inundation or saturation (USACE, 1987).

2. *Wetland Soils* - As soils are saturated or inundated long enough over the growing season they develop anaerobic conditions in their upper part. These anaerobic conditions lead to the development of various characteristics (indicators) that can be located and identified within the soil profile. These indicators can be identified using a document developed by the Natural Resources Conservation Service (NRCS) (USDA, NRCS, 1998) and the use of a soil color chart (Munsell, 1994).

3. *Wetland Vegetation* - Wetland vegetation is often referred to as "hydrophytic vegetation" or "hydrophytes". These are plants that have adapted to life with anaerobic conditions in their root zones. The determination of whether a given plant species is considered a hydrophyte is indicated by the species indicator status (Reed, 1988). This indicator status consists of a five point ranking system as follows:

a. Wetland Obligate (OBL) - a plant species that is found in a wetland over 99% of the time.

b. Facultative Wetland (FACW) - a plant species that is found in a wetland from 67% to 99% of the time.

TABLE 3 – COWARDIN MODIFIERS	
WATER REGIME (Non-tidal)	**SOIL**

A – Temporarily Flooded	g – organic
B – Saturated	m – mineral
C – Seasonally Flooded	
D – Seasonally Flooded/Well Drained	**SPECIAL MODIFIERS**
E – Seasonally Flooded/Saturated	b – beaver
F – Semipermanently Flooded	d – partially drained/ditched
G – Intermittently Exposed	f – farmed
H – Permanently Flooded	h – diked/impounded
J – Intermittently Flooded	r – artificial substrate
K – Artificially Flooded	s – spoil
W – Intermittently Flooded/Temporary	x – excavated
Y – Saturated/Semipermanent/Seasonal	
Z – Intermittently Exposed/Permanent	Note: Other modifiers exist including Tidal Water Regimes, Coastal Halinity Water Chemistry, and Inland Salinity Water Chemistry, but these are not used on wetlands found on the Reservation.
U – Unknown	
pH MODIFIERS FOR FRESH WATER	
a – acid	
t – circumneutral	
l – alkaline	

c. Facultative (FAC) - a plant species that is found in a wetland from 34% to 66% of the time.

d. Facultative Upland (FACU) - a plant species that is found in a wetland from 1% to 33% of the time.

e. Upland Obligate (UPL) - a plant species that is found in a wetland less than 1% of the time.

The wetland indicator using this ranking system states that a wetland will have at

least 50% of its dominant species (aerial coverage of 30% or more) ranked as obligate, facultative wetland, or facultative.

FUNCTIONS AND VALUES

The reader is directed to see the definitions of these two terms (see Appendix) to grasp the differences between them. When assessing these functions, the most common method is to rank a given wetland's function on a scale of high, medium, or low. Some methods also use an "exceptional" designation. It should be recognized that not all wetlands will possess all of these functions and values at the same time, and therefore, some wetland functions will be recorded as "N/A" (not applicable) during an assessment. There are 12 wetland functions and values as defined by the Minnesota Routine Assessment Method for Evaluating Wetland Functions Version 3.0 (MnRAM 3.0) (Minnesota Board of Water & Soil Resources, 2004a) as follows:

1. *Maintenance of Characteristic Vegetative Diversity/Integrity* - This function determines how diverse (number of different plant species) the given wetland is, and how able it is to maintain that diversity over time. Wetlands are ranked high if they possess a large number of wetland plant species that are native to that particular type of wetland. Wetlands are ranked lower for this function if various disturbances have caused the vegetation to change to more non-native or non-wetland plants.

2. *Maintenance of Hydrologic Regime* - This function determines how well a given wetland is maintaining the hydrologic regime that would be expected for that wetland type. This function is evaluated by the wetland's characteristics and land use within the wetland, as well as within the wetland's immediate watershed. Wetlands with unaltered outlets and relatively undisturbed conditions in the wetland and surrounding watershed rank higher for this function. Wetlands with constricted or managed outlets and development in and/or around the wetland will rank low.

3. *Flood/Stormwater Attenuation* - This wetland function determines how well a given wetland retains storm water. The potential for flooding and flood damage down gradient from the wetland is also considered in this assessment. Wetlands with a high holding capacity and a high potential for flood damage downstream will rank high for this function. A low retention or low potential for flood damage will rank lower.

4. *Downstream Water Quality* - This wetland function determines a given wetland's ability to contribute to the quality of water that exits it. Assessment for this function includes the source of water that enters the wetland, surrounding land use and runoff, and the type and use of the waters that receive the runoff

from the given wetland. Wetlands rank high for this function if they contribute to water quality downstream, especially if that downstream water is used for recreation or for potable water. A wetland will be ranked low if it has been ditched or altered to reduce water retention time.

5. Maintenance of Wetland Water Quality - This function is considered a separate function from #4 above (Note: MnRAM 2.0 combined these two functions into one function – Wetland Water Quality). This function determines how well a given wetland is able to maintain water quality within the wetland itself. Assessment of this function includes upland land use surrounding the wetland, sediment delivery to the wetland, storm water runoff volume and rates, and upland buffers. Wetlands rank high for this function if they do not receive high rates of sediment or storm water inputs. Wetlands that do receive high rates of sediments, storm water, and/or nutrients are ranked lower.

6. *Shoreline Protection* - This function determines how well a given wetland contributes to the shoreline protection of a lake, stream, or open water body. The wetland's proximity to this water and its ability to absorb erosive forces is key to the ranking of this function. A high function means the wetland is in direct contact with a lake, stream, or open water body and contributes largely to its shoreline protection. A wetland would be ranked low for this function if it was isolated from lakes, streams, or open water bodies.

7. *Maintenance of Characteristic Wildlife Habitat Structure* - This function determines the given wetland's ability to maintain an animal community characteristic of its type. The presence of rare species, habitat structure, habitat interspersion and connectivity, and regional biological diversity are used in the assessment of this function. Wetlands are ranked high if they are relatively undisturbed and exhibit a full range of plants and animals that would be expected in a wetland of its type and size. Wetlands that have been degraded by human activity will rank lower for this function.

8. *Maintenance of Characteristic Fish Habitat* - This function determines a given wetland's ability to contribute to spawning or nursery habitat or refuge for native fish species. The wetland's connection with deepwater habitats (lakes, rivers or streams) is especially important in assessing this function and would result in a higher ranking. Wetlands that harbor fish colonies as a result of flooding events would rank lower.

9. Maintenance of Characteristic Amphibian Habitat - This function determines a given wetland's ability to contribute to over-wintering and/or breeding habitat for native amphibians including salamanders, frogs, and turtles. A wetland having an adequate wetland hydroperiod and lacking predatory fish

species would rank high for this function. Wetlands lacking year-round water depth or having predatory fish present would rank lower.

10. *Aesthetics/Recreation/Education/Cultural* - This "function" assesses the wetland's *value* to provide aesthetically pleasing views, recreational opportunities, educational benefits, cultural resources, and scientific research potential. Wetlands that are located close to human habitation are given a higher rank for this category. Inaccessible wetlands or those wetlands with minimal visual diversity would rank low.

11. *Commercial Uses* - This function assesses a wetland's capability to produce commercially viable crops such as wild rice or cranberries. Wetlands that produce a commercial crop with seasonal or temporary modifications would rank high for this function. The wetland would rank low if used infrequently for non-commercial consumptable uses.

12. *Groundwater Interaction* - This function assesses a given wetland's ability to contribute to groundwater discharge if it is a groundwater supported wetland, or contribute to groundwater recharge if it is a surface-water supported wetland. This function is the most difficult to assess without data not usually available unless certain groundwater studies are conducted.

MnRAM Version 3.0 also assesses the following:

1. Storm Water Sensitivity
2. Wetland Restoration Potential

REFERENCE WETLANDS

Reference Wetlands, often referred to as "reference standard wetlands", are wetlands that are selected to represent the best wetland of that given type within the watershed or wetland comparison domain. Currently the Fond du Lac Reservation is establishing a set of reference wetlands for each of the four types (forested, scrub shrub, emergent, and aquatic bed). However, plans include the compilation of reference wetlands representing each class and subclass of wetlands found on the Reservation (currently 18 wetland classes and subclasses). The current reference wetlands already studied on the Reservation are as follows (numbers refer to the wetland identification number used in the NWI coverage for the FDL GIS):

Reference Wetland #988 - This wetland is classified as PAB2/EM2Hb (Palustrine Aquatic Bed Wetland with a submergent vascular plant dominance and a non-persistent emergent vegetation minor component and having a permanent water regime influenced by the activity of beavers). This wetland is

4.9 acres in size and is located just north of West Twin Lake off of Twin Lakes Road in Stoney Brook Township.

Reference Wetland #1572 - This wetland is classified as PSS1/EM3E (Palustrine Scrub Shrub Wetland with a broad-leaved deciduous shrub dominance and a emergent narrow-leaved non-persistent plant minor component and having a seasonally saturated water regime). This 435.1 acre wetland is located south of Pine Drive southwest of Lost Lake and northwest of Hardwood Lake. This wetland is situated on both sides of a portion of the original flow of Stoney Brook.

Reference Wetland #2317 - This wetland is classified as PFO4/SS3Ba (Palustrine Forested Wetland with a needle-leaved evergreen plant dominance and a broad-leaved evergreen shrub minor component and having a saturated water regime that is acidic). This wetland is located adjacent to Arrowhead Forest Road, south of its crossing with the Enbridge Pipeline (formerly Lakehead Pipeline).

Reference Wetland #3318 - This wetland is classified as PAB1H (Palustrine Aquatic Bed Wetland with a submergent algal dominance and having a permanent water regime). This wetland is located on the fringe of an 8.3-acre lake adjacent to Ditchbank Forest Road north of Miller Lake. This wetland has been classified by other systems as a lake, and is known locally as Lac Lake.

Reference Wetland #3529 - This wetland is classified as PAB2/4H (Palustrine Aquatic Bed Wetland with a submergent vascular plant dominance and a floating leaved plant minor component with a permanent water regime). The wetland is 7.6 acres in size and is located west of Miller Lake and the access road on the west side of Miller Lake south of Ditchbank Forest Road.

Reference Wetland #4466 - This wetland is classified as PFO1/4B (Palustrine Forested Wetland with a deciduous tree dominance and a needle-leaved evergreen tree minor component with a saturated water regime). This 261.9 acre wetland is located northwest of the junction of Cary Road with Minnesota State Highway 210.

Reference Wetland #4808 - This wetland is classified as PEM3Bg (Palustrine Emergent Wetland with a narrow-leaved nonpersistent plant dominance and a saturated water regime in organic soils). This wetland is 26.5 acres in size and is

located on the north side and adjacent to Minnesota State Highway 210 east of Wild Rice Lake. This wetland nearly surrounds Reference Wetland #4815.

Reference Wetland #4815 - This wetland is classified as PFO4B (Palustrine

Forested Wetland with a needle-leaved evergreen tree dominance and a saturated water regime). This 45.3 acre wetland is located inside the perimeter created by Reference Wetland #4808.

The Fond du Lac Reservation has begun to assess their wetlands using the Minnesota Routine Assessment Method for Wetlands Version 3.0 (MnRAM 3.0). As this assessment program progresses it is anticipated that more wetlands on the reservation will be designated as reference wetlands.

RISKS AND CHALLENGES TO WETLANDS

There are numerous risks to wetland integrity throughout the world. Some of these risks are global in scope (such as global warming) while others are more local. On the Fond du Lac Reservation, the following represents the most pressing and common risks to wetlands on the Reservation:

1. Fragmentation: Numerous wetlands have been effected by the construction of roads (see definition in the Appendix). These roads, etc. have reduced the size of wetlands, altered their hydrology and often caused their degradation.

2. Drainage: As stated above, the Fond du Lac Reservation's overall hydrology and drainage has been impacted by the construction of a 47-mile judicial ditch system. Although a number of lakes were the primary "targets" for this drainage, this system also altered the drainage patterns of many wetlands adjacent to this drainage system. This alteration was accomplished by the construction of these ditches and the subsequent dikes or ditchbanks created along side of the ditches.

3. Agricultural Runoff: Only a few farms remain in operation on the Reservation. Of those, the raising of livestock (dairy cows, cattle and horses) and haying/grazing are the only agricultural land uses on the Reservation. The use of agricultural best management practices are lacking on most of these operations, putting the adjacent and nearby wetlands at risk from nutrient rich and possibly contaminated runoff. Several feedlots are located on the reservation. These operations pose the most serious risk to water quality in general if agricultural best management practices are not adhered to consistently.

4. Development: This is most likely the largest wetland risk in the entire United States. It is also, to a smaller degree, a problem on the Reservation. Numerous wetlands have been destroyed, reduced, severely impacted, or degraded through filling, road construction, and housing and other building projects, both through permit-authorized and clandestine activities.

5. Invasive Species: Numerous invasive species can affect wetlands. Many of

these species have no predators and thus can reproduce and expand in an area without inhibitions. For information on specific invasive species in this area, the reader is referred to the Invasive and Exotic Species section found further in this document.

Each of these risks and proposed solutions are discussed in the various sections of the Wetland Protection and Conservation Plan below.

WETLAND PROTECTION AND MANAGEMENT PLAN

PURPOSE AND NEED

It has been estimated that since the 17th century, over fifty percent of the original wetlands in what is now the lower 48 United States, have been destroyed by human activities and other adverse impacts. On the Fond du Lac Reservation, approximately 2,000 to 4,000 acres of wetlands were drained in the early 1900s by a 47-mile judicial ditch system. Fortunately, wetlands are now recognized as some of the most productive and diverse natural areas of the world. They serve as habitat for wildlife and fish, and support many species of wild plants. It has also been realized, that as human development and its related impacts spread, Indian Reservations have become important refuges of biological diversity (Wenzel, 1992).

On the Fond du Lac Reservation, wetlands augment this diversity by serving as habitat for animals such as river otter, muskrat, beaver, mink, waterfowl, bald eagle, osprey, and great gray owl, some of which are endangered, threatened, rare, or sensitive species. These wetlands also support a great variety of wild plants, many of which are harvested for food and traditional medicines. These wetlands and associated ecosystems also provide opportunities for subsistence hunting, trapping, and gathering. These activities are of greater importance to Indian people than the general public. This not only exemplifies, but intensifies the need to develop a plan protecting the wetland resources upon which Tribal members depend. In addition, because the Fond du Lac Reservation possesses some of the best waterfowl habitat in northeastern Minnesota, more non-tribal people hunt ducks on the Reservation than tribal members.

The Fond du Lac Reservation Business Committee (RBC) has a responsibility and a commitment to the people and the environment of the Reservation, which involves the protection and enhancement of this biological integrity. The development of a Joint Comprehensive Wetland Protection and Management Plan will help to ensure that the further destruction of wetlands within the exterior boundaries of the Reservation will be avoided, and that these wetlands will continue to function in their natural condition. This includes providing food and habitat for fish and wildlife, providing natural products for human use (wild rice, traditional foods, furs, waterfowl, and medicines), furnishing clean groundwater recharge, and offering opportunities for recreation and aesthetic appreciation.

IMPACTS TO OTHER PLANS, STANDARDS, OR RESOURCES

Through the years various plans and standards have been developed to manage the various resources on the Reservation. The Fond du Lac Joint Comprehensive Wetland Protection and Management Plan (JCWPMP) in no way attempts to circumvent, avoid, change, or disagree with any of these plans or standards. However, the FDL-JCPMP does intend to increase protection of wetlands where these other plans are deemed inadequate. The following plans, standards and resources are addressed as follows

(boldface emphasis added for clarity):

> **1. Fond du Lac Water Quality Standards:** these standards pertain to the surface waters of the Reservation and specifically include wetlands under protection on the Reservation. Fond du Lac plans to expand specific wetlands protection in the Standards through the development of narrative and/or numeric criteria and designated uses for wetlands.
>
> **2. Fond du Lac Land Use and Management Plan:** this plan outlines policies and goals for land use on the Reservation. Wetlands are mentioned several times as follows (emphasis added):
>
> > **a. Guiding Policies, Natural Resources, Policy #5:** "Areas designated as essential natural resources, including but not limited to wild rice waters, sugar bushes, **wetlands**, hunting areas and gathering sites, are to receive absolute management priority for those purposes."
> >
> > **b. Guiding Policies, Natural Resources, Policy #7:** "Permanent development is, in general, not to be permitted within flood plains, or within 500 feet of streams, rivers, **wetlands** or lakes." (Also contains exceptions to this policy).
> >
> > **c. Guiding Policies, Housing, Policy #5:** "Band or tribal land will not be made available for residential leases until a site suitability review has been completed. This review shall consider, at a minimum, such concerns as: presence of historical or cultural resources, presence of important gathering or harvesting sites, environmental issues (e.g., old landfills or dumps), ability to place on-site sewage treatment system, road access, impacts on natural resources such as **wetlands**, and compatibility with management goals on nearby Band or tribal lands."
> >
> > **d. Guiding Policies, Implementation, Policy #4:** "Formally adopt various plans, programs, and standards regarding specific activities to implement aspects of this plan including but not limited to natural resources management, surface and ground water quality standards, **wetland protection and management**, and housing.
>
> These policies provide additional limited protection to the wetlands on the Reservation. However, the exceptions to Guiding Policies, Natural Resources, Policy #7 are too broad to provide protection since nearly any proposal could be justified in using one of the exceptions.
>
> **3. Fond du Lac 1990 Natural Resources Management Plan and Environmental Assessment:** This plan is an older version and will be replaced by the new Integrated Resource Management Plan in development. Wetlands

are referred to only once in this document. The section on Water Resources contains one paragraph about wetlands. Specifically it is stated “Management alternatives should be evaluated for their potential effects on wetlands.”

4. Fond du Lac Strategic Wildland Fire Management Plan and Environmental Assessment: This plan pertains to the control of wildland fires, sets goals and objectives regarding wildland fire and interagency coordination, and describes the use of prescribed fire for habitat restoration and enhancement. The plan addresses wetlands and specifically states that “Precautions should be taken to protect wetland habitats during the implementation of this fire management plan.” (Section 3.4.1 Wetlands). The Fond du Lac Joint Comprehensive Wetland Protection and Management Plan recognizes the need for prescribed fire in habitat restoration and enhancement and encourages its use in the restoration of degraded wetlands on the Reservation.

5. Fond du Lac Wild Rice Management and Restoration Plan: This plan addresses the impact the ditch system caused to the various wild rice lakes on the Reservation and outlines the plan to restore these lakes to original or near original condition in regards to wild rice habitat. The FDL-JCWPMP encourages the continued use of restoration and water control activities in regards to the wild rice lakes.

6. Fond du Lac Integrated Resource Management Plan: This plan is designed to increase coordination between various program and various resources that are the responsibility of the Division of Resource Management. Each section of this plan describes the resource and outlines various management options for that resource based on a projected needs budget. Wetlands are included in the Water section. The plan recommends increased staff to handle the oversight and protection of wetlands in not only the reservation but the 1854 and 1837 Ceded Territories.

7. Impacts to Resources:

A. Water: This Plan will work towards increased wetland diversity and overall condition and therefore, will also promote the increase in water quality and maintenance on the Reservation.
B. Wildlife: This plan will work towards the protection and enhancement of wetland areas important to wildlife species used by tribal and non-tribal hunters and trappers on the Reservation.

C. Fish: This plan will work towards the protection and enhancement of wetlands that provide nesting and cover for fish species important to tribal members, especially the wetlands adjacent to important Reservation

fishing lakes and streams.

D. Vegetation: This Plan will work towards the increased diversity of vegetation (especially the wetland vegetation) on the Reservation. Several key wetland plants are recommended in habitat restoration efforts outlined below. However, this plan promotes the increased diversity of vegetation when desirable, native plant species are considered. This plan in no way promotes, encourages, or condones the increase or introduction of non-native or undesirable plant species (see Invasive and Exotic Species section below).

In addition to these reservation plans, several other plans have been developed to manage wetland resources as follows:

1. St. Louis County Wetland Plan – This Local Wetland Plan was developed in 1996. The Plan recognizes that St. Louis County has significant areas of wetlands and while protection is important, it also recognizes that communities have a need for housing, agriculture, mining, industry, commercial, forestry, and recreation as well. Numerous factors were included into the Plan that are not addressed by the Minnesota Wetland Conservation Act (WCA). The St. Louis County Wetland Plan is implemented through a series of actions that are stated in policies, which are divided into four sections of Program Administration, Government Relations, Economic Activity, and Wetland Impacts, Functions and Values.

2. City of Cloquet Comprehensive Wetland Protection and Management Plan – This Local Wetland Plan was developed in the summer of 2003 and approved by the Minnesota Board of Water and Soil Resources (BWSR) on October 22, 2003. However, the Plan has not been adopted by the Cloquet City Council. The Plan sets up three categories of wetlands for protection as follows:

a) Special Protection Areas – these include seasonally flooded forests, fish lakes, trout streams, wetlands within 300 feet of trout streams, the St. Louis River, and wetlands in the primary wellhead protection areas of the City of Cloquet. These wetlands are protected by at least a 3:1 replacement ratio.

b) WCA Protection Areas – these include wetlands throughout most of the City of Cloquet that are not located in Special Protection Areas or fall under Flexible Protection. The replacement ratio for these wetlands is 1:1.

c) Flexible Protection – this “protection” is available for impacts equal to or under 0.5 acres per project in certain Type 2, 6, and 7 wetlands in the East Un-named Creek, West St. Louis River, East St. Louis River, Crystal River, and Otter

Creek subwatersheds. In addition, the area must be zoned residential, multifamily, or commercial. If these criteria are met, projects are eligible for 0.5:1 mitigation.

If the LGUs agree to enter into the conditions of this plan, these “local management plans” may need to be modified to reflect the changes in wetland protection and management within the external boundaries of the reservation.

EXISTING WETLAND PROTECTIONS

Currently three main laws are in force that protect wetlands on the Reservation as follows:

1. Clean Water Act: the main protection of wetlands comes from Section 404 of the CWA (33 USC 1344) which pertains to the dredge and/or fill of “waters of the United States” including wetlands. EPA and the USACE share the responsibilities of enforcing this Act. EPA has ultimate authority under the Act, while the USACE administers the wetland dredge and fill permit program. Section 404 requires any dredge or fill activity in waters of the United States, including wetlands to be legally permitted. This is currently the only law that governs wetlands on Tribally-owned land. The St. Paul District of the USACE has jurisdiction on the Fond du Lac Reservation. Three different types of permits are issued by the St. Paul District as follows:

A. General Permit (GP) - this permit regulates activities for projects that have minimal adverse impacts. They cover activities that have been identified as being similar in nature and causing only minimal individual and cumulative environmental impacts.

B. Letter of Permission (LOP) - this permit also regulates activities for projects that have minimal adverse impacts up to two acres in size. Wetland compensatory mitigation is required for all impacts that exceed 10,000 square feet. It should be noted here that this permit is no longer available for projects occurring on the Reservation. These permits are pre-approved by the EPA for the CWA Section 401 Water Quality Certification. However, since the Fond du Lac Reservation is establishing a CWA Section 401 Tribal Water Quality Certification process for the Reservation, the previous EPA approval was denied for the renewed GP/LOP-R-05 permit.

C. Individual Permit (IP) - this permit regulates all activities in wetlands that are not covered by either a General Permit or Letter of Permission; usually required for potentially significant impacts over two acres in size.

2. Minnesota Wetland Conservation Act: This Act, first passed in 1991 and amended in 1993, 1994, 1996, and 2002 states that “Wetlands must not be drained or filled unless (a) drain or fill activity is exempt or (b) wetlands are replaced by restoring or creating wetland areas of at least equal public value. Goal is no net loss of wetlands.” (Minnesota Wetland Conservation Act Administrative Manual, 1997). There are ten exemptions to this rule including areas or activities of 1) agricultural, 2) drainage, 3) federal approvals, 4) wetland restoration, 5) incidental wetlands, 6) utilities/public works, 7) forestry, 8) approved development, 9) de minimis, and 10) wildlife habitat. The Minnesota Wetland Conservation Act pertains to all public and private land ownership on the Reservation except trust land, allotment land, and tribally owned land (both FDL and Minnesota Chippewa Tribe (MCT)). It also gives wetland administrative authority to the Local Government Unit (LGU). In most cases, the LGU is the local county in which the wetland is located, but the LGU can also be a city, watershed district, or Soil and Water Conservation District (SWCD). The Minnesota Board of Water and Soil Resources has administrative oversight to the LGUs. There are three LGUs with WCA jurisdiction on the reservation; Carlton County, St. Louis County, and the City of Cloquet.

3. Minnesota Public Waters Work Permit Program: This program’s purpose is to provide for the orderly and consistent review of permit applications in order to conserve and utilize the water resources of the state in the best interest of the people. Projects constructed below the ordinary high water level (OHWL), which alter the course, current, or cross section of public waters or public waters wetlands, may require a public waters work permit. Two types of Public Waters Work Permits are available. General permits are "pre-issued" permits issued on a statewide or county level. If work proposed in public waters or public waters wetlands meets the requirements of a specific general permit, an individual permit is not required. Currently there are five categories of general permits as follows: Emergency Repair of Public Flood Damages, Multiple Purposes, Bridge and Culvert Projects, Dry Hydrants, and Bank/Shore Protection or Restoration. An individual permit is required if the proposed work does not meet the requirements of a specific general permit.

SEQUENCING

From the onset of a development project, no matter what its size, the planning of a project must follow sequencing. Clean Water Act Section 404(b)(1) guidelines are the origin for the sequencing concept. Sequencing is a three-step process that must be followed in a specific order as follows:

1. Avoidance - when developing a project the developer must attempt to choose a site that avoids all wetlands. If the only available site possesses wetlands, then the project should be designed to avoid them anyway.

2. Minimization - if the project cannot avoid all wetlands or it the avoidance of all wetlands causes the project to be cost prohibitive, then the impact of those wetlands must be minimized to the greatest extent practical. Various designs and configurations of the project should be examined to determine the most viable option that minimizes unavoidable wetland impacts. This process is known as an Alternatives Analysis.

3. Mitigation - if the project cannot avoid all wetlands and the extent of the impact on those wetlands has been minimized to the greatest extend practical, then those unavoidable impacts to wetlands must be replaced through a wetland mitigation plan (also called a replacement plan).

When a developer applies for a CWA Section 404 Permit, he/she must be able to demonstrate sequencing. As stated above, the process in selecting the final design that takes sequencing into consideration is often referred to as an alternatives analysis. For further information on sequencing, refer to 40 CFR Part 230.10.

RESERVATION RIGHTS

The Clean Water Act (CWA) provides for the provision that a State or Tribe can assume the CWA Section 404 Permit Program from the Federal government. The assumption of this authority makes sense for Indian reservations since they are located closer to the proposed activities and are often more familiar with local resources, issues, and needs than are Federal regulators (EPA, 1995). To be eligible to assume the Federal program, the Tribal program must include the following:

1. Jurisdiction - the Tribe must have an equivalent scope of jurisdiction as the Federal program. The Tribe has to have some form of governmental body that carries out the administrative and decision making needs of the Tribe or reservation. The Fond du Lac Reservation is governed by a five-member decision-making body known as the Reservation Business Committee or RBC. The RBC consists of a Chairman, Secretary/Treasurer, District I (Cloquet) Representative, District II (Sawyer) Representative, and District III (Brookston) Representative. Each is elected to a four-year term. Elections are normally held every other year with the Chairman, and District I and III Reps elected one year, and the Secretary/Treasurer and the District II Rep elected two years later.

2. Regulation - the Tribe must regulate at least the same activities as the Federal program. The Tribe or reservation needs to adopt legislation or ordinances that will provide for at least the same regulatory protection for wetlands as the Federal program. The Tribe or Reservation, if it chooses, can adopt increased protection beyond the Federal program. The Joint Comprehensive Wetland Protection and Management Plan (JCWPMP) and its

accompanying Wetland Ordinance will serve as the regulatory instruments for the purposes of this requirement.

3. Participation - the Tribe must provide for sufficient public participation. The Federal program calls for a minimum 30-day public notice period before a permit decision is made. In addition, if the public requests a public hearing and can show just cause as to why a public hearing is warranted, a public hearing is also scheduled and conducted before a permit decision. The Tribe or reservation assuming permit program authority must also set-up guidelines for the participation of the public with at least a 30-day public review period and provision for a public hearing. The proposed Wetland Ordinance will provide for this requirement utilizing the same public comment provisions as found in the FDL Water Quality Ordinance.

4. Compliance - the Tribe must ensure compliance with the Section 404(b)(1) guidelines, which provide environmental criteria for permit decisions. The Tribe or reservation needs to develop environmental criteria for permit decisions that is the same or better than the Federal program. This criteria must also take into consideration the concept of “sequencing”. This Plan addresses these concepts and the accompanying Wetland Ordinance also provides for this process.

5. Enforcement - the Tribe must have adequate enforcement authority. The Tribe or reservation must be able to deal with violations of its regulations and/or ordinances and have the ability to issue a Cease and Desist Order, an Order to Rescind, and a Restoration Order as applicable to the situation. The Fond du Lac Reservation has a Conservation Officer assigned to enforce all reservation environmental ordinances. If prosecution of this ordinance is necessary (all efforts for voluntary cooperation have been exhausted), the U.S. Marshalls Office would proceed on behalf of the U.S. Department of Justice.

It is the intention of the Office of Water Protection to begin the steps necessary to assume the Clean Water Act Section 404 Permit Program authority for the Fond du Lac Reservation. For the purposes of this FDL-Joint CWPMP this authority will be referred to as the Fond du Lac Reservation Wetland Regulatory Program (FDL-WRP).

WETLAND ORDINANCES

The Fond du Lac Reservation Joint Comprehensive Wetland Protection and Management Plan outlines various existing wetland protections and recommends additional protections necessary for the complete protection and management of the wetland resources of the Reservation. However, it is felt that additional legal and binding protections are necessary to fully protect the resource. Therefore, it is recommended that this FDL-Joint CWPMP be used as a guide by the Fond du Lac Band of Lake Superior Chippewa, Carlton County, St. Louis County and the City of

Cloquet to draft, adopt and enforce the wetland protections stated here.

With the Reservation considering the assumption of Clean Water Act Section 404 Permit authority, a wetland ordinance would also serve the purpose of "ramping up" this authority. This allows the Fond du Lac Band to obtain jurisdiction over its wetlands, while working on the various legal and regulatory aspects of obtaining full wetland permitting authority on the Reservation.

RESERVATION WETLAND MITIGATION AND "NO NET LOSS"

During the development of the CWA Section 404 Permit Program for the Reservation, some key decisions regarding the guidelines for wetland mitigation requirements have to be made. Three general aspects of wetland mitigation have to be considered when developing the mitigation guidelines as follows:

1. On-site vs. Off-site Mitigation: What criteria should be used in determining whether proposed wetland mitigation site is considered on-site mitigation or off-site mitigation? Some wetland regulatory entities consider a given distance from the impacted wetland (such as ½ mile or 3 miles) as the criteria, while others consider whether the proposed mitigation site is in the same watershed. For the purposes of this document, on-site mitigation will be any accepted mitigation performed within the immediate sub-watershed in which the impact occurs.

2. In-kind vs. Out-of-kind Mitigation: Some wetland regulatory entities feel the need to control the type of wetland the mitigation wetland becomes through the designation of in-kind mitigation (mitigation wetland is the same wetland type as the impacted wetland) or out-of-kind mitigation (mitigated wetland is not the same wetland type as the impacted wetland). Often the control is in the form of penalties (most commonly an increase in the mitigation ratio) for out-of-kind mitigation. The purpose of this control lies in the fact that the regulators are trying to control what functions of the impacted wetland will be mitigated in the replacement wetland. In theory, a mitigation wetland that is in-kind will have the same level of functional capacity as the impacted one. For the purposes of this document, in-kind mitigation will be wetlands that are restored or created that are the same wetland type as determined by using the wetland types found in Eggers and Reed, 1997.

3. Mitigation Ratios: Mitigation ratios are determined by the use of a mitigation ratio table or formula. The mitigation ratio often incorporates the "penalties" one incurs from the in-kind/out-of-kind and/or on-site/off-site decisions of the proposed mitigation wetland location and design. In all cases the minimum ratio is 1:1, that is for every acre of impact to a given wetland an acre of wetland is replaced elsewhere. However, with the use of these tables or formulas and the "penalties" that are incorporated into them, the ratio can be higher. Often

impacted wetlands are required to be mitigated at 2 acres of replacement for every impacted acre, or even 3 (or more!) acres of replacement for every acre impacted. These higher ratios are the result (or consequences) of locating a mitigation wetland beyond the on-site threshold and/or creating or restoring a wetland that is a different type than the impacted one. What can make this difficult is that if a given mitigation ratio table or formula is designed for a given area having a broad range of wetland types and land uses, and then is applied to a smaller area that does not have the same diversity in wetland types and/or land uses, a proposed project can be cost prohibitive because the cost of additional wetland mitigation acres is too high. Worse yet, is the real possibility that the project is prohibitive because no suitable location can be found for a mitigation site. For the purposes of this document, the ratios in **Table 4 – Fond du Lac Compensatory Wetland Mitigation Ratios** will be used by the Fond du Lac Office of Water Protection.

Another option available to the reservation in developing its wetland regulatory program is the use of an In-Leu-Fee program. In an In-Leu-Fee program, the applicant pays a fee to the regulator in-leu of mitigation. The regulating authority then uses these in-leu fees to restore or create wetlands to mitigate for the loss of wetlands through its permit program. There are advantages and disadvantages to this type of program. An advantage to restoring wetlands through in-leu fees is that the restoration project conducted would be much larger in size than many smaller restorations conducted by each individual applicant, and in regards to wetland functions, larger wetlands are better than smaller ones. One disadvantage to an in-leu fee program is there is often a disconnection or delay from the time the permitted wetland is filled and the time that this fill is replaced. This delay can be seen as a “net loss” of wetlands until the in-leu fee program has built the replacement wetland. This temporal loss is discussed in detail in USACE, 2004.

RESERVATION WETLAND MITIGATION BANK

The opportunity exists for the Reservation to construct a wetland mitigation bank by the creation and/or restoration of wetland acreage. There is a definite need for such a bank for the Reservation to use to compensate the impacts that result from various Reservation housing projects and other projects. However, additional options regarding this proposed bank exist as follows:

1. **Option A:** The Reservation could construct this bank and use the wetland acre credits exclusively for mitigating impacts from Reservation sponsored projects. This would give the Reservation the opportunity to speed up the time it would take to conduct a given project if wetland impacts occurred. Using these

TABLE 4 – FOND DU LAC COMPENSATORY WETLAND MITIGATION RATIOS

Type of Impact Site	Compensation Location	Type of Compensation	Compensation Process	Ratio
Priority Wetland	n/a	n/a	n/a	2.5:1.0
Management Wetland or Restoration Wetland	On-Site	In-Kind	In-Advance	1.0:1.0
			Not-In-Advance	1.25:1.0
		Out-of-Kind	In-Advance	1.25:1.0
			Not-In-Advance	1.5:1.0
	Off-Site	In-Kind	In-Advance	1.25:1.0
			Not-In-Advance	1.5:1.0
		Out-of-Kind	In-Advance	1.5:1.0
			Not-In-Advance	1.5:1.0
Violation	n/a	n/a	n/a	3.0:1.0

wetland credits exclusively for Reservation projects ensures that adequate credits are available at any given time.

2. Option B: The Reservation could construct this bank and place the bank credits in the Minnesota Wetland Banking System. This banking system, administered by the Minnesota Board of Water and Soil Resources (BWSR), is a series of wetland mitigation banks throughout the state. The BWSR coordinates the program by matching a party interested in purchasing wetland credits with the party that has credits available to sell nearest the impacted wetland. The BWSR does not dictate the terms of the sale, it only coordinates in getting the two parties (buyer and seller) together. The advantage this would have for the Reservation is that the cost of the construction of the wetland bank can be reconciled and money could then be available to construct another bank as would be needed as the first bank's credit are used. Of course, priority of credits in this bank should be given to FDL projects. The disadvantage to this is that the BWSR collects administrative fees from the banks to fund the program.

It is recommended that the Fond du Lac Reservation pursue Option A. Given the limited on-Reservation options for wetland restoration, this option would be in the best interest

of the Band so that wetland credits are available when the Band needs them.

INVASIVE AND EXOTIC SPECIES

There are several plant species, which are not native to this area and/or have the potential to displace native plant species in area wetlands. In addition, one non-native, invasive invertebrate animal can also harm native wetland plants. The following species have already been identified as invasive and pose a threat to the area's wetlands:

1. *Lythrum salicaria* (Purple loosestrife): This plant was first introduced from Europe for garden planting. However, it has escaped from cultivation and currently is found naturally and widespread throughout most of the eastern and midwest portions of the United States (39 states) and adjacent Canada. Numerous states, counties and other municipalities spend millions of dollars to eliminate or control this plant. Once established in a shallow marsh wetland or even a wet road-side ditch, this plant soon takes over and forces other native plants out of the wetland. This plant is a robust perennial and is capable of producing thousands of seeds from a single individual. Three methods of control (or a combination of these) are used for this species - mechanical, chemical, and biological. Mechanical control consists of the physical removal of the plant or parts (usually the stems) of the plant. When only the stem is removed, chemical control is also employed. Removal of the plants can be accomplished using simple hand tools (spades or shovels) if the affected area is small or the population of purple loosestrife is small. For larger treatments, power rakes or mowers are utilized. Chemical control is used most often in conjunction with mechanical control. The typical application of these methods is the removal of the upright portion of the plant, followed by a chemical application to the cut end of the remaining stem. Biological control consists of the introduction of an insect known to feed on the plant. This method is usually only effective in large areas of purple loosestrife. Three species have been introduced in various locations. The weevil *Hylobius transversovittatus* has been introduced in Canada and at least seven states in the United States, including Minnesota. The adults of this species feed on the above-ground portions of the plant, while their larvae attack the roots and crown of the plant. The adult female lays her eggs on the main stem or in the roots. Additionally, two leaf-eating beetles have been introduced to control Purple loosestrife. *Galerucella calmariensis* and *G. pusilla* have both also been introduced in Canada and at least seven states in the United States, including Minnesota. Both adults and larvae feed on the foliage of the plant and appear to move from plant to plant as the foliage is eliminated.

Purple loosestrife already occurs on the Reservation. Limited control efforts were conducted on a small site on Mission Road in the summers of 1999 and 2000. Each year an informal purple loosestrife survey has been conducted on the Reservation. One population was found and eradicated in 1999 and 2000; five

populations in 2001; eight in 2002; three in 2003; five sites in 2004 (a full survey was not completed in 2004; nor were any control efforts); and 2 sites in 2005. Increased monitoring and control efforts are necessary to prevent this invasive species from inhabiting wetlands and wild rice lakes on the Reservation. It is recommended that a general survey of this plant be conducted on the Reservation. It is also recommended that all known locations be eradicated as soon as possible by mechanical means. No chemical control efforts are recommended for use on the Reservation.

2. *Pontederia cordata* (Pickerel-weed/Moose ear): Although this plant species is native to this area, it has found to be invasive to wild rice beds. No documented control methods have been found for this species. The recommended method of control for this species is through the use of a “cookie cutter” aquatic weed cutting machine and then collection of all the debris using an aquatic weed harvester. This debris would then be placed on shore (in upland) and surrounded by slit fencing to prevent the rhizomes from re-establishing. Although this method is recommended, extreme care should be taken to prevent the accidental introduction of this plant to new areas, especially while the aquatic weed harvester is transporting the plant debris. The timing of this cutting should also be taken into consideration. To prevent re-introduction, the plant should be cut before viable seed set (usually occurs in late August). The Fond du Lac Natural Resources Program has been using this method to eliminate/control this plant on Perch and Rice Portage Lakes on the Reservation.

3. *Myriophyllum spicatum* (Eurasian water-milfoil): This introduced plant species is found in numerous lakes and wetlands found along the edge of these lakes in the midwest including in Minnesota. As of yet, this species has not been identified in any of the Reservation lakes, although only one survey of “public access” lakes was conducted in 2001. However, there is a risk of unintentional introduction to several lakes on the Reservation, with Big Lake, West Twin Lake, and Joe Martin Lake having the biggest risks. Several studies have attempted to develop controls for this species using mechanical means. However, these efforts have proven ineffective with this species. Currently, only chemical control efforts have been successful using 2,4-D dosing to the lake system. This plant species has the capability of reproducing via fragmentation, therefore any plant fragment introduced in a given lake can eventually produce an uncontrollable population. It is therefore recommended that any lake at risk on the reservation be posted with warning signs at all landings. In addition, these lakes should also be checked periodically for evidence of Eurasian water milfoil.

4. *Phalaris arundinacea* (Reed canary grass): This plant species is also native to this area, but has the potential to develop pure stands in wetlands, especially in disturbed sites. Numerous control efforts have been conducted on this species throughout the eastern and mid-western United States. A multi-method, multi-

year control program has been found to be the most effective for large expanses of this plant. However, for small effected areas, shading the plants with something as simple as dark plastic has found to be effective in killing the plants. Once the plants are dead, removal of the plastic and reseeding or replanting of desirable species is all that is needed. The Fond du Lac Reservation has many wetlands with populations of this plant. However, no studies have been conducted to determine if these populations are indeed invasive and/or spreading.

5. *Cirsium palustre* (European swamp thistle/Marsh thistle): Although this plant species has not yet been identified in this area, this species has the potential to force native herbaceous species from cedar swamps and other forested wetlands. Since its introduction from Europe, this plant species has been seen inhabiting forested wetlands and wet meadows in much of New England, Michigan, Wisconsin, and various parts of Canada. Currently, no control measures have been identified for this species, although some experimentation with insects (*Larinus planus* - Flower-head weevil) is currently underway in Canada.

6. *Potamogeton crispus* L. (Curly pondweed/ Curly-leaf pondweed): Although this plant species is native to the northern Minnesota region, this plant is often invasive in nature. It is extremely pollution tolerant, and therefore, has a tendency to out compete other aquatic native plants. The plant has been known to develop monotypic stands in recreational lakes, and is a nuisance to boating.

7. *Orconecyes rusticus* (Rusty crayfish): This crustacean invades lakes, rivers, and streams in several areas of North America. They are invasive because they are more aggressive than other native crayfish, are better able to avoid fish predation, and can harm native fish populations by eating their eggs and young. They also can displace native crayfish, hybridize with them, and graze on and eliminate native aquatic plants.

8. *Agrilus planipennis* (Emerald ash borer): This exotic beetle attacks the various species of ash trees including *Fraxinus nigra* (Black ash) found in forested wetlands. The adults of this beetle do not damage the tree to any large degree. However, the larvae of this species of beetle can greatly damage the tree. Currently infestations of this species are limited to parts of Michigan, Ohio, Indiana, and Ontario, Canada.

CULTURALLY SENSITIVE SPECIES

Numerous plant species found in wetland environments have been identified as culturally sensitive. That is to say, these plants play important roles in the subsistence, spiritual, or medicinal aspects of Fond du Lac Band Members. It is the intent of the FDL-JCWPMP to promote the increased habitat and protection of existing habitat for these desired plant species. The following species are addressed specifically because they either play a major role in the culture of the Fond du Lac Band of Lake Superior Chippewa or they are in decline or have lost habitat through various human activities:

1. *Zizania palustris* (Wild rice): In many ways this plant species defines the Fond du Lac Band of Lake Superior Chippewa. All efforts should be made to increase the occurrence of this species. Habitat restoration and water quality improvement efforts should be conducted to obtain this goal.

2. *Hierocloe odorata* (Sweet grass): This species is utilized by band members for utility, ornamental, and ceremonial purposes. Suitable habitat for this species is rare on the Reservation. It is recommended that habitat suitable for this species be created or restored on the reservation and the introduction (or reintroduction) of Sweet grass be conducted.

3. *Thuja occidentalis* (Northern white cedar): This plant species is the defining element of a cedar swamp, a rather rare occurring and declining habitat in this area. Band members utilize this species for wild rice knockers, as well as for ceremonial use. Guidelines set forth in the FDL Forest Management Plan should be followed in regards to this species and its habitat.

4. *Picea mariana* (Black spruce): This plant species is rather prevalent on the Reservation and is used primarily as a utility plant. The roots of Black spruce are extremely strong, yet quite flexible, making them an excellent choice for lacing birch bark in the fashioning of containers and canoes. The wood of this species is also used to make ricing poles. Guidelines set forth in the FDL Forest Management Plan should be followed in regards to this species and its habitat.

Meeker, Elias, and Heim (1993) include many “culturally sensitive plants” in their book. The reader is encouraged to learn about these other plants that are important to the Fond du Lac Band of Lake Superior Chippewa and other Tribes in the area. The discussion of plants in this section does not imply that the Reservation should work toward the increase in population or habitat for each of these species. Rather, it is to point out the need for diversity in wetland types and habitats so that each of these species has an equal or near equal opportunity to maintain a stable population so that each given species can be collected and utilized by this, and succeeding generations of the Fond du Lac Band of Lake Superior Chippewa.

BEST MANAGEMENT PRACTICES

There are three main areas in which Best Management Practices (BMP) are necessary to protect wetlands: Construction, Agriculture and Forestry. Once these BMPs are learned they should become “second nature” and be followed always. Workers in these three industries should be adequately trained in the approved and appropriate techniques in erosion and sediment control. In addition, this training needs to be periodically updated to keep workers current on new technologies and techniques being developed in Best Management Practices. Only when these methods are used **consistently** and **continuously** can wetlands be truly protected during these activities.

1. Construction BMPs: There are numerous Best Management Practices that are applicable in the construction industry. Whether the construction consists of building a road, a bridge, a house, a septic system, or any other construction, all BMPs pertain to one thing - Sediment Control. Anytime unvegetated soil is exposed to the elements, erosion is a concern. Controlling precipitation runoff (rain events or snow melt) is important at any job site. Some BMPs include, but are not limited to the following:

A. Silt fencing - silt fencing consists the placement of a water-permeable membrane or curtain using wooden stakes. The two most important aspect to the placement of silt fencing is to 1) be certain to place the fencing on the inboard or water contact side of the stakes, and 2) be certain to bury the fencing at least 6 inches under the substrate. Also, the condition of the silt fencing should be checked periodically, especially within 24 hours after a rain event. Necessary repairs or replacement should be undertaken as soon as possible. Although large storm events can damage or destroy silt fencing, the most common reason for silt fence failure is improper installation. Silt fencing should always be placed between a construction site and a wetland. However, the silt fence should not be placed on a slope; at least six feet of flat surface should be located between the slope and the fence to allow water to pond long enough for sediment to settle out. It also should be noted that silt fence is the “last line of defense”; if silt fence is continuously filling with sediment, other BMPs are not effective or non-existent.

B. Straw bales - straw bales are real straw bales that are placed on the substrate and secured with wooden stakes. They are mostly used to slow the flow of water on slopes and sloping ditches. Like silt fencing, straw bales need to be placed properly and also inspected regularly for proper performance. Because of numerous problems with the use of straw bales (Bordenave, 1999), it is recommended that straw bales be limited to the use of flat field surface impoundments for sediment removal, or for temporary (one to two days) diversion or plugging an undesirable runoff condition. In all cases, straw bales should be removed as soon as the site is revegetated to avoid permanent alteration of the hydrology. Other BMPs

are available for more effective erosion and sediment control such as rock check dams, triangular silt dikes, etc.

C. Rock check dams – this BMP consists of the placement of rock, usually in sloped ditches, to slow the movement of water, thus reducing its velocity and thereby reducing its erosive force. Rock check dams replace straw bales in these situations, especially where a permanent BMP is needed. Rock check dams can also be used as water diversions on slopes to protect other BMPs such as turf re-enforcement mats (TRMs).

D. Track walking – track walking consist of using the tracks of a bulldozer to create small “water breaks” on exposed slopes. The bulldozer is run up and down the slope, as apposed to the traditional method of going cross-wise along the surface of the slope. Track walking has shown to reduce soil erosion on slopes by as much as 50%. This method is especially effective when used before seeding and mulching a slope, or for a temporary BMP on stockpiles.

E. Mulch - mulching consists of the placement of a material that will prevent erosion on all exposed and unvegetated slopes. Mulch can consist of straw, shredded bark, nylon matting, etc. Mulch is placed on the substrate either during the seeding process or directly after seeding.

F. Seeding - seeding is simply the placement of a seed mix on the exposed substrate. Seed mixes vary but it is recommended that all seed mixes consist of only native, non-invasive plant species. Mulch must be placed on the seed, either during the seeding operation (usually applied with hydro-seeders) or immediately after.

In addition to these BMPs for use during construction, other BMPs are applicable to designing structural elements to control storm-water runoff from affecting wetlands as much as possible. The reader is referred to the numerous Best Management Practices found in Protecting Natural Wetlands (EPA, 1996). **Table 5 - Best Management Practices for Wetlands** lists both non-structural and structural BMPs that can be incorporated into the design of any construction project. The table also lists the potential benefits to wetlands in their use. It is recommended that the use of these Best Management Practices be incorporated into designs of all construction projects on the reservation to the practical extent possible. Every BMP on the list is fully explained in the EPA document, including its purpose, applicability, design criteria, potential impacts to wetlands, maintenance requirements, and sources of additional information. It is recommended that all planning, design, and construction entities that work on projects on the Reservation obtain and follow this document. Additional documents that may be helpful include: “Field Manual on Sediment and Erosion

Control Best Management Practices for Contractors and Inspectors" (Fifield, 2002) and "Erosion Control Handbook" (Mn/DOT).

2. Agriculture BMPs: There are numerous Best Management Practices for agricultural practices. Some of these BMPs include planting trees on steep slopes, plowing around (rather than over) other slopes, installing grass swales where gullies form, and preventing livestock from grazing near streams or

TABLE 5 – BEST MANAGEMENT PRACTICES FOR WETLANDS	
NONSTRUCTURAL BMPs:	
Pollution Prevention	Watershed Management Plans
Preventative Construction Techniques	Outreach/Educational Programs
Riparian Areas	Wetland Management Plans
STRUCTURAL BMPs:	
Infiltration Basins	Infiltration Trenches
Sand Filters	Grassed Swales
Vegetative Filter Strips	Vegetated Natural Buffers
Open Spaces	Extended Detention Dry Basins
Wet Ponds	Constructed Wetlands
Level Spreaders	Oil/Grit Separators/Water Quality Inlets
French Drains	Dry Wells/Roof Downspout Systems
Exfiltration Trenches	Porous/Concrete Grid Pavements
BMPs IN SERIES	

wetlands. Two sources for agricultural BMPs are the U.S. Natural Resources Conservation Service (NRCS) and the county Soil and Water Conservation District (SWCD).

3. Forestry BMPs:

A. Harvesting in wetlands - timber harvesting and other management activities in wetlands should be restricted to periods when the surface of the wetland is sufficiently frozen to support harvesting and other equipment and should use all applicable BMPs for frozen conditions.

B. Haul roads/skid trails - when it is absolutely necessary for a haul road and/or skid trail to be located in a wetland, they must be designed so as to not impede the natural hydrology of the wetland including inflow and

outflow of flood waters.

It is recommended that the Best Management Practices outlined in “Sustaining Minnesota Forest Resources: Voluntary Site-Level Management Guidelines” (Minnesota Forest Resources Council, 2005) be employed whenever possible.

Although minor in comparison with BMPs for construction, agriculture and forestry, one additional BMP should be noted here. The Fond du Lac Reservation has a large population of beaver. Most of the streams, as well as numerous drainage ditches, on the Reservation are dammed by these beavers. Current practice has been to trap, or in some way kill the offending individual(s) and then destroy the dam. However, evidence collected nationwide has shown this to be ineffective and expensive. The use of deception and/or exclusion has found to be more cost effective in the control of beavers. It is therefore recommended that a general policy be developed on the Reservation to adopt appropriate and cost effective best management practices in regards to beaver dams. Numerous and effective methods for beaver control have been developed and promoted by the organizations The Fund for Animals, and Beavers, Wetland and Wildlife.

BUFFERS

Upland buffers surrounding wetlands not only increase the diversity of the area, but also provide added protection to wetlands. This protection is mainly in the form of water quality protection by filtering particulate matter and chemicals before they enter the wetland. It is recommended that two buffers be established to protect the wetlands on the Reservation as follows:

1. Soft Buffer: a soft buffer is one in which exceptions can be allowed without penalty if certain criteria are met. A buffer of 500 feet was recommended in the FDL Land Use and Management Plan. However, as stated before, this plan allows for this buffer to be eliminated if the development “benefits the Band in general”. It is recommended that this buffer be followed whenever practical. However, exceptions to this buffer must meet the criteria outlined in Natural Resources Guideline #7 of the FDL Land Use and Management Plan.

2. Hard Buffer: a hard buffer is one in which either absolutely no exception is allowed or in which an exception is allowed but with an added cost to the developer (sometimes referred to as a “paper fill”). A buffer of 100 feet on flat surfaces and 100 feet plus an additional 4 feet for every 2^{O} of slope for un-level ground is recommended. In addition, a buffer of 300 feet for wetlands adjacent to

wild rice lakes or cold-water streams (as per the Designated Uses of the Fond du Lac Water Quality Standards) is recommended.

In all cases, these buffers must be fully vegetated. The buffer distance must be maintained between the outermost wetland boundary and any permanent development, including buildings, septic tanks, propane tanks, heating oil tanks, roads, driveways, walkways, etc. These buffer recommendations refer to new developments or re-developments.

Because of the importance and value of buffers, it is also recommended that the use of buffers on wetland mitigation sites be given a 25% credit toward the mitigation acreage requirement. As an example, a 10-acre mitigation wetland with a four-acre buffer should receive 11 acres of mitigation credit.

It is recommended that the Fond du Lac Band develop a Land Use Ordinance that addresses buffers and setbacks, to further protect water quality on the Reservation.

PROBLEMS AND PROPOSED SOLUTIONS

The Risks and Challenges to Wetlands section above stated general problems and risks to wetlands. This section will address specific risks to wetlands on the Reservation and give recommendations to prevent, alleviate, or eliminate those impacts to the wetlands.

1. Septic Systems: Only a small portion of the Reservation is serviced by the City of Cloquet sewer system. The rest of the Reservation is exclusively serviced by Individual Sewage Treatment Systems (ISTS). Most of these systems consist of standard septic tanks and drain fields. However, most new construction on the Reservation has utilized mounded septic systems. Both these systems can fail due to poor maintenance, age, or poor design. Therefore, there is concern that if and when these various systems fail, they could affect the water quality of the Reservation, including wetlands. It is recommended that an inventory of these individual sewage treatment systems be conducted so that the reservation can know the extent of their use and performance. It is also recommended that research and study be conducted to find safer, more efficient, yet cost effective ways to treat residential waste water. Systems investigated should include both individual sewage treatment systems (ISTS), including closed-loop systems, and collective or community sewage treatment systems. Especially for those communities that are situated near wetlands or other surface waters, the use of treatment wetlands should also be investigated.

It is further recommended that all new systems and as many pre-existing systems as possible be fitted with lint filter systems to filter their washing

machine discharge. This simple step could extend the lives of most of these systems, as well as prevent their clogging and/or failure.

2. Roads: The construction of roads causes the fragmentation of wetlands. Numerous wetlands on the Reservation have been fragmented by roads, mainly with one large portion on one side of the road and another, smaller portion on the other side of the road. In the overwhelming majority of these wetlands, the smaller portion is severely degraded. However, numerous wetlands on the Reservation have been degraded on both sides due to the installation of a road. The most common direct cause of wetland degradation from road construction is the loss of hydrology. When roads are constructed with little or no hydrologic connections between the two portions, degradation in the form of vegetation loss or change is the result. The building of roads decreases hydrologic flow, decreases each wetland's immediate watershed, and increases runoff from the road which can often introduce various pollutants (oil, gas, grease, etc) into the wetlands. It is recommended that when the construction or improvement of a road on the Reservation is necessary, that the design or redesign of such road(s) consider the increased use of culverts or small bridge-ways to increase the hydrologic flow between the two effected wetland portions. It is also important that culverts be installed to the proper elevation to prevent the drainage or flooding of any wetlands. Although no recommendations or guidance exists pertaining to culvert use in wetlands, the concept should be investigated further in the hope that criteria can be established.

3. Drainage: As stated before, a 47-mile ditch system was constructed on the Reservation. In addition, numerous other drainage ditches were also constructed throughout the Reservation. Nearly all of these ditches were constructed for the purpose of draining land for agriculture. Because most of these lands are no longer (or never were) in agricultural use, it stands to reason that some of these ditches no longer serve a purpose. Therefore, it is recommended that these ditches be identified, and if practical, be restored to their original condition to begin to return the natural hydrology to wetlands affected by the drainage.

4. Agricultural Runoff: Numerous agricultural activities on the Reservation lack adequate BMPs, which affects the water quality of the Reservation. The Fond du Lac Reservation recently developed a Non-Point Source (NPS) Management Plan to address, in part, agricultural runoff concerns. Projects are now being identified to address numerous NPS situations on the Reservation, and funding is being sought through EPA's NPS program.

5. Invasive and Exotic Species: Many natural resource agencies have been developing Invasive Species Management Plans (ISMP) to dictate the prevention and/or control of invasive species. Fond du Lac has a policy of no chemical use on the Reservation. Currently, the Fond du Lac Reservation has not developed this type of plan. It is recommended that the Environmental, Natural Resources, and Forestry Programs at Fond du Lac develop an Invasive Species Management Plan. This plan should incorporate the best, proven techniques for

preventing the introduction of invasive species and the non-chemical control of not only those invasive species that have been identified on the Reservation, but also those invasive species that could potentially be introduced.

REGULATORY PROGRAM

PROGRAM OUTLINE

As stated in the previous section, the Fond du Lac Band will be ramping up a wetland regulatory program to protect and manage the large wetland resource on the Reservation. This regulatory program will be modeled after Clean Water Act Section 404 (33 USC 1344). The Fond du Lac Wetland Ordinance will establish the legal basis for this program on the Reservation. This ordinance will make it illegal for any person, organization, agency, or government to impact wetlands on the Reservation without obtaining a Wetland Exemption Certificate or a Wetland Activity Permit. This ordinance will apply to all persons, entities, and lands on the Reservation regardless of tribal, public, or private status.

RESTRICTIONS

The Fond du Lac Reservation – Office of Water Protection will be establishing a three-tiered wetland management classification system. This management classification will be based on the Recommended Wetland Management Classification System (Minnesota Board of Water & Soil Resources, 2004c). This system outlines a four-category wetland management system as determined by a given wetland's functional ratings using MnRAM 3.0 (Minnesota Board of Water & Soil Resources, 2004a).

1) Preserve – these wetlands have the highest functioning capacity of any wetlands evaluated using MnRAM 3.0 (Exceptional or High ratings). The recommendation is to preserve these wetlands by maintaining wetland and existing functions, values and wildlife habitat; actively manage these wetlands to protect unique features; applying strict avoidance standards; recommending the development of conservation easements; requiring the WCA minimum or greater replacement ratio in mitigation with documented replacement of functions and values; and recommending requiring buffer replacement.

2) Manage 1 – these wetlands have high or medium functioning capacity. The recommendation is to manage these wetlands by maintaining the wetland without degrading existing functions, values and wildlife habitat; applying the WCA sequencing process; and requiring the WCA minimum or greater replacement ratio in mitigation.

3) Manage 2 – these wetlands have a medium or low functioning capacity. The recommendation is to manage these wetlands by maintaining the wetland footprint; improve the wetland biological and plant community diversity and integrity or enhance other functions if possible; applying the WCA sequencing process; consider the wetland for restoration; and requiring the WCA minimum replacement ration in mitigation.

4) Manage 3 – these wetlands have been degraded to the point where their functions are low, except for their capacity for flood/storm water attenuation and downstream water quality sensitivity. The recommendation for these wetlands is to allow for relaxed sequencing and replacement plan flexibility; to consider these wetlands for restoration

and/or enhancement; and allow mitigation flexibility.

A sampling of 24 wetlands on the Fond du Lac Reservation suggests that a majority of wetlands on the Reservation would fall under the Preserve or Manage 1 classification. The following classifications should be established by the Office of Water Protection for wetlands on the Reservation:

1) Priority Wetlands – These wetlands are the same as the Preserve classification as stated above. All wetlands within 300 feet of any water designated E1 Wild Rice Areas in the Fond du Lac Water Quality Standards will also be included in this classification. Strict avoidance will be enforced, with the exception of plant or wildlife habitat improvement projects sponsored or endorsed by a government resource management agency. Only the Oil and Hazardous Materials Containment and Cleanup Exemption, and the Forestry Exemption will be allowed in Priority Wetlands. The strict use of appropriate Best Management Practices (BMPs) will be enforced through the use of compliance inspections. No Deminimus Exemption or Agriculture Exemption Certificates will be issued for activities in Priority Wetlands.

2) Management Wetlands – These wetlands are the same as the Manage 1 classification as stated above. All Exemption Certificates and Wetland Activity Permits will be available for Management Wetlands provided it is a single and complete project and all sequencing and mitigation requirements are satisfied. All sequencing, permitting, and mitigation requirements will apply to these wetlands.

3) Restoration Wetlands – These wetlands are classified by combining the Manage 2 and Manage 3 classifications as stated above. The Office of Water Protection is in the process of identifying potential wetland restoration projects on the Reservation. This classification will identify wetlands on the Reservation that have the potential for restoration and/or enhancement and will also be eligible for compensatory wetland mitigation credit if a restoration and/or enhancement project is undertaken in these wetlands. If impacts are proposed for Restoration Wetlands, all sequencing, permitting, and mitigation requirements will still apply to these wetlands.

EXEMPTIONS

Because of the Fond du Lac Band's desire to be informed prior to any wetland activity, no non-notification exemptions will exist. All of the exemptions listed below will require notification to the Fond du Lac Reservation – Office of Water Protection. All but one of these Notification Exemptions will require notification *prior* to the project start. The Notification Exemptions are as follows:

1) Oil and Hazardous Materials Containment and Clean-Up Exemption – allows for the immediate containment and cleanup of any spill of oil and/or hazardous materials that has occurred in and/or adjacent to wetlands. The Office of Water Protection must be notified of the clean up within three (3) days of the spill event. This is

the only Notification Exemption which allows after-the-fact notification. This exemption only applies to activities required for the containment and cleanup of oil and hazardous substances which are subject to the National Oil and Hazardous Substances Pollution Contingency Plan.

2) Deminimus Exemption – property owners on the Fond du Lac Reservation are allowed a one-time exemption not to exceed 400 square feet in size. Property owners are still required to follow sequencing to be eligible for this exemption. This exemption does not apply to those property owners who have already used the 400 ft^2 exemption allowed by the United States Army Corps of Engineers or the 10,000 ft^2 "deminimus" exemption allowed through the Minnesota Wetland Conservation Act. The Office of Water Protection must be notified at least 10 days prior to the start of the project. An Exemption Certificate will then be issued to the property owner.

3) Forestry Exemption – allows for the performance of silvicultural activities, including timber harvest, provided these activities limit the impact on the hydrologic and biologic characteristics of the wetland. No drainage activities, as well as the construction of dikes, drainage ditches, tile lines, or buildings will be allowed under this exemption. The Office of Water Protection must be notified at least 10 days prior to the start of the activity. An Exemption Certificate will then be issued to the property owner and to the operator (if different from the property owner). For Fond du Lac timber sales, the Exemption Certificate will be issued to the Fond du Lac Forestry Program, only.

4) Agricultural Exemption – allows for the continuation of on-going agricultural activities in wetlands provided the activity was started prior to 1986 and has occurred at least 5 of the last 10 years. This exemptions does NOT authorize any new wetland impacts. Landowners eligible for this exemption should contact the Fond du Lac Reservation – Office of Water Protection for an Agricultural Exemption Certificate to avoid possible delays in their agricultural activities.

PERMITS

The permit system that the Fond du Lac Band intends to establish is nearly identical to the permit system now administered by the St. Paul District of the U.S. Army Corps of Engineers. Three permits will be available as follows:

1) General Permit – GP1 will cover maintenance of existing structures and fills that impact no more than 0.33 acres of wetland/water area. This General Permit cannot be used for any impacts in wild rice beds or in water/wetlands within 300 feet of any wild

rice bed. Maintenance activities that do not meet this criteria may be eligible for a Letter of Permission Wetland Activity Permit.

2) Letter of Permission Wetland Activity Permit – A Letter of Permission (LOP) will

cover common impacts to wetlands not covered by a General Permit that do not exceed 2 acres for a single and complete project. Any proposed impact of 2 or more acres must be permitted by a Standard Wetland Activity Permit.

3) Standard Wetland Activity Permit – This Standard Permit will authorize wetland impacts of 2 or more acres for a single and complete project.

PERMIT APPLICATIONS

Property owners desiring to impact wetlands for legitimate projects can make applications to the Fond du Lac Reservation - Office of Water Protection. Applications will include the following:

1) The name, address, phone, fax (if applicable), and email (if applicable) of the applicant.

2) A description of the activity including the purpose and need of the project, the reason the project must impact wetlands, project phasing (if applicable), the location and dimensions of all adjacent structures (if applicable), a list of all authorizations required by other federal, interstate, state, tribal, and local agencies for the work (including all approvals received or denials already made), and the Best Management Practices (BMPs) to be utilized to minimize additional impacts to water resources.

3) Location of proposed wetland impacts, including township, range, section, ¼ section, ¼ section (if applicable), street address (if applicable), county, township name, and city name (if applicable).

4) A description of the wetland proposed to be impacted including wetland type (using Eggers and Reed, 1997), dominant wetland vegetation, wetland size, proposed impact size.

5) A map of the proposed project indicating the locations of all wetlands, proposed wetland impacts, and structures, roads, driveways and culverts, both existing and proposed.

6) A description of at least two alternatives to the proposed project (this includes the selected alternative). The “no-build” or “do-nothing” alternative is one acceptable alternative.

7) A description of the proposed compensatory wetland mitigation (Compensatory Wetland Mitigation Plan or Minnesota Wetland Replacement Plan).

8) The names and addresses of all adjoining property owners.

9) An application fee of $xxx.00 (no fee will be charged for government agencies or Fond du Lac Band Members).

10) A Wetland Delineation Report complete with the accompanying data sheets.

The Fond du Lac Reservation – Office of Water Protection will accept the Fond du Lac Reservation Wetland Activity Permit Application, Application for Department of the Army Permit (Eng Form 4345), or the Minnesota Local/Federal/State Application Forms for Water/Wetland Projects.

PERMIT APPLICATION PROCESSING

Upon receiving an application, the following reviews will be conducted:

1) Administrative Review – The Office of Water Protection shall review the application for completeness and accuracy. If the application is deemed to be incomplete and/or inaccurate, it will be returned to the applicant or the additional information will be requested from the applicant; this will occur within ten (10) days of the receipt of the application. If the application is deemed to be complete and accurate, the request for a Wetland Activity Permit will be issued in a Public Notice for a 30-day comment period. All comments received by the OWP will be sent to the applicant for a satisfactory response.

2) Technical Review – During the 30-day comment period, the Office of Water Protection will conduct a technical review of the application to evaluate whether the activity is in compliance with the Clean Water Act (including Section 404(b)(1) guidelines), the Fond du Lac Wetland Ordinance, and other applicable ordinances or regulations.

PERMIT RECOMMENDATIONS/DECISIONS

After both the Technical Review and the 30-day comment period and response(s) have been completed (federal agencies have 90 days to comment), the Office of Water Protection will make a recommendation to the Director of the Resource Management Division regarding the Wetland Activity Permit Application. The Director will then issue one of three possible decisions: 1) Grant the Wetland Activity Permit with General Conditions, 2) Grant the Wetland Activity Permit with General and Special Conditions, or 3) Deny the Wetland Activity Permit. For Letters of Permission (LOP) Wetland Activity Permits the decision will be issued within 60 days from when the application was deemed complete and accurate. For Standard Wetland Activity Permits the decision will be issued within 120 days from when the application was deemed complete and accurate.

APPEALS

The applicant may appeal the Director's decision utilizing the following process:

1) A Notice of Appeal is sent by the applicant to the Office of Water Protection in writing within ten (10) days of receiving the Wetland Activity Permit Decision.

2) Upon receiving a Notice of Appeal from the applicant, the Office of Water Protection will present the applicant's file to the Environmental Program Director for procedural and technical review.

3) After the Environmental Program Director's review is completed, the appeal will be presented to the Fond du Lac Reservation Business Committee (RBC) for the final decision. The Reservation Business Committee's decision is binding.

MITIGATION

Mitigation guidelines will generally follow those recently established by the St. Paul District of the U.S. Army Corps of Engineers. A minimum mitigation ratio of 1:1 will be used for all permitted projects on the Reservation. In addition, many projects will require a higher mitigation ratio based upon three factors – 1) will the mitigation take place before or concurrent with the proposed impact; 2) will the mitigation take place on or adjacent to the proposed impact; and 3) will the mitigation be of the same wetland type as the proposed impacted wetlands.

Several methods of compensatory wetland mitigation will be accepted by the Fond du Lac Reservation - Office of Water Protection as follows:

1) Wetland Restoration – also known as wetland rehabilitation or wetland re-establishment. This is the preferred method of mitigation on the Reservation. This method of Compensatory Wetland Mitigation will be accepted for all mitigation requirements both at the 1:1 minimum or for any required mitigation above the minimum. A list of potential wetland restoration project sites is available from the Office of Water Protection.

2) Wetland Creation – Although not preferred, this method of mitigation will be accepted for all mitigation requirements both at the 1:1 minimum or for any required mitigation above the minimum.

3) Wetland Enhancement – This method of Compensatory Wetland Mitigation cannot be used by itself to fulfill all mitigation requirements; it cannot be used to fulfill the minimum 1:1 requirement, only mitigation required above the minimum. In addition, this method can only be combined with other acceptable methods at less than 50% of the total

mitigation.

4) Wetland Preservation – Preservation will only be accepted if the proposed preservation wetland is under demonstrable threat of development, assuming that the development would be permitted if such a proposal were to be submitted to the Office of Water Protection. In addition, the wetland must be performing physical and biological functions, and must be of a type important to the region. This method of Compensatory Wetland Mitigation cannot be used by itself to fulfill all mitigation requirements. Rather, this method can only be combined with other acceptable methods at less than 50% of the total mitigation at an 8:1 (12.5%) credit.

5) Wetland Buffer – This is not considered to be a method of Compensatory Wetland Mitigation. However, because wetlands benefit from natural upland buffers, a 4:1 (25%) credit will be given for upland buffers established and maintained as part of a Compensatory Wetland Mitigation package, but must be less than 50% of the total mitigation.

6) Wetland Banking – This method of mitigation will only be accepted if the applicant demonstrates that all On-Reservation mitigation options have been pursued and rejected.

Definitions of each of these types of mitigation can be found in the Appendix of this document. Additional information can be found in Mitsch & Gosselink, 2000.

WETLAND ACTIVITY PERMIT GENERAL CONDITIONS

The following General Conditions will be a part of every Wetland Activity Permit issued by the Fond du Lac Reservation – Office of Water Protection:

1) Permits issued will be valid for a period of two (2) years from the date of issue. If additional time is necessary for the completion of the authorized activity, the applicant can request an extension, in writing, from the Office of Water Protection at least 30 days before a Letter of Permission Wetland Activity Permit expires, or 90 days before a Standard Wetland Activity Permit expires.

2) The authorized activity must be maintained in good condition and in conformance with the terms and conditions of the permit. The applicant will not be relieved of this requirement if said applicant abandons the permitted activity, although the applicant can make a good faith transfer to a third party, provided such transfer is in compliance with General Condition 5 of this section. Should the applicant wish to cease to maintain the authorized activity or should the applicant desire to abandon the activity without a good faith transfer, the applicant must obtain a modification of the issued permit from the Office of Water Protection, which may require restoration of the area.

3) Any fill material placed in wetlands as authorized by the permit, must be free from contamination.

4) If any previously unknown historic or archaeological remains are encountered while accomplishing the activity authorized by the permit, the applicant must stop all activity and notify the Office of Water Protection immediately. The Office of Water Protection will then initiate Federal/State/Tribal coordination required to determine if the remains warrant a recovery effort or it the site is eligible for listing on the National Register of Historic Places.

5) If the applicant or landowner chooses to sell the property associated with the authorized permit, the applicant must submit an Application for Wetland Activity Permit Transfer, complete with the signature of the new owner, to the Office of Water Protection to validate the transfer of responsibility for the authorized permit.

6) A Clean Water Act Section 401 Tribal Water Quality Certification from the Fond du Lac Reservation is required for all Wetland Activity Permits.

7) The applicant must allow representatives from the U.S. Army Corps of Engineers, Fond du Lac Reservation – Office of Water Protection, Minnesota Board of Water and Soil Resources, and the applicable county and/or SWCD to inspect the authorized activity at any time deemed necessary to ensure that the activity is being or has been accomplished in accordance with the terms and conditions of the permit.

As noted above, Special Conditions may also be imposed on the issued permit to address specific situations, activities, or project sites that may require specific conditions to ensure the authorized activity conforms with the protection and management intent of the Fond du Lac Reservation wetland regulatory program and this document.

APPENDIX

DEFINITIONS

alluvium - sedimentary material deposited by flowing water.

alternatives analysis - the process of final design selection that takes sequencing into consideration.

anaerobic - without the presence of oxygen.

animal unit - a measurement used to determine the number and impact of livestock in an area (see feedlot). One horse is one animal unit. One cow is 1.4 animal units. One pig is 0.4 animal units. One chicken is 0.2 animal units.

aquatic bed - a wetland in the Palustrine Ecological System which is dominated by floating and/or submerged plants.

Best Management Practices (BMPs) – methods, measures, or practices to prevent or reduce water pollution, including, but not limited to structural and non-structural controls, operation and maintenance procedures, and other requirements and scheduling and distribution of activities.

bounce - term used to describe the sudden increase of water level in a lake (particularly wild rice lakes) primarily from the influx of storm water. Bounce can be devastating to the development of wild rice *(Zizania palustris*) especially during its floating leaf stage.

creation - in regards to wetlands, a created wetland is usually a mitigation wetland or treatment wetland that is located where no wetland has existed previously.

criteria - features or standards upon which a wetland determination is based; wetland criteria includes features from wetland hydrology, wetland soils, and wetland vegetation.

Cowardin Classification System - This system was developed by a team of wetland ecologists and is a hierarchal method for grouping ecologically similar wetlands. The classification is first divided into Ecological Systems of Marine (Oceans and saltwater systems), Esturarine (estuaries or areas where saltwater and fresh water combine), Riverine (rivers, streams, and creeks), Lacustrine (lakes), or Palustrine (true wetlands). Each of these systems are then divided into subsystems which reflect hydrological conditions (the Palustrine system is not divided into subsystems). Next, subsystems (or the Palustrine system) are divided into classes which describe the wetland vegetation or substrate in the case of unvegetated wetlands. Each class is further divided into subclasses which, in the case of vegetated wetlands, describes this vegetation such as

deciduous broadleaf, needled evergreen, etc. The classification system also includes the use of modifiers to describe the water regime (hydrology), water chemistry (pH, salinity, etc.) and special modifiers relating to altered wetlands (impounded, artificial, etc.). Thus a certain wetland on the Fond Du Lac Indian Reservation could be coded by this system as: PFO2Bd; where P = Palustrine system, FO = Forested class, 2 = needle-leaved deciduous (such as Tamarack) subclass, B = saturated water regime, and d = partially drained/ditched special modifier.

delineation (wetland) – the demarcation of wetland boundaries using the three criteria of hydrology, soils, and vegetation.

dominant (Cowardin classifications) - a type of vegetation that has an areal coverage of 60% or more in the given wetland.

dominant species (wetland indicator status) - a plant species in which the areal coverage constitutes 30% or more in a given area.

drift (glacial) - rock material carried and deposited by or from a glacier.

emergent - a non-woody plant which has aerial parts that extend above the surface of the water; two types of emergents exist: 1) persistent emergents in which the aerial parts stay erect after the plant has dispersed its seeds (such as cattails), and 2) non-persistent emergents in which the aerial portions collapse after the seeds have dispersed (such as arrowheads).

emergent wetland - a wetland class within the Palustrine Ecological System which is dominated by non-woody emergent plants.

enhancement – in regards to wetlands, enhancement increases one or more functions of the wetland through modification (usually the hydrology).

erosion – the dislodging of a soil particle by wind or water (including rainfall).

facultative - a plant indicator status in which the species in question is commonly found in a wetland between 34% and 66% of the time.

facultative wetland - a plant indicator status in which the species in question is commonly found in a wetland between 67% and 99% of the time.

feedlot - an agricultural area where 10 or more animal units (see definition above) are located in a confined space in which no grass is allowed to grow. To be considered a feedlot, the area must have 7 or more cows, 10 or more horses, 40

or more pigs, or 80 or more chickens. Combinations of these animals are also possible.

floating - wetland plants in which all of the plant (free floaters) or a portion of the plant floats on the surface of the water.

forested wetland - a wetland class within the Palustrine Ecological System which is dominated by trees.

free from contamination – a permit General Condition requiring that all fill material placed in wetlands be free from contamination. Contaminants include heavy metals, petroleum products (including asphalt), toxic chemicals and materials, and other materials that may degrade the biota of the wetland.

function (wetland) - a physical, chemical, or biological process of a wetland.

graywacke - cemented “dirty sand” containing clay and rock fragments in addition to quartz and feldspar. They indicate rapid erosion and deposition without much chemical weathering.

indicator - a physical, chemical, or biological component of a wetland that can be measured or observed that is used to detect the presence of a given wetland criteria for regulatory purposes.

in-kind (mitigation) - situation in which the compensatory mitigation wetland is the same wetland type as the impacted wetland. For the purposes of this document, wetland types will be defined by using Eggers and Reed, 1997.

inundated - having standing water above the surface of the substrate.

jurisdictional wetland - a wetland that has all three wetland criteria present.

mitigation (wetland) - the process of replacing impacted wetland acreage with another; often referred to as “compensatory mitigation.”

mitigation plan - a formal written document that outlines the process a developer will follow to replace (mitigate) unavoidable wetlands lost from a project.

moraine - a hill or other topographic formation of rock or stone debris deposited by a glacier.

obligate (wetland) - a plant indicator status in which the species in question is commonly found in a wetland more than 99% of the time.

off-site (mitigation) - situation in which the compensatory wetland is located a considerable distance from the impacted wetland.

on-site (mitigation) - situation in which the compensatory wetland is located in the same area as the impacted wetland.

ordinary high water level - is a reference elevation that defines the Minnesota DNR's regulatory authority over development projects that are proposed to alter the course, current or cross section of public waters and public waters wetlands. For lakes and wetlands, the OHWL is the highest water level that has been maintained for a sufficient period of time to leave evidence on the landscape. The OHWL is commonly that point where the natural vegetation changes from predominately aquatic to predominantly terrestrial. For watercourses, the OHWL is the elevation of the top of the bank of the channel. For reservoirs and flowages, the OHWL is the operating elevation of the normal summer pool. The OHWL is also used by local units of government as a reference elevation from which to determine structure setbacks from water bodies and watercourses.

out-of-kind (mitigation) - situation in which the compensatory wetland is not the same type of wetland as the impacted wetland. For the purposes of this document, wetland types will be defined by using Eggers and Reed, 1997.

outwash - the coalescing alluvial fans of braided streams from the margins of a glacier.

palustrine - an Ecological System in the Cowardin Classification System in which the water body is a true wetland system.

paper fill - hypothetically filling in a wetland “on paper” that requires the actual mitigation of the hypothetical fill. Used by some regulatory programs when an exception to a buffer is granted. The developer impacts the buffer but not the wetland, but would still be required to mitigate wetlands as if the fill had actually taken place.

permanent - a wetland water regime characterized by the presence of standing water in all seasons in all years.

preservation – in regards to wetlands, preservation is the protection of a wetland often through the use of covenants or conservation easements.

replacement plan - a term the Minnesota Wetland Conservation Act uses for a formal written document that outlines the process a developer will follow to replace (mitigate) unavoidable wetland losses.

reference standard wetland - a wetland judged to have the highest level of overall sustainable functional capacity for its type within the wetland comparison domain.

restoration - in regards to wetlands, a restored wetland is one in which a wetland had existed previously or is still in existence but severely degraded.

roads - any highway, street, road, entrance, or driveway designed and built to handle vehicular traffic.

saturated - a wetland water regime characterized by a wet soil without standing water; the water level in this water regime can be from the soil surface to several inches below the surface.

scrub shrub wetland - a wetland class within the Palustrine Ecological System which is dominated by shrub species.

seasonally flooded/saturated - a wetland water regime characterized by flooding or inundation in the spring resulting from snow melt and then later drying out until the soil is only saturated for the remainder of the growing season.

sediment - soil material suspended in water. Results from the process of erosion.

seed set - the time in a plant's life cycle in which seeds are formed and have matured in the fruit of the plant.

sequencing - a step-wise order of impacting wetlands. When a given development project is in consideration, the person or entity in charge of the project must 1) avoid wetland impacts; 2) minimize unavoidable wetland impacts, and 3) mitigate all unavoidable wetland impacts.

shrub - a woody plant, typically shorter than a tree, and typified as being branched from the base with two or more stems.

siltstone - fine-grained rocks composed mainly of compacted silt.

slate - a metamorphic rock composed of paper-thin layers of very fine-grained material primarily composed of mica or quartz and lacks a shiny cleavage surface.

stratified - the ordered layering of rocks, often sorted by relative size.

submergent - a wetland plant species in which all of the plant remains below the surface of the water.

till - glacial drift composed of an unconsolidated, heterogenous mixture of clay, sand, gravel, and boulders.

treatment wetland - a created wetland specifically designed to treat waste water or storm water to improve water quality.

tree - a woody plant, typically taller than a shrub, and typified as being unbranched at the base with a single trunk or stem.

upland (upland obligate) - a plant indicator status in which the species in question is commonly found in a wetland less than 1% of the time.

value (wetland) - a desired outcome as a result of a wetland function; often a judgement that a given function provides a financial, educational, cultural, recreational, or aesthetic benefit.

wetland - those areas that are inundated or saturated by surface or groundwater 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 (USACE & EPA).

wetland comparison domain - the geographic area such as a political boundary, major or local watershed, or ecoregion subsection that is used for functional comparisons provided that this area is of a sufficient size as to contain some relatively undistrurbed reference standard wetlands.

ACRONYM LIST

A	Public Water Supply Designated Use
AB	Aquatic Bed
B	Wildlife Designated Use (Hydrology section)
B	Saturated water regime (Water regimes section)
BMP	Best Management Practices
BWSR	Minnesota Board of Water and Soil Resources
C1	Cold Water Fisheries Designated Use
C2	Warm Water Fisheries Designated Use
C3	Subsistence Fishing (Netting) Designated Use
CFR	Code of Federal Regulations
cfs	Cubic feet per second
D1	Primary Contact Recreational Designated Use
D2	Secondary Contact Recreational Designated Use
dbh	Diameter at Breast Height
DNR	Minnesota Department of Natural Resources

E1	Cultural Wild Rice Area Designated Use
E2	Cultural Aesthetic Waters Designated Use
EM	Emergent
EPA	United States Environmental Protection Agency
F	Agricultural Designated Use (Hydrology section)
F	Fahrenheit (Climate section)
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
FDL	Fond du Lac Reservation
FDL-WPCP	Fond du Lac Reservation Wetland Protection and Conservation Plan
FO	Forested
G	Navigation Designated Use
GIS	Geographic Information System
GP	General Permit
H	Commercial Designated Use (Hydrology section)
H	Permanent water regime (Water regimes section)
IP	Individual Permit
ISTS	Individual Sewage Treatment System
L	Lacustrine System
LGU	Local Government Unit
LOP	Letter of Permission
MnRAM	Minnesota Routine Assessment Method
MPCA	Minnesota Pollution Control Agency
MCT	Minnesota Chippewa Tribe
NPS	Non-Point Source
NRCS	National Resources Conservation Service
NWI	National Wetland Inventory
NWP	Nationwide Permit
OBL	Obligate (Wetland Obligate)
OHWL	Ordinary High Water Level
P	Palustrine System
R	Riverine System
RBC	Fond du Lac Reservation Business Committee
RH	Relative Humidity
SCS	Soil Conservation Service (now the NRCS)
SS	Scrub Shrub
SWAP	Standard Wetland Activity Permit
SWCD	Soil and Water Conservation District
TRM	Turf Re-enforcement Mat
WAP	Wetland Activity Permit
WCA	Minnesota Wetland Conservation Act
UPL	Upland (Upland Obligate)
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture

USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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