Red Lake Wildlife Management Area Master Plan, 2023-2033

June 29, 2023

DEPARTMENT OF NATURAL RESOURCES

Notice is hereby given that the Red Lake Wildlife Management Area Master Plan, 2023-2033 for the Minnesota Department of Natural Resources has been completed and is now adopted.

Sarah Strommen, Commissioner

June 29, 2023
Date

Executive Summary

Department of Natural Resources Mission Statement

The mission of the Minnesota Department of Natural Resources (DNR) is to work with Minnesotans to conserve and manage the state's natural resources, to provide outdoor recreation opportunities, and to provide for commercial uses of natural resources in a way that creates a sustainable quality of life.

Fish and Wildlife Division Vision and Purpose

The Fish and Wildlife Division (FAW) is responsible for managing fish and wildlife populations and providing related outdoor recreational opportunities in Minnesota. We conserve and enhance water and land habitats; regulate hunting, trapping, and fishing; foster environmental stewardship; and work with partners and the public to accomplish shared goals. Our work is informed by biological and social sciences, cultural and economic values, and our public trust obligation to manage fisheries and wildlife in perpetuity.

WMA System Description and Purpose

Wildlife Management Areas (WMAs) are part of Minnesota's outdoor recreation system and are established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. They are the backbone of the DNR's wildlife management efforts and are key to protecting wildlife habitat for future generations by providing Minnesotans with opportunities for hunting, fishing, and wildlife watching, and by promoting important wildlife-based tourism in the state.

Red Lake WMA Vision Statement

Red Lake WMA will be managed to provide quality hunting, fishing, trapping, and wildlife viewing, as well as other outdoor recreational experiences compatible with the statutory purpose of WMAs. These opportunities will be provided in a way that recognizes Red Lake WMA's ecological significance. Management priority will be given to providing a balanced range of wildlife habitat conditions by promoting the development of under-represented forest habitats and successional stages. More common plant communities and habitats will be managed to sustain ecological health and provide for the production of species sought by hunters, trappers, and bird watchers.

Red Lake WMA Master Plan Summary

This plan summarizes management activities for Red Lake WMA, an approximately 325,000-acre WMA in northwest Minnesota. The last master plan for Red Lake WMA was written in 1980 and was intended to cover a 10-year period. This is the first formal updating of the master plan since 1980.

Significant changes in this plan reflect a greater emphasis on restoring and enhancing native plant communities, increased knowledge of the fauna and flora of Red Lake WMA, changing wildlife and public use of the area, and new challenges like invasive species, changing user groups, and changing climate.

White-tailed deer and deer hunters will benefit by the creation of early-successional aspen habitat along the road system, and by the establishment of more walk-in access points across drainage ditches.

Grouse, woodcock, and upland gamebird hunters will benefit by the creation of early-successional aspen habitat, and by the establishment of more walk-in access points across drainage ditches. In addition, spruce grouse habitat needs will be focused around core areas of diverse jack pine cover, and habitat on a management opportunity area for sharp-tailed grouse will continue to be managed for the benefit of sharp-tailed grouse. Management actions directed towards benefitting ruffed grouse will also benefit American woodcock production.

Black bear and bear hunters will benefit by increasing the production of blueberries and other foods through appropriate thinning of pine stands to increase sunlight penetration to the forest floor, and by protecting denning habitat that attracts black bear from long distances from Red Lake WMA.

Waterfowl and waterfowl hunters will benefit by the production of cavity nesting species including wood ducks, common goldeneyes, and mergansers along the forested tributaries of the Rapid and Roseau rivers. Waterfowl hunters who take snipe, sora, and other rails will also benefit from the production of these species in the vast shallow and grassed wetland landscape that dominates Red Lake WMA.

Snowshoe hare and hunters and trappers will benefit by the creation of dense shrub and conifer cover generated through forest habitat management, and brushland shearing and mowing. Trappers will benefit because snowshoe hares are an important prey item for furbearing predators.

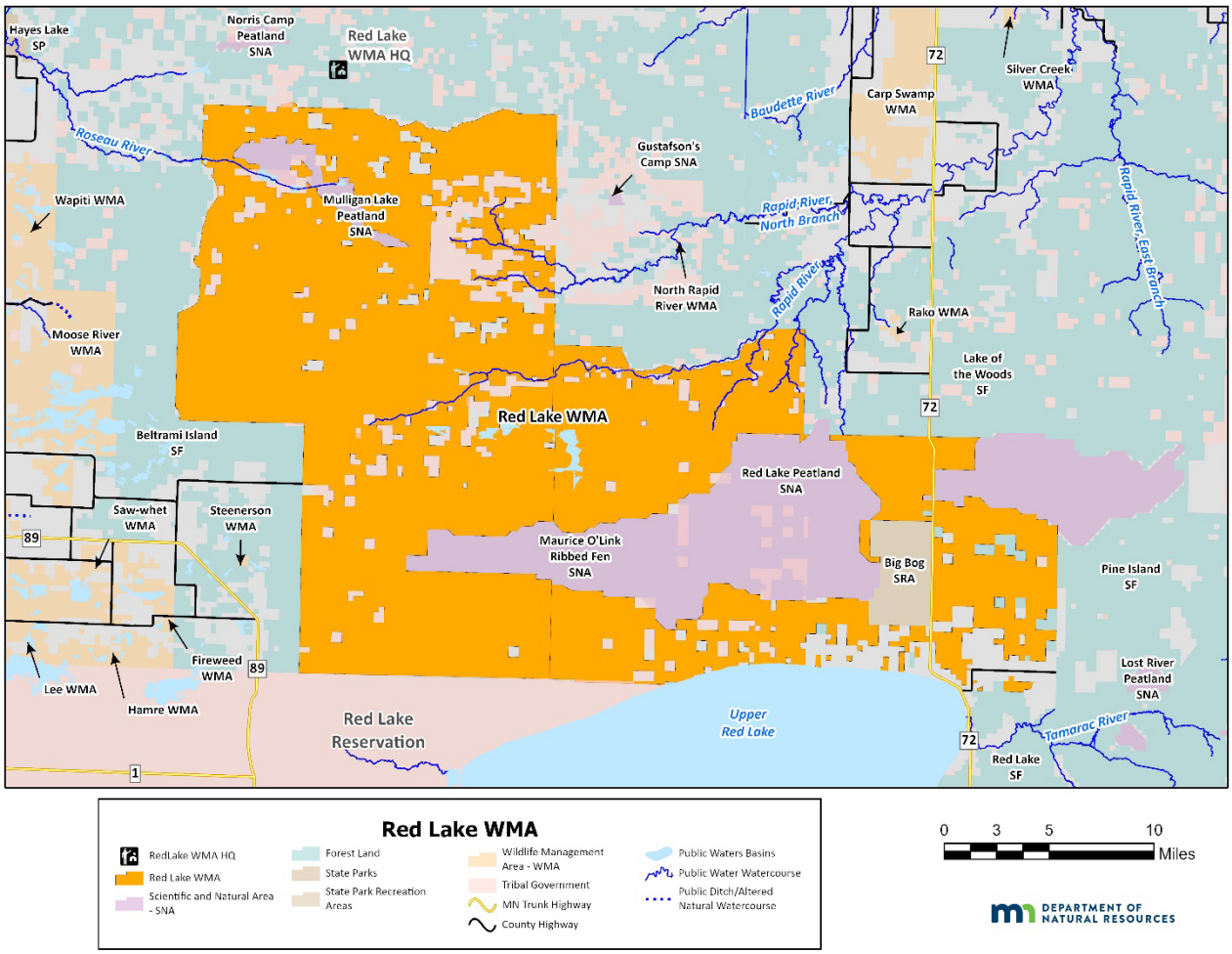
Trappers will also benefit from ensuring there is the appropriate quantity and spatial distribution of large aspen for cavities for denning and sheltering sustainable populations of fisher and pine marten.

Wildlife viewers will benefit from the maintenance of habitats that support sought-after species that occur in greater abundance on Red Lake WMA than most other places in Minnesota.

The patterned peatlands within the boundary of Red Lake WMA are unique on a global scale; however, they have been altered by past ditching and drainage efforts. We will work together with Ecological and Water Resources Division (EWR) hydrologists, watershed districts, soil and water conservation districts, and other entities to maintain and restore natural hydrology to the maximum extent practicable. This plan identifies two priority areas to initially focus restoration and protection efforts.

The plan spells out desired conditions and management goals, objectives, and strategies needed to achieve them. Techniques are presented for management of the different habitat types, including prescribed fire, brush treatments, forest habitat enhancement through targeted timber harvest, and riparian and wetland protection and restoration. An annual calendar of management activities is included, as is a discussion of current and potential research and monitoring activities.

Figure 1. Red Lake Wildlife Management Area



Contents

Figures

Tables

Introduction

Major Unit Definition

Minnesota currently has 1,541 Wildlife Management Areas (WMAs) totaling more than 1.3 million acres distributed across the state. These WMAs are managed out of 37 local offices, eight of which are classified as "major units" due to the large acreages under management in that administrative area. Each of the major units manages a primary WMA and may also manage other nearby units. Major units are typically, although not always, distinguished by having resident staff (wildlife area supervisor and assistant wildlife area supervisor). They also typically have greater acreage that is more intensely managed than most WMAs; larger fleet asset lists including heavy equipment such as bulldozers, tractors, and graders; larger staff complements; and more capital improvements.

Purpose of Plan

This master plan outlines the management of Red Lake WMA through 2033, in accordance with the Minnesota Outdoor Recreation Act of 1975. The plan's purpose is to provide management guidance, a basis for allocating staff and fiscal resources, direction for annual work planning, and metrics for measuring management accomplishments.

The previous management plan was prepared in 1980, and many environmental and social changes have occurred since then. Minnesota's population has grown, the climate has changed and continues to change, invasive species have proliferated, new state and federal policies have been enacted, recreation demands and preferences have changed, and many wildlife and plant populations have declined throughout the state. A revised management plan is needed to address and manage for these changing conditions. The plan update process also provides an opportunity to engage with a wide variety of Minnesotans using modern engagement tools and techniques. This plan is among six other comprehensive management plans the Department of Natural Resources is updating for the state's WMA major units. They are 10-year management plans, which will continue to be revised as new management practices develop, resource philosophies evolve, and new challenges are encountered.

Long-range Goals

For Red Lake WMA, the overarching long-range goals outlined in this plan are:

1. **To maintain or enhance wildlife production, habitat, and biodiversity**
2. **To maintain or increase hunting, fishing, trapping, and other compatible outdoor recreational opportunities**

Planning Process

The planning process began in July 2018, when an internal planning team was assembled of staff from multiple DNR divisions with diverse areas of expertise (Appendix A). The U.S. Fish and Wildlife Service (USFWS) and the Red Lake Nation also had representatives on the planning team. The team members changed several times over the course of the project as staff retired, changed positions, and encountered capacity challenges, but overall representation among divisions remained relatively stable.

During September 2018, DNR staff were encouraged to provide feedback via an online questionnaire on what they perceived as the most pressing issues, largest untapped opportunities, greatest successes, and biggest challenges related to the management of Red Lake WMA.

On November 28, 2018, an online questionnaire was provided for the public and announced via a DNR news release. The online questionnaire was available from November 28 to December 19 for public input. The questionnaire received responses from 145 individuals, and a summary of responses collected can be found in Appendix B. The planning team reviewed the public comments and continued to consider them while developing content for the plan.

In January 2019, the DNR held focused input meetings with Red Lake Nation and local watershed districts to coordinate early input into the planning process. The project was then delayed for several years due to staff turnover and temporary shifts in departmental and divisional priorities related to the COVID-19 pandemic. In August 2022, the planning team reconvened and continued to work on drafting updated goals, objectives, and strategies for Red Lake WMA.

In March 2023, the DNR hosted an in-person focus group meeting at Itasca State Park and an online public input webinar to receive additional input from stakeholders. A summary of recommendations received can be found in Appendix C.

In April 2022, the first complete draft of the plan was distributed for internal DNR staff review and comments. Internal comments were incorporated into the draft in preparation for the upcoming public review period.

On May 19, 2023, the draft plan was made available for public review and comments. The public comment period remained open until June 20. During this period, Red Lake WMA staff hosted an in-person open house at Big Bog State Recreation Area and an additional online open house during which attendees were encouraged to ask questions and provide input. Comments were also collected via the Engage with DNR website, U.S. mail, email, and personal communication directly to staff. All comments were analyzed thematically and reviewed by the planning team and division leadership. A summary

document describing the comment themes received and how they were addressed is included in Appendix D.

Guiding Documents

Management at Red Lake WMA is informed and guided by an array of statutes, rules, directives, and plans that do not have a strict hierarchy. A list of many of these documents is included in Table 1. The management objectives and strategies in this plan were developed within the context of these existing guidance documents. Due to the interdisciplinary nature of DNR's work, individual management decisions are often context-dependent and require close and consistent coordination beginning at the local level and attention to multiple applicable guidance documents. When appropriate and relevant, the DNR considers plans developed by other agencies and organizations. This coordination helps ensure that all management decisions and actions taken within Red Lake WMA will be made to the benefit of wildlife, wildlife habitats, and compatible outdoor recreation.

Select WMA Statutes and Rules

Minnesota Statues, Chapter 84 Department of Natural Resources, Section 84.942 Fish and Wildlife Resources Management Plan states that the commissioner shall prepare fish and wildlife management plans designed to accomplish the policy of section 84.941.

Minnesota Statutes, Chapter 86A Outdoor Recreation System, Section 86A.05 Classification and Purposes defines the purpose of state WMAs as "to protect those lands and waters that have a high potential for wildlife production and to develop and manage those lands and waters for the production of wildlife, for public hunting, fishing, and trapping, and for other compatible outdoor recreation uses." It also states that WMAs need to be administered in a manner that will "perpetuate, and if necessary, reestablish quality wildlife habitat for maximum production of a variety of wildlife species." Finally, "public hunting, fishing, trapping, and other uses shall be consistent with the limitations of the resource, including the need to preserve an adequate brood stock and prevent long-term habitat injury or excessive wildlife population reduction or increase. Physical development may provide access to the area but will be developed to minimize intrusion on the natural environment."

Minnesota Statutes, Section 86A.09 Development and Establishment of Units describes the requirements that apply to the development of the master plan.

Minnesota Statutes, Section 97A.135 Acquisition of Wildlife Lands, Subdivision 1 Public Hunting and Wildlife Areas states that the commissioner may designate land acquired under this subdivision as a wildlife management area for the purposes of the outdoor recreation system.

Minnesota Rules, Chapter 6230 Wildlife Management has general and specific rules that apply to WMAs.

Red Lake WMA habitat management and operations are typically funded through Pittman-Robertson Wildlife Restoration Act grants (16 U.S.C. 669 et seq.) and the Beltrami Island Fund. Wildlife Restoration grants require that habitat management and operation activities serve wildlife management purposes (50 CFR 80.50). A small portion of Red Lake WMA was acquired with Wildlife Restoration grant funds so must comply with federal regulation 50 CFR 80.134. These grant-acquired properties must continue to serve the purpose for which they were acquired, and grant acquired real property may not be sold without USFWS approval.

Additional Documents

Table 1. Additional documents used to guide the development of the Red Lake WMA Master Plan

Document Name	Plan Year	Plan Owner
American Woodcock Conservation Plan	2008	Multiple
Audubon Minnesota Blueprints for Bird Conservation	2014	Audubon Minnesota
Beltrami Island Land Utilization Project Comprehensive Conservation Management Plan (LUP CCMP)	2013	DNR/USFWS
Conservation Agenda	2015-2025	DNR
Deer Plan	2019-2028	DNR
Deer Population Goal Setting	Ongoing	DNR
Executive Order 11990, Protection of Wetlands	1977	Executive Order
FAW Directive No. 070205: Outdoor Recreation Area Unit Administrative Handbook (Forest Management on WMAs and AMAs/FMAs)	2009	DNR
FAW Directive No. 070605: Outdoor Recreation Area Unit Administrative Handbook (Development Standards for WMA/AMAs)	2010	DNR
Forest Resource Management Plan • Strategic Direction • Current 10-Year Stand Exam List • Northern Minnesota & Ontario Peatlands Section Forest Resource Management Plan (NMOP SFRMP)	2018	DNR
Long Range Duck Recovery Plan	2006	DNR
Managing Minnesota's Shallow Lakes for Waterfowl and Wildlife: Shallow Lakes Program Plan	2010	DNR
Minnesota Prairie Conservation Plan	2011	Minnesota Prairie Plan Working Group

Document Name	Plan Year	Plan Owner
Minnesota Wolf Management Plan	2001	DNR
Minnesota's Endangered Species Statute	2022	Minnesota Statute
Minnesota's Wildlife Management Area Acquisition	2002	The Citizens' Advisory Committee
Moose Management and Research Plan	2011	DNR
Minnesota Peatland Protection Act	2022	Minnesota Statute
Red Lake River One Watershed One Plan	2017	Red Lake Watershed District
Red Lake Watershed District 10 Year Plan	2006	Red Lake Watershed District
Red Lake Wildlife Management Area Master Plan	1980-1989	DNR
Red River Basin Stream Survey Report, Red Lake River Watershed	2004	DNR
Ruffed Grouse in Minnesota: A Long-Range Plan for Management	2012	DNR
Strategic Management Plan for Elk (Interim)	2016	DNR
Surveillance and Management Plan for Chronic Wasting Disease	2019	DNR
Sustainable Timber Harvest Analysis	2019	DNR
Wetland Conservation Act	1991	Board of Water and Soil Resources
Working with Partners for Wildlife Conservation: Minnesota's Wildlife Action Plan (MNWAP)	2015-2025	DNR

All acronyms and initialisms used in this plan are listed in Appendix E.

Area History

Geographic History

The history of the Red Lake area is complex, involving two indigenous tribes, the federal government, the state of Minnesota, and its counties. Land ownership patterns resulted from a variety of Indian treaties and cessions; state and federal land grants, sales, programs, and laws; and private and corporate actions.

Pre-settlement. By as early as 1630, the Ojibwe had established a village at Fond du Lac. In the succeeding decades, alliances were made with the Assiniboine and Cree living near Rainy Lake and Lake of the Woods. By the late 1600s, fighting between the Dakota Sioux and the Ojibwe flared and continued intermittently until about 1730, when the Dakota abandoned their claims to lands east of the Mississippi River when they were driven from Mille Lacs Lake. Subsequently, the Ojibwe moved

rapidly to dislodge the Dakota from the area around Leech Lake and Red Lake, fighting successful battles that secured the region for themselves (Van Brunt, 1921). In the succeeding decades, the Ojibwe at Red Lake fortified their ownership and expanded their control over the lands above Red Lake to Lake of the Woods and pushed further west into the region near Pembina and Lake Winnipeg in what is now Manitoba.

Once their position was secure, European fur traders began to engage with the Red Lake people (Nute, 1930). The earliest trading with the Ojibwe there took place when James Grant visited the band sometime prior to 1784, while another trader, Joseph Reaume, camped and traded at Red Lake during the season of 1784-85. The first trading house at Red Lake was established in 1790, when the Northwest Company founded a fort on the east side of Red Lake (this post was subsequently transferred to the American Fur Company in 1826). A few years later, in 1794, Vincent Roy founded a post at the junction of Thief and Red Lake rivers to exploit the successful ventures of the Ojibwe in the region. That same year, Baptiste Cadotte founded a post on the western shore of Red Lake near the outlet of the Red Lake River under a British charter.

Throughout the remainder of the early half of the nineteenth century, the Red Lake Ojibwe demonstrated themselves as successful in solidifying their position, expanding outward and participating in buffalo hunts and fighting alongside their Pembina Band relatives west of the Red River, claiming new territories there (Ferris, 2006).

Land Settlement. By the middle of the 1800s, European settlers were beginning to pressure the Red Lake people to cede certain lands for European settlement. A treaty was attempted in 1851 that would have allowed for some settlement to occur, but it failed to gain congressional approval due to arguments in Washington over adding new territories to non-slave owning states. Subsequently, in 1863, Minnesota Governor Alexander Ramsey was pressured by powerful land interests to attempt a new treaty. He brought the Red Lake and Pembina bands together for the negotiation of a treaty at the "Old Crossing" of the Red Lake River (Kappler, 1941). This treaty witnessed the relinquishment of over 11-million acres of land in northwest Minnesota and present-day eastern North Dakota. The treaty reserved lands for the Red Lake people in a large area surrounding Red Lake and extending north to Lake of the Woods and Rainy River.

This retained area was later diminished through the passage of the 1889 Nelson Act, whereby the Red Lake band was forced to cede a large portion of the northern and western extents of its territory—including the area surrounding what is now the Red Lake WMA—to the United States for certain considerations (Kappler, 1941). Red Lake Band leaders hoped that the provisions of the Nelson Act, which established a defined territory, would ultimately protect their claim to the lands surrounding Upper Red and Lower Red lakes (Wright, Coffin, & Aaseng, 1992). The northeast portion of what is now

Upper Red Lake was excluded from tribal ownership, and this omission has been under question for over 100 years.

On March 10, 1902, yet another agreement was negotiated between the Red Lake Band and the United States for the cession of additional land in the western portion of the reservation. This agreement was approved by Congress (with amendments) under the Act of February 20, 1904 (Kappler, 1941). Consistent with the provisions of the Nelson Act, this Act called for the Red Lake Band to cede land to the United States for timber sales and homesteading. While the band protested this action, most of the lands were disposed of by the 1930s, no longer under tribal ownership.

This final taking left the Red Lake Band with about 300,000 acres of land surrounding most of Upper Red and Lower Red lakes—leaving about 825,842 acres for the band. The 1904 agreement solidified the coined term "closed reservation," reflecting the tribe's ability to resist further diminishment or allotment of the reservation. Because of this action, the Red Lake Band was, and presently is, able to create and enforce sovereignty over its landholdings in Minnesota.

Red Lake Wildlife Management Area History

Red Lake Game Preserve. In 1929, the Minnesota Legislature established the Red Lake Game Preserve (RLG) in Beltrami, Lake of the Woods, and Koochiching counties to prevent default on drainage bonds issued by these counties (Minnesota Session Laws, 1929). The state was authorized to take absolute title to approximately 1.3 million acres of tax-delinquent lands within the preserve and assumed the responsibility for paying the outstanding principal and interest on the drainage bonds. These RLG lands, now more commonly known as Consolidated Conservation (Con-Con) lands, were placed under the jurisdiction of the Department of Conservation (now the DNR) to be managed as a state wildlife preserve and hunting grounds for the propagation, preservation, and use of wildlife, timber, and other resources. The department was required to classify all tax-forfeited lands with respect to their suitability for agriculture, forestry, and wildlife production. Lands classified more suitable for agriculture were to be sold at public auctions.

Beltrami Island State Forest. In 1931, the Minnesota Legislature designated approximately 230 square miles of RLG lands as a state forest. The area was expanded in 1933 and designated the Beltrami Island State Forest. Further additions in 1943, 1963, and 1991 established the present boundary, which encompasses about 703,382 acres.

Red Lake Game Refuge. The last stronghold of the woodland caribou in the contiguous United States was the "big bog" area in the RLG (Minnesota Conservation Department, 1933). To protect and propagate the remaining caribou, and also migratory waterfowl, furbearers, and other big game species, the Department of Conservation in 1932 established a 266,500-acre game refuge north of

Upper Red Lake. Further additions between 1932, 1954, and 1999 established the present boundary of the Red Lake WMA.

Between 1932 and 1950, all hunting and trapping on the refuge was prohibited. Selective hunting and trapping seasons were opened in 1951. Since 1958, the refuge has been open by Commissioner's Orders to the hunting and trapping of all game species during their established seasons. Moose season was closed in 1990 in Red Lake WMA due to low population numbers and has remained closed to this day.

The portion south of township 157 and east of range 34 was removed from Red Lake WMA on May 27, 1981 (Commissioner Order 2090). These boundaries were adjusted to facilitate management and eliminate lands with low wildlife management potential (Minnesota Department of Natural Resources, 1980). These lands were also removed in preparation for Red Lake Scientific and Natural Area (SNA) nomination. The Red Lake Peatland area was designated as SNA as part of the 1991 Wetland Conservation Act (Wright, Coffin, & Aaseng, 1992). Mulligan Lake Peatland was also designated as an SNA, although it is not in the area that was removed from WMA status. The portion taken out in Commissioner's Order 2090 was reinstated back into Red Lake WMA as the Red Lake WMA Supplement by the 2000 legislature to designate lands not in the SNA or the Big Bog Recreation Area.

Federal Resettlement Program. By the early 1930s, much of the land settled during the drainage period had been abandoned or tax forfeited. Scattered settlers, however, still lived on the area. The combination of unproductive lands and the economic depression of the 1930s forced many settlers into an extreme financial crisis. In 1933, the federal government responded by initiating the Land Utilization Project (LUP) under the National Industrial Recovery Act. The LUP authorized the federal government to purchase sub-marginal lands from isolated and distressed settlers and to relocate these people onto more accessible and productive lands. The Beltrami Island Development Project in Beltrami, Lake of the Woods, and Roseau counties was initiated in 1935 at the request of the Minnesota Department of Conservation and the Minnesota Rural Rehabilitation Corporation. By 1936, over 300 families had been relocated onto more productive lands within these counties (Murchie & Wasson, 1937). The period of settlement and resettlement introduced novel habitat types to the landscape: open upland grasslands, monotypic pine and spruce plantations, roads, impoundments, and gravel pits.

Image 1. Bill Rulien family and friends at his homestead near the Rapid River near Carp and Rako

The federal government also authorized extensive relief work projects in the area beginning in 1935. During the next five years, the Civilian Conservation Corps (CCC) and Works Progress and Federal Resettlement administrations constructed roads, fire lanes, telephone lines, dams, patrolman's cabins, and other buildings on the RLG. One-room log cabins were built as housing for refuge patrolmen. Three of these cabins remain on Red Lake WMA: one near Gladen's Camp, one south of the Patrolman's Walking Trail, and one northeast of the Blue Kettle Trail.

In 1940, the 80,781 acres of scattered Beltrami Island LUP lands were leased to the state of Minnesota. The term of the lease was for a period of 50 years, with provisions for automatic renewal for three successive terms of 15 years each. An additional 651 acres were added to the lease by Public Land Order No. 495 in 1948. These lands were placed under the jurisdiction of the Department of Conservation, Division of Game and Fish (now FAW) to be managed for wildlife, forest resources, and recreation. USFWS administers the lease for the federal government and an updated lease was signed between the DNR and the USFWS in 1999, with another update signed in 2009 that automatically renews every five years.

The USFWS acquired additional parcels using proceeds from timber harvests on LUP land, bringing total LUP acres to 86,476 as of 2019. There are 21,697 acres of scattered LUP lands within the present boundaries of the Red Lake WMA and 64,779 acres outside the unit (which includes 3,392 acres surrounded by the Red Lake WMA supplement).

In 1942, Presidential Executive Order #9091 established the Beltrami Wildlife Management Area from the Beltrami Island LUP "as a refuge and breeding ground for native birds and other wildlife." LUP lands are considered to be a part of the National Wildlife Refuge System, and the Beltrami Island Land Utilization Project Comprehensive Conservation Management Plan (CCMP) was written for the LUP

lands in 2013 as required by the USFWS. As a result of the CCMP, a citizens' advisory group met twice-annually in February and October for seven years.

Norris Camp. Norris Camp, two miles north of the present WMA boundary, was built in the 1930s as a CCC camp and then was used for the Beltrami Island Resettlement Program. The 30 or more buildings and federally owned equipment were made available to the state under the terms of the 1940 lease. Norris Camp, located on state land, was transferred from the Federal Resettlement Administration to the state to be the RLG headquarters in 1942 (Norris Camp National Register Nomination). The camp now has 14 remaining buildings that contribute to a listing on the National Register of Historic Places, and it still serves as the Red Lake WMA headquarters.

Besides Norris Camp, the CCC also constructed satellite camps at the east end of Moose River Road, Schilling Impoundment, Hiwood, and Oak's Corner. These satellite camps were built to facilitate work projects in these areas. There are two known remnant buildings from these satellite camps, which were moved from the original camp areas to a site about three miles west of Oak's Corner and four miles east from the east end of Moose River Road.

Since 1942, Norris Camp has been the headquarters for Red Lake WMA and provided the infrastructure necessary to perform the work that occurs on Red Lake WMA and within the administrative area. Several of the historic buildings have become more in need of repair as time has passed. Despite this, many of the historic buildings continue to be critical to daily operation of Red Lake WMA. For many decades, these buildings have supported the staff and equipment that are critical to maintain Red Lake WMA. For example, in 2022 alone, the Duplex and Wolf Shack buildings provided over 500 person/days of lodging for DNR staff and research that supported management. This availability of on-site housing provides direct access to staff who need to access the WMA on a daily basis and has served to greatly increase efficiency and reduce travel times necessary for work on the WMA. The continued operation of Norris Camp as the headquarters for Red Lake WMA is critical to the ongoing management of Red Lake WMA.

Red Lake Tribal Lands. In 1934, the Indian Reorganization Act authorized certain public lands ceded to the United States in 1889 to be restored to appropriate Indian tribes. On February 22, 1945, the Secretary of the Interior issued an Order of Restoration that restored to tribal ownership various "unused" lands of the Red Lake Indian Reservation which were ceded under the Nelson Act and the Act of February 20, 1904. Most of these lands had been open to settlement but had not been settled. Therefore, in May of 1945, and subsequently in 1946 and 1947, approximately 157,499 acres of noncontiguous lands were restored to the Red Lake Band. In 1988, subsequent findings by the Bureau of Land Management (BLM) restored an additional 186,533 acres, and in 1999 the DNR returned additional lands totaling 86,686 acres. A later 2001 finding by the BLM resulted in another return of land to Red Lake totaling 34,579 acres. Most recently, a 2016 finding has resulted in 59,625 acres being

returned to the Band (FR Doc. 2017–00556). Because of the return of these lands to the Red Lake Band, the landscape in much of northern Minnesota is checker-boarded by Red Lake tribal land.

Approximately 29,817 acres of Red Lake tribal lands are located within the area designated as the Red Lake WMA. These ceded lands were parcels where there were never any homesteaders or where would-be homesteaders failed to fulfill the terms of the legislation to receive title. This accounts for the current pattern of reservation inholdings throughout the Beltrami Island area and the Northwest Angle (Wright, Coffin, & Aaseng, 1992).

Red Lake WMA Practice Bombing and Moose Wallows. The U.S. Army sought to establish the Upper Red Lake Firing Range in 1941 to be used as a bombing and anti-aircraft range. The range, located on the part of Red Lake WMA north Upper Red Lake, was used from 1947 to 1952. An agreement with the Minnesota Department of Conservation between 1949 and 1951, called "Operation Woosh," had a goal of producing moose wallowing holes in the bog through dropping bombs (Easthouse, 2016). More than 50 live bombs were dropped, creating ponds up to 30 feet deep and 100 feet wide (see photo). The army also practiced firing at targets towed by B-26 bombers from F-51 Mustang fighter planes across the bog within Red Lake WMA, and soldiers shot at radio-controlled, 8-foot-long unmanned planes from the ground as the planes flew above the bog.

Peatland Scientific and Natural Areas. There are two peatland SNAs within the Red Lake WMA boundaries: the Red Lake Peatland and Mulligan Lake Peatland SNAs. These peatland SNAs were designated in 1991. More about these globally important SNAs can be found in the Landscape Context section.

Image 2. Bomb crater from Operation Woosh

Archaeological and Historic Aspects

No pre-contact cultural heritage sites have been identified on lands currently administered as the Red Lake WMA. However, archaeological research has demonstrated that Native American groups utilized the abundant resources of the Red Lake area, with excavations near the mouth of the Tamarack River—only about a mile south of the extreme southeast corner of Red Lake WMA—recovering evidence of human occupation dating back as much as two millennia.

Although the Red Lake WMA is currently comprised primarily of wetland, this boggy and largely impenetrable landscape would have been more amenable to human exploitation during drier periods in prehistory. For example, prairie would have stretched across the area north of Upper Red Lake around 8,000 years ago, and Native Americans likely hunted bison on this open, largely treeless plain. Archaeological evidence of these people's activities would be difficult to uncover, however, as artifacts and cultural features left behind would now be deeply buried in the peat that has formed on this landscape over the past 3,000 years.

If Native American archaeological sites are to be discovered in the Red Lake WMA, such sites are likely to be found on the sand and gravel ridges located in the northern tier of Red Lake WMA. These sandy ridges were formed along the margins of glacial Lake Agassiz approximately 10,000 years ago. Smaller sand ridges marking extinct levels of Upper Red Lake, located along Red Lake WMA's southern border, also have the potential to retain archaeological deposits. In addition to marking the ancient shores of resource-rich lakes, these beach ridges possess qualities that render them favorable locations for archaeological sites long after the water has receded. Beach ridges, for example, offer easy to follow, well-drained transportation routes for both humans and game. Assuming a largely treeless landscape (the conditions that likely existed in the area between 4,000 and 8,000 years ago), beach ridges could also provide vistas from which humans could spot and follow the movements of large game animals.

Fur traders were the first Euro-Americans to venture into northwest Minnesota, with historic documentation indicating that a fur-trading post was established at the present town of Waskish on Upper Red Lake. While it is unlikely that Euro-American traders ventured into the forested interior between Red Lake and Lake of the Woods, it is probable that their indigenous fur suppliers ventured far up the Rapid or Roseau rivers in search of beaver and other furbearers, leaving behind trade goods in what is now Red Lake WMA. Given the scarcity and relative value of Euro-American-made trade goods, the Native American trappers would have been unlikely to leave a substantial archaeological record of their activities. If archaeological sites associated with contact-era fur trapping exist, they would likely be small, sparse artifact scatters (perhaps a single misplaced or discarded item), potentially associated with a watercourse or wetland.

Logging-related sites would likely be associated with better drained settings, perhaps along the Hogback, Spina, and Rapid River forest roads (FR). It appears that much of the timber removed from the area was done by small-scale or family operations with felled timber being processed at small sawmills scattered throughout the forest, or by larger mills in Warroad and Baudette. Logs were driven out of the forest on the region's rivers (particularly the Rapid) or trucked out in the winter. It appears that logging railroads were never established in the area.

Euro-American settlement began in what is now the Red Lake WMA around 1905, with farmsteads largely limited to the main unit of Red Lake WMA. Farmsteads typically included dispersed, rustic buildings constructed of rough-hewn or locally milled timber. However, because as deliberate efforts to reclaim homesteads and building sites were undertaken as part of the Beltrami Island Resettlement Project, physical evidence of these farmstead structures may be difficult to discern. Structural features—typically cellar holes—persist at some of the recorded homesteading sites. Also, because these homesteads were occupied for a relatively short period of time, the properties are unlikely to include substantial artifact deposits. While there are documented instances of individuals being buried near their homestead, deceased settlers were typically interred in one of the several small cemeteries that are scattered throughout the area. There is one known individual burial location on Red Lake

WMA, along the Hall Walking Trail south of the West Bankton Road. There are two cemeteries with Red Lake WMA boundaries: the Wildwood Cemetery south of the Hogsback Road and the Beaver Dam Cemetery south of the Faunce-Butterfield Road, east of 7-Mile Corner.

Existing Conditions

Land Ownership

The type of land ownership and associated policies strongly influence natural resource management on state-owned lands. The management goals and designation type are affected by the acquisition history, present land ownership patterns, the sources of acquisition funds, and state and county policies. There are multiple land type designations making up Red Lake WMA. The acreage of each of these land type designations within Red Lake WMA can be found in Table 2. Each designation type carries different implications.

Acquisition of Wildlife Lands

The commissioner of natural resources, or their designee, such as the FAW director, is authorized to acquire lands for wildlife management purposes (Minnesota Statutes, 1978). A regional Strategic Land Asset Management (SLAM) team meets twice a year to prioritize existing and new proposed acquisition projects. After approval through this regional process, FAW may attempt to acquire lands from willing sellers. The division must also obtain approval from the appropriate county board before land can be purchased for a WMA. Newly acquired WMAs are designated by the commissioner and the public notified through the State Register.

Multiple funding sources are used for wildlife land acquisition, including the Game and Fish Fund, which is funded by proceeds of hunting and fishing licenses, and federal matching funds from the Pittman-Robertson Wildlife Restoration Act. In addition, wildlife land acquisition has been through state bonding funds, and through the Environment and Natural Resources Trust Fund as recommended by an administrative committee, the Legislative-Citizen Commission on Minnesota Resources (LCCMR). Since 2011, wildlife land acquisitions have also been funded through a legislative appropriation known as the Outdoor Heritage Fund (OHF), through its administrative body, the Lessard-Sams Outdoor Heritage Council (LSOHC).

Lands purchased with federal dollars and most purchased with state dollars have use restrictions. The land must be bought and continue to be used for a wildlife conservation purpose. Examples of such programs include the federal Pittman-Robertson Fund (50CFR Part 80.134), OHF, and the state Game and Fish Fund. It is important these lands are not used for a non-conservation purpose, since doing so could put these funds at risk statewide. Any necessary, non-conservation uses of wildlife lands, for example, a road-widening easement through a WMA, must be approved by the funding organization through an extensive divestiture process. Generally, approved wildlife conservation activities in the Red Lake WMA include the operation of public hunting grounds and the improvement of wildlife habitats.

Acquisition of the Present WMA

Red Lake WMA currently consists of approximately 325,000 acres. The state owns approximately 93% of Red Lake WMA, and leases approximately 7% of the land from the USFWS. Almost all of the state-owned lands were acquired as Con-Con lands. Ownership of these lands by the state resulted from legislative action to prevent default on drainage bonds in northern Minnesota. The state paid off the bonds in exchange for property ownership and sold some Con-Con lands. For the lands remaining in Red Lake WMA, the state legislature determined that the best use of the land was for wildlife management. Unlike other major WMAs in the state, only 120 acres of WMA lands were purchased through Pittman-Robertson Wildlife Restoration grant funding. A priority for future acquisitions will be given to lands containing rare habitats, plants, or animal species. The purchase of additional lands is completed with willing sellers.

Table 2. Land ownership classification at Red Lake WMA Main Unit and Red Lake WMA Supplement

Red Lake WMA Land Type	Acres	Percent
Main Unit:		
Acquired – WMA	416	0.15%
Consolidated Conservation – SNA	15,803	5.57%
Consolidated Conservation – WMA	215,474	76.00%
Federal LUP: State Lease – WMA	21,575	7.61%
Other public	282	0.10%
Private	5,566	1.96%
Red Lake Reservation	23,498	8.29%
Tax Forfeited – WMA	183	0.06%
Trust Fund – WMA	437	0.15%
Volstead – WMA	285	0.10%
Total	**283,519**	
Supplement:		
Acquired – WMA	24	0.03%
Consolidated Conservation – WMA	84,025	99.97%
Total	**84,049**	

Area Description

Landscape Context

Red Lake WMA lies within the Agassiz Lowlands Ecological Subsection of the Laurentian Mixed Forest Province (Figure 2). The Aspen Parklands Subsection is located immediately to the west and southwest of Red Lake WMA, resulting in a unique transitional zone between prairie and northern boreal forest. The Agassiz Lowlands is a large, gradually sloping, poorly drained area named after prehistoric Glacial Lake Agassiz. Upper Red and Lower Red lakes and Lake of the Woods are remnants of Glacial Lake Agassiz. Much of the area is peatland, including forested peatland dominated by black spruce and tamarack, and non-forested sedge meadows, or sedge fens. Aspen, birch, and jack pine dominate uplands in the form of remnant beach ridges left behind by the receding glacial lake.

Although the area is often perceived as very flat, there is moderate topographic relief. U.S. Geological Survey topographic data show a maximum elevation of approximately 1,316 feet located a little west of Norris Camp, and the Hogsback FR generally follows a topographic divide. To the north of Hogsback FR, the land drops off toward Lake of the Woods, which has an elevation of 1,063 feet. To the south, the land gently slopes towards Upper Red Lake, which has an elevation of 1,175 feet. To the west, the north branch of the Roseau River exits Hayes Lake State Park at an elevation of 1,158 feet, and at the City of Roseau the elevation of the river is 1,041 feet. To the east, the north and south branches of the Rapid River exit the Beltrami Island State Forest at elevations of 1,159 and 1,158 feet respectively, and from there the Rapid River enters the Rainy River at an elevation of 1,068 feet.

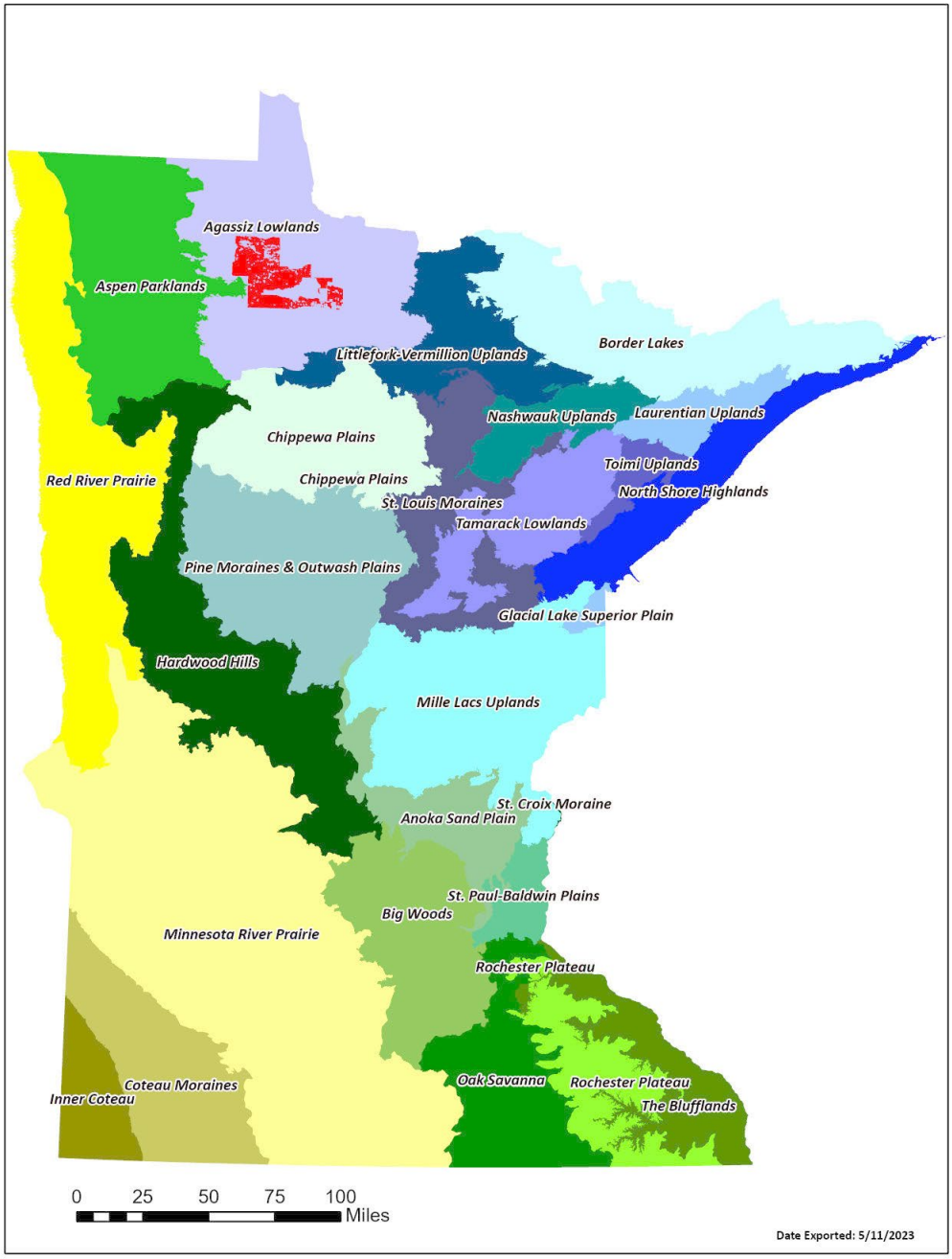
A globally important patterned peatland lies within the boundaries of Red Lake WMA. The Red Lake Peatlands are listed as a National Natural Landmark and are the largest patterned peatlands in the lower 48 states. They feature one of the largest and best developed water tracks, where groundwater moves through large expanses of grasses and sedges. This “big bog” stretches nearly 50 miles in length and remains extremely valuable for the study of peatland ecological and developmental processes due to being relatively undisturbed, yet accessible (Wetlands of Distinction, Red Lake Peatland). Patterned peatlands appear to be restricted to Minnesota, the Hudson Bay Lowlands, northern Alberta and Saskatchewan, western Alaska, and Siberia (Glaser, Vegetation Patterns in the North Black River Peatland, northern Minnesota, 1983).

SNAs are public lands established to protect natural features of exceptional scientific or educational value. Red Lake Peatland SNA showcases a wide array of classic peatland landforms, including a large, highly developed water track, ribbed fen, tear-drop islands, circular islands, ovoid islands, and raised bog. Mulligan Lake SNA, one of the few peatlands in the state not impacted by ditching, contains the headwaters of the Roseau River.

In addition to the SNAs, a number of other public lands lie in close proximity to Red Lake WMA. See Figure 1 for map of public lands in the vicinity of Red Lake WMA. Large complexes of public land like this provide important habitat for rare features in this unique landscape. This importance has been recognized in a number of planning initiatives including Audubon Minnesota's Important Bird Areas (IBA) and Minnesota's Wildlife Action Plan (MNWAP).

MNWAP identifies this area has having medium to medium-high quality habitats and species presence in the Wildlife Action Network, which indicates that this area provides important habitats for Species in Greatest Conservation Need (SGCN). SGCN are defined as native animals, nongame and game, whose populations are rare, declining, or vulnerable to decline and are below levels desirable to insure their long-term health and stability. Also included are species for which Minnesota has a stewardship responsibility. All state-listed species and federally listed species that occur in Minnesota are automatically SGCN. Additional non-listed species are SGCN based on specific criteria and expert opinion.

Figure 2. Ecological Subsections of Minnesota



Socioeconomic Context

The footprint of the Red Lake WMA lies within the northern Minnesota counties of Lake of the Woods and Beltrami. The area is sparsely populated. The Red Lake WMA and surrounding public lands provide important ecosystem services to the local area. The value of these services is difficult to measure, but extremely important to human wellbeing and quality of life. For example, the area provides food through the harvest of wildlife, insects that pollinate both agricultural crops and timber, plants and decomposers that build soil, and trees and peat that store carbon. The wild land is also valuable for its cultural and spiritual benefits to people. The value of clean water is more measurable: the Rapid River Watershed, its headwaters located within Red Lake WMA, is the healthiest watershed in the state (DNR's Watershed Health Assessment Framework).

Public lands and waters in the area in and around Red Lake WMA are also an important source of revenue (e.g., from recreational users and other natural resource products) for the local economy. The land provides timber that is made into paper and dimension lumber in area mills. Wood is also used for local heating as firewood and chips. Tourism is important locally too. Beltrami, Lake of the Woods, and Roseau counties have many resorts reliant on the walleye and sturgeon from Lake of the Woods, Upper Red Lake, and the Rainy River. Other recreational pursuits such as hunting, trapping, wildlife viewing, off-highway vehicle (OHV) use, and snowmobiling also generate local income. Picking berries and mushrooms and gathering boughs for wreath-making is popular with both local people and visitors.

Climate

The climate of the Red Lake WMA vicinity is humid-continental with short, mild summers and long, cold winters. The average temperature is 66.5°F in July and 4°F in January. Winter temperatures of negative 40°F are common. The average growing season is approximately 122 days long. The first killing frost is expected by about September 22 and the last normally no later than May 22; however, low-lying bog areas may experience frost throughout the summer.

Average annual precipitation is 25.19 inches, ranging from 0.59 inches in February to 4.21 inches in June (see Appendix F). About 17 inches, or 70%, of the annual precipitation falls during May through September. Average annual snowfall is 46.7 inches. Greatest snow depths generally occur in December and January, with averages around 9 inches. Prevailing winds are from the northwest during winter, changing to the south and southwest during the spring and summer. Precipitation and mean annual temperature trends at Red Lake WMA over the past 60 years can be found in Appendix F.

Global climate change is discussed in further detail in Strategic Considerations.

Geology and Soils

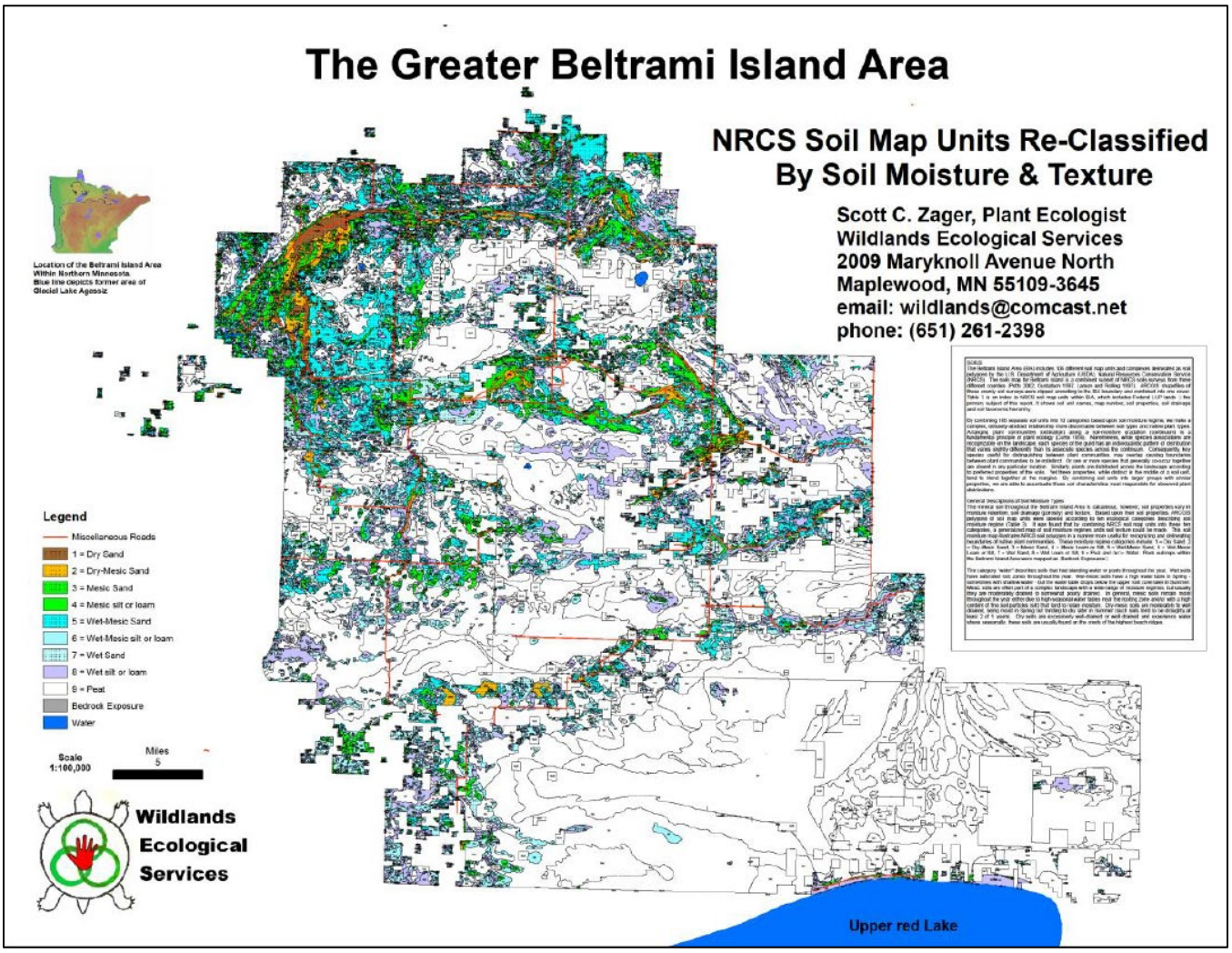
The Red Lake WMA lies on the western edge of the Canadian Shield, or Laurentian Plateau, where bedrock forms the oldest crustal plate on the North American continent (Ojakangas & Matsch, 1982).

Although most of the underlying bedrock is buried beneath glacial sediments and lake deposits, there are two known areas of exposed bedrock within the Beltrami Island area along the South Branch of the Rapid River. The outcrop known as Moose Mountain, near Oak's Corner, has been described as a long ridge of bedrock oriented from northwest to southeast, about 1,000 feet long (Lockner, 2008).

Red Lake WMA was once entirely covered by Glacial Lake Agassiz. Several beach ridges mark the various stages of Glacial Lake Agassiz where it temporarily stalled as its waters receded (Eng, 1979). The best examples of these beach ridges are traversed by roads within the Red Lake WMA and the surrounding Beltrami Island State Forest, including the Faunce-Butterfield Road, Hogsback-O'Brien Trail, Stony Corners Trail, and Spina Trail.

The mineral soil throughout the Beltrami Island area is calcareous; however, soil properties vary in moisture retention, soil drainage (porosity), and texture. Combining Natural Resources Conservation Service (NRCS) soil map units into nine ecological categories yields a generalized map of soil moisture regimes and soil texture (Zager, 2011). Figure 3 illustrates NRCS soil polygons in a manner more useful for recognizing and delineating boundaries of native plant communities. These moisture regime categories include Dry Sand, Dry-Mesic Sand, Mesic Sand, Mesic Loam or Silt, Wet-Mesic Sand, Wet-Mesic Loam or Silt, Wet Sand, Wet Loam or Silt, and Peat. Figure 3 also emphasizes that the upland areas are concentrated and not disbursed, and these are the areas seen from the road system, which favors uplands.

Figure 3. Soil map units of Red Lake WMA and Beltrami Island State Forest identified by Scott C. Zager based on soil moisture and texture.



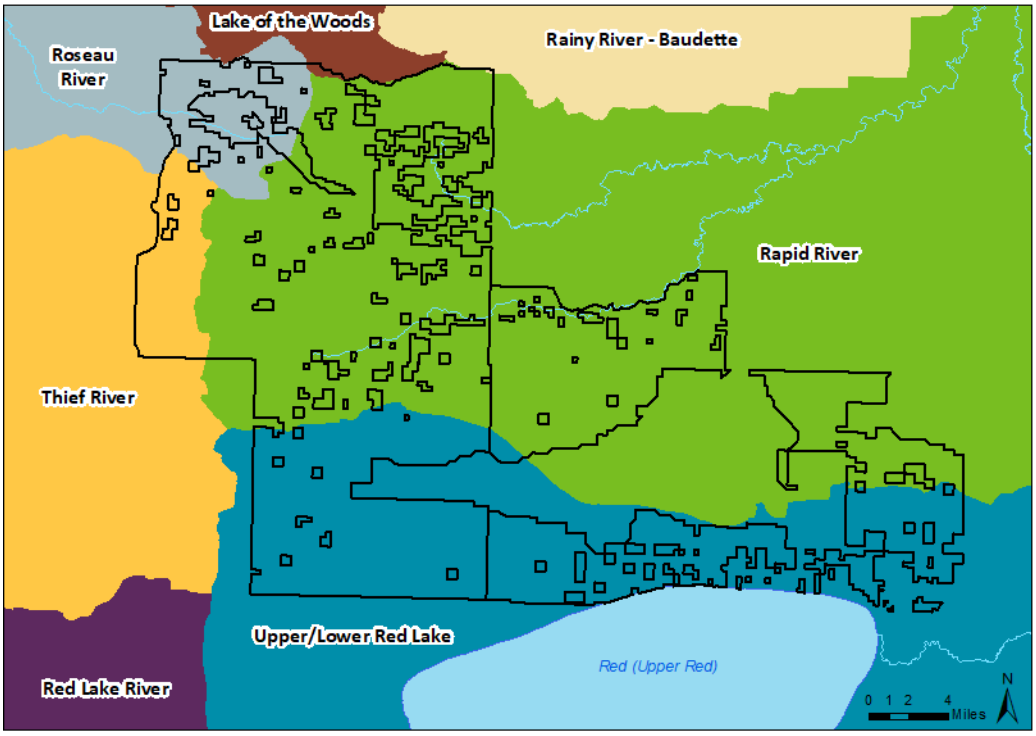
Surface Hydrology

The Agassiz Lowlands ecological subsection is a large, very flat, poorly drained area named after prehistoric Glacial Lake Agassiz. The water holding capacity of the soils rank among the highest in the world (NRCS 1998). The subsection is primarily a mix of some of the most significant peatlands in the world interspersed with remnant upland sand islands dominated by conifers and aspen.

Four major watersheds drain the Red Lake WMA (Figure 4). Approximately 50% of the Red Lake WMA is within the 2,900 square mile Rapid River Watershed (Helgeson, Lindholm, & Erickson, 1975), 40% in the 5,990 square mile Upper/Lower Red Lake Watershed (Bidwell, Winter, & Maclay, 1970), and 10% in the 1,150 square mile Roseau River (Winter, Maclay, & Pike, 1967) and Thief River watersheds. Drainage is generally northward towards the Rainy River, Lake of the Woods, and the Roseau River.

The southern portion of the "big bog" area drains into Upper Red Lake. Overall, Watershed Health Assessment Framework scores for the primary watersheds on Red Lake WMA are high, but several impairments are present throughout. The Rapid River Watershed is highly altered from both in channel straightening/ditching and the creation of lateral ditches that were constructed through peatlands from 1905 to 1920. As a result of this altered hydrology, the Rapid River is incised and entrenched throughout many reaches of the channel, especially in the lower reaches. Sediment contributions from near-stream and stream bank erosion ultimately reach the total suspended solids impairment threshold below the confluence of the East Fork of the Rapid River and the Rapid River Main stem. Over 79% of the land within the Rapid River Watershed, including Red Lake WMA lands, is under public ownership; however, today 75% of the Rapid River is hydrologically altered (Sigl, et al., 2020).

Figure 4. Major watersheds, Hydrologic Unit Code (HUC) 8-level, surrounding Red Lake WMA



Surface waters are derived primarily from runoff and groundwater discharge to stream channels. Although many of the unmaintained drainage ditches have become obstructed with sediments and vegetation or dammed by beavers, they are still likely having a significant impact on the hydrology of the system. Since the ditch channels were installed below the elevation of the surrounding peatlands, shallow groundwater is able to flow from the adjacent wetlands and discharge into the ditch channels. Once water has entered the ditch channels, it is able to move quickly out of the area as in-channel flow to discharge into downstream rivers and lakes. Degraded peat soils are seen adjacent to the ditch channels as a result of the de-watering that has occurred in this laterally effected area.

Other than the 118,000-acre Upper Red Lake bordering Red Lake WMA to the south, the only natural lakes of significant size on the unit are Mulligan, Roseau, and Lost lakes, although technically these are in the Mulligan Lake Peatland SNA. Mulligan Lake covers about 87 acres, and average depth is 3 feet. Roseau and Lost lakes, located upstream from Mulligan Lake, cover about 31 and 59 acres, and form the headwaters of the north branch of the Roseau River.

Three impoundments, totaling 700 acres, have been developed on Red Lake WMA. Dikes and dams constructed across the south and north branches of the Rapid River and the north branch of the Roseau River form the Shilling, Spina, and Roseau impoundments, respectively. Beaver dams also impound waters on rivers, streams, and drainage ditches throughout the area. Impoundment acreages fluctuate depending on precipitation levels and beaver numbers and activity.

Peatlands

Over 60% of the Red Lake WMA consists of peatland soils, with the water table close to or at the surface in a continuous, interconnected complex. This peatland complex overlays the four watershed divides within Red Lake WMA. This expansive peatland within Red Lake WMA is known as the Red Lake Peatland and is the southernmost of the boreal peatlands in North America. Its southerly position, at the edge of climatic conditions favorable for development of boreal peatlands, makes it a bellwether for the impacts of climate change on the earth's northern peatlands. The Red Lake Peatland is the largest and most ecologically complex patterned peatland in the United States outside Alaska.

Surface vegetation on Red Lake peatlands varies from cedar swamps, raised bogs in ovoid islands, and vast patterned fens studded with tear-shaped islands dominated by tamarack and black spruce. Significant areas around the perimeter of the peatland have been cut by drainage ditches dating from 1905-1920, but a large central area of peatlands within area remains unaffected (Bradof, 1992).

120,160 acres of Red Lake WMA are designated Peatland Watershed Protection Areas surrounding Red Lake Peatland and Mulligan Lake Peatland SNAs. Watershed protection areas are designated to protect and ensure the natural functioning of the ecological and hydrological processes of SNA peatland areas. Prohibited activities include peat mining (with compensation for Trust Fund Lands), and any activities that would significantly modify the water levels or flows, water chemistry, plant and animal species and communities, or other natural features of these peatland scientific and natural areas.

Groundwater

In Minnesota, all large water track features of the patterned peatlands arise downslope from beach ridges, glacial outwash plains, or glacial moraines. Within the Red Lake WMA, the huge water track north of Upper Red Lake is fringed by beach ridges to the north and west (Glaser, 1992c). Most groundwater within the Beltrami Island area is recharged from the upland beach ridges; however, the

Red Lake Peatlands receive some subsurface flow from Upper Red Lake. Groundwater models have indicated that within the Beltrami Island area, groundwater discharges generally occur within a 10 kilometer radius of local aquifers (Reeve, Warzocha, Glaser, & Slegel, 2001).

Annual groundwater recharge is primarily from precipitation and snow melt that percolates through the various peatlands. Approximately 74% (17 inches) of the annual precipitation is dissipated through evapotranspiration, mostly from lowland bog areas, and 26% (six inches) is lost through runoff (Helgeson, Lindholm, & Erickson, 1975).

Groundwater quality in the area varies widely, depending on the distance moved over land or through soil, physical and chemical characteristics of the water-bearing materials, and contact time with these materials. Most groundwater is of the calcium-magnesium-bicarbonate type, high in total hardness.

Habitats and Plant Communities

Introduction

Wildlife habitat can be defined as the totality of an animal's abiotic (e.g., water, mineral, thermal, solar) and biotic (typically plant) environmental components that allow for it to reproduce and survive interim periods to reproduce. For some animals (e.g., small mammals, reptiles, amphibians) one habitat provides for both needs; however, most animals (e.g., migratory mammals and birds) require different habitats, often vastly different and far apart, to optimize reproduction and survival. Red Lake WMA is a diverse site that provides many different habitat types for wildlife (Figure 5).

Native Plant Communities

The habitat at Red Lake WMA can be categorized into distinct native plant communities (NPCs) . In this document, habitat types are categorized first at an ecological system level (e.g. Fire Dependent Forests and Woodlands) and then at the specific NPC type (e.g. FDn32d, Jack Pine – Black Spruce Woodland). Native plant communities are classified into ecological systems based on vegetative and hydrological characteristics, followed by seasonal delivery and movement of nutrients and by timing and severity of natural disturbances (Figure 6). Specific NPC type is determined by additional factors, including canopy dominants, substrate, and finer environmental conditions. Table 3 shows the relative percentage of important NPC ecological systems found at Red Lake WMA. Table 4 lists all NPCs known to occur at Red Lake WMA.

An NPC-informed management approach recognizes the inherent ecological characteristics of a site and incorporates that information into natural resource management activities. Most wildlife research and forest inventories have been developed through classifications by vegetation cover types (e.g., aspen, jack pine, aspen-spruce-fir). DNR staff are trained to use both classification systems, and this plan draws information from both.

Figure 5. Overview of the habitat types found at Red Lake WMA

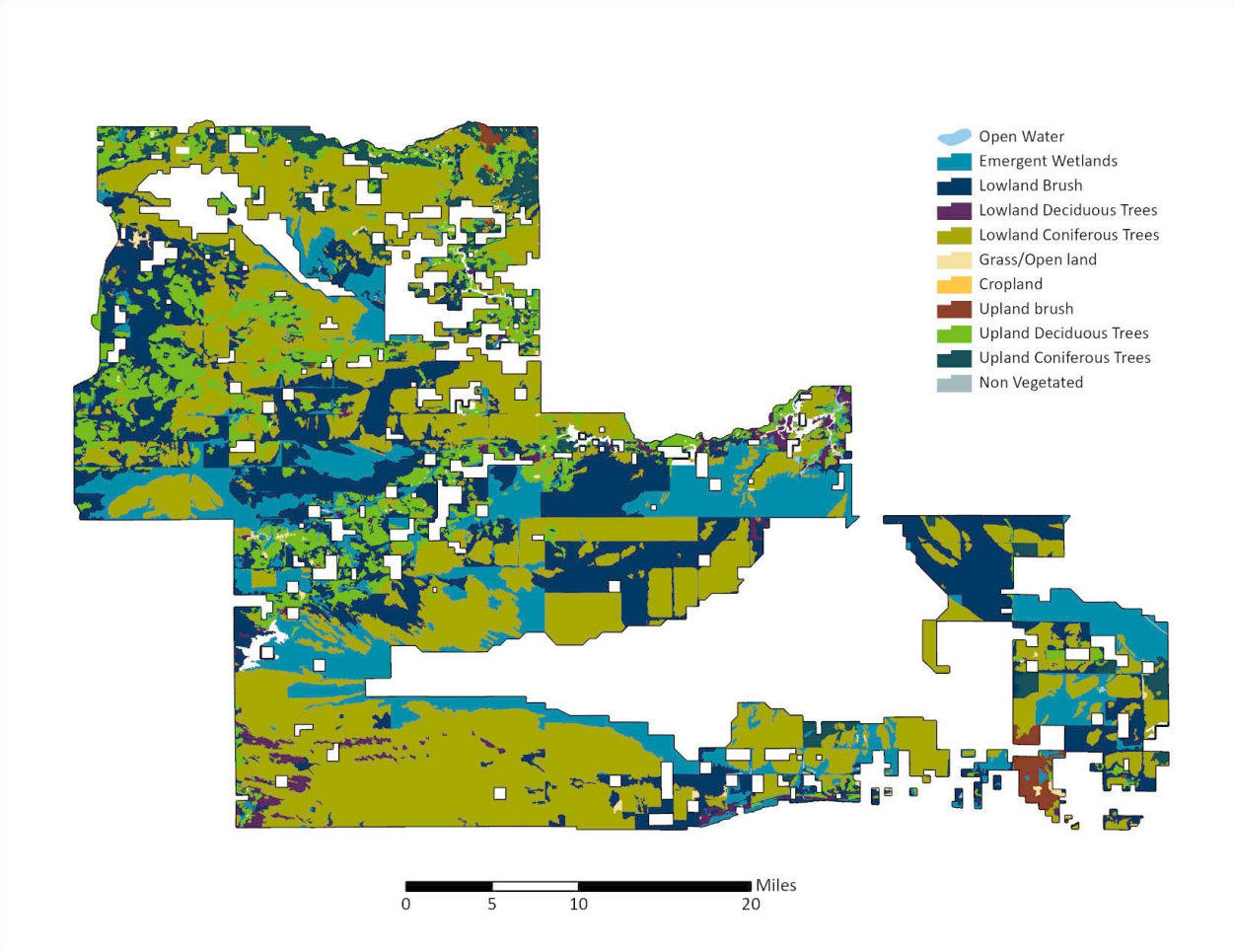
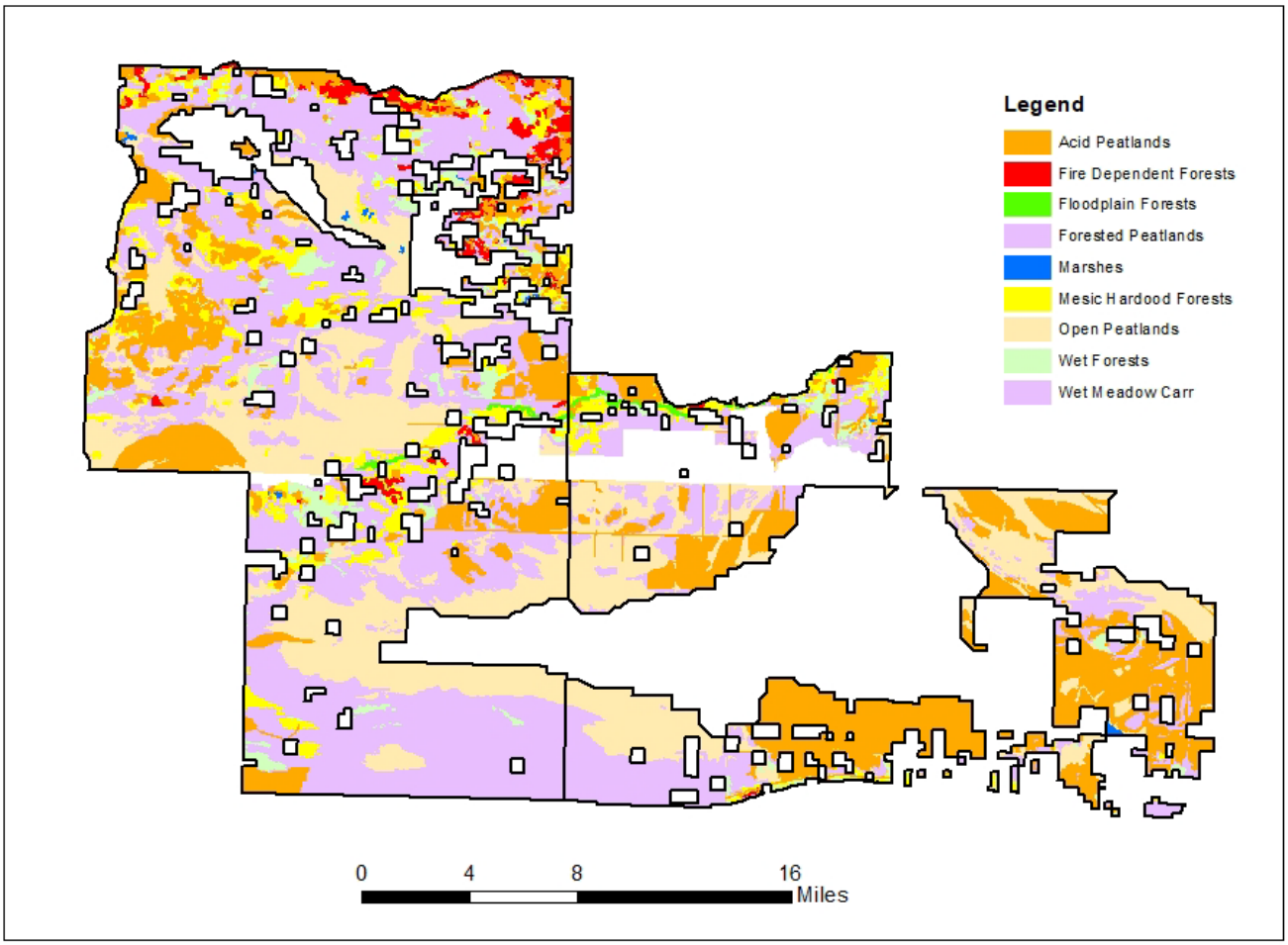


Table 3. Relative percentage of mapped NPC ecological systems found at Red Lake WMA

NPC Ecological Systems	Acres	Percentage
Fire Dependent Forests and Woodlands (FDn)	3079	1%
Mesic Hardwood Forests (MHn)	20,896	7%
Floodplain Forests and Wet Forests (FFn, WFn, WFw)	13,774	5%
Forested Rich Peatlands and Acid Peatlands (FPn, APn)	145,766	51%
Upland Prairies, Cliff/Talus, Rock Outcrops, Lakeshores, and River Shores (UPn, CTn, ROn, LKi, RVx)	Trace	Trace
Open Rich Peatlands, Wet Meadow/Carr, Marshes, and Open Water (OPn, WMn, MRn)	99,992	35%

Figure 6. Overview of mapped NPC ecological systems found at Red Lake WMA



Some instances of the plant communities found at Red Lake WMA exhibit excellent ecological integrity and are uncommon for this area, for Minnesota, and even on a global scale (Table 4). Conservation Status Ranks, which reflect the imperilment of a community across its range (state ranks referred to as S-ranks and global ranks referred to as G-ranks), and the Condition Ranks, which refer to the integrity or quality of an individual occurrence of a community, are used to assess the relative importance of different occurrences. More information on Conservation Status Ranks and Condition Ranks can be found in Appendix G and at the DNR NPC status and procedures webpages.

Table 4. Native plant community classes known to occur at Red Lake WMA and their associated conservation status and observed condition ranks

NPC class	Description	Status Rank	Condition Rank
APn80	Northern Spruce Bog	S4, G4G5-G5	Varies, A rank – unknown
APn81	Northern Poor Conifer Swamp	S4-S5, G5	Unknown
APn90	Northern Open Bog	S2-S4S5, G2-G5	Unknown
APn91	Northern Poor Fen	S3-S5, G3G4-G5	Varies, A rank – unknown
FDn12	Northern Dry-Sand Pine Woodland	S2, G4G5	Unknown
FDn32	Northern Poor Dry-Mesic Mixed Woodland	S1-S3, G2-G5	Unknown
FDn33	Northern Dry-Mesic Mixed Woodland	S2-S5, G4-G5	Unknown
FDn43	Northern Mesic Mixed Forest	S2-S5, G3G4-G5	Unknown
FDw24	Northwestern Dry-Mesic Oak Woodland	S2-S3, G4	B rank
FFn57	Northern Terrace Forest	S3, GNR	Unknown
FPn62	Northern Rich Spruce Swamp (Basin)	S3, G5	Unknown
FPn63	Northern Cedar Swamp	S3-S4, G4	Varies, A rank – unknown
FPn71	Northern Rich Spruce Swamp (Water Track)	S3, GNR	Unknown
FPn73	Northern Alder Swamp	SNR, GNR	Varies, CD rank – unknown
FPn81	Northern Rich Tamarack Swamp, Water Track	S4, GNR	Varies, AB – unknown
FPn82	Northern Rich Tamarack Swamp, Western Basin	S4-S5, G4	Varies, BC – unknown
FPw63	Northwestern Rich Conifer Swamp	S3, G4	Unknown
MHn44	Northern Wet-Mesic Boreal Hardwood-Conifer Forest	S2-S4, GNR-G5	Varies, A rank – unknown
MHn46	Northern Wet-Mesic Hardwood Forest	S4, GNR	Varies, C – unknown
MRn83	Northern Mixed Cattail Marsh	S2, G4-G5	Unknown
MRn93	Northern Bulrush-Spikerush Marsh	S2, G4-G5	Unknown
OPn81	Northern Shrub Shore Fen	S5, G3G5-GNR	Varies, AB – unknown
OPn91	Northern Rich Fen (Water Track)	S2-S4, GNR-G5	Varies, A rank – unknown
OPn92	Northern Rich Fen Basin	S4, G4G5-GNR	Varies, A rank – unknown
OPn93	Northern Extremely Rich Fen	S2, G2	A rank
WFn53	Northern Wet Cedar Forest	S3-S4, GNR	Varies, A rank – unknown
WFn55	Northern Wet Ash Swamp	S3-S4, G4	Unknown

NPC class	Description	Status Rank	Condition Rank
WFn64	Northern Very Wet Ash Swamp	S4, G4	Varies, AB – unknown
WFn74	Northern Wet Alder Swamp	S3, GNR	Unknown
WFw54	Northwestern Wet Aspen Forest	S4, G5	Unknown
WMn82	Northern Wet Meadow/Carr	S4-S5, G4-G5	Varies, AB – unknown

Descriptions of NPCs that occur within Red Lake WMA

FDn32: The rare community type FDn32d, Jack Pine – Black Spruce Woodland, is known to occur within Red Lake WMA on the sandy soils of the beach ridges of prehistoric Glacial Lake Agassiz.

FDn33: At Red Lake WMA, all of the white pine in the late-successional age class is already designated as old growth and considered exceptional quality.

MHn44: Specific community type MHn44c, Aspen-Fir Forest, is fairly widespread across Red Lake WMA, occurring on poorly drained sandy lake plains. This is the predominant aspen-producing NPC on Red Lake WMA.

MHn46: This NPC occurs primarily along the Rapid River in conjunction with floodplain forests and provides some unique forest conditions (e.g., basswood and bur oak) on Red Lake WMA.

FFn57: Specific community type FFn57a, Black Ash-Sugar Maple Terrace Forest, is known to occur within Red Lake WMA along the Rapid River.

WFn55: Wet hardwood forest on mucky mineral soils in shallow basins, typically with standing water in the spring, but draining by late summer. In Red Lake WMA, typical locations include wetlands or near rivers and coverage consists of ash or mixed ash and hardwoods.

WFn64: Typically has standing water present throughout spring and summer, and its mucky substrate does not reliably freeze solid during the winter.

WMn82: Specific community types WMn82a, Willow-Dogwood Shrub Swamp, and WMn82b, Sedge Meadow, have extensive distribution across Red Lake WMA. Willow – Dogwood Shrub Swamp can be described as open wetlands with abundant broad-leaved graminoids, and shrub cover typically greater than 25%. Sedge Meadow can be described as open wetlands with abundant broad-leaved graminoids, and shrub cover typically greater than 25%. The invasive species common reed grass and reed canary grass have become increasingly abundant in this community type over the past several decades, reducing species diversity in many occurrences.

Upland Grasslands and Shrublands: Modified upland grasslands and shrublands occur on Red Lake WMA, on embedded LUP lands and inholdings where human activity has planted them or where tree

cover has been removed. While these are not intact native plant communities, they do contain native plant species, and can mimic large gap-phase disturbances within the otherwise mostly forested landscape.

Primary Forest

Primary forests are forests of native tree species in areas that have never or only rarely been impacted by humans and have no clearly visible indications of human activities. They can be of any stand age or successional stage, regardless of the time since a natural disturbance event. Primary forests are rare in the Great Lakes region today (911,818 acres) compared to what existed prior to European settlement (Frelich, 1995).

Red Lake WMA contains a significant amount of primary forest. Widespread European settlement of the Red Lake area occurred around 1920, later than other parts of Minnesota. In addition, lowland conifer forests were not prioritized for logging because of their small tree sizes and inaccessible, wet soils.

Old Growth Forest

Old growth forests are sites that represent the later stages of succession in forested ecosystems. They have developed over a long period of time, essentially free from stand-replacing disturbances. They contain characteristics such as relatively large, old trees of long-lived species that are beyond traditional timber harvest rotation age and a relatively high frequency of large snags and large diameter downed logs. Old growth forests typically experience ongoing mortality, including some mortality in canopy trees. Old growth forests are also rare in Minnesota today (less than 6% of forests) compared to what existed prior to European settlement (Peters, Wilson, D., Edgar, & Ek, 2021); Jaakko Poyry Consulting, Inc, 1992).

Rare Plants

Rare plant species found at Red Lake WMA are listed in Table 5. State status designation is also included. A species is designated as endangered (END) if the species is threatened with extinction throughout all or a significant portion of its range. A species is designated as threatened (THR) if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. A species is designated as a species of special concern (SPC) if although the species is not endangered or threatened, it is extremely uncommon in this state, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations. Additional information on all of Minnesota's rare species can be found in the DNR Rare Species Guide. Species that are federally listed receive additional protection.

Table 5. Rare plant species known to occur at Red Lake WMA

Species (Common Name)	Species (Scientific Name)	State Status
Upswept moonwort	*Botrychium ascendens*	Endangered
Prairie moonwort	*Botrychium campestre*	Special concern
Common moonwort	*Botrychium lunaria*	Threatened
Mingan moonwort	*Botrychium minganense*	Special concern
Pale moonwort	*Botrychium pallidum*	Special concern
St. Lawrence grapefern	*Botrychium rugulosum*	Special concern
Least moonwort	*Botrychium simplex*	Special concern
Coastal sedge	*Carex exilis*	Special concern
Twig rush	*Cladium mariscoides*	Special concern
Ram's head orchid	*Cypripedium arietinum*	Threatened
English sundew	*Drosera anglica*	Special concern
Few-flowered spikerush	*Eleocharis quinqueflora*	Special concern
Northern oak fern	*Gymnocarpium robertianum*	Special concern
Small white waterlily	*Nymphaea leibergii*	Threatened
Lapland buttercup	*Ranunculus lapponicus*	Special concern

Wildlife

Introduction

Because of its size, remoteness, and inaccessible expanses, Red Lake WMA is uniquely situated among WMAs to provide habitat to maintain viable populations of species with large home ranges, and species that are rare, threatened, or declining elsewhere, not just on a regional or statewide scale, but on a global scale as well. Red Lake WMA is also of sufficient size to support the full lifecycle of popular game species like grouse and pine martens and the seasonal movements of white-tailed deer. This section describes wildlife species known or suspected to occur at Red Lake WMA, their associated habitats, and other considerations.

Birds

Red Lake WMA's diverse habitats attract a large variety and number of birds. A checklist of bird species known to occur or probably occurring on or near the unit can be found in Appendix H. Common breeding species are found in Table 6. Eleven species are listed on Minnesota's Endangered, Threatened or Special Concern Species list that was updated in 2013. SGCN were identified in the

MNWAP. SGCN include all of Minnesota's species listed as endangered, threatened, or special concern, along with an additional 46 non-listed bird species that can be thought of as "watch list species."

The entire "big bog" area has been designated as an IBA by the National Audubon Society. This designation covers the LUP lands in Lake of the Woods and Beltrami counties and also extends east into mid-Koochiching County and to the south, nearly enveloping Upper Red Lake. The western parts of the Red Lake WMA are also featured as part of the Pine-to-Prairie Birding Trail.

Table 6. Common or important breeding bird species found at Red Lake WMA and their associated habitats

Habitat	Game Species	Nongame Species
Lakes, wetlands, waterways and ditches; open peatlands	Canada goose, wood duck, mallard, blue-winged teal, ring-necked duck, common goldeneye, common merganser, hooded merganser, sandhill crane, sora, Wilson's snipe, American woodcock (SGCN)	Trumpeter swan (SGCN, SPC), northern harrier, solitary sandpiper, spotted sandpiper, Wilson's phalarope (THR), American bittern, yellow rail (SPC), bald eagle, short-eared owl (SPC), alder flycatcher, yellow-bellied flycatcher, eastern kingbird, tree swallow, marsh wren, sedge wren, veery (SGCN), gray catbird, Nashville warbler, common yellowthroat, yellow warbler, northern waterthrush, swamp sparrow, song sparrow, savannah sparrow, LeConte's sparrow (SGCN), Nelson's sparrow (SPC), red-winged blackbird, yellow-headed blackbird
Forests (coniferous, deciduous and mixed; forested peatlands)	Spruce grouse, ruffed grouse, American woodcock, mourning dove	Barred owl, great gray owl, long-eared owl, saw-whet owl, great horned owl, eastern whip-poor-will (SGCN), northern goshawk (SPC), Cooper's hawk, sharp-shinned hawk, broad-winged hawk, red-tailed hawk, black-billed cuckoo (SGCN), ruby-throated hummingbird, yellow-bellied sapsucker, downy woodpecker, hairy woodpecker, northern flicker, pileated woodpecker, black-backed woodpecker (SGCN), three-toed woodpecker, eastern wood-pewee, great crested flycatcher, least flycatcher, olive-sided flycatcher (SGCN), yellow-bellied flycatcher, yellow-throated vireo, blue-headed vireo, red-eye vireo, blue jay, gray jay, common raven, black-capped chickadee, boreal chickadee (SGCN), red-breasted nuthatch, white-breasted nuthatch, brown creeper, winter wren (SGCN), house wren, ruby-crowned kinglet, golden-crowned kinglet, American robin, hermit thrush, wood thrush, veery (SGCN), Swainson's thrush, brown thrasher (SGCN), gray catbird, cedar waxwing, ovenbird, Connecticut warbler (SGCN), golden-winged warbler (SGCN), American redstart,

Habitat	Game Species	Nongame Species
		Cape May warbler (SGCN), yellow warbler, Tennessee warbler, Nashville warbler, palm warbler, pine warbler, chestnut-sided warbler, yellow-rumped warbler, black-and-white warbler, black-throated green warbler, Blackburnian warbler, scarlet tanager, rose-breasted grosbeak, indigo bunting, Baltimore oriole, pine siskin, American goldfinch, red crossbill, purple finch (SGCN), Lincoln's sparrow, white-throated sparrow, dark-eyed junco, evening grosbeak.
Brushlands	Ruffed grouse, sharp-tailed grouse (SGCN), American woodcock (SGCN), Wilson's snipe	Short-eared owl (SPC), alder flycatcher, olive-sided flycatcher (SGCN), sedge wren, American robin, veery (SGCN), brown thrasher (SGCN), gray catbird, rose-breasted grosbeak, Cape May warbler (SGCN), golden-winged warbler (SGCN), Nashville warbler, yellow warbler, chestnut-sided warbler, northern waterthrush, swamp sparrow, song sparrow, Lincoln's sparrow, clay-colored sparrow
Prairies, grasslands, savannas	Sharp-tailed grouse (SGCN), sandhill crane, mourning dove	Northern harrier, killdeer, American kestrel (SGCN), common nighthawk (SGCN), black-backed woodpecker (SGCN), olive-sided flycatcher (SGCN), Cape May warbler (SGCN), eastern kingbird, black-billed magpie, American robin, eastern bluebird, chipping sparrow, clay-colored sparrow, savannah sparrow, song sparrow, brown-headed cowbird, bobolink (SGCN), Brewer's blackbird (SGCN)
Homesteads and developed areas	Mourning doves	Killdeer, eastern phoebe, American crow, barn swallow, cliff swallow, tree swallow, American robin, eastern bluebird, house wren, chipping sparrow

SGCN=Species in Greatest Conservation Need, SPC= Minnesota Special Concern Species, THR=Threatened, END=Endangered

Waterfowl and Game Birds

Waterfowl. Waterfowl are not a particularly significant component of the avian community in the Red Lake area due primarily to the lack of open water habitats and marshes.

Canada geese, mallards, teal, and ring-necked ducks are marsh birds that have limited habitat in the Red Lake WMA area; this habitat is neither at risk of degradation or loss in Red Lake WMA. It also cannot be readily enhanced or expanded. Wood ducks, common goldeneyes, hooded mergansers, and common mergansers are cavity-nesting species and require available cavities suitable for successful reproduction.

Grouse. The most significant avian game species in the Red Lake WMA are the grouse species (ruffed, spruce, and sharp-tailed). They are highly sought after by hunters, as evidenced by the results of the questionnaire distributed during scoping for the LUP plan (Minnesota Department of Natural Resources and U.S. Fish and Wildlife Service, 2013). They are also ecological keystone species, and the

spruce grouse is a SGCN as well as a boreal species sought out by bird watchers. The sharp-tailed grouse is also limited in distribution in Minnesota, and here it is tied to peatlands and brushlands.

Ruffed grouse are associated with deciduous and mixed deciduous-coniferous forests, reaching their highest densities in MHn44 aspen communities (Table 7). Ruffed grouse are widely reported to need a mix of young and old aspen and mixed aspen stands in close proximity in order to find the right combination of food and cover, with a preference for younger aspen stands, although recent research (Kouffeld, 2011) (Gutierrez, 2012) is suggesting a greater importance for conifers than the classic research of Gordon Gullion. Pole-sized and sapling aspen stands are needed for various life stages, and conifers can be important thermal cover in winter, especially if warmer winters result in less snowcover. Coarse woody debris (i.e., fallen logs) found in older forests or retained after harvest provides male ruffed grouse drumming logs for breeding displays. Black bear, white-tailed deer, snowshoe hare, beaver, American woodcock, and a variety of songbirds also benefit from early successional forests created by logging and preferred by ruffed grouse. Ongoing DNR research is showing that red pine are negatively related to ruffed grouse stand occupancy and positively related to ruffed grouse extinction in stands. Mixed forest was negatively related to ruffed grouse extinction (i.e., reduced extinction) in forest stands and tree density of winter stands was positively related to extinction of ruffed grouse in forest stands.

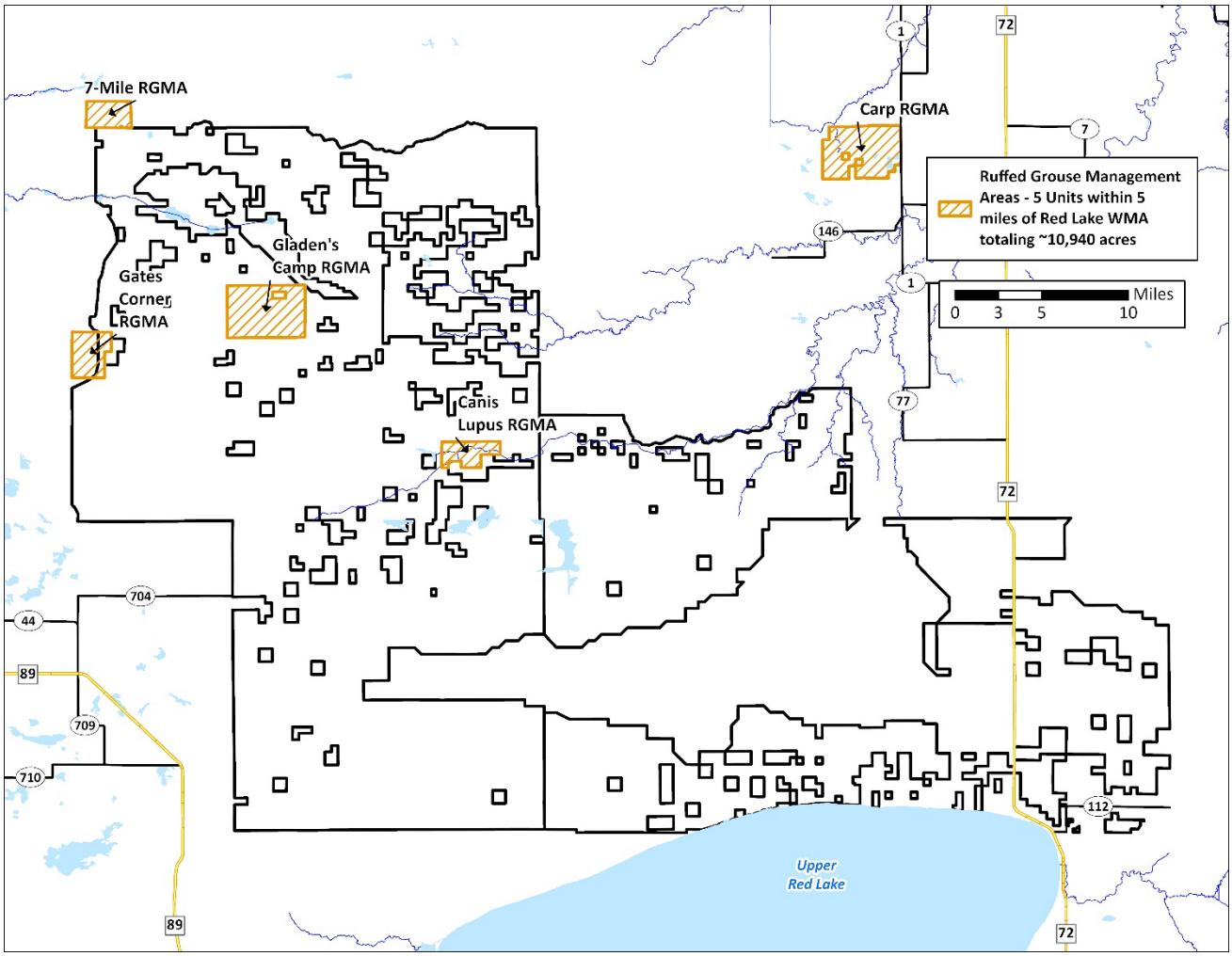
There are three Ruffed Grouse Management Areas in and near the Red Lake WMA: an area of slightly under one square mile in T.158N, R.36W just north of Gate's Corner; about 1,120 acres in T.159N, R.36W by 7-Mile Corner; and about 360 acres in T.157N, R.34W by the Canis Lupus Walking Trail (Figure 7).

Table 7. Cover types with a mean ruffed grouse habitat score greater than or equal to 2 on a relative index scale from 0 to 4. For the purposes of the ruffed grouse habitat model, these cover types are considered ruffed grouse habitat (Ruffed Grouse in Minnesota: A Long-Range Plan for Management)

MN Gap Analysis Program Cover Type	Score
Aspen/White Birch	4
Upland Shrub	3.333
Spruce/Fir-Deciduous mix	3.111
White/Red Oak	3
Jack Pine-Deciduous mix	3
Upland Coniferous/Deciduous mix	2.889
Northern Pin Oak	2.778
Red Oak	2.555

MN Gap Analysis Program Cover Type	Score
Bur/White Oak mix	2.555
Red/White Pine-Deciduous mix	2.333
Upland Deciduous	2.222
Balsam Fir mix	2.111
Lowland Deciduous Shrub	2
Red Cedar-Deciduous mix	2

Figure 7. Ruffed Grouse Management Areas in and near Red Lake WMA



Sharp-tailed grouse occur in open landscapes such as grasslands, sedge meadows, brushlands, savannahs, and boreal peatlands. In Minnesota, there is a population in the northwestern counties that includes all of the Beltrami Island area, and another population centered in Aitkin, Pine, Carlton, and

St. Louis counties. The mating system of sharp-tailed grouse involves a lek, or dancing ground, where males congregate to display or "dance" and females visit to select a mate. Dancing grounds occur in open landscapes where predators can be detected. As the amount of brush cover increases within about 1 kilometer of a dancing ground, the suitability of an area decreases as a dancing ground (Hanowski, Christian, & Niemi, 2000) (Bailey & Larson, Undated). However, brush cover away from dancing grounds is an important component of sharp-tailed grouse habitat for nesting, hiding, and brood-rearing (Bailey & Larson, Undated). A study in Canada found that leks are abandoned when aspen cover exceeds 56% in a 1-kilometer radius and when grass and sedge cover decreases to below 15% (Berger and Baydack 1992). Other species that potentially benefit from sharp-tailed grouse habitat management include sandhill cranes, yellow rails, short-eared owls, northern harriers, and moose. The remote peatlands north of Upper Red Lake provide open landscape conditions. There is one area along Dick's Parkway FR that is actively managed to maintain open conditions for sharp-tailed grouse.

Spruce grouse inhabit both lowland coniferous forests and upland coniferous forest, particularly black spruce and jack pine. Broods sometimes use the edge of clearcuts if lowland coniferous forest is nearby. Spruce grouse eat the needles of short-needle conifer species, leaves, berries, mushrooms, insects, and buds. In winter, they roost in deep powdery snow, or when the snow has a thin crust, they use conifers for roosting. DNR research is finding that dense forest structure is important for spruce grouse, and dense structure is more typical in early and mid-successional forests. Essential upland habitat components appear to be dense (2,500-3,500 stems/acre), early successional conifer stands 7-14 meters in height, with branches that touch or nearly touch the ground. Preferred jack pine stands are typically over 12 meters tall and have not yet reached the self-pruning stage (Gregg, Heeringa, & Eklund, 2004), but older lowland conifer stands can also provide dense cover.

American Woodcock. American woodcock is the only shorebird that inhabits the forest floor. This species needs a variety of habitats for its life cycle and is typically found in moist woodlands and edges of marshes and fields. Woodcock habitat on Red Lake WMA is young forest, particularly aspen, or other brushy areas located near forest openings, used for courtship displays and night roosting. A variety of openings are used by woodcock including timber harvest areas, natural openings, roads, and grasslands. Openings are usually within 100 meters of diurnal cover, which includes areas of early successional growth, shrublands, or dense understory in forests (Kelley, Williamson, & Cooper, 2008).

Sandhill Crane. Sandhill cranes in northwestern Minnesota belong to the "greater" subspecies but migrate westward with the midcontinent population rather than southeast with the rest of Minnesota's greater sandhill cranes. Maintenance of wetland habitats, particularly seasonally flooded and scrub-shrub wetlands is the primary need for all populations of sandhill cranes (Tacha, Nesbitt, & Vohs, 1994).

Nongame Birds

Red Lake WMA has an incredible diversity and abundance of nongame birds – breeding, spring and fall migrants, and winter visitors. Many of the breeding birds are fairly unique for Minnesota or attain their greatest abundance on the Red Lake WMA, including solitary sandpipers, Wilson's phalaropes, American three-toed woodpeckers, great gray, short-eared and northern hawk-owls, Connecticut warblers, boreal chickadees, and perhaps palm warblers. Red Lake WMA also holds strong populations of other species that are on the decline elsewhere, such as yellow rail, eastern whip-poor-will, common nighthawk, olive-sided flycatcher, and yellow-bellied flycatcher. Lowland conifer birds were studied on Red Lake WMA and elsewhere by Natural Resources Research Institute (NRRI) from 2013-2014 (Bednar, Zlonis, Panci, Moen, & Niemi, 2015); results are summarized in Table 8.

Table 8. Lowland conifer bird use

Stand Cover Type/Age/Site Index	Original Sample Plots – Density	Original Sample Plots – Species Number	Most Abundant Users	Common Users	Avoiders
Stagnant Black Spruce-Tamarack	15.2	53	Nashville warbler, yellow-rumped warbler, yellow-bellied flycatcher, Connecticut warbler, palm warbler, white-throated sparrow	Olive-sided flycatcher, ruby-crowned kinglet, dark-eyed junco, gray jay, boreal chickadee, Lincoln's sparrow	Winter wren, black-and-white warbler, Swainson's thrush
Old-growth Productive Black Spruce-Tamarack	16.1	56	Nashville warbler, yellow-rumped warbler, white-throated sparrow, Connecticut warbler, yellow-bellied flycatcher	Golden-crowned kinglet, blue-headed vireo, gray jay, winter wren, red-breasted nuthatch	Black-throated green warbler, Swainson's thrush, palm warbler
Middle-aged Productive Black Spruce-Tamarack	14.3	55	Nashville warbler, yellow-rumped warbler, white-throated sparrow, black-and-white warbler, yellow-bellied flycatcher	Connecticut warbler, golden-crowned kinglet, hairy woodpecker, black-capped chickadee, brown creeper, blue jay	Swainson's thrush

Stand Cover Type/Age/Site Index	Original Sample Plots – Density	Original Sample Plots – Species Number	Most Abundant Users	Common Users	Avoiders
Regenerating Productive Black Spruce-Tamarack	18.6	41	Nashville warbler, sedge wren, common yellowthroat, swamp sparrow, white-throated sparrow, alder flycatcher	Lincoln's sparrow, palm warbler, song sparrow	Blue-headed vireo, brown creeper, Connecticut warbler, golden-crowned kinglet, hermit thrush, Swainson's thrush, yellow-rumped warbler
Old-growth White Cedar	14.9	57	Nashville warbler, black-throated green warbler, black-and-white warbler, yellow-bellied flycatcher, Swainson's thrush, ovenbird	Blue-headed vireo, red-breasted nuthatch, winter wren, yellow-rumped warbler, white-throated sparrow, purple finch	Connecticut warbler, golden-crowned kinglet, dark-eyed junco

Woodpeckers

Woodpeckers excavate cavities that other wildlife depend upon. The woodpeckers of most importance are pileated woodpeckers, northern flickers, yellow-bellied sapsuckers, hairy woodpeckers and black-backed woodpeckers because of the sizes of cavities they create, the number of cavities they create, and the locations of cavities they create. Priority cavity dependent birds, along with mammals, are listed in Table 9. Identified thresholds for cavity trees are provided in Appendix I and can provide a menu for selecting species to consider when managing a suite of forest stands.

Table 9. Priority cavity-dependent wildlife species for the Red Lake WMA, their habitat requirements, and characteristics (North, Jones, Mehmel, & St-Louis, 2023)

Species	Minimum Area Required	Habitat	Forest Age	Forest Structure	Cavity Trees	Other
Wood duck	n/a	Deciduous riparian forest for nesting	Mature	Mature trees with large cavities	Used pileated woodpecker nests in aspen	Often use old pileated woodpecker cavities

Species	Minimum Area Required	Habitat	Forest Age	Forest Structure	Cavity Trees	Other
					or natural cavities	
Common goldeneye	n/a	Deciduous riparian forest for nesting	Mature	Mature trees with large cavities	Used pileated woodpecker nests in aspen	Often use old pileated woodpecker cavities
Barred owl	565 acres	Mixed or deciduous forest, upland or lowland	Mature	Old trees with large cavities	Natural cavities in large diameter trees	
Pileated woodpecker	320 acres, but not all of it has to be forested	Mixed or deciduous upland forest	Mature	Mature trees suitable for large cavities	Large diameter aspen preferred	Key excavator of cavities for other large cavity dependent species
Yellow-bellied sapsucker	5-20 acres (estimated)	Deciduous upland forest	Mature		Aspen, mean 30 cm diameter at breast height (dbh)	Create sapwells for hummingbirds
Hairy woodpecker	5-40 acres (estimated)	Deciduous upland forest	Mature		Aspen preferred, mean 30-35 cm dbh	HAWO and YBSA create cavities for many other species to use
Black-backed woodpecker	160 acres (estimated), but not all forested	Upland or lowland conifers	Mature	Open savannah-like settings seem preferred	Medium diameter conifers	Primary cavity excavator in conifers
Fisher	5-10 mi^2	Upland or lowland coniferous or mixed	Mature	Overstory dominated by conifers >38 cm dbh, with $\geq$2 subcanopy layers	Aspen preferred, average 50 cm dbh	Iconic boreal species, limited by winter habitat
Pine marten	6 mi^2 for males, 1.7 mi^2 for females	Upland and lowland	Mature	Dense conifer cover, with extensive	Aspen and cedar preferred,	Iconic boreal species, limited

Species	Minimum Area Required	Habitat	Forest Age	Forest Structure	Cavity Trees	Other
		conifers, ash		CWD to create portals to the subnivean zone	average 40 cm dbh	by winter habitat
Northern long-eared bat	500-acre patches where tree cover is extensive in 800 m radius of maternal den roost tree	Deciduous, coniferous, or mixed forest	Mature	Maternal roosts in decayed and larger dbh deciduous trees (esp. aspen in northern MN) where forest tree cover is 80% and mean dbh is 34.5 cm statewide	Preferred aspen for maternal roost trees (preferred trees of 25-50 cm dbh, with mean dbh of 39.3 cm dbh due to use of larger non-aspen trees statewide)	Federal Endangered species, roost in colonies

Stewardship Species

Audubon Minnesota recently evaluated the importance of Minnesota habitats for selected bird species on a global scale. Twelve bird species are more common in Minnesota than elsewhere in the United States. These birds are considered Minnesota's Stewardship Species (Table 10: Audubon Minnesota 2012). If their stronghold in our state were to diminish, it could potentially impact the global population of that species. The Red Lake WMA provides nesting habitat for 11 of the 12 species.

Table 10. Stewardship Species in Minnesota and relationship to Red Lake WMA

Species	% Global Population	% of Range in Minnesota	Occurrence in Red Lake WMA	Habitat
American white pelican	18	In combination with North Dakota – 40% of global population	Likely forages and rests on north shore of Upper Red Lake	Uses wetlands during migration
American woodcock	10	6% of its breeding range	Breeding	Young forests
Baltimore oriole	5	8% of its breeding range	Breeding	Forest edges, open woodlands

Species	% Global Population	% of Range in Minnesota	Occurrence in Red Lake WMA	Habitat
Black-billed cuckoo	10	10% of its breeding range	Likely breeding	Forest edges and thickets
Bobolink	13	9% of its breeding range	Limited breeding	Open peatlands and grasslands
Chestnut-sided warbler	6	6% of its breeding range, and highest U.S. abundance	Breeding	Young forests and brushlands
Golden-winged warbler	42	12% of its breeding range	Breeding	Shrub wetlands, and young and mature forests in close proximity
Nashville warbler	5	5% of its breeding range, and highest U.S. abundance	Breeding	Diverse forests and bushlands
Rose-breasted grosbeak	6	10% of its breeding range	Breeding	Mesic upland forests 20-40 years old, and brushlands
Sedge wren	33	14% of its breeding range, and highest U.S. abundance	Breeding	Moist grasslands with shrubby component/wet meadows
Trumpeter swan	12	Largest population south of Alaska/Canada	Limited breeding	Marshes and shallow lakes
Veery	6	5% of its breeding range, and highest U.S. abundance	Breeding	Damp deciduous forests/riparian forests, wet brushlands

Forest Interior Species

Forest interior species are species that need large blocks of forested habitat to meet their lifecycle needs or to maintain viable populations. Within the greater project area, North et al. (2014) identified the following species as forest interior species at the landscape level (meaning they were much more abundant in the forest interior than in the periphery that included agricultural areas): spruce grouse, great gray owl, northern saw-whet owl, eastern whip-poor-will, black-backed woodpecker, three-toed woodpecker, alder flycatcher, boreal chickadee, red-breasted nuthatch, winter wren, golden-crowned kinglet, ruby-crowned kinglet, Swainson's thrush, hermit thrush, mourning warbler, Connecticut warbler (see also Lapin et al. 2012), black-and-white warbler, American redstart, black-throated green warbler, chestnut-sided warbler, pine warbler, Blackburnian warbler, yellow-rumped warbler, Lincoln's

sparrow, dark-eyed junco, red crossbill, and white-winged crossbill. The gray jay would also fit into this category.

Other species that are often considered forest interior species because they have large home ranges and need large blocks of forest, especially to maintain viable populations, include northern goshawk, sharp-shined hawk, Cooper's hawk, broad-winged hawk, barred owl, and pileated woodpecker. Ovenbirds, scarlet tanagers, red-eyed vireos, and eastern wood-pewees have sometimes been considered forest interior species in other locations.

From the lists above, we identified the following forest interior species as priority species (Table 11).

Table 11. Priority forest interior bird species for the Red Lake WMA, their habitat requirements, and characteristics

Species	Minimum Area Required	Habitat	Forest Age	Forest Structure	Cavity Trees	Other
Northern goshawk	4,000 acres foraging habitat within a 12,500-20,000 acre home range	Mixed or deciduous upland forest over large home range	Mature and old growth forest	Open mid-canopy, high canopy-closure	n/a	Needs to be managed at the landscape scale
Barred owl	565 acres	Mixed or deciduous forest, upland or lowland	Mature	Old trees with large cavities	Natural cavities in large diameter trees	
Pileated woodpecker	320 acres	Deciduous or mixed forests	Mature	Large trees	Large diameter aspen preferred	
American three-toed woodpecker	200-600 acres	Lowland conifers	Mature to old growth	Old trees 20-30 cm dbh for nesting	Medium diameter conifers	One of rarest breeding birds in MN
Gray jay	90-140 acres	Coniferous upland or lowland, or mixed forests	Mature or old growth, including stagnant lowland conifer	Variable	n/a	Iconic boreal species, declining due to climate change

Species	Minimum Area Required	Habitat	Forest Age	Forest Structure	Cavity Trees	Other
Boreal chickadee	>10 acres	Lowland conifers	Mature, old-growth, and stagnant	More closed canopy cover	Small to medium sized trees (e.g., aspen, dead birch, dead spruce	
Winter wren	0.5-3 acres	Lowland conifer forests	Mature or old-growth	Tip up root wads for nesting; large logs and trees, snags, water features	n/a	Susceptible to forest fragmentation (Hejl et al. 2002)
Swainson's thrush	10 acres	White cedar	Old growth	Dense shrubs	n/a	
Connecticut warbler	108 m between nests (Pitocchelli et al. 1997)	Lowland conifers	Middle-aged, old-growth and stagnant spruce-tamarack	Medium canopy cover, Sphagnum moss layer	n/a	
Black-throated green warbler	2-5 acres	Usually coniferous forests	Mature forest, old growth white cedar	Variable	n/a	Susceptible to spraying for spruce budworm

Winter Birds

Winter birds that occur on the Red Lake WMA are particularly sought after by bird watchers because these are largely boreal species migrating from remote areas of Canada. These include rough-legged hawks, northern hawk owls, snowy owls, great gray owls, northern shrikes, bohemian waxwings, pine grosbeaks, and red and white-winged crossbills. Although few bald eagles nest in Red Lake WMA (primarily along the north shore of Upper Red Lake), large numbers appear to move onto Red Lake WMA in anticipation of finding white-tailed deer carcasses and gut piles from the deer hunting season.

Mammals

Mammal species present on Red Lake WMA were determined from information supplied by Section of Wildlife records and observations from staff working at Red Lake WMA and can be found in Appendix J.

Approximately 53 mammal species are known to occur on or near Red Lake WMA. Fifteen of these species are identified as game species, three are state listed as threatened, nine are state listed as special concern (including one species, the northern long-eared bat, that is federally listed as Endangered), and four are considered SGCN.

Large Mammals and Big Game

Red Lake WMA supports white-tailed deer, moose, black bear, and gray wolf and accommodates large numbers of white-tailed deer and black bear hunters, especially those seeking a more remote experience. White-tailed deer are habitat generalists and use almost all the habitats available at Red Lake WMA, but at a lower density than in other parts of the state. White-tailed deer tend to feed in early successional cover types and in lowland conifers that provide security and thermal cover. They prefer that these cover types are well interspersed with each other and favor edge habitat. The aspen and jack pine harvest has been steady the past 30 years and supplies current early successional habitat for food resources. Forest openings are also mowed as time and budgets allow to maintain the grass and forb browse component. There has been little interest in harvesting white cedar due to lack of markets and regeneration issues.

Moose were once common on Red Lake WMA, but the population started a steep decline in about 1993. The northwest Minnesota moose population fell from about 4,000 animals in 1985 to 84 by 2007 (Cox, 2004) (Lenarz, 2007), after which time the winter moose survey was discontinued. Despite the steep population decline, a small population continues to persist in the area between Dick's Parkway FR and the Faunce FR, north to Norris Camp and Brown's Slough.

Gray wolves persisted here because the remote nature of most of Red Lake WMA prevented intensive hunting and trapping. White-tailed deer are the most important food source. Beavers and snowshoe hares are also important food items.

Black bear occur throughout Red Lake WMA, although the most common forest types of Red Lake WMA are not considered good food-producing habitats (Berg, 1992). The peatlands are good denning habitat, and male bears especially have been documented to travel up to 150 miles to den in lowland conifer stands.

Mid-sized Mammals, Small Game, and Furbearers

Red Lake WMA is home to several mid-sized mammals, many of which are classified as "small game" in hunting regulations or as furbearers in trapping regulations. Common small game hunted on Red Lake WMA include raccoon, coyote, red fox, and snowshoe hare. Furbearers include a variety of mammals trapped or hunted for their pelts. Important furbearers on WMA include pine marten, fisher, bobcat, red fox, coyote, mink, otter, raccoon, muskrat, and beaver.

Gray squirrels are absent or very rare on the Red Lake WMA but may expand into the area with climate change.

Small Mammals

Small mammals are important to ecosystems, serving as food for predators, distributors of seeds, grazers, and consumers of invertebrates. Several species of voles, mice, shrews, bats, moles, and squirrels are common. Red squirrels and flying squirrels can be considered ecological keystone species (along with beavers) for their roles as ecosystem engineers.

Several species of bats occur at Red Lake WMA, but the northern long-eared bat is the only one that is federally listed as endangered. Recent statewide studies of bats by NRRI (Swingen, et al., 2015) (Swingen, et al., 2017) included Red Lake WMA and Beltrami Island State Forest. They found that northern long-eared bats prefer decaying and larger diameter aspen for maternal den roost sites in northern Minnesota forests, where tree cover equals or exceeds 80% near the maternal roost tree, and where forest cover is extensive within an 800-meter radius of the roost tree.

Fish

Red Lake WMA lands do not provide significant fish habitat except where they contain or border rivers and streams. There are few open water wetlands, lakes, or ponds in Red Lake WMA, and those that do exist are typically too shallow to support fish over the winter. This does not mean that they do not have considerable value for fish, however, as they do filter water, store water on the landscape, and release it slowly into the river systems. A list of fish species associated with the Red Lake WMA planning area is provided in Appendix K.

Surveys focused on streams in the Beltrami Island State Forest and Red Lake WMA in 1997 (Schmidt, 1999) found the three most abundant species sampled were indicative of good habitat quality, based on Schmidt's (1999) criteria (brook stickleback, a "headwaters" species and insectivore; northern redbelly dace, a "headwaters" species; and central mudminnow, an insectivore). Together these three species comprised 58.5% of the fish sampled. Top carnivores like largemouth bass and northern pike occurred in very small numbers at only two of twenty sampling stations. Three species that are intolerant of habitat degradation (blacknose shiner, longnose dace, and Iowa darter) accounted for 2% of the total catch.

Upper Red Lake

Upper Red Lake is a 120,000-acre lake, 60% (72,000 acres) of which is under the jurisdiction of the Red Lake Nation. The remaining 40% (48,000 acres) falls under state jurisdiction. WMA lands occupy approximately 5.9 miles of shoreline, or about 10.4% of the approximately 57 miles of shoreline on

Upper Red Lake, and intermixed LUP lands occupy approximately 4.4 miles of shoreline, or about another 7.7% of the shoreline on Upper Red Lake.

Upper Red Lake is famous for its walleye fishery. Northern pike are also a significant fishery on Upper Red Lake, and their population has been stable over the past eight years, with a nice mixture of fish sizes in the gill net samples. A popular black crappie fishery developed in the mid 1990s, but the population has seen a gradual decline from an all-time high recorded in 1996.

Rapid River

The Rapid River has two branches that originate in the Red Lake WMA, in a remote bog area east of the Mulligan Lake peatland. Almost 75% of the watershed is comprised of wetlands (NRCS undated), which contributes to making the Rapid River Watershed the healthiest watershed in the state. The river joins the Rainy River east of Baudette near Clementson near the Koochiching County line. Portions of the river have been extensively channelized in the past. The river supports 28 species (see Appendix K), including five species (18%) that are deemed "intolerant" of degradation. Lake sturgeon spawn at the rapids near the mouth of the river. Some portions of the river, especially near the mouth, are well suited for northern pike. A 2003 stream assessment found that stream channels are relatively stable and well vegetated, with good water quality and habitat, but generally lacks game fish, probably due to extensive beaver dams upstream from Lake of the Woods County Highway 1.

Roseau River

The Roseau River in Minnesota extends for over 95 miles and ultimately connects to the Red River of the North in Manitoba. The north branch of the Roseau River originates in the Mulligan Lake Peatland. The Roseau River supports 40 species of fish, of which only three (rock bass, stonecat, Iowa darter) are considered intolerant of habitat and water quality degradation (Appendix K). Early surveys of the river below the confluence of the north and south branches in the 1970s indicated game fish such as walleye and northern pike were prominent in the river system, but that extreme seasonal water level fluctuations limited the size of the fishery and concentrated large fish into remnant deeper water areas.

Based on diversity, percent composition and abundance of intolerant species, and metrics of biological integrity, the reaches of the Rapid and Roseau rivers in the Red Lake WMA planning area provide good quality habitat for nongame fishes, and the primary management focus should be on watershed and riparian corridor protection measures rather than restoration measures.

Herpetofauna

The Agassiz Lowlands subsection has a low diversity of reptiles and amphibians relative to other parts of the state. Eighteen species have been documented in Beltrami, Lake of the Woods, and Roseau

counties. The amphibians are blue-spotted salamander, tiger salamander, American toad, Canadian toad, gray tree frog, Cope's gray tree frog, spring peeper, western chorus frog, green frog, northern leopard frog, mink frog, and wood frog. The reptiles are painted turtle, snapping turtle, prairie skink, smooth green snake, redbelly snake, plains garter snake, and common garter snake. The snapping turtle and smooth green snake are designated SGCN.

Reptiles and amphibians have relatively small territories, which make them highly vulnerable to habitat changes (Oldfield & Moriarty, 1994). The vast peatlands and coniferous forests are also among the poorest habitats for reptiles and amphibians (Appendix L). Wood frogs, mink frogs, American toads, and blue-spotted salamanders are common bog inhabitants. Bog water is very acidic (pH under 4.5) which inhibits reptile and amphibian use. Certain habitats within the Red Lake WMA planning area, such as rivers and streams, non-forested wetlands, and deciduous forested wetlands are likely to be most important to reptiles and amphibians.

Invertebrates

Aquatic Invertebrates

Mussel populations in northern Minnesota streams are of low diversity relative to southern Minnesota streams. Five species of mussels were collected while sampling for fish in the BISF/Red Lake WMA (Schmidt, 1999). The Rapid River system contained all five species: cylindrical papershell, fatmucket, white heelsplitter, the state-listed creek heelsplitter, and giant floater, with both heelsplitters found only in this watershed. Additionally, mussels were sampled in the Rapid River in 2006 (B. Sietman, personal communication) and 2021 (Skoog, 2022). A total of eight mussel species were collected during these two surveys, adding black sandshell, plain pocketbook, and creeper to the species known in the Rapid River. Hansen Creek in the Roseau River watershed supported only fatmucket. Three species of mussels have been observed upstream of Hayes Lake in the Roseau River (Buegler, 2000) with the population being dominated by fatmucket. Water quality and quantity in the Red Lake WMA planning area is more than sufficient for maintaining mussel populations. The main threat to mussels is from dams that block upstream movements of their host fish species. Because mussels are long-lived (from several decades to over a century), it can take a long time for threats to successful reproduction to be detected.

Insects

The insect fauna of most areas, including the Agassiz Lowlands, has been poorly studied historically. Recent surveys reveal a rich fauna of strong boreal affinity, combined with elements of the eastern deciduous woodland and aspen parkland biomes. Species richness within the Agassiz Lowlands of Beltrami, Lake of the Woods, and Roseau counties could approach 10,000 species. Well over 10,000

specimens representing approximately 1,500-2,000 species have been collected in recent surveys, but outside of Lepidoptera (moths and butterflies), most await identification.

Species of Conservation Interest

The overwhelming diversity of insects, and the lack of information for many groups, makes conservation by habitat (rather than by species) the most practical approach for their protection. Individual species, however, can be useful indicators for management practices or ecological changes.

Highlighting the lack of information is *Oxyetheria itascae*, a species of caddisfly with no common name. This special concern caddisfly species was discovered in 1993 and has never been found outside of northern Minnesota. Although larvae of other caddisflies of the genus *Oxytheria* have been found in both lakes and streams, larvae and adult females of this species have never been found. Adult males have never been found near lakes and seem to prefer meandering, silt-bottomed streams. In Red Lake WMA and the immediate surrounding area, 17 males were collected in Hansen Creek, two males were collected in the Roseau River, three males were collected in Hayes Lake State Park (presumably in the Roseau River), and one male was collected in Miller Creek.

The boreal peatland Lepidoptera fauna is remarkable and includes large populations of many seldom-encountered species. The presence of such large and detectable populations at their southern and western range extremes makes these areas particularly valuable for climate monitoring. Species apparently at their southern range limit within the Agassiz Lowlands include arctic fritillary (*Boloria chariclea*), *Carsia sororiata, Lasionycta secedens*, *Lasionycta taigata*, and *Xestia mixta*. Other peatland species near their southern range limit (but occur farther south than the Agassiz Lowlands) include Freija fritillary (*Boloria freija*), Frigga fritillary (*Boloria frigga*), and red-disked alpine (*Erebia discoidalis*).

The jack pine woodlands also harbor many boreal species possibly at their southern range extreme within the Agassiz Lowlands. These include large marble (*Euchloe ausonides*), Macoun's arctic (*Oeneis macounii*), and *Lithophane georgii*.

Public Use

Minnesota's wildlife management areas are used for public hunting, trapping, fishing, and other activities compatible with wildlife and fish management. Hunting has always accounted for the largest share of public use on the Red Lake WMA. Red Lake WMA is also used for non-hunting or fishing activities such as wildlife watching, foraging, nature photography, winter sports, and hiking. Knowledge of the present use-levels is necessary to predict the future demand for outdoor recreation and to guide management objectives and strategies.

A public use survey was also conducted for the LUP plan in 2010-11, the results of which are relevant to Red Lake WMA currently. The LUP plan surveyed 43 respondents, of which 76.7% visited Red Lake

WMA. All of the 43 respondents visited the greater LUP planning area in fall, and spring had the lowest use, by 74.4% of respondents. The most popular activities were hunting (95%), berry picking and nature drives (77% each), camping and hiking (67% each), snowmobiling (58%), bird watching and mushroom hunting (44% each), and photography and fishing (40% each), while only 12% reported trapping. When asked what activity was most important, hunting (40%) and snowmobiling (21%) came out on top of activities allowable on Red Lake WMA.

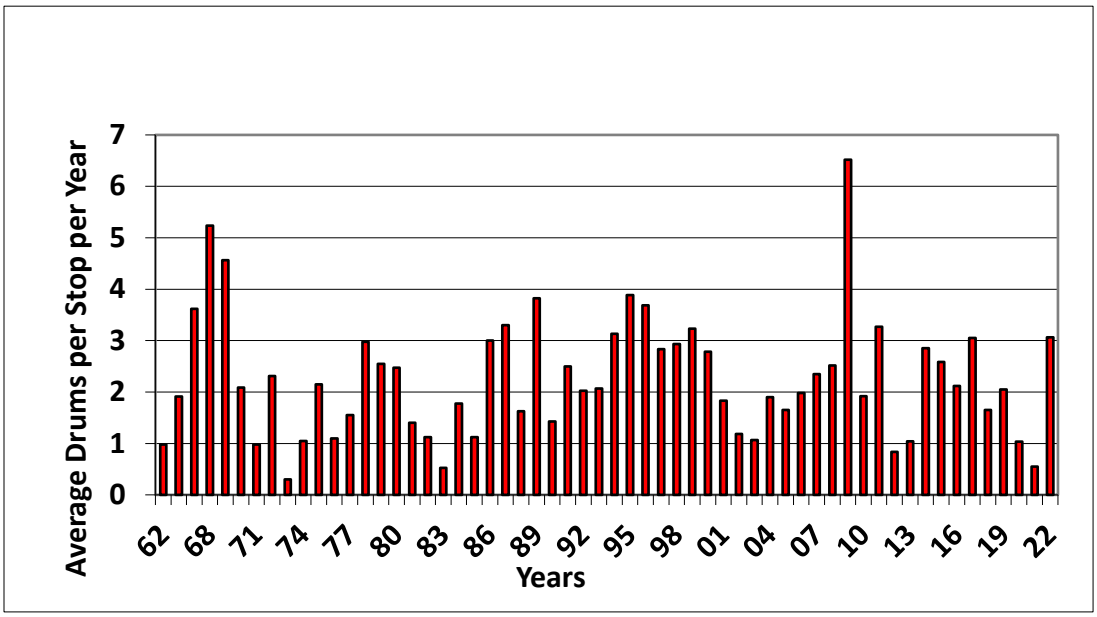
Hunters targeted ruffed grouse (91%), white-tailed deer (79%), woodcock (40%), hare/rabbits (37%), spruce grouse (35%), sharp-tailed grouse (26%), waterfowl (23%), black bear (14%), squirrel (12%), and moose, mourning dove, and bobcat (2% each). Blueberries were the primary species sought after by berry pickers, with 94% picking blueberries, followed by 42% picking cranberries and 33% picking raspberries. Other fruits picked were juneberry, chokecherry, strawberry, rose hips, wild grapes, and pin cherry.

Hunting

Ruffed Grouse Hunting. Ruffed grouse hunting is the most popular activity on Red Lake WMA. Along with ruffed grouse, hunters often take spruce grouse and American woodcock. Red Lake WMA attracts hunters from out-of-state for spruce grouse. There are not good estimates of the number of grouse or woodcock taken, nor of the size of the spruce grouse population, but there are annual ruffed grouse drumming count data that depict population trends (Figure 8). Data show that ruffed grouse numbers follow a roughly 10-year cycle.

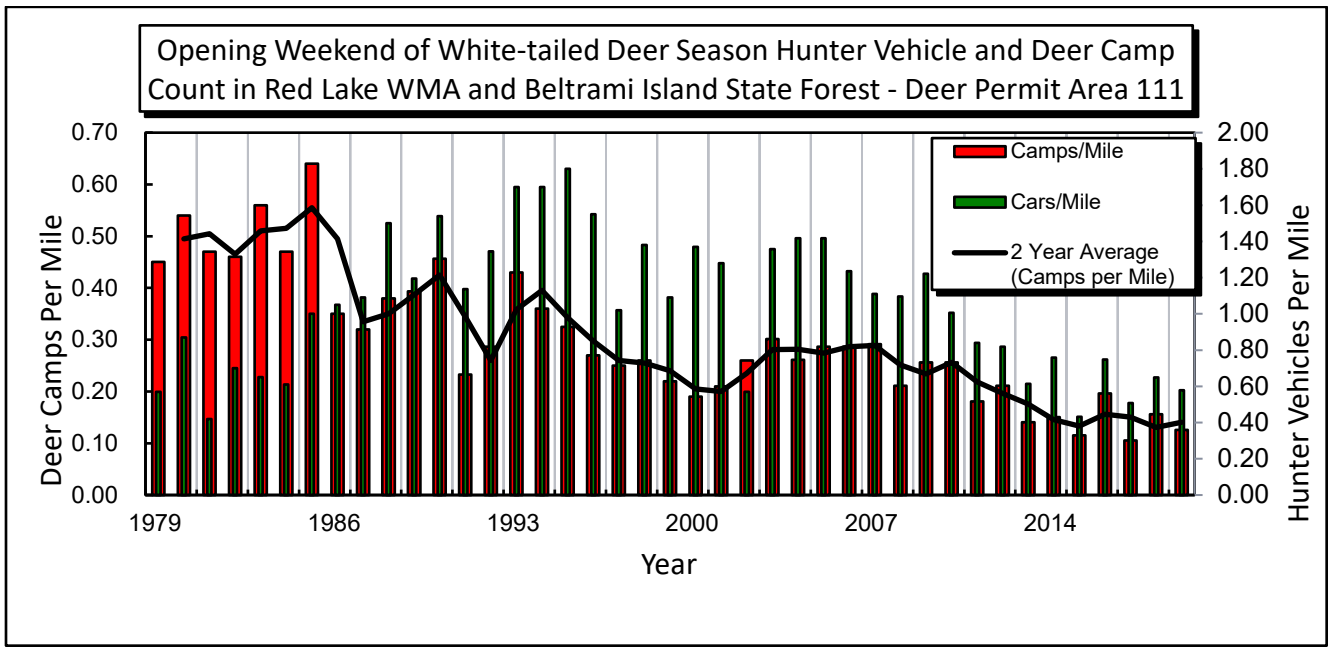
White-tailed Deer Hunting. White-tailed deer hunting is the second-most popular activity on Red Lake WMA. White-tailed deer population density is managed through hunter harvest strategies. Annual assessment of population modeling and hunter harvest data by DNR staff leads to the annual hunter harvest strategy designation to help meet white-tailed deer density goals, set through a stakeholder informed process. Population goals were last revised in 2022.

Figure 8. Beltrami Area Ruffed Grouse Drumming Counts



The fall white-tailed deer harvest in deer permit area (DPA) 111 (containing Red Lake WMA) shows reported white-tailed deer harvest by year and method. Since 1979, car counts have been conducted on Red Lake WMA on opening day of the firearms A seasons. These counts provide an estimate of the number of hunters using Red Lake WMA depicts the number of hunters per year (Figure 9).

Figure 9. Estimated number of hunters per year based on vehicle counts on opening day of the firearms white-tailed deer seasons (estimate based on 2.5 hunters per vehicle)



***Waterfowl Hunting*.** Waterfowl hunting opportunities are limited on the Red Lake WMA. Primary opportunities are on the north shore of Upper Red Lake, Roseau Flowage, along the Rapid River, and at pools where Chase Creek and Miller Creek cross the Rapid River Forest Road. Some hunters also use beaver ponds for waterfowl hunting. Species most likely to be harvested are Canada geese, wood ducks, mallards, blue-winged teal, and ring-necked ducks.

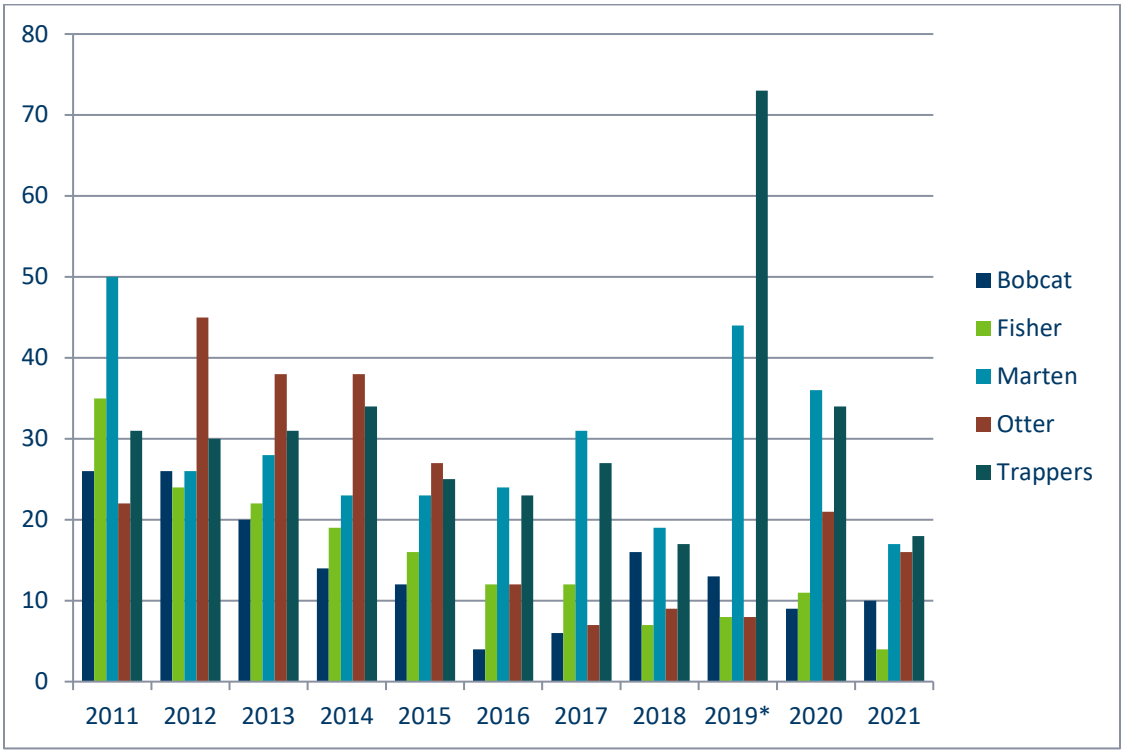
***Black Bear Hunting*.** Black bear hunting opportunities on Red Lake WMA are excellent. Black bear habitat includes most of Red Lake WMA with the exception of the protected peatland areas. Baiting is the most common method used to hunt black bear. Hunting success varies depending on natural food abundance and black bear population size.

Trapping

All trappers on Red Lake WMA are required to obtain a special use permit. This permit provides managers the ability to monitor trapping pressure and harvest within the Red Lake WMA boundary. Roughly 17-35 trappers apply for special use permits annually, except for 2019 when 73 trappers registered furs, perhaps due to an extended marten/fisher season.

Four species are actively tracked at Red Lake WMA: bobcat, fisher, pine marten, and river otter. Figure 10 shows the harvests from Red Lake WMA from 2011-2021.

Figure 10. Red Lake WMA Fur Registration



Wildlife Observation

Wildlife observation is an activity that occurs widely, but it is often difficult to quantify. Nearly all visitors to Red Lake WMA are looking to observe wildlife whether they are hunting or not. Wildlife observation is one of the fastest growing wildlife-related recreation activities in the United States, and as such, has significant implications for the work of wildlife agencies (Sinkular, Jennings, Morgan, Pototsky, & Dayer, 2022).

Red Lake WMA is an especially popular wildlife viewing destination for birdwatchers because of the potential to view species that are often difficult to detect elsewhere, including spruce grouse, sharp-tailed grouse, yellow rail, piping plover, snowy owl, northern hawk-owl, great gray owl, long-eared owl, boreal owl, northern saw-whet owl, American three-toed woodpecker, black-backed woodpecker, bohemian waxwing, golden-winged warbler, Connecticut warbler, white-winged crossbill, hoary redpoll, short-eared owl, Wilson's phalarope, boreal chickadee, black-throated blue warbler, bay-breasted warbler, red crossbill, and pine grosbeak.

Viewing opportunities on Red Lake WMA are currently limited. They include the boundary road system (Dick's Parkway, Butterfield FR, Hogsback FR, Faunce [Rangeline] FR, Rapid River FR [east], Highway 72, Lake of the Woods County 16); a few interior roads (Spina, Rapid River [west], Bankton [west], and Blanchard FRs); the network of hunter walking trails (HWTs); and a few pullouts and short minimum maintenance road/spurs. Areas of extensive ditching along forest roads and Highway 72 prevent walk-in access to large areas of Red Lake WMA except during winter. Better viewing opportunities exist at some of the ancillary DNR lands around Red Lake WMA (e.g., Big Bog SRA boardwalk, Brown's Slough, Winter Lake Road SNA, Norris Camp).

Resource Gathering

Resource gathering, also known as foraging, is an activity where edible foods are harvested for personal use. No commercial harvest of any plants (except trees) or animals (except for bait harvest with the issuance of a permit) is permitted on Red Lake WMA. A variety of wild foods commonly collected for personal consumption include blueberries, cranberries, raspberries, mushrooms, juneberries, and chokecherries. Wild rice is commonly found on Roseau flowage on Red Lake WMA. Silver maple tapping occurs along the Rapid River east of Faunce FR in spring for making sugar or syrup. Spruce top and balsam bough collecting also occurs in fall/winter, although it is limited.

Strategic Considerations

This section outlines overarching considerations that influence how management actions at Red Lake WMA are planned and implemented. Some factors, such as those listed under operational context, are ongoing considerations; other factors, such as chronic wasting disease (CWD) and climate change, are new and emerging threats to Red Lake WMA.

Climate Change

Climate change is impacting Minnesota's wildlife, plants, waters, historic resources, infrastructure, and available outdoor recreation activities. Within Red Lake WMA, predicted changes in climate could influence native plant communities and the wildlife habitat they provide in many ways. The changes are expected to affect plant and animal distributions; however, the specific impacts are uncertain at this time. Climate change is predicted to shift the boreal forest north and out of Minnesota. Ongoing DNR research indicates that the northwestern (i.e., Red Lake WMA) and northeastern (i.e., Superior Uplands) portions of the boreal forest in Minnesota may provide climate refugia for a variety of species that inhabit boreal forest. Flooding from more frequent and heavy rains has impacted infrastructure like roads and dams. We will use an adaptive management approach using best available science, and adaptations to changing climatic conditions will need to be embedded into planning, budgeting management, and maintenance in a comprehensive way.

Invasive Species

The state defines an invasive species as a species that is non-native to the ecosystem under consideration whose introduction causes or is likely to cause economic or environmental harm or harm to human health or threatens or may threaten natural resources or the use of natural resources in the state (Minnesota Statutes Chapter 84D, Subd. 9). Invasive species include plants, animals, and other organisms. The unintended movement of an animal, plant, plant part, or seed has the potential to adversely impact an entire system. Educating users, early detection, and aggressive treatment of invasive species can be effective tools in minimizing new introductions and their further spread.

Animals

Invasive terrestrial earthworms are present within Red Lake WMA. The current extent and abundance of them is unclear. These worms first arrived in North America from Europe, likely through soils and plants that were transported by Europeans. The worms alter the composition of the forest floor by consuming the fallen leaves that make up the duff layer. This leads to a lower survival rate of tree seedlings and other forbs and can facilitate the establishment of invasive plants.

Animals that are not known to be present within Red Lake WMA but have the potential to be in the future include mute swans (*Cygnus olor*), emerald ash borers (*Agrilus planipennis*), common carp (*Cyprinus carpio*), faucet snails (*Bithynia tentaculata*), Mountain pine beetle (*Dendroctonus ponderosae*), and spongy moths (*Lymantria dispar*).

Terrestrial Plants

Woody Plants. There are four woody invasive species known to occur within or adjacent to Red Lake WMA. The one currently posing the largest threat is European buckthorn (*Rhamnus cathartica*). Buckthorn was first brought to Minnesota from Europe in the mid-1800s as a popular species for hedges. It is a concern to managers because it outcompetes native plants, degrades wildlife habitat, serves as a host to other pests, and can form dense thickets.

The three other species that are present are non-native bush honeysuckles (*Lonicera* spp.), Siberian elm (*Ulmus pumila*), and Siberian peashrub (*Caragana arborescens*). Non-native bush honeysuckles are present in isolated locations. These honeysuckles were once commonly planted for wildlife. They often invade savanna and woodland edge habitats, where they compete with native plant species.

Siberian peashrub was once widely recommended as a wildlife food plant and was planted by DNR staff. The species has spread from open fields into forest stands, where it outcompetes native herbs and shrubs, as well as naturally regenerating tree species. The largest infestations are along Dicks Parkway.

One species that is not currently found in northwestern Minnesota but has the potential to have major impacts if it were to arrive in the future is round leaf bittersweet (*Celastrus orbiculatus)*. This woody vine can form dense cover and pull down trees. It currently has limited distribution in southeastern and central Minnesota but could be spread to other parts of the state when people improperly dispose of wreaths and other decorations containing non-native bittersweet fruits.

Herbaceous Plants. There are three species present within Red Lake WMA that are on Minnesota's prohibited noxious weed list and must be controlled: Canada thistle (*Cirsium arvense*), common tansy (*Tanacetum vulgare),* and spotted knapweed (*Centaurea stoebe*). Efforts are being taken to prevent the spread, maturation, and dispersal of propagating parts of these species.

Canada thistle invades natural areas such as prairies, savannas, wet prairies, and sedge meadows where disturbance exists. Once established, it outcompetes native plants and forms dense stands. The seeds are tufted for dispersal by the wind and remain viable in the soil for over 20 years.

Common tansy was introduced to the United States from Europe for medicinal and horticultural purposes. Common tansy displaces native vegetation and forms dense stands in disturbed sites. It has been documented in small populations at Red Lake WMA.

Spotted knapweed is native to Europe and Asia. It threatens dry prairie, oak savannas, and sandy ridges where it is phytotoxic and spreads rapidly. It is known to occur along the periphery of Red Lake WMA, especially in disturbed areas and roads.

Other nonnative species of concern occurring within Red Lake WMA include birdsfoot trefoil (*Lotus corniculatus*), burnet saxifrage (*Pimpinella saxifraga*), common burdock (*Arctium minus*), and stinking chamomile (*Anthemis cotula*). Although these species are not listed on Minnesota's noxious weed list, they do pose threats to native communities.

Birdsfoot trefoil and burnet saxifrage both invade prairies, roadsides, and disturbed open areas. Birdsfoot trefoil forms dense mats that choke and shade out native plants. Birdsfoot trefoil is currently present along roadsides.

Common burdock occurs sporadically. It invades pastures, fields, and other open areas. It produces burs that readily stick to clothing and fur.

Stinking chamomile flourishes in disturbed areas, especially areas that are tilled for agricultural purposes. It forms dense stands, and the finely-divided leaves make it difficult to control with herbicide. Within Red Lake WMA, it is not yet known to invade open areas that are undisturbed.

Other nonnative species that occur on Red Lake WMA include oxeye daisy (*Chrysanthemum leucanthemum*), perennial sow thistle (*Sonchus arvensis*), and smooth brome grass (*Bromus inermis*). These species appear to be present mostly along roadsides and are not posing an immediate threat to habitats within Red Lake WMA.

One species not known to be in Red Lake WMA but that has been found nearby is wild parsnip (*Pastinaca sativa*). This species is of particular concern if it were to establish at Red Lake WMA due to its potential to inflict burns to skin of people that come into contact with the plant's sap. Wild parsnip typically grows in open places such as roadsides, pastures, and disturbed areas.

Aquatic Plants

There are three known invasive aquatic plant species occurring within Red Lake WMA: purple loosestrife (*Lythrum salicaria*), hybrid cattail (*Typha x glauca*), and reed canarygrass (*Phalaris arundinacea*). Each of these species has the potential to negatively impact the quality of wetlands.

Purple loosestrife invades marshes and replaces native species such as sedges, broadleaf cattails, and other wetland plants. It forms dense stands and infested areas become unusable to native wetland animals including ducks, geese, rails, bitterns, muskrats, frogs, toads, and turtles. It is known to occur sporadically on ditch grades. Hybrid cattail has been found along watercourses at Red Lake WMA. Reed canarygrass is present throughout Red Lake WMA in many wetlands. It is a major threat to wetland

habitats as it often outcompetes native species by forming dense stands. Invasion by reed canarygrass is generally associated with disturbance.

Invasive aquatic plants that are not known to exist on Red Lake WMA but would likely have negative impacts if introduced include Eurasian watermilfoil (*Myriophyllum spicatum*), curly-leaf pondweed (*Potamogeton crispus*), non-native phragmites (*Phragmites australis subsp. australis*), and starry stonewort (*Nitellopsis obtuse*).

Fish and Wildlife Disease and Parasites

A variety of wildlife diseases threaten wildlife populations that use Red Lake WMA, and a variety of disease and parasite outbreaks have the potential to impact wildlife populations on Red Lake WMA. Disease responses will vary depending on the scale and causative agent of the outbreak, and all actions are closely coordinated with other DNR divisions, FAW's wildlife health program, and partners (state, federal, and tribal agencies) as appropriate.

Waterfowl Diseases

Waterfowl are susceptible to several infectious diseases that cause mortality including avian cholera, avian botulism, avian tuberculosis (TB), avian salmonellosis, chlamydiosis, duck plague, aspergillosis, and avian influenza. A common denominator among outbreaks is a concentration of waterfowl, and often poor water quality. Avian salmonellosis and aspergillosis also infect songbirds, but the source of these outbreaks is usually moldy, contaminated food at feeders, which also serve as the requisite concentration point.

Chronic Wasting Disease

CWD is a contagious neurological disease affecting cervid species, including white-tailed deer, elk, and moose. It causes a characteristic spongy degeneration of the brains of infected animals resulting in emaciation, abnormal behavior, loss of bodily functions, and death. As of the writing of this plan, no CWD has been detected on Red Lake WMA or within DPA 111.

Mange

Mange, particularly sarcoptic mange, is a disease transmitted by mites, and affects mainly canids (wolves, foxes, coyotes), but also bears, raccoons, porcupines, and some rabbits and squirrels. The mites are transferred from one individual to another through direct contact or transfer at den sites. The disease causes hair loss, and in some cases the exposed skin becomes encrusted or oozes fluids, often resulting in death. Red foxes are particularly susceptible to mange, and thousands can die during an outbreak.

Rabies

Rabies is an acute infectious disease of the central nervous system caused by a virus that is transmitted in saliva through bites. Rabies is most common in raccoons, skunks, bats, and foxes, but can occur in any mammal. Once signs of the illness manifest, rabies is always fatal; however, proper post-bite treatment is nearly 100% effective in preventing onset. Rabies outbreaks in the wild can be controlled by oral vaccinations in food items left out for consumption, but this is difficult and expensive.

White Nose Syndrome

In 2017, White Nose Syndrome (WNS), a fungus affecting hibernating bat species, was confirmed in multiple locations in Minnesota. This fungus causes significant mortality in bats. All sites surveyed in southeast Minnesota in 2017 were positive for WNS. The extent of the impact to all bat species occurring in Minnesota is unknown, but dramatic declines are expected based on population trends in other states where WNS has been confirmed. Northern long-eared bats have been hit particularly hard by WNS. As a result, the USFWS recently changed the designation from threatened to endangered, and it is currently listed as special concern in Minnesota.

The Lake States Forest Management Bat Habitat Conservation Plan (Bat HCP) was created to provide flexibility to the DNR to do management work in forested habitats while addressing federal Endangered Species Act regulations related to federally threatened and endangered bat species.

Currently, there are no known bat hibernacula on Red Lake WMA. If any were to be discovered, entry to the hibernacula would be restricted so as not to introduce WNS or cause undue disturbance to hibernating animals, and EWR staff would be consulted.

Bovine Tuberculosis

Bovine TB is an infectious disease caused by the bacterium *Mycobacterium bovis* that is transmitted by the exchange of respiratory secretions between infected and uninfected animals. Thus, transmission is a function of inter-deer-proximity which is a function of white-tailed deer density. Transmission is also a function of interactions with domestic cattle. Although bovine TB transmission to humans is unlikely, in Michigan it has been transmitted to omnivores and carnivores such as black bear, raccoon, coyote, bobcat and red fox. A TB infection area involving deer and cattle about 18 miles west of the Red Lake WMA boundary was a DNR management focus from 2005-2013. Bovine TB was never found on Red Lake WMA.

West Nile Virus

West Nile Virus is a mosquito-borne virus that can kill some birds (particularly waterfowl, ruffed grouse, crows, and jays) and mammals (including elk and moose). The disease was found in 71% of elk tested from the Grygla herd in northwest Minnesota from 2004-2009.

Eastern Equine Encephalitis

Eastern equine encephalitis is another mosquito-borne virus that can kill mammals and is a greater mortality threat for most species than is West Nile Virus. It has been detected in 13.6% of elk tested from the Grygla herd in northwest Minnesota from 2004-2009.

Mycobacterium Paratuberculosis

Mycobacterium paratuberculosis is a disease of ungulates, including elk and moose, that causes poor body condition and can lead to death. It was found in 29% of elk tested from the Grygla herd in northwest Minnesota from 2004-2009.

Forest Health

Introduction

The largest threats to forest health on Red Lake WMA are driven by weather and climate, and there are several immediate and future threats to Red Lake WMA's forests on the horizon. Some disturbances related to forest health impacts may provide important habitat benefits to wildlife; however, impacts to Red Lake WMA and the landscape as a whole, including other ownerships and land administrations, will be carefully considered when making management decisions.

On an individual scale, trees have a finite age limit. As many trees grow older, environmental and biotic stressors can combine to reduce the fitness of individual trees. This decline in health can be associated with a variety of opportunistic insect species and diseases but can also provide habitat benefits to many wildlife species.

Aspen Health

Aspen and mixed deciduous forest provides valuable habitat for a variety of species on Red Lake WMA.

Spongy moth is a threat to aspen forest health in Minnesota. It currently has not been recorded in northwest Minnesota; however, there could be forest health issues at the local or stand level in the future.

A variety of stem canker diseases can kill aspen, the most common one being hypoxylon canker. Hypoxylon canker can reduce the number of stems in younger aspen forests. In rare circumstances, an aspen forest is extremely susceptible to hypoxylon canker and tree density diminishes considerably.

Forest tent caterpillar (FTC) is a native defoliator of a wide variety of deciduous trees and shrubs and can be found throughout most deciduous forests in North America. FTCs are native insects and play critical roles in structuring aspen mixed-wood forests and can change forest stand dynamics, which can potentially benefit certain wildlife species. However, managers should also take into account that defoliation can stress trees, especially when consecutive, heavy defoliation occurs during populations outbreaks.

Ash Health

Black ash forests cover vast lowland areas of Red Lake WMA. In certain NPCs, black ash is the only native tree species that grows well. Loss of ash in these forests could result in the conversion of forest habitat to open wetlands.

Emerald ash borer (EAB) is a non-native phloem and cambium feeder of ash trees. Typically, when EAB is discovered in a new location, it continues to spread as habitat allows. As of March 2023, EAB has been identified approximately 140 miles from Red Lake WMA. EAB adults move about 0.5-1.0 mile per year naturally, so it could take up to 350 years for EAB to reach Red Lake WMA. However, spread could happen more quickly if infested material is moved across the landscape by humans.

Tamarack Health

Since 2001, at least 60% of Minnesota's tamarack forest has been impacted by eastern larch beetle (ELB), a native bark beetle. Historically, ELB operated in periodic cyclical outbreaks; however, the current outbreak is mediated by longer growing seasons, which have increased reproductive success and allowed populations to increase more quickly than in the past. It shows no signs of abating. At some point, most of Red Lake WMA's mature tamarack will likely be impacted by ELB. Some stands that were severely impacted have naturally regenerated, and recent research by the DNR and University of Minnesota indicate that many tamarack stands affected by ELB are capable of natural regeneration with tamarack as well as other tree species (Shaunette, 2022).

Pine Health

Pine bark beetles (*Ips* genus) are native to Minnesota and occur naturally throughout the state. These beetles are attracted to areas of stressed pines, as these trees provide ideal habitat for larvae. Dense, single-species stands tend to be more susceptible to the effects of outbreaks. Evidence of beetle exit holes are evident on almost every mature red pine tree within Red Lake WMA. Beetle larvae provide an excellent food source for many woodpecker species. Black-backed and three-toed woodpeckers, among other species, are well documented to utilize pine stands that are infected with beetle larvae.

Mountain pine beetle (*Dendroctonus ponderosae*) is a bark beetle native to western North America that has impacted millions of acres of forest in the western United States and Canada. Mountain pine beetle is not known to occur in Minnesota but has been demonstrated to reproduce in logs of all of Minnesota's native pines. As with most specialist insects that can generate dramatic population increases that result in outbreaks, areas in its native range containing monotypes of host species are especially vulnerable to effects.

Diplodia is a genus of fungal diseases that occurs on Red Lake WMA. The fungus causes shoot blight, stem cankers, and collar rot that impacts red pines and other pines to a lesser extent. On Red Lake WMA, *Diplodia* shoot blight has been observed on individual trees, and can cause reduced growth and tree mortality. In red pine stands infected with *Diplodia,* natural regeneration is possible; however, recruitment of seedlings infected with *Diplodia* is lower than in stands without *Diplodia*.

Spruce Health

Eastern spruce dwarf mistletoe (*Arceuthobium pusillum*, ESDM) is a native plant that is an obligate parasite of black spruce throughout its range. It causes large witches' brooms and kills spruce, often within 20 years of infection. ESDM most commonly infects black spruce stands, but white spruce and balsam fir are also highly susceptible. However, it is not as common on white spruce because they rarely occur in pure stands. Other conifers can be hosts of ESDM, but they are usually only infected when growing near infected spruce. ESDM is common in Minnesota – evidence of ESDM infection was found in 56% of 196 stands surveyed in Minnesota (Hanks, Hooten, M.B., & Baker, F.A., 2011).

Mistletoe seeds are explosively discharged from ripe fruits in August and September, and they can travel as far as 55 feet, although most land within 5 feet. Seeds can also stick to the bodies of animals and may be carried to trees at greater distances, potentially starting new infection centers. New infections are invisible, or latent, for two or more years before visible symptoms form and tend to spread radially, forming circular pockets that influence habitat in spruce stands (Gray, Russel, Babcock, & Windmuller-Campione, 2022). The effects on habitat can be so pronounced that mistletoe has been proposed as keystone species because of the impact on the nesting rates of native birds (Watson,

2001). DNR research has also shown that mistletoe brooms can be important habitat for pine martens that use them for thermal refugia and resting sites (Joyce, 2013).

Human Activities

Red Lake WMA is an important public land unit in northwest Minnesota and provides multiple opportunities for recreation. Red Lake WMA will continue to support its mission of protecting and managing the land for wildlife production and for hunting, fishing, and trapping opportunities. It is expected that other users may seek to use and enhance the area for other recreational activities. These activities may be allowed or implemented based on their compatibility with the primary purpose of Red Lake WMA.

Regulated hunting, fishing, and trapping are not a threat to habitat or wildlife populations. Taking of animals or plants beyond the legal allowances could threaten habitat and wildlife.

Operational Context

Administrative and Fiscal

Red Lake WMA is managed by the Section of Wildlife, within the DNR's Fish and Wildlife Division, and is in the DNR's northwest region. WMA operations are funded primarily through the Game and Fish Fund, which is supported by the sale of hunting, fishing, and trapping licenses and federal Wildlife and Sport Fish Restoration grants. These grants are funded through surcharges on hunting and fishing equipment. Game and Fish funding is used primarily to cover salary and operational costs. Some wildlife management projects on Red Lake WMA are funded through dedicated wildlife accounts (e.g., white-tailed deer, black bear), and other sources of project funding include the Minnesota Outdoor Heritage Fund, or other grant funding, such as the Competitive State Wildlife Grant and Legislative-Citizen Commission on Minnesota Resources. Most project funding comes from the Beltrami Island Fund, which is funded through timber sale receipts on LUP lands. Additional project funding may be brought to Red Lake WMA through partnerships. Partnering organizations can apply for grants and help administer habitat projects on Red Lake WMA to achieve combined organizational and resource goals.

Staffing

The Red Lake WMA staffing plan consists of one area manager, one assistant area manager, one technician, and one office and administrative assistant (OAS) that is shared with Baudette Wildlife. Staffing is also provided in part by Baudette Wildlife since a portion of Red Lake WMA is within the Baudette Wildlife administrative area. Baudette Wildlife staff consists of one area manager and one assistant manager. Staffing levels are a factor in implementing plan strategies and how priority work is accomplished.

Partnerships

Partnerships with outside groups have been important for Red Lake WMA in the past, and this is expected to continue into the future. In the past, non-profit groups have assisted with everything from building and facility maintenance to habitat improvement projects. Partnerships with these groups is important and helps the DNR leverage resources to achieve outcomes that would not otherwise be possible.

Operational Orders, Policies, Guidelines, and Directives

DNR operational orders define the internal management of the department. Policies, guidelines, and directives are tools used to further define the ways that specific work is undertaken on state lands. Periodic review and updating of existing guidance documents occur, and new documents are developed as new policy needs are identified.

Interdisciplinary Coordination

FAW Red Lake WMA and Baudette Wildlife staff participate in annual forest resource management coordination meetings with the Forestry Division (FOR) and EWR. In addition to these annual standing meetings, Red Lake WMA staff work in close coordination with other divisions continuously throughout the year. Red Lake WMA and Baudette Wildlife staff also communicate with the regional management team on WMA issues as they arise.

Desired Conditions

The desired conditions for Red Lake WMA are grouped under two goals: Goal 1) Maintain or enhance wildlife habitat and biodiversity, and Goal 2) Maintain and increase compatible outdoor recreational opportunities. Habitat goals for the 10 years outlined in this plan are described using NPC ecological systems and priority management areas have been identified. Each NPC and priority management area contains specific management objectives and strategies for achieving the desired outcomes. While habitat goals over the next 10 years will be pursued in acreages or percentages, it is important to note that exact habitat goals may not be reached due to environmental conditions, catastrophic natural events, climate change and other factors that are outside DNR's span of control.

Goal 1. Maintain or enhance wildlife habitat and biodiversity.

All Habitat Types

Habitats in Red Lake WMA are recognized as vitally important for sustaining wildlife populations and biological diversity in northern Minnesota. Many habitats in Red Lake WMA require active attention and management to maintain appropriate amounts and successional states and to sustain them in healthy condition over time. Treatments require an adaptive management approach as prescriptions are developed, results are evaluated, and follow-up treatments are designed.

Forest stands are included in the DNR's forest modeling and planning processes, so that timber harvest can be used as a tool to advance goals that include sustaining diverse age classes and habitat types across the landscape. Timber harvest can be used to advance stand-level wildlife management objectives such as diversifying planted red pine stands, increasing the amount of mast-producing oak, or regenerating jack pine communities to support game species such as spruce grouse. Other site level interventions may include invasive species treatments with herbicides, mechanical cutting, and prescribed burning. Prescribed fire and brush mowing may be used to maintain open habitats or to reduce invasive species presence and prevalence.

We will make management decisions to protect threatened and endangered species and support rare species and habitats. Endangered species impacts are considered before the implementation of individual management actions, including burn plans. Individual management actions will align with requirements for protection of endangered species and will follow the guidelines developed in the Bat HCP.

One of the tools used to develop yearly Red Lake WMA-specific work plans is DNR's annual stand exam list process. The annual stand exam lists for fiscal years shown in Table 11 were identified using modelling criteria developed by FAW as part of DNR's most recent 10-year forest modeling effort. These stands will be field visited and will serve as the starting point for meeting the habitat goals

outlined in this plan (Table 12). DNR intends to conduct another 10-year forest modeling effort that will identify stands for examination and potential treatment beginning with fiscal year 2029.

It is important to note that this plan uses both stand and NPC growth stage to describe forested habitats. It is also important to note that stand age and NPC growth stage are not necessarily equivalent. The annual stand list will identify, for example, a 65-year-old aspen stand for field review. Field review will identify NPC type (or types) and growth stage (or growth stages) present in that stand. stage The NPC growth stage percentages in the section that follows identify opportunities to move a stand or portions of a stand in a desired direction. They are not intended to be used as blanket prescriptions.

Upon field examination, management actions selected may include timber harvest, but other forest management actions such as no treatment, prescribed burning, understory planting, thinning, seeding, or scarification can also be used to meet the goals of this plan. In selecting among potential management actions, considerations will include effectiveness in achieving goals, available resources, and specific local conditions and spatial considerations.

Table 12. Red Lake WMA stand examination acres for fiscal years 2024-2028

Modeled Cover Types	Number of Stands	Total Acres
Ash/lowland hardwoods	1	7
Aspen/balsam poplar – high site	4	53
Aspen/balsam poplar – low site	8	127
Balsam fir	18	620
Birch	5	70
Black spruce lowland – high site	15	155
Black spruce lowland – low site	30	1,063
Black spruce lowland – medium site	36	1,063
Jack pine	6	11
Red pine – plantation	2	90
Tamarack – high site	57	1,888
Tamarack – low site	114	9,779
White spruce	7	35
Total	**303**	**14,962**

Management Objective 1.1: Provide a range of wildlife habitat conditions, forest habitats, and successional stage coverage across Red Lake WMA.

- Pursue specific NPC-informed habitat management objectives and strategies below by evaluating all stands on Red Lake's 10-year exam list to meet habitat objectives identified below and consider annual plan additions (APAs) when necessary to meet habitat goals.
- Utilize NPC data for Red Lake WMA and verify NPC site level classification while developing management prescriptions.
- When addressing management objectives, preferentially locate desired habitat conditions for early and mixed successional game species where habitat and access conditions are conducive (typically near existing road and trail systems), while managing contiguous blocks of interior habitat for wide-ranging species.
- Intentionally conduct active management in areas and configurations to provide optimal wildlife habitat including for species that need large blocks of contiguous forest and older forest habitat, as well as species that need mixed-age and young forest habitats in close proximity.
- Utilize active site-level management approaches to contribute toward desired landscape level habitat conditions and complement related landscape plans (NMOP SFRMP, LUP CCMP, One Watershed, One Plan [1W1P], etc.).
- Evaluate primary forest to determine appropriate management direction, including old-growth or lowland conifer old-growth designations.

Management Objective 1.2: Diversify wildlife habitat types at multiple spatial scales to increase resistance and resilience to current and potential environmental stressors.

- Incorporate concepts from resilience, resistance, and facilitation strategies to sustain habitats in the face of climate change.
    - Apply strategies from the Northern Institute of Applied Climate Science (NIACS) to address current and future habitat impacts from climate change.
- Take initial steps to diversify existing habitats to enhance their resistance and resilience to potential forest health issues before infestation occurs.
- Consult NPC tree suitability data and NIACS climate change projections when planning habitat projects.
- Proactively control existing populations of invasive species and prevent the introduction of new species and populations.
    - Prioritize control of common tansy, spotted knapweed, and Siberian peashrub through spot treatments.
    - Continue to monitor for new occurrences of wild parsnip within Red Lake WMA and prioritize its control if detected.

- Coordinate with other land managers to identify and treat invasive species infestations to ensure that efforts are not duplicated (e.g., coordinating invasive species treatments in gravel pits, where infestations are common).
- Work with agency partners to find new and creative strategies for invasive species control.

Management Objective 1.3: Restore hydrologic function of Red Lake WMA, with special focus in the lowland forests and peatlands.

- As per DNR policy, follow Minnesota Forest Resources Council (MFRC) forest management guidelines for riparian management zone (RMZ) best management practices.
- Work with hydrological experts within the DNR, Red Lake Nation, local watershed districts, and other partners to prioritize and implement habitat restoration projects.
    - Several priority areas (Spring Fen, Blanchard Road) have been identified as supporting this objective.
        - Consideration will be given to areas where roads, ditches, or spoil banks impede overland or groundwater flow.
        - Other opportunities will be explored, especially along the Rapid River and the oxbow forest communities that are unique on Red Lake WMA.
- If culverts along the southernmost 800 feet of the Spina Road wash out, consider alternatives that improve hydrologic function, including foot bridge installation and removing this last portion of the road.
- When appropriate based on the NPC, utilize opportunities to increase conifer coverage in order to increase evapotranspiration, and increase water retention times, especially in riparian areas.

Management Objective 1.4: Preserve and perpetuate the rare plant and animal species known to occur in Red Lake WMA.

- Conduct Natural Heritage Information System review before implementing any projects, operational actions, or special events.
- Document and verify rare species locations.
- Work with FAW wildlife research and EWR to develop monitoring protocols for priority species.

Management Objective 1.5: Provide both summer and winter habitat needs by increasing the amount of spruce and fir within stands.

- Maintain conifer and deciduous species in close proximity, both within stands and between stands, through harvest design, underplanting, seeding, and management timing, including deferrals or early harvest.
- Increase conifer coverage within stands when possible.

Mesic Hardwood Forests

Management Objective 1.6: In MHn44 (Northern Wet-Mesic Boreal Forest), manage for wildlife species including white-tailed deer, ruffed grouse, cavity-dependent birds, northern long-eared bats, fishers, pine marten, woodcock, snipe, and blue-spotted salamanders by increasing under-represented habitat components characteristic of diverse later-successional habitats.

Tree Species Composition

- Increase white spruce, white pine, and balsam fir acreage in MHn44 sites from 2,449 acres to 3,000 acres through management, including deliberate leave tree selection, partial harvest, and seeding or planting projects.
- Maintain or increase the coverage of mixed aspen/spruce/fir stands through management timing, including early harvest, harvest design, underplanting, and seeding.

Growth Stage Conditions

- Decrease the amount of MHn44 habitats in the young growth stage condition (0-35 years) from 57% to 47%.
- Increase the amount of MHn44 habitats in the transition growth stage condition (35-95 years) from 32% to 37%.
- Increase the amount of MHn44 habitats in the mature growth stage condition (95-195 years) from 10% to 15%.
- Silvicultural practices, including but not limited to even-aged, uneven-aged, and partial harvesting, will be applied on a case-by-case basis to promote these desired conditions.
- When harvesting to meet these conditions, choose a diversity of aspen stand ages to replenish younger stands growing into moderate-aged classes and to allow some stands or portions of stands to grow into older classes.

Habitat Structure and Context

- Maintain large cavity trees for waterfowl nesting near watercourses.
- Locate aspen clearcuts near white-tailed deer wintering areas.
- Maintain a component of large diameter cavity trees, as aspen is shown to be a preferred cavity tree for multiple game and non-game species alike.
- Consider early harvest of aspen with a goal of reducing age class imbalances and re-establishing diverse forest stands.

Management Objective 1.7: In MHn46 (Northern Wet-Mesic Hardwood Forest), manage for wildlife species including bald eagles, ospreys, fishers, pine marten, cavity-nesting waterfowl

including wood ducks and goldeneyes, and overall aesthetics by favoring white spruce and elm in management decisions.

Tree Species Composition

- Increase white spruce, white pine, birch, and elm acreage in MHn46 sites through management, including deliberate leave tree selection, partial harvest, and seeding or planting projects.
    - Currently only 4 acres of this habitat is categorized as white spruce, white pine, or birch, but 231 acres are typed as "other" (i.e., cover types not expected in this habitat).
    - Prioritize acreage of "other" cover types for a conversion to white pine, white spruce, and birch during stand examination (42 out of 51 acres on the 10-year exam list in MHn46 are typed as "other" cover types).
- Maintain or increase the coverage of mixed aspen/spruce/fir stands through management timing, including early harvest, harvest design, underplanting, and seeding.

Growth Stage Conditions

- Decrease the amount of MHn46 habitats in the young growth stage condition (0-35 years) from 55% to 45%.
- Increase the amount of MHn46 habitats in the transition growth stage condition (36-95 years) from 18% to 23%.
- Increase the amount of MHn46 habitats in the mature growth stage condition (>95 years) from 27% to 32%.
- Silvicultural practices, including but not limited to even-aged, uneven-aged, and partial harvesting, will be applied on a case-by-case basis to promote these desired conditions.
- When harvesting to meet these conditions, choose a diversity of aspen and "other" stands ages to replenish younger stands growing into moderate-aged classes and to allow some stands or portions of stands to grow into older classes.

Habitat Structure and Context

- Confirm NPC classification for the handful of MHn46 stands that have been identified on Red Lake WMA.
- Take into consideration forest health concerns, such as Dutch elm disease, associated with growing elm into later successional stages.

Floodplain Forests

Management Objective 1.8: In FFn57 (Northern Terrace Forest), maintain and enhance intact riverine habitats that protect forest resources and water quality, increasing under-represented habitat components characteristic of diverse later-successional habitats.

Tree Species Composition

- Maintain or increase aspen, oak, basswood, elm, and white spruce acreage in FFn57 sites at or above 766 acres through management, including deliberate leave tree selection, partial harvest, and seeding or planting projects.
- Maintain or increase the coverage of mixed stands through management timing, including early harvest, harvest design, underplanting, and seeding.

Growth Stage Conditions

- Decrease the acreage of FFn57 sites in the young growth stage (0-55 years) from 29% to 19%.
- Decrease the acreage in the transition growth stage (55-95 years) from 27% to 22%.
- Increase the acreage in the mature stage (>95 years) based on what becomes available from the earlier age classes.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a wide variety of aged stands to replenish younger stands, but prioritize stands in the transitional and young growth stage, and allow some stands to reach the mature growth stage.

Habitat Structure and Context

- Increase oak and basswood components to maximize oak mast production for mast dependent species, including black bear, wood duck, raccoon, and flying squirrels.
- Maintain and improve travel corridors to benefit wildlife species with large home ranges, including fishers, pine marten, and semi-aquatic furbearers.
- Maintain and restore ephemeral wetlands, isolated oxbow habitats, and riverine-associated wetlands to benefit waterfowl broods, amphibian breeding habitat, and semi-aquatic furbearers.
- Manage for cavity-nesting waterfowl and bats by retaining larger diameter aspen and other trees with natural cavities.
- Maintain and enhance bank stabilization by preserving or protecting riparian areas.
- Consider benefits of increasing conifer coverage in a floodplain habitat for increased evapotranspirative capacity and flood reduction, but not at the expense of mast producing

trees, and while recognizing that basswood, elm, and silver maple are unique on Red Lake WMA in this area.
- Assist transition of existing ash stands to other lowland hardwoods, including silver maple.

Wet Forests

Management Objective 1.9: In WFn53 (Northern Wet Cedar Forest), manage for orchids and wildlife species including lynx, spruce grouse, black bear, white-tailed deer, golden crowned kinglets, olive-sided flycatchers, snowshoe hares, pine marten, fishers, and gray jays by increasing under-represented habitat components characteristic of diverse early-successional habitats, particularly white cedar.

Tree Species Composition

- Maintain or increase birch, black spruce, and balsam fir acreage in WFn53 sites at or above 992 acres through management, including deliberate leave tree selection, partial harvest, and seeding or planting projects.
- Increase within stand diversity through management timing, including early harvest, harvest design, underplanting, and seeding by focusing management activities in "other" cover types.

Growth Stage Conditions

- Increase the acreage of WFn53 sites in early stages (0-55 years) from 24% to 29%.
- Maintain the acreage of WFn53 sites in early transitional stages (55-75 years) at or around 12%.
- Increase the acreage in mature stages (75-105 years) from 8% to 13%.
- Decrease the acreage in late-transitional stages (105-155 years) from 33% to 28%.
- Decrease acreage in old stages (>155 years) from 23% to 18%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, gap harvest, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus harvest in early-transitional, late-transitional, and old growth stages.

Habitat Structure and Context

- Maintain white cedar for white-tailed deer winter cover and orchid habitat, especially when in close proximity to young deciduous stands.
- Explore potential benefits of replicating historic disturbance regimes, which were typically small-scale disturbances.

Management Objective 1.10: In WFn55 (Northern Wet Ash Swamp), manage for uncommon or rare plants and wildlife species including moose, lynx, ruffed grouse, black bear, white-tailed deer, golden crowned kinglets, olive-sided flycatchers, and gray jays by implementing practices to sustain and diversify the forest communities where ash is present.

Tree Species Composition

- Decrease ash acreage in WFn55 sites from 1,605 to 1,505 acres through management, including deliberate leave tree selection, partial harvest, and seeding or planting projects.
- Increase aspen, birch, balsam fir, tamarack, black spruce, and white cedar acreage in WFn55 sites from 2,858 to 2,958 acres.
- Increase diversity through underplanting, seeding, and heterogenous harvest design wherever possible to proactively counteract anticipated ash decline.

Growth Stage Conditions

- Decrease the acreage of WFn55 sites in early successional stages (0-75 years) from 68% to 58%.
- Increase the acreage of WFn55 sites in the transitional successional stage (75-195 years) from 32% to 41%.
- Maintain the acreage of WFn55 sites in the mature growth stage (>195 years) near 1%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus harvest in the mature successional stage.
- Focus harvesting in “other” cover types and reserve tree species desired to increase.

Habitat Structure and Context

- If implementing partial harvests (such as gaps) to reduce ash coverage, maintain or develop uneven-aged forest conditions to avoid negative hydrologic change (swamping).
- Explore opportunities for resistance and resilience climate change strategies and look for opportunities to emulate strategies outlined by the U.S. Forest Service (USFS) and others (Palik, Clark, D'Amato, Swanston, & Nagel, 2022).

Management Objective 1.11: In WFn64 (Northern Very Wet Ash Swamp), manage for wildlife species including cavity-nesting waterfowl, rose breasted grosbeaks, Baltimore orioles,

hibernating black bear, wood frogs, pine marten, pileated woodpeckers, snipe, and bald eagles by supporting management that is consistent with FAW ash management guidelines.

Tree Species Composition

- Where present, increase balsam fir, birch, tamarack, white cedar, and white spruce acreage in WFn64 from 119 to 130 acres through planting, seeding, girdling, felling, or other experimental or management techniques designed to prevent swamping.
- Decrease ash coverage wherever feasible.

Growth Stage Conditions

- Increase the acreage of WFn64 sites in early successional stages (0-75 years) from 32% to 37%.
- Increase the acreage of WFn64 sites in the transitional successional stage (76-135 years) from 20% to 25%.
- Decrease the acreage of WFn64 sites in the mature growth stage (>135 years) from 48% to 38%.
- To remain consistent with FAW ash management guidelines, these growth stage conditions will be achieved through silvicultural practices including planting, seeding, girdling, felling, or other experimental or management techniques designed to prevent swamping.

Habitat Structure and Context

- Explore opportunities to develop and implement new strategies and new research as they become available, especially guidelines developed by USFS forest scientists, including Brian Palik.
- Verify NPC coverage to determine if there are inclusions of other NPCs within WFn64 stands that could be managed to meet the objectives of other NPCs, especially WFn55 inclusions.
- Promote techniques including underplanting, seeding, and hand felling, prioritizing the maintenance of local hydrologic conditions.
- Support community growth stage distribution changes that occur mostly through natural disturbance regimes.

Fire-Dependent Forests and Woodlands

Management Objective 1.12: In FDn12 (Northern Dry-Sand Pine Woodland), manage for wildlife species including white-tailed deer, black bear, pine marten, fishers, spruce grouse, ruffed grouse, black-backed woodpeckers, blue-headed vireos, dark-eyed juncos, red-breasted nuthatches, eastern wood-pewees, cedar waxwings, white-winged crossbills, whip-

poor wills, olive-sided flycatchers, snowshoe hares, and pine grosbeaks by managing and diversifying conifer stands.

Tree Species Composition

- Maintain the 446 acres of red pine currently in FDn12 sites but look for opportunities to increase within stand diversity (jack pine, paper birch, balsam fir) through management, primarily through thinning harvest, but also through deliberate leave tree selection, partial harvest, and seeding or planting projects.
- Maintain the 1,434 acres of jack pine currently in FDn12 sites and consider increasing within stand diversity (red pine, paper birch, balsam fir) depending on site level conditions and management objectives (e.g., spruce grouse management objectives).

Growth Stage Conditions

- Decrease the acreage of FDn12 habitats in young growth stage condition (0-55 years) from 86% to 76%.
- Increase the amount of FDn12 habitats in the transitional growth stage condition (55-75 years) from 7% to 12%.
- Increase the amount of FDn12 habitats in mature growth stage condition (75-195 years) from 7% to 12%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus on on harvest treatments that benefit spruce grouse and increase within stand diversity.
- Carefully maintain early successional jack pine habitats in areas where they are likely to benefit spruce grouse.
- Manage a minimum of eight FDn12 forest stands of at least 220 acres toward components characteristic of mature forest growth stage conditions. Focus efforts where later successional species are already present or where they can be introduced.

Habitat Structure and Context

- Maintain quality early successional jack pine habitats in the spruce grouse priority areas, and in areas where dense winter cover is lacking for species including white-tailed deer and snowshoe hare.
- Use prescribed burns and other means to manage existing early successional and open areas for berry production to benefit black bear.

- Increase age and species diversity within monotypic stands through a variety of methods, including timber harvest, prescribed fire, timber stand improvement, retaining late successional species for seed sources after harvest, and other means.
- Prioritize planted sites for management strategies that will diversify the stand.
- Favor retention of old red pines during harvest and management activities to maintain the availability of those habitat features and forest aesthetics.
- Prioritize natural pine regeneration by retaining seed trees to maintain structural complexity and local tree genetics.

Management Objective 1.13: In FDn32 (Northern Poor Dry-Mesic Mixed Woodland), manage for wildlife species including white-tailed deer, spruce grouse, pine marten, fishers, woodpeckers, and secondary cavity nesters, barred owls, broad-winged hawks, black-throated green warblers, and Blackburnian warblers by maintaining or creating stands that are diverse in species and age.

Tree Species Composition

- Increase birch, white pine, jack pine, white spruce, and black spruce acreage in FDn32 from 7 to 10 acres through silvicultural techniques including gap harvest, partial harvest, and leave tree selection.
- Utilize techniques that will increase within stand diversity.

Growth Stage Conditions

- Decrease the number of FDn32 habitats in the early successional stage (0-55 years) from 41% to 36%.
- Decrease the number of FDn32 habitats in the transitional successional stage (56-95 years) from 48% to 43%
- Increase the number of FDn32 habitats in the mature stages (>95 years) from 11% to 21%.
- Consider alternative management strategies that maintain or replicate the natural diversity of these stands, such as a variable retention harvest approach.

Habitat Structure and Context

- Consider conversion from aspen cover type, in alignment with the NMOP SFRMP.
- Focus harvesting in “other” cover types and reserve species desired to increase.

Management Objective 1.14: In FDn33 (Northern Dry-Mesic Mixed Woodland), manage for wildlife species including barred owls, black-throated green warblers, Blackburnian warblers, pine warblers, eastern wood-pewee, cavity nesters and secondary cavity users, snowshoe

hares, and spruce grouse by maintaining conifers, mixed stands, and habitat components characteristic of older growth stages.

Tree Species Composition

- Utilize opportunities to increase within stand diversity (paper birch, balsam fir, white spruce, and white pine) in FDn33 habitats from 183 to 210 acres through management, primarily through thinning harvest, but also through deliberate leave tree selection, partial harvest, and seeding or planting projects.
- Maintain the 603 acres of jack pine currently in FDn33 sites and consider increasing within stand diversity (red pine, paper birch, balsam fir) depending on site level conditions and management objectives (e.g., spruce grouse management objectives).
- Utilize techniques that will limit the spread of aspen and reduce aspen coverage.

Growth Stage Conditions

- Decrease the amount of FDn33 habitats in young growth stage condition (0-35 years) from 46% to 41%.
- Decrease the amount of FDn33 habitats in the transitional growth stage condition (36-55 years) from 40% to 35%.
- Increase the amount of FDn33 habitats in mature growth stage condition (56-125 years) from 10% to 15%.
- Increase the amount of FDn33 habitats in old condition (>125 years) from 4% to 9%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus treatments that benefit that can benefit spruce grouse and increase within stand diversity.
- Carefully maintain early successional jack pine habitats in areas where they are likely to benefit spruce grouse.

Habitat Structure and Context

- Maintain quality early successional jack pine habitats in the spruce grouse priority areas, and in areas where dense winter cover is lacking for species including white-tailed deer and snowshoe hare.
- Use prescribed burns and other means to manage existing early successional and open areas for berry production to benefit black bear.
- Increase age and species diversity within monotypic stands through a variety of methods, including timber harvest, prescribed fire, timber stand improvement, retaining late successional species for seed sources after harvest, and other means.

- Prioritize plantations for management strategies that will diversify the stand.
- Favor retention of late successional conifers during harvest and management activities to maintain the availability of those habitat features and forest aesthetics.
- Prioritize natural pine regeneration by retaining seed trees to maintain structural complexity and local tree genetics.
- Manage preferentially for conifers and conifer-dominated stands where appropriate. Management will recognize that aspen is a natural component of early successional FDn33 stands, but management that fundamentally shifts sites toward aspen coverage will be avoided.
- Increase diversity within planted stands through a variety of methods, including timber harvest, prescribed fire, timber stand improvement, and other means.

Management Objective 1.15: In FDn43 (Northern Mixed Mesic Forest), manage to provide a diversity of age and cover types that are appropriate to the NPC.

- Verify occurrences and manage appropriately if presence is verified.
- If determined to be other NPC instead of FDn43, update NPC data accordingly.

Forested Rich Peatlands

Management Objective 1.16: In FPn63 (Northern Cedar Swamp), manage for orchids and wildlife species including boreal chickadees, Connecticut warblers, Nashville warblers, dark-eyed juncos, white-tailed deer, pine marten, snowshoe hares, and spruce grouse by perpetuating white cedar and diverse lowland conifer stands.

Tree Species Composition

- Increase balsam fir and white cedar acreage from 2,461 to 2,700 acres.

Growth Stage Conditions

- Decrease the number of FPn63 sites in the early successional stage (0-55 years) from 14% to 9%.
- Increase the number of FPn63 sites in transitional successional stage (56-115 years) from 20% to 30%.
- Decrease the number of FPn63 mature sites (>115 years) from 66% to 61%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus harvest in stands of “other” cover types and reserve species desired to increase.

Habitat Structure and Context

- Retain reserves of primary forest in stands that are receiving harvest treatment.
- Evaluate primary forest stands for potential lowland conifer old growth designation.
- Focus management activities to increase the proportion of conifers and maintain canopy closure.
- Maintain and enhance white cedar and other conifers to provide winter food and cover for white-tailed deer.
- Actively explore white cedar regeneration techniques to ensure a continued supply of cedar dominated habitats.

Management Objective 1.17: In FPn71 (Northern Rich Spruce Swamp-Water Track), manage for wildlife species including boreal chickadees, yellow-bellied flycatchers, alder flycatchers, Connecticut warblers, Nashville warblers, red-squirrels, pine marten, and spruce grouse by perpetuating black spruce and a variety of lowland conifer species.

Tree Species Composition

- Increase white cedar and black spruce acreage from 5,730 to 6,050 acres.

Growth Stage Conditions

- Maintain the number of FPn71 sites in the early successional stage (0-55 years) at 24%.
- Maintain the number of FPn71 sites in late successional stage (>56 years) at 76%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus harvest in stands of “other” cover types and reserve species desired to increase.

Habitat Structure and Context

- Retain reserves of primary forest in stands that are receiving harvest treatment.
- Evaluate primary forest stands for potential lowland conifer old growth designation.
- Focus management activities to increase the proportion of conifers and maintain canopy closure.
- Actively explore white cedar regeneration techniques to ensure a continued supply of cedar dominated habitats.
- Consider alternative harvest design strategies that benefit Connecticut warblers.

Management Objective 1.18: In FPn73 (Northern Alder Swamp), manage for wildlife species including hawk owls, alder flycatchers, veerys, northern water thrushes, and sharp-tailed grouse by promoting open landscapes and improving water quality.

- Promote open landscapes and early successional brushlands by implementing timber harvest, shearing, mowing, prescribed fire, and other means.
- Avoid adverse impacts to hydrology when planning and conducting habitat projects by following MFRC site level guidelines.

Management Objective 1.19: In FPn81 (Northern Rich Tamarack Swamp-Water Track), manage for wildlife species including boreal chickadees, Connecticut warblers, brown creepers, pine marten, snowshoe hares, bobcats, gray jays, sharp-tailed grouse, and ruby-crowned kinglets by maintaining and renewing tamarack and/or converting these sites to black spruce.

Tree Species Composition

- Increase black spruce acreage from 6,771 to 7,050 acres.
- Maintain white cedar acreage at approximate 1,284 acres.

Growth Stage Conditions

- Maintain the number of FPn81 sites in the early successional stage (currently 34%).
- Maintain the number of FPn81 sites in late-successional stages (currently 66%).
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus harvest in stands of “other” cover types and reserve species desired to increase.
- Retain reserves of primary forest in stands that are receiving harvest treatment Evaluate primary forest stands for potential lowland conifer old growth designation.
- Actively explore white cedar regeneration techniques to ensure a continued supply of cedar dominated habitats.
- Consider alternative harvest design strategies that benefit Connecticut warblers.
- Seek opportunities to increase within stand diversity to mitigate ongoing habitat impacts of the eastern larch beetle, while striving to maintain tamarack as a component of these stands.
- Seek opportunities to restore tamarack and black spruce in open areas.

Habitat Structure and Context

- In brush-dominated areas, manage for open landscapes via timber harvest, shearing, mowing, prescribed burning, or other means.

- Where short-term and long-term habitat benefits can be demonstrated, enhance regeneration of young tamarack stands through focusing harvest on dead tamarack.

Management Objective 1.20: In FPn82 (Northern Rich Tamarack Swamp-Western Basin), manage for wildlife species including boreal chickadees, Connecticut warblers, brown creepers, pine marten, ruby-crowned kinglets, and great gray owls by maintaining and renewing tamarack and/or converting these sites to black spruce and/or white cedar.

Tree Species Composition

- Maintain or increase cedar coverage at or around 346 acres.
- Increase black spruce coverage from 1,852 to 2,052 acres.

Growth Stage Conditions

- Decrease the number of FPn82 sites in the early successional stage (0-55 years) from 45% to 40%.
- Increase the number of mature sites (>55 years) from 55% to 60%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus harvest in stands of "other" cover types and reserve species desired to increase.

Habitat Structure and Context

- Retain reserves of primary forest in stands that are receiving harvest treatment Evaluate primary forest stands for potential lowland conifer old growth designation.
- Seek opportunities to increase within stand diversity to mitigate ongoing habitat impacts of the eastern larch beetle, while striving to maintain tamarack as a component of these stands.
- Where short-term and long-term habitat benefits can be demonstrated, enhance regeneration of young tamarack stands through focusing harvest on dead tamarack.

Acid Peatlands

Management Objective 1.21: In APn80 (Northern Spruce Bog) and APn81 (Northern Poor Conifer Swamp), manage for wildlife species including northern bog lemmings, Connecticut warblers, short-eared owls, and hawk owls.

Tree Species Composition

- Increase the coverage of black spruce, tamarack, and white cedar from 4,414 to 4,500 acres by converting from "other" species.

Growth Stage Conditions

- Decrease the number of APn80 sites in the early successional stage (0-55 years) from 21% to 16%.
- Increase the number of APn80 sites in the mature stages (>55 years) from 79% to 84%.
- Silvicultural practices will be applied on a case-by-case basis to promote these desired conditions, including but not limited to even-aged, uneven-aged, and partial harvesting.
- When harvesting, choose from a variety of age classes to replenish young stands, but focus harvest in stands of "other" cover types, avoid stands of primary origin, and reserve species desired to increase.

Habitat Structure and Context

- Retain reserves of primary forest in stands that are receiving harvest treatment Evaluate primary forest stands for potential lowland conifer old growth designation.
- Where short-term and long-term habitat benefits can be demonstrated, enhance regeneration of young tamarack stands through focusing harvest on dead tamarack.

Management Objective 1.22: In APn90 (Northern Open Bog and APn91 (Northern Poor Fen), protect and restore sensitive acid peatland communities and surface and groundwater resources.

- Maintain natural hydrology whenever possible.
- Work with partners to identify and implement opportunities to restore hydrology, restore peatland habitats, and improve water quality.
- Avoid new impoundments and structures that alter hydrology or impede overland flow.
- Avoid or minimize impacts from vehicular access for management.
    - Avoid construction of new management accesses.
    - Minimize use of established management accesses.
    - Work to eliminate management accesses on sensitive habitat by seeking alternative routes through less sensitive habitats wherever possible.
- Where appropriate, reset succession for openland species through mowing, burning, or shearing.

Open Rich Peatlands

Management Objective 1.23: In OPn81 (Northern Shrub Shore Fen), OPn91 (Northern Rich Fen-Water Track), and OPn92 (Northern Rich Fen-Basin), protect and restore sensitive open peatland communities and surface and groundwater resources.

- Maintain natural hydrology whenever possible.

- Work with partners to identify and implement opportunities to restore hydrology, restore peatland habitats, and improve water quality.
- Avoid new impoundments and structures that alter hydrology or impede overland flow.
- Avoid or minimize impacts from vehicular access for management.
    - Avoid construction of new management accesses.
    - Minimize use of established management accesses.
    - Work to eliminate management accesses on sensitive habitat by seeking alternative routes through less sensitive habitats wherever possible.
- Where appropriate, reset succession for openland species through mowing, burning, or shearing.

Wet Meadow/Carr

Management Objective 1.24: In WMn82 (Northern Wet Meadow/Carr), manage for wildlife species including sharp-tailed grouse, sandhill cranes, yellow rails, northern harriers, and short-eared owls by protecting and restoring sensitive open wetland communities.

- Maintain natural hydrology whenever possible.
- Work with partners to identify and implement opportunities to restore hydrology and improve water quality.
- Avoid new impoundments and structures that alter hydrology or impede overland flow.
- Avoid or minimize impacts from vehicular access for management.
    - Avoid construction of new management accesses.
    - Minimize use of established management accesses.
    - Work to eliminate management accesses on sensitive habitat by seeking alternative routes through less sensitive habitats wherever possible.
- Where appropriate, reset succession for openland species through mowing, burning, or shearing.

Marshes

Management Objective 1.25: In MRn83 (Northern Mixed Cattail Marsh) and MRn93 (Northern Bulrush-Spikerush Marsh), protect and restore sensitive open wetland communities.

- Maintain natural hydrology whenever possible.
- Work with partners to identify and implement opportunities to restore hydrology, restore wetland/openland habitats, and improve water quality.
- Avoid new impoundments and structures that alter hydrology or impede overland flow.
- Avoid or minimize impacts from vehicular access for management.

- Avoid construction of new management accesses.
- Minimize use of established management accesses.
- Work to eliminate management accesses on sensitive habitat by seeking alternative routes through less sensitive habitats wherever possible.

- Where appropriate, reset succession for openland species through mowing, burning, or shearing.

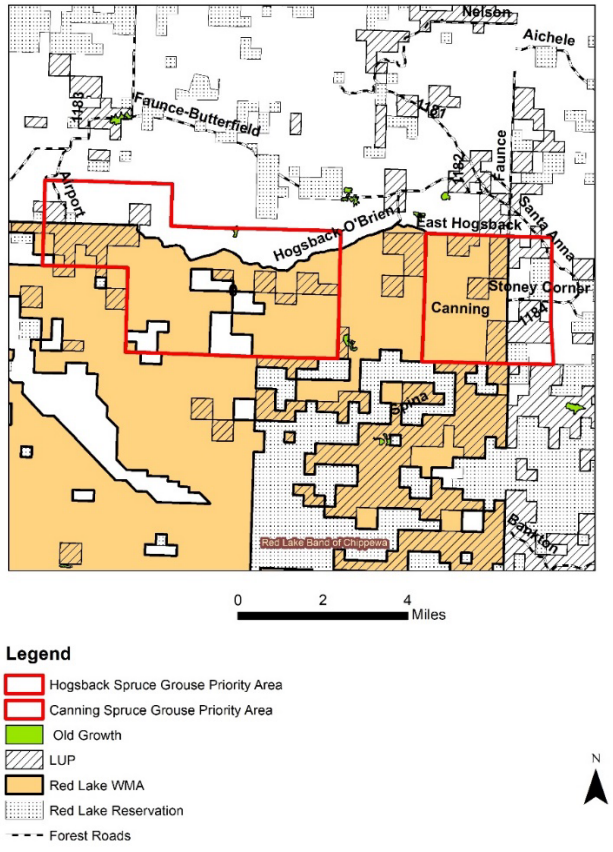
Priority Areas

Priority areas describe locations having particular management focus. Seven priority areas are identified in this plan and described below.

Spruce Grouse Priority Areas

Spruce grouse priority areas will be situated in areas readily accessible to the public and where management will intentionally benefit spruce grouse, including research, and potentially provide areas suitable for interpretation of habitat work (Figure 11).

Figure 11. Spruce grouse priority areas at Red Lake WMA



Management Objective 1.26: Increase the quality and amount of spruce grouse habitat wherever spruce grouse habitat exists within Red Lake WMA, but with a targeted emphasis in the spruce grouse priority area.

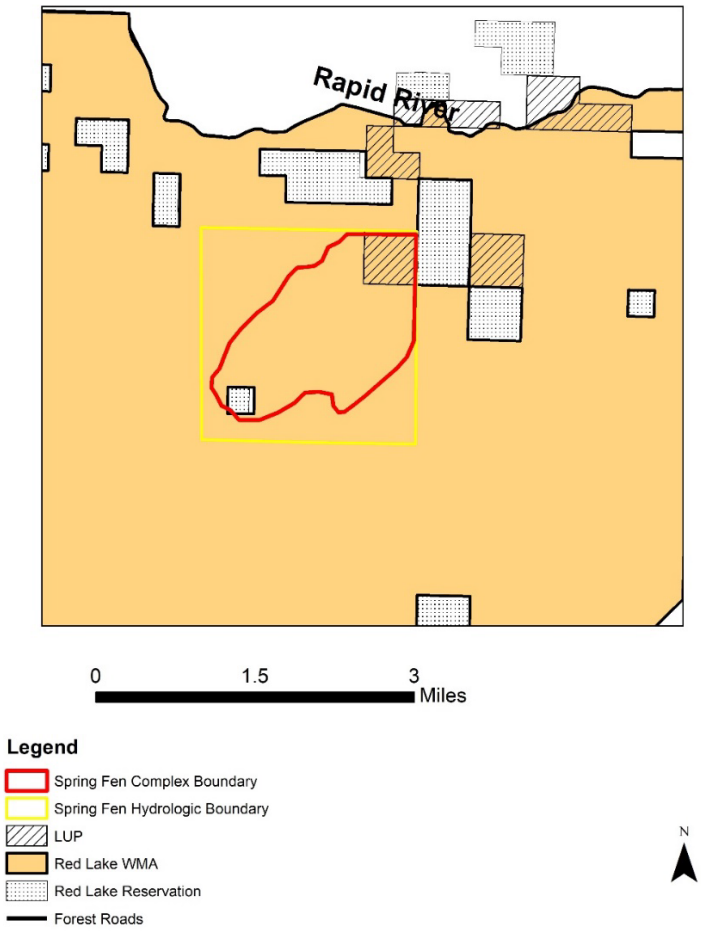
- Maintain dense stands of jack pine.
- Manage planted pine stands toward diverse pine communities that have thick and diverse understories.
- Rotate harvest of jack pine stands around stands of later successional conifers.
- Manage some stands of longer-lived conifer species for longer retention times and manage stands in ways that increase diversity and density of conifer species in the understory.
- In jack pine stands, promote clearcut harvest in stands with sparse overstory structure, and promote post-harvest treatments that ensure dense regeneration of jack pines and limit deciduous encroachment.
- Manage stands dominated by long-lived conifer (white pine, red pine, and white spruce) via thinning and timber stand improvement projects to increase within stand age and species diversity.
- Stimulate dense understory regeneration through thinning treatments and post-thinning treatments that include mechanical site-preparation, seeding, planting, burning, herbicide, or other treatments.
- Retain canopy trees where appropriate to meet habitat or other resource management goals.
- Manage or maintain lowland conifer habitats that support nesting spruce grouse, especially when adjacent to upland spruce grouse habitat.

Spring Fen Priority Area

This area contains a rare wetland plant community known as a spring fen (OPn93a NPC) and is the only observed location of this community type within Red Lake WMA (Figure 5, Figure 12). The fen community also crosses into the watershed protection area for the Red Lake Peatland SNA. This native plant community is identified as being state imperiled (S2-rank) and globally imperiled (G2-rank).

Fens are protected under Minnesota statute 103G.223, which specifies that known locations of calcareous fens may not be filled, drained, or otherwise degraded by any activity, unless approved by the DNR commissioner through a calcareous fen management plan. DNR maintains regulatory authority over activities that may impact calcareous fens regardless of whether the fen is listed or already degraded. In addition, state-threatened and endangered species are documented in this area.

Figure 12. Spring fen priority area at Red Lake WMA



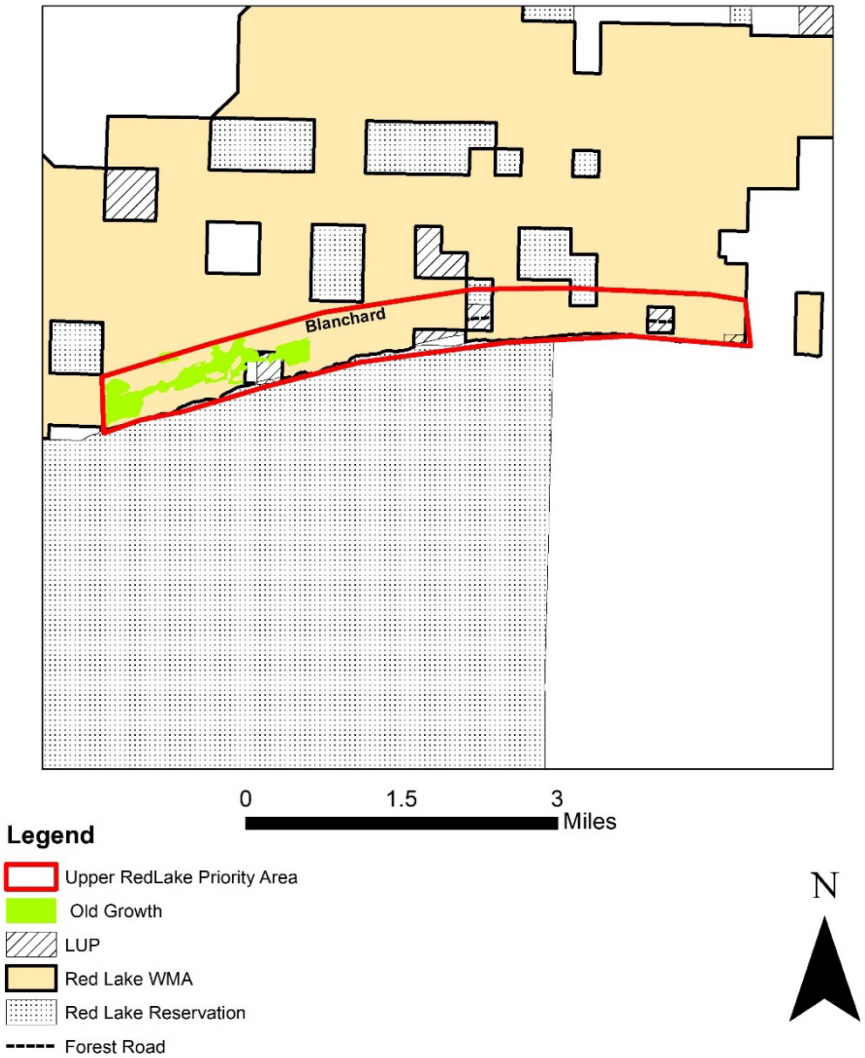
Management Objective 1.27: Maintain the local hydrology and characteristic wetland vegetation of this rare ecological feature.

- Follow department-prescribed screening distances and associated review processes to avoid potential ecological impacts to the spring fen.
- Consider limited tree removal to help maintain hydrologic conditions by reducing woody encroachment into fen channels and the associated evapotranspiration moisture losses.
- Keep all heavy equipment on previously established roads and berms to prevent or minimize peat compaction or rutting that may impede the flow of groundwater.
- Carefully evaluate road or trail construction and heavy equipment operations and consult with DNR fen experts before operating within the spring fen hydrologic boundary.
- Complete groundwater chemistry, peat sampling, and additional vegetation sampling to provide the necessary information for this fen to be included on the formally recognized statewide list of calcareous fens.

Upper Red Lake North Shore Priority Area

The Upper Red north shore priority area parallels the Upper Red Lake shoreline and is bisected by the Blanchard FR (Figure 13). The western portion of this priority area overlaps the Upper Red Lake Old Forest Management Complex (OFMC). The priority area is roughly ½ mile wide and composed of lowland hardwood, bur oak, trembling aspen, and northern hardwoods. The northern hardwoods consist of basswood and American elm. This is the only area in Red Lake WMA where northern hardwoods exist. DNR has designated old growth lowland hardwood/bur oak stands at the west end. This priority area has specific, locally unique climate conditions because it is adjacent to Upper Red Lake.

Figure 13. Upper Red Lake North Shore Priority Area at Red Lake WMA



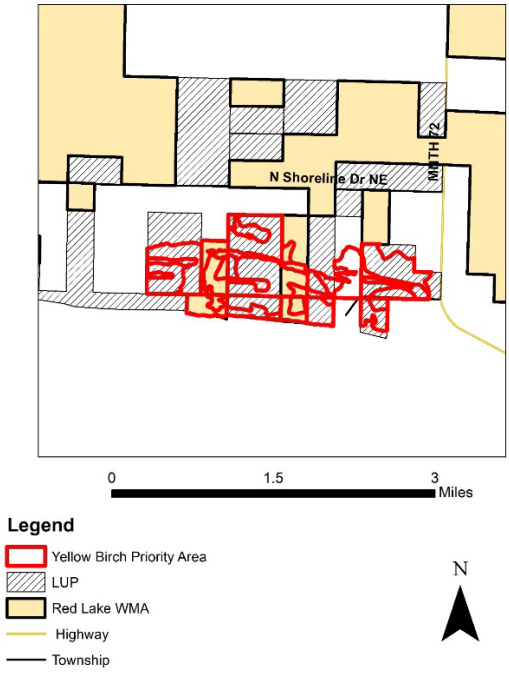
Management Objective 1.28: Manage for cavity-nesting waterfowl such as wood ducks, common goldeneyes, and mergansers, and a source of coarse woody debris for the nearshore environment of Upper Red Lake by promoting old forest characteristics such as snags and dead and down woody material.

- Evaluate boundaries of designated old growth stands, because current boundaries follow section lines and likely do not reflect ecological boundaries.
- Maintain and restore wetlands including beaver ponds to benefit waterfowl broods, amphibian breeding habitat, and semi-aquatic furbearers.
- Increase oak and basswood components to maximize oak mast production for mast dependent species, including black bear, wood ducks, raccoon, and flying squirrels.
- Manage for cavity-nesting waterfowl and bats by retaining larger diameter aspen and other trees with natural cavities.
- Maintain and enhance bank stabilization by preserving riparian areas by retaining dead and down woody material.

Yellow Birch Priority Area

Yellow birch is found in the eastern United States, westward to Minnesota. It is found in the northern half of Minnesota and extends into the southeast corner of Red Lake WMA (Figure 14). Red Lake WMA is also the northwestern extent of its range in Minnesota.

Figure 14. Yellow Birch Priority Area at Red Lake WMA



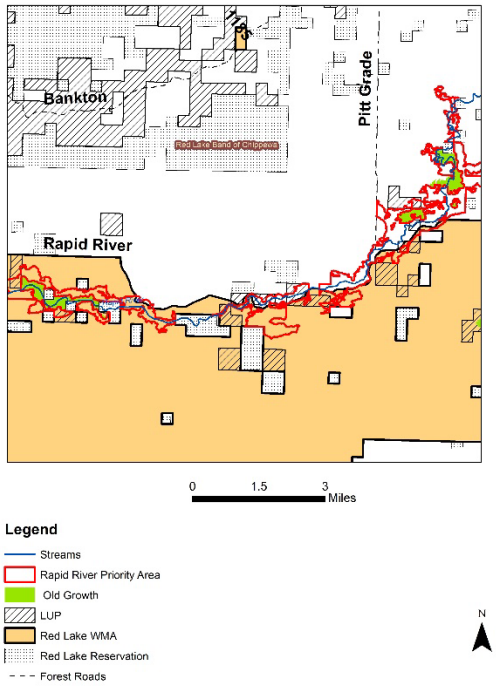
Management Objective 1.29: Maintain the current yellow birch trees and expand the range of yellow birch trees farther north and west in Red Lake WMA.

- Consider yellow birch management and regeneration strategies in (Tubbs, 1977) (Erdmann, 1990), (Bolton & D'Amato, 2011), and the USFS recommendations for favoring yellow birch if harvesting in the area.
    - Add or retain existing or future coniferous coarse woody debris.
    - Implement girdling and/or single tree felling of adjacent trees around mature yellow birch seed trees (LUP CCMP, N. Jensen pers. Comm.) to allow canopies to expand for increased seed production, and single tree openings will also provide enough sunlight for yellow birch regeneration.
    - Consider constructing wire cage enclosures to prevent white-tailed deer browse damage.

Rapid River Riparian Core Priority Area

The Rapid River riparian area between Faunce Rangeline Road and Pitt Grade provides habitats only found in this portion of Red Lake WMA (Figure 15). This priority area overlaps the Rapid River East OFMC. Silver maple, American basswood, bur oak, and American elm are found in the wet forests and Rapid River flood plain that make these habitat types unique to the area. The priority area along the Rapid River is composed primarily of wet forests, flood plain forest, and mesic hardwood forests.

Figure 15. Rapid River Riparian Core Priority Area



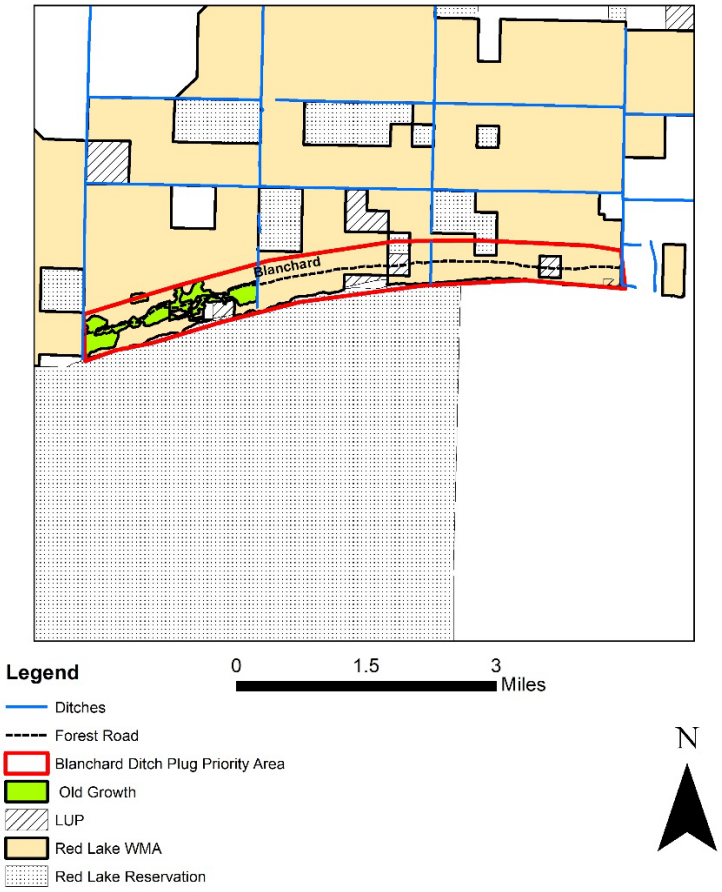
Management Objective 1.30: Provide a contiguous habitat corridor for wildlife species that depend on old forest riparian zones, including fishers, pine marten, kingfishers, mink, otter, barred owls, and cavity-nesting waterfowl.

- Maintain and enhance long lived deciduous tree species, large cavity trees, and dead and down woody material.
- Restore riverine hydrology and floodplain connectivity where possible.
- Follow management strategies outlined under Management Objective 1.8.

Blanchard Road Ditch Plug Priority Area

Four homestead era ditches bisect the Blanchard FR and flow south into Upper Red Lake (Figure 16). These ditches were dug between 1905 and 1915 in hopes of converting the area into crop land. This area harbors a number of uncommon species, including Wilson's phalarope, spruce grouse, and thrushes, and offers a unique opportunity to form partnerships between federal, state, county, and tribal governments to complete a large, hydrological habitat restoration.

Figure 16. Blanchard Road Ditch Plug Priority Area



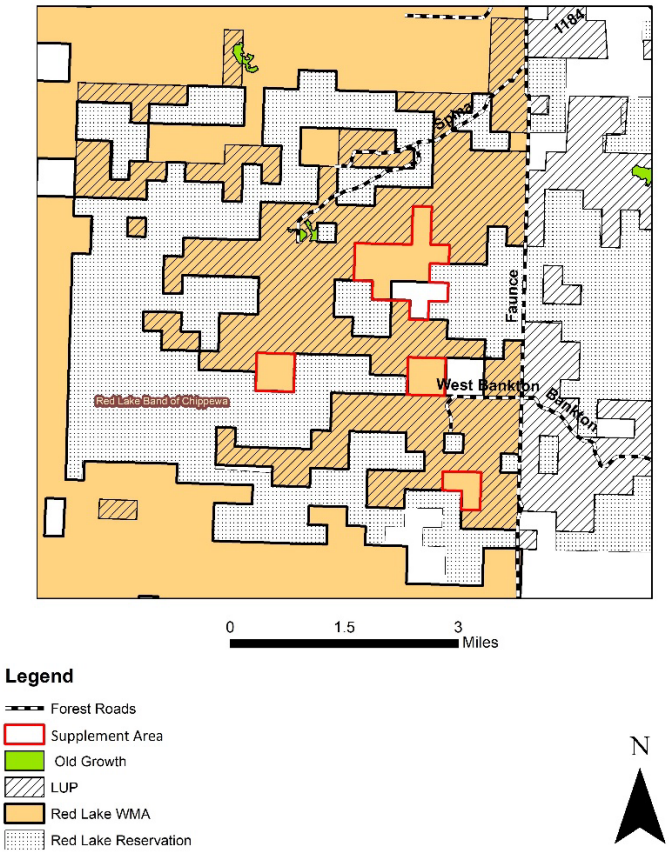
Management Objective 1.31: Restore natural hydrology to a large peatland system and a commercially important fishery by strategically identifying priority locations to abandon and/or plug ditches.

- Partner with the Red Lake Nation, USFWS, watershed districts, and local stakeholders to abandon and plug ditches and generally restore natural peatland hydrology.
    - Consult "Final Report Warroad Watershed Storage Identification and Evaluation" by Houston Engineering to assist with identification of restoration sites.

Rapid River Headwaters Supplement Priority Area

The LUP CCMP outlines a Rapid River headwaters area where active management is not planned, except for forest road and hunter walking trail maintenance (Figure 17). No vegetation management has occurred in this area for several years. The result is an ecologically and visually unique area that is a destination for groups who camp and hunt grouse and white-tailed deer on both the West Bankton and the Spina FRs.

Figure 17. Rapid River Headwaters Area Supplement at Red Lake WMA



Management Objective 1.32: Include portions of Red Lake WMA as a supplement to the Rapid River headwaters area to benefit species that require large areas of intact forest and maintain water quality within intact watersheds.

- No vegetation management is planned within the proposed supplement during the 10-year span of this plan.
- Continue state forest road maintenance and hunter walking trail maintenance.
- Maintain established dispersed campgrounds.
- Explore installation of permanent fire rings and picnic tables, particularly at identified access points.
- Consider designating this supplement as an OFMC if it meets old growth policy during the next statewide forest planning process.

Goal 2. Maintain or increase compatible outdoor recreational opportunities.

Minnesota's WMAs are used for public hunting, trapping, fishing, and other activities compatible with wildlife and fisheries management. Hunting has always accounted for the largest share of public use on the Red Lake WMA, but Red Lake WMA is also used for non-hunting or fishing activities such as wildlife viewing, resource foraging, nature photography, winter sports and hiking.

Red Lake WMA is managed to provide quality hunting, trapping, fishing and other compatible fish and wildlife-related recreation. Dispersed, unstructured recreation with a minimum of developed facilities will be provided as part of the outdoor recreation system in northwestern Minnesota, which, when combined with more structured recreational opportunities on other state land in the area, provides for diverse recreational opportunities.

Management Objective 2.1. Maintain, increase, and promote recreational opportunities including hunting, trapping, and dispersed camping.

- Ensure active habitat management around roads and trails to provide the mixed age class habitats that hunters expect to see in locations where they can maximize their access to hunting opportunities in mixed-age habitats.
- Maintain and improve walking access to Red Lake WMA.
    - Continue to partner with other groups to maintain and improve signage for HWTs and other trails that aid hunters in navigation.
    - Create a minimum of 2 miles of new HWT re-routes, focusing on areas where deep ditches block access to upland hunting opportunities.
    - Re-evaluate existing HWTs where re-routes would provide better access.

        - Consider closing HWTs that present regular maintenance issues, for example, because they are too wet.
        - Strive for net-gain in HWT creation and re-evaluation.
- Continue to provide undeveloped camping opportunities.
    - Post perennial camping areas with "designated overnight use area" signs.
        - White Pine HWT, Kory Kelly HWT, Lost Lake HWT, Beaver Dam east and west, Hall HWT and associated opening to the south, Big White Pine, and Peet's Camp are examples.
    - Consider modest amenities at popular sites, e.g., fire rings, tables.
    - Explore customer-friendly methods of providing dispersed camping permits, e.g., website downloads.
    - Clearly communicate camping rules using signs and other tools.

Management Objective 2.2. Maintain, increase, and promote other compatible recreational opportunities including bird watching, berry picking, and wildland solitude.

- Replace weathered WMA entrance signs.
- Create a comprehensive brochure about Red Lake WMA opportunities.
- Explore partnering with other DNR divisions to create an interpretive trail system that focuses on resources such as accessible blueberry/black spruce/tamarack bogs, old growth forests, and white cedar stands with rare orchids.
- Increase silver maple abundance to provide opportunities for maple sap collection.
- Develop self-guided maps and brochures for interpretive trails.
- Partner to promote the Lake of the Woods County Wilderness Drive and other similar opportunities.
    - Develop kiosks and other interpretive displays as opportunities arise.
    - Create a map of interpretive opportunities including the Pine to Prairie Birding Trail.

Management Objective 2.3. Continue and improve communication and coordination with surrounding landowners, the public, and other agencies, and develop new partnerships and collaborate with partners to expand outreach efforts.

- Continue to produce a quality Norris Camp newsletter to reach existing interested partners and expand the mailing list.
- Maintain and expand relationships with Red Lake Nation and individual tribal members.
    - Look for opportunities to partner on habitat and outreach projects.
- Maintain/expand relationships with local school districts and historical societies.
- Develop a work group of invited landowners and other agencies and schedule regular update meetings to inform and coordinate with these stakeholders.

Management Objective 2.4. Use existing tools and identify new opportunities to engage the public, including new and diverse user groups, and encourage recreational opportunities that may be unique to Red Lake WMA (e.g., remote hunting and camping experiences, observing rare species).

- Continue to interpret and maintain Norris Camp.
- Explore opportunities to host annual tours of Norris Camp with Lake of the Woods County Historical Society.
    - Maintain interpretive displays inside the sanitation building and mess hall.
- Highlight Red Lake WMA activities, natural history observations and recreational opportunities using a variety of tools including videos, social media posts, webinars, and traditional media.
- Continue to provide school programs, presentations, and workshops.
- Continue to engage the Red Lake Nation on youth activities in ceded lands.
- Offer a presentation to the Minnesota Ornithologists' Union meeting on an annual or biannual basis.
- Work with local chamber of commerce to promote Red Lake WMA.
- Request that the Explore Minnesota vacation and travel guide promotes Red Lake WMA.

Implementation Process

Operational Overview

The management objectives and strategies laid out in this plan describe the "what" and "why" for management intended to occur on the Red Lake WMA in the next 10 years, but specific operations at Red Lake WMA are dependent on several factors, including weather conditions, funding, and changing priorities. To allow flexibility in the operational plan, the "who," "when," and "how" of specific work activities will be determined annually by unit staff in conjunction with division-wide annual work planning. Table 13 shows an overview of ongoing annual work activities that are performed at Red Lake WMA in a typical year.

Table 13. Overview of annual work activities performed at Red Lake WMA in a typical year

Activity/Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Develop project specs and site marking	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Required training	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Burn plans	Yes	Yes	Yes	No	No	No	No	No	No	No	No	Yes
Gate/ sign repairs	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	No
Forest habitat management coordination	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control structure maintenance/ monitoring	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
CCM/contract project proposals	Yes	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes
Brush mowing	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Deer season/ CWD management	Yes	No	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes
Camping permits	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Forest stand exam reviews	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Trapping season/ data entry	Yes	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes

Activity/Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Asset inventory	Yes	No	No	No	No	No	No	No	No	No	No	Yes
Furbearer registration	Yes	No	No	No	No	No	No	No	No	No	No	Yes
Review & update site emergency plan	Yes	No	No	No	No	No	No	No	No	No	No	Yes
Rx burn equipment inventory & prep	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No
Rx burning	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Wildlife project proposals	No	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Invasive species control	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Terrestrial invasives grant	No	No	Yes	No	No	No	Yes	No	No	No	No	No
Firebreak maintenance	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes
Partner coordination meetings	No	Yes	Yes	No	No	No	Yes	No	No	No	No	No
OHF proposals	No	No	No	Yes	Yes	No	No	No	No	No	No	No
Deer goal setting/ public meetings	No	No	No	Yes	No	No	No	Yes	No	No	No	No
Grouse surveys	No	No	No	Yes	Yes	No	No	No	No	No	No	No
Tree planting/ seeding	No	No	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No
Road repair/ maintenance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Dike repair	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No
Boundary posting	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Outreach & Education					Yes							
Mow dikes	No	No	No	No	No	Yes	No	No	Yes	No	No	No
Direct seeding	No	No	No	No	No	Yes	No	No	No	Yes	Yes	No

Activity/Task	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Goose banding	No	No	No	No	No	Yes	Yes	No	No	No	No	No
Mowing trails, roads & parking lots	No	No	No	No	No	No	Yes	Yes	Yes	No	No	No
Accomplishment reporting	No	No	No	No	No	No	Yes	No	No	No	No	Yes
Predator scent post survey	No	No	No	No	No	No	No	No	Yes	No	No	No
Conservation Legacy Partners grants	No	No	No	No	No	No	No	No	Yes	No	No	No
Rx burn reporting	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Winter track survey	Yes	Yes	No	No	No	No	No	No	No	No	No	Yes
Grounds & facility maintenance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Adaptive Management

The management objectives and strategies in this document will be reviewed annually by regional and area staff and adjusted as necessary. Specifically, we will continuously review research and monitoring results and build off those results to improve habitat restoration techniques, maximize wildlife benefit, and increase user satisfaction. We will also continue to collaborate with other divisions and partners to continue, improve, and expand research and monitoring projects. A revision of the master plan is recommended in 10 years, or 2033. A 5-year midpoint review is recommended to evaluate progress and identify any necessary adjustments.

Research and Monitoring

Because the Red Lake WMA planning area represents a large area of contiguous natural habitat, it has the potential to serve as a natural laboratory. LUP Beltrami Island Funds also allow leveraging and supporting research that benefits federal lands, but results can be applied to managing Red Lake WMA.

Current Research and Monitoring

Research

- Spruce grouse habitat use study
- Connecticut warbler and boreal chickadee habitat use study
- Gray wolf survival and movements
- Tamarack regeneration following eastern larch beetle
- Botrychium inventory
- Hymenoptera inventory
- Lepidoptera inventory
- Odonata inventory
- Woodpecker nesting habitat use

Wildlife Monitoring

- Grouse drumming surveys
- Woodcock surveys
- Spruce grouse surveys
- Sharp-tailed grouse surveys
- Breeding bird survey routes (50-080 [Red Lake] and 50-048 [Waskish])
- Nightjar surveys (1 on, 1 near WMA)
- Western Great Lakes owl survey routes (1 on, 1 near)
- Beltrami Island Christmas bird count
- Predator scent post surveys
- Winter track count surveys
- Woodpecker nest monitoring and database
- Black-backed woodpecker, three-toed woodpecker, and boreal chickadee observations database
- Bat surveys (historical)
- Black bear food production/abundance index
- Winter moose aerial survey (historical)

Fish and Herptile Monitoring

- None

Invertebrate Monitoring

- See above

Vegetation/Habitat Monitoring

- Alternative black spruce harvesting potential for benefitting Connecticut warblers and boreal chickadees
- Variable density thinning in red pine plantations
- Peatland vegetation response to Minnie wildfire
- Map all of the primary forest on Red Lake WMA

Invasive Species Monitoring

- Incidental identification and eradication

Geophysical Monitoring

- National Weather Service (NWS) weather reporting station
- Soil moisture monitoring
- Winter severity index

Public Use Monitoring

- Trapping permits
- Furbearer harvest
- Hunter walking trail user satisfaction surveys
- Camping permits
- White-tailed deer hunter car/camp survey

Potential Research and Monitoring Projects

DNR research, survey, and monitoring projects will be initiated in coordination with the Section of Wildlife's research program. Academic institutions or other agencies may also pursue research projects that support or complement WMA management direction.

- Aspen thinning trial to increase growth rates for cavity dependent wildlife
- Increase woodpecker nest monitoring effort
- Study fisher and pine marten winter habitat use

- Resume aerial moose winter surveys on a periodic basis
- Operationalize periodic old growth monitoring
- Contributing to developing nest webs with waterfowl and wetlands research unit
- Study olive-sided flycatcher habitat use and ecology
- Follow-up monitoring of peatland vegetation response to Minnie wildfire
- Establish and run a new breeding bird survey route that focuses coverage on and around Red Lake WMA
- Aerial infrared surveys of sharp-tailed grouse leks
- Seek funding to expedite a formal description of newly-identified species found within Red Lake WMA

References

Armbruster, M. (1987). Habitat Suitability Index Models: greater sandhill crane. *Biological Report 82(10.140)*. Washington, D.C.: U.S. Fish and Wildlife Service, National Ecology Center.

Audubon. (2019). *Audubon Conservation*. Retrieved from Audubon Org: https://mn.audubon.org/conservation/blueprint-minnesota-bird-conservation

Averill, J., & McGrew, P. (1929). The reaction of swamp forests to drainage in Northern Minnesota. State of Minnesota, Department of Drainage and Waters.

Bailey, J., & Larson, M. (Undated). Identifying open-brushland landscapes for sharp-tailed grouse management: a habitat model approach. *Unpublished presentation notes*. Minnesota Department of Natural Resources Forest and Wildlife Populations Research Group.

Bailey, R., Mech, L., Hickling, W., Nicotera, R., Rutske, L., Linn, R., . . . Siderits, K. (1978). Eastern timber wolf recovery plan. Washington, D.C.: U.S. Gov. Printing Office.

Bednar, J., Zlonis, E., Panci, H., Moen, R., & Niemi, G. (2015, December). Development of Habitat Models and Habitat Maps for Breeding Bird Species in the Agassiz Lowlands Subsection, Minnesota, USA. *State Wildlife Grant, T-39-R-1/ F12AF00328*. Natural Resources Research Institute.

Berg, W. (1992). Large mammals. *Chapter 6 in The Patterned Peatlands of Minnesota*. Minneapolis, MN: University of Minnesota Press.

Bidwell, L., Winter, T., & Maclay, R. (1970). Water resources of the Red Lake River watershed, northwestern Minnesota. *Atlas HA-346*. Washington, D.C.: U.S. Geol. Surv.

Bolton, N., & D'Amato, A. (2011). Regeneration responses to gap size and coarse woody debris within natural disturbance-based silvicultural systems in northeastern Minnesota, USA. *Forest Ecology and Management 262:1215-1222*.

Bradof, K. (1992). Ditching of Red Lake Peatland during the homestead era. *Chapter 17 in The Patterned Peatlands of Minnesota*. Minneapolis, MN: University of Minnesota Press.

Breckenridge, W. (1949). A century of wildlife. *The Minnesota Quarterly. Reprinted in The Conservation Volunteer.* Minnesota Department of Natural Resources.

Buegler, W. (2000). Species diversity of freshwater mussels in the Roseau River. *Unpublished Report*. Minnesota Department of Natural Resources.

Cox. (2004, December). Northwest Minnesota Moose Mystery Research, Summary Report. *Multiagency posthumous compilation based on Cox et al. Parasite-mediated decline in moose population at the southern range periphery*. Wildlife Monographs.

Crawford, H., & Jennings, D. (1989). Predation by birds on spruce budworm Choristoneura fumiferana: functional, numerical and total responses. *Ecology*, 70:152-163.

Dana, S., Allison, J., & Cunningham, R. (1960). Minnesota lands: Ownership, use, and management of forest and related lands. Washington, D.C.: The American Forestry Association.

Easthouse, D. (2016, January-February). Bombing the Bog. *Minnesota Conservation Volunteer*. Saint Paul, MN: Minnesota Department of Natural Resources.

Eng, M. (1979). An evaluation of the surficial geology and bog patterns of the Red Lake Peatland Area, Minnesota. *Map*. Minnesota Department of Natural Resources, Division of Minerals.

Erdmann, G. (1990). Betula alleghaniensis Britton. Yellow Birch. *Silvics of North America. Volume 2, Hardwoods. U.S. Forest Service Agricultural Handbook 654.* Washington, D.C.

Ferris, K. (2006). The Chippewa of North Dakota: an Examination of American Indian Cultural Evolution During the Eighteenth and Nineteenth Centuries. Fargo: North Dakota State University.

Frelich, L. (1995). Old Forest in the Lake States Today and before European Settlement. *Natural Areas Journal 15: 157-167*.

Friends of Sax-Zim Bog. (n.d.). Big Picture of Friends of Sax-Zim Bog as a Benefit to the Community. *2020*.

Glaser, P. (1983). Vegetation Patterns in the North Black River Peatland, northern Minnesota. *Canadian Journal of Botany*, 61(8):2085-2104.

Glaser, P. (1992). Raised Bogs in Eastern North America--Regional Controls for Species Richness and Floristic Assemblages. *Journal of Ecology*, 80(3):535.

Glaser, P. (1992a). Vegetation and water chemistry. . *Chapter 2 in The Patterned Peatlands of Minnesota*. Minneapolis, MN: Univeristy of Minnesota Press.

Glaser, P. (1992b). Peat landforms. *Chapter 1 in The Patterned Peatlands of Minnesota*. Minneapolis, MN: University of Minnesota Press.

Glaser, P. (1992c). Ecological development of patterned peatlands. *Chapter 3 in The Patterned Peatlands of Minnesota*. Minneapolis, MN: University of Minnesota Press.

Glaser, P., Siegel, D., Romanowicz, E., & Shen, Y. (1997). Regional Linkages Between Raised Bogs and the Climate, Groundwater, and Landscape of North-Western Minnesota. *Journal of Ecology*, 85(1):3.

Gorham, E., Janssens, J., & Glaser, P. (2003). Rates of peat accumulation during the post glacial period in 32 sites from Alaska to Newfoundland, with special emphasis on northern Minnesota. *Canadian Journal of Botany*, 81:429-438.

Gorham, E., Wright, H., Glaser, P., & Wheeler, G. (1979). Ecological and floristic studies of the peatland vegetation of northern Minnesota. *Peat program 1978-1979 biennium legislative appropriation progress report no. 5*. St. Paul, MN: Minnesota Department of Natural Resources.

Gray, E., Russel, M., Babcock, C., & Windmuller-Campione, M. (2022). Structural characteristics of black spruce (Picea mariana) infested with eastern spruce dwarf mistletoe (Arceuthobium pusillum), Minnesota, USA. . *Forest Ecology and Management, 523*.

Gregg, L., Heeringa, B., & Eklund, D. (2004). Conservation assessment for spruce grouse (Falcipennis canadensis). *Review draft*. U.S. Forest Service, Eastern Region.

Griffin, K. (1975). Vegetation studies and modern pollen spectra from the Red Lake peatland, northern Minnesota. *Ecology*, 56:531-546.

Grimaldi, D., & Engel, M. (2005). Evolution of the insects. Cambridge University Press.

Gutierrez, R. (2012, January 11). New research on ruffed grouse: what does it tell us about options for grouse management in the future? *Annual Research Review Symposium*. Cloquest, MN: Sustainable Forests Education Cooperative.

Hanks, E., Hooten, M.B., & Baker, F.A. (2011). Reconciling multiple data sources to improve large-scale prediction of forest disease incidence. *Ecological Applications 21(4):1173-1188*.

Hanowski, J., Christian, D., & Niemi, G. (2000). Landscape requirements of prairie sharp-tailed grouse Tympanuchus phasianellus campestris in Minnesota, USA. *Wildlife Biology*, pp. 6:257-263.

Heinselman, M. (1963). Forest sites, bog processes, and peatland types in the Glacial Lake Aggasiz region. *Minnesota Ecol. Monogr.*, 33:327-374.

Helgeson, J., Lindholm, G., & Erickson, D. (1975). Water resources of the Lake of the Woods watershed, north-central Minnesota. *Atlas HA-544*. Washington, D.C.: U.S. Geol. Surv.

Hilsenhoff, W. (1987). An improved biotic index of organic stream pollution. *Great Lakes Entomologist*, pp. 20:31-39.

Janssens, J., Hansen, B., Glaser, P., & Whitlock, C. (1992). Development of a raised-bog complex. *Chapter 13 in The Patterned Peatlands of Minnesota*. Minneapolis, MN: University of Minnesota Press.

Joyce, J. (2013). Space use behavior and multi-scale of American marten (Martes Americana) in northeastern Minnesota. . *A thesis submitted to the faculty of the University of Minnesota.*

Kappler, C. (1941). Indian Affairs: Laws and treaties. Washington: Gov. Printing Office.

Kelley, J., Williamson, S., & Cooper, T. (2008). American woodcock conservation plan. Wildlife Management Institute.

Kouffeld, M. (2011). Selection of landscapes by male ruffed grouse during peak abundance. *M.S. Thesis*. University of Minnesota.

Lenarz, M. (2007). 2007 Aerial Moose Survey. *Fish and Wildlife Populations and Research Group*. Minnesota Department of Natural Resources.

Lockner, W. (2008, January 23). *Personal email communication with Gretchen Mehmel*.

Minnesota Conservation Department. (1933). First Biennial report of the Commission of Conservation, 1931-1932. St. Paul, MN.

Minnesota Department of Natural Resources. (1980). Red Lake WMA Master Plan, 1980-1989. St. Paul, MN.

Minnesota Department of Natural Resources. (1982). Inventory of Peat Resources, Aitkin County, Minnesota. *Peat Inventory Project*.

Minnesota Department of Natural Resources and U.S. Fish and Wildlife Service. (2013). Beltrami Island Land Utilization Project. *Comprehensive Conservation Management Plan*.

Minnesota Department of Natural Resources. (n.d.). Ruffed Grouse in Minnesota: A Long-Range Plan for Management. *2011*. St. Paul, MN: Division of Fish and Wildlife.

Minnesota Session Laws. (1929). Chapter 258.

Minnesota Statutes. (1978). Secs 97.48 and 97.481.

Murchie, R., & Wasson, C. (1937). Beltrami Island, Minnesota: Resettlement Project. *Bulletin 334*. Saint Paul, MN: University of Minnesota Agricultural Experiment Station.

North, M., Jones, S., Mehmel, G., & St-Louis, V. (2023). How long does it take aspen to attain sizes suitable for use by cavity-dependent wildlife in Northwestern Minnesota's Agassiz Lowlands? *Unpublished report*. Minnesota Department of Natural Resources and Bemidji State University.

North, M., Mehmel, G., Walters, B., & Siverhus, B. (2013-2014). Birds of the Beltrami Island State Forest and Red Lake Wildlife Management Area Region. *The Loon, Volume 85-86*.

Nute, G. L. (1930). Posts in the Minnesota Fur-Trading Area, 1660-1855. St. Paul: Minnesota Historical Society.

Ojakangas, R., & Matsch, C. (1982). The Quaternary Period. *Chapter 7 in Minnesota's Geology*. Minneapolis, MN: University of Minnesota Press.

Oldfield, B., & Moriarty, J. (1994). Amphibians and reptiles native to Minnesota. Minneapolis, MN: University of Minnesota Press.

Palik, B., Clark, P., D'Amato, A., Swanston, C., & Nagel, L. (2022). Operationalizing forest assisted migration in the context of climate change adaptation: Examples from the eastern USA. *Ecosphere 13(10):e4260*.

Peters, E., Wilson, D., Edgar, C., & Ek, A. (2021, March). Old Forest Extent and Changes in Minnesota 2003-2018. *Minnesota Forestry Research Notes No. 311*. Department of Forest Resources, University of Minnesota, St. Paul.

Pietz, P., & Tester, J. (1979). Utilization of Minnesota peatland habitats by snowshoe hare, white-tailed deer, spruce grouse, and ruffed grouse. *Final technical report submitted to Minnesota DNR and Minnesota Peat Program*. Minneapolis, MN: University of Minnesota.

Reeve, A., Warzocha, J., Glaser, P., & Slegel, D. (2001). Regional ground-water flow modeling of the Glacial Lake Agassiz Peatlands, Minnesota. *Journal of Hydrology*, 243:91-100.

Schmidt, K. (1999). Beltrami Island State Forest and Red Lake Wildlife Management Area 1997 fish survey results. *Unpublished report*. St. Paul, MN: Native Fish Conservancy.

Shaunette, A. (2022, June). Evaluating regeneration and stand dynamics in tamarack stands impacted by eastern larch beetle in northern Minnesota, USA. *Master of Science Thesis*. University of Minnesota.

Sigl, W., Mielke, N., Donatell, J., Grayson, S., Bourdaghs, M., Vaughan, S., . . . Nerem, K. (2020, June). Lower Rainy River and Rapid River Watersheds Monitoring and Assessment Report. Minnesota Pollution Control Agency.

Sinkular, E., Jennings, K., Morgan, K., Pototsky, C., & Dayer, A. (2022). Minnesota Results of the Wildlife Viewer Survey: Enhancing Relevancy and Engaging Support from a Broader Constituency. Blacksburg, Virginia: Virgina Tech.

Skoog, M. (2022). Rapid River Stream Survey. *Unpublished Report*. Minnesota Department of Natural Resources.

Stewig, J., & Standera, T. (2003). Rapid River Stream Survey. *Unpublished Report*. Minnesota Department of Natural Resources.

Swingen, M., Baker, R., Catton, T., Kirschbaum, K., Nordquist, G., Dirks, B., & Moen, R. (2015, September). Preliminary Summary of 2015 Northern Long-eared Bat Research in Minnesota. *NRRI Technical Report No. NRRI/TR-2015/44*.

Swingen, M., Moen, R., Baker, R., Nordquist, G., Catton, T., Kirschbaum, K., . . . Dietz, N. (2017). Summary of 2017 Bat Research in Minnesota. *NRRI/TR-201740*. Natural Resources Research Institute.

Tacha, T., Nesbitt, S., & Vohs, P. (1994). Sandhill cranes. *Chapter 6 in Migratory shore and upland game bird management in North America*. Washington, D.C.: International Association of FIsh and Game Agencies.

Topp, T. (2012). Rapid River Initial Fisheries Stream Survey. Minnesota Department of Natural Resources.

Tubbs, C. (1977). Manager's handbook for northern hardwoods in the north central states. *U.S. Forest Service General Technical Report NC-39*. St. Paul, MN.

Van Brunt, W. (1921). Duluth and St. Louis County, Minnesota; Their Story and People: An Authentic Narrative of the Past, with Particular Attention to the Modern Era in Commercial, Industrial, Educational, Cive and Social Development. *American Historical Society*. Madison: University of Wisconsin.

Van Offelen, H., Groshens, T., Evarts, B., Johnson, M., & Berg, G. (2003). Red River Stream Survey Report: Roseau River Watershed 2000. Minnesota Department of Natural Resources.

Watson, D. (2001). Mistletoe-A keystone resource in forests and woodlands worldwide. . *Annual Review of Ecology and Systematics, 32(1):219-49*.

Winter, T., Maclay, R., & Pike, G. (1967). Water resources of the Roseau River watershed, northwestern Minnesota. *Atlas HA-241*. Washington, D.C.: U.S. Geol. Surv.

Wright, H., & Glaser, P. (1983). Postglacial peatlands of the Lake Agassiz plain, northern Minnesota. *Glacial Lake Agassiz*. Geological Association of Canada Special Paper 26.

Wright, H., Coffin, B., & Aaseng, N. E. (1992). The patterned peatlands of Minnesota. Minneapolis: University of Minnesota Press.

Zager, S. (2011). The natural history of federal LUP lands within the Beltrami Island area. *Unpublished report submitted to Red Lake WMA and Agassiz NWR*.

Appendix A. Red Lake WMA Planning Team Members

Team members have changed over the course of this project. Active members at the conclusion of the project are included in the table below.

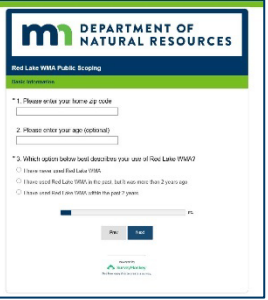
Role	Name	Division	Position	Location
Executive Sponsor	Kelly Straka	Fish and Wildlife	Wildlife Section Manager	St. Paul
Managing Sponsor	Kelly Wilder	Fish and Wildlife	Policy & Planning Supervisor	St. Paul
Managing Sponsor	Blane Klemek	Fish and Wildlife	Northwest Regional Wildlife Manager	Bemidji
Managing Sponsor	Ted Dick	Fish and Wildlife	Forest Habitat Supervisor	Grand Rapids
Project Manager	Laurinda Brown	Fish and Wildlife	Policy & Planning Coordinator	Fergus Falls
Assistant Project Manager	Kerry Ross	Operations Servies	Northwest Regional Planner	Bemidji
Core Team Member	Charlie Tucker	Fish and Wildlife	Area Wildlife Supervisor	Red Lake WMA
Core Team Member	Scott Laudenslager	Fish and Wildlife	Area Wildlife Supervisor	Baudette
Core Team Member	Talesha Karish	Fish and Wildlife	Assistant Area Wildlife Supervisor	Baudette
Core Team Member	Mike North	Fish and Wildlife	Forest Wildlife Coordinator	Brainerd
Core Team Member	Nick Jensen	Ecological and Water Resources	Regional Forest Ecologist	Bemidji
Team Subject Matter Expert	Matt Skoog	Fish and Wildlife	Area Fisheries Supervisor	Baudette
Team Subject Matter Expert	Brent Mason	Ecological and Water Resources	Area Hydrologist	Bemidji
Team Subject Matter Expert	Chad Jacobson	Forestry	Regional Timber Specialist	Bemidji
Team Subject Matter Expert	Chris Gronewold	Forestry	Regional Silviculturist	Bemidji
Team Subject Matter Expert	David Dragon	Forestry	Area Supervisor	Baudette
Team Subject Matter Expert	Kristi Coughlon	Operations Services	Regional Information Officer	Bemidji

Role	Name	Division	Position	Location
Team Subject Matter Expert	Allen Larsen	Parks and Trails	Park Manager	Hayes Lake
Team Subject Matter Expert	Cheryl Kelley-Dobie	Lands and Minerals	State Program Administrative Director	Bemidji
Team Member (External)	Jim Graham	USFWS	Agassiz National Wildlife Refuge Manager	Agassiz NWR
Team Member (External)	Jay Huseby	Red Lake Department of Natural Resources	Wildlife Director	Red Lake
Team Advisor (External)	Al Pemberton	Red Lake Department of Natural Resources	Natural Resources Director	Red Lake

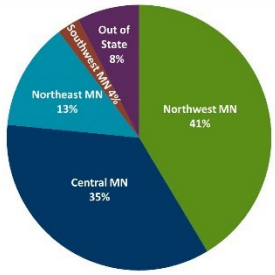
Appendix B. Red Lake WMA Public Scoping Summary (2018)

Questionnaire Background

- Questions developed by Red Lake WMA staff and WMA planner
- Open November 28 to December 19 (3 weeks)
- Advertised via media, MN DNR home page, Camp Norris Newsletter
- 145 respondents
- Voluntary, informal, not randomized

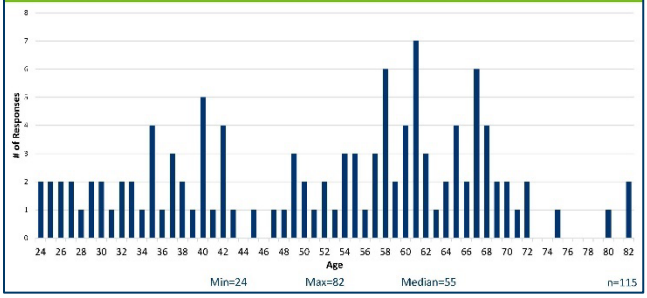


Please enter your home zip code



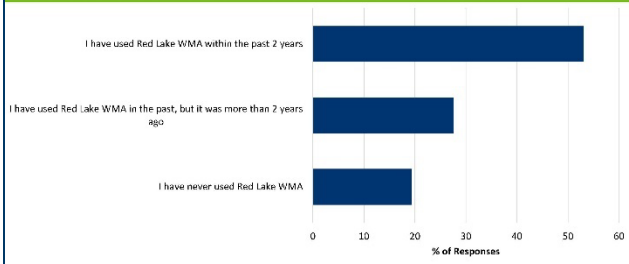
n=145

Please enter your age



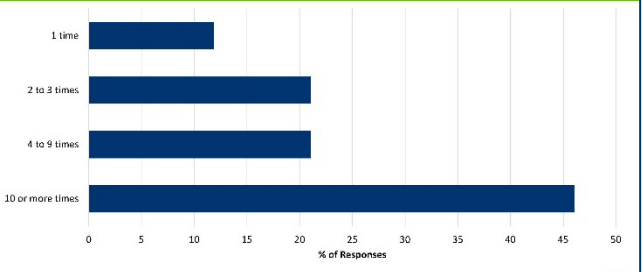
Min=24 Max=82 Median=55 n=115

Which option below best describes your use of Red Lake WMA?



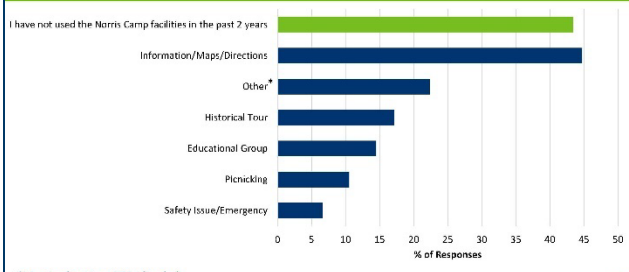
n=145

Please indicate the number of times you have visited Red Lake WMA in the past 2 years



n=76

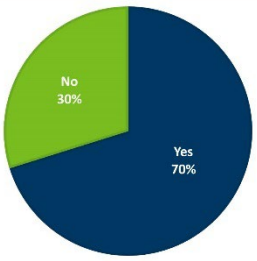
Please indicate if you have used the Norris Camp facilities in past 2 years for any of the following reasons



*Meeting location, ATV riding hub

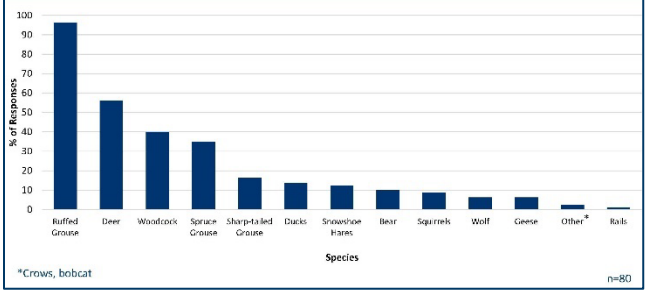
n=76

Have you used Red Lake WMA for hunting?



n=114

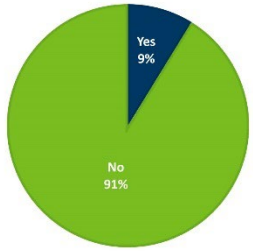
Which species have you hunted at Red Lake WMA?



*Crows, bobcat

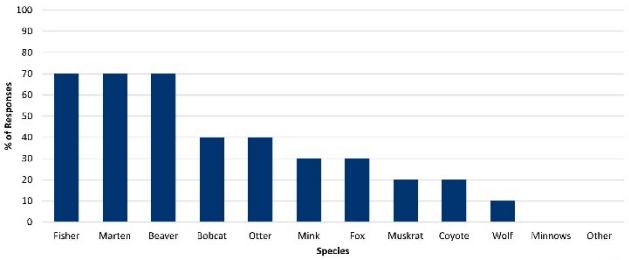
n=80

Have you used Red Lake WMA for trapping?



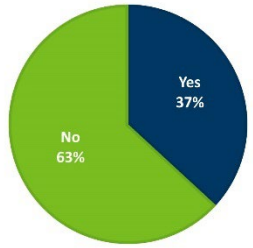
n=114

Which species have you trapped at Red Lake WMA?



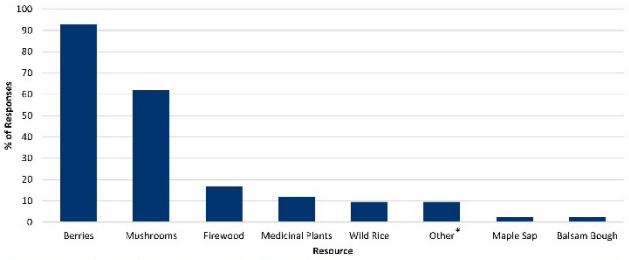
n=10

Have you used Red Lake WMA for resource gathering?



n=114

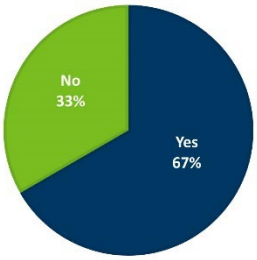
Which resources have you gathered at Red Lake WMA?



*Odonata specimens, hazelnuts, mosses and lichens, Christmas tree

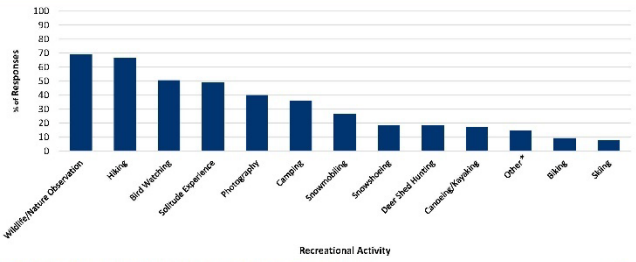
n=42

Have you used Red Lake WMA for other recreational activities?



n=114

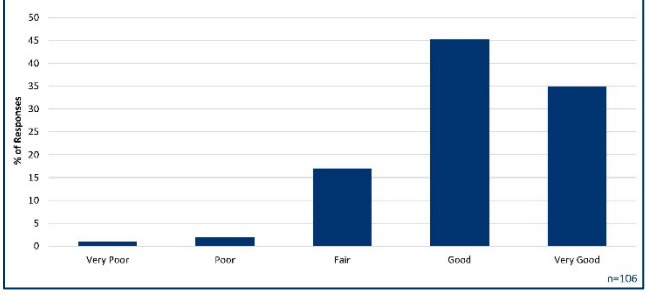
Which recreational activities have you participated in at Red Lake WMA?



*Trail cams, ATV use, horseback riding, dog sledding, driving on forest roads

n=75

How would you describe the overall quality of your visit(s) to Red Lake WMA?



n=106

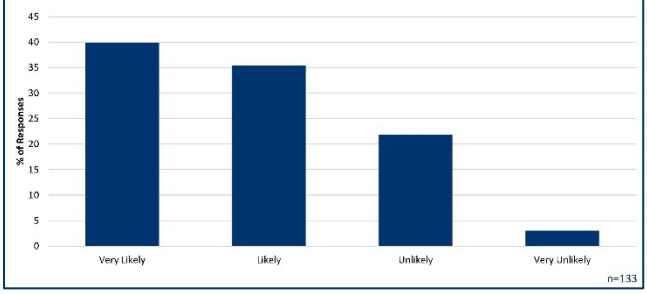
What did you like about your visit(s) to Red Lake WMA?

- Size
- Large expanse of public land
- Unique ecosystem
- Remoteness
- Wilderness feel
- Lack of development
- Solitude
- Peaceful
- Quiet
- Beautiful
- Diverse habitat
- High quality wildlife habitat
- Bogs and peatlands
- Good deer and grouse hunting
- Cover
- Rare plants and insects
- Giant blueberries
- Wildlife observation
- Fishing
- Family history
- Campsites
- Hiking
- Access
- Road conditions
- Trails
- Non-motorized trails
- Educational opportunities
- Don't have to worry about rules
- History
- Friendly staff

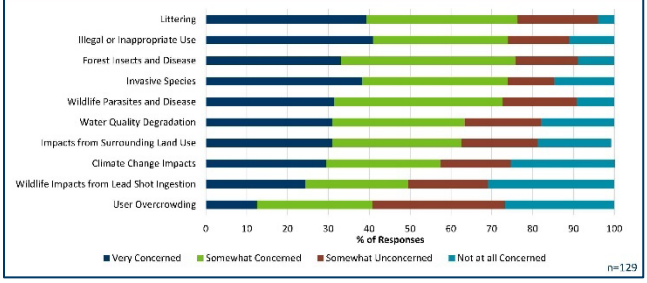
What could be done to improve the quality of your visits to Red Lake WMA?

- ATV Use
- Road Access
- Trail Access
- Game Species Management
- Habitat Management
- Camping
- Rules

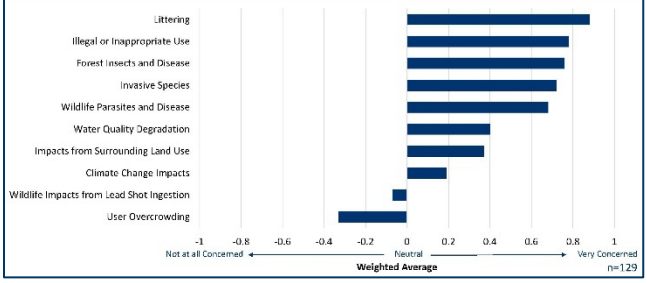
How likely are you to use Red Lake WMA in the next year?



Please rate your level of concern regarding these potential threats to fish and wildlife habitat at Red Lake WMA



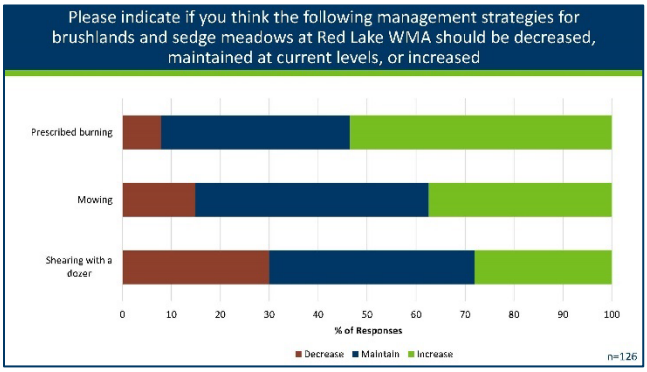
Please rate your level of concern regarding these potential threats to fish and wildlife habitat at Red Lake WMA



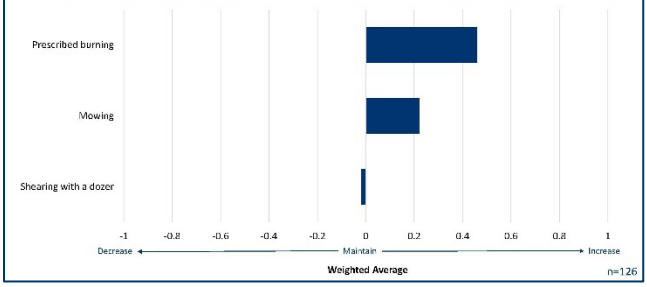
Please enter any comments you have regarding potential threats to fish and wildlife habitat at Red Lake WMA

- Illegal Use
- Forest Insects and Disease
- Invasive Species
- Wildlife Parasites and Disease
- Water Quality Degradation
- Climate Change Impacts
- Development
- Lack of Interest
- Recreational Vehicles
- Wildlife Management vs Timber Harvest

Please indicate if you think the following management strategies for brushlands and sedge meadows at Red Lake WMA should be decreased, maintained at current levels, or increased



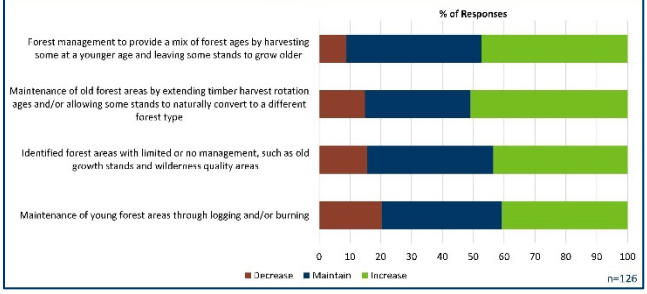
Please indicate if you think the following management strategies for brushlands and sedge meadows at Red Lake WMA should be decreased, maintained at current levels, or increased



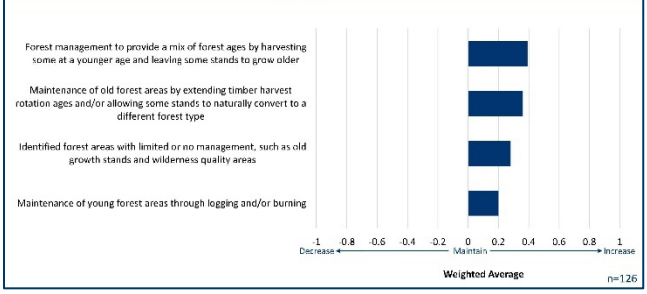
Please enter any comments you have regarding management strategies for brushlands and sedge meadows at Red Lake WMA

- Prescribed burning
- Mowing
- Shearing
- Focus management in small areas
- Manage for recreational use
- Restore hydrology

Please indicate if you think the following management strategies for forests at Red Lake WMA should be decreased, maintained at current levels, or increased



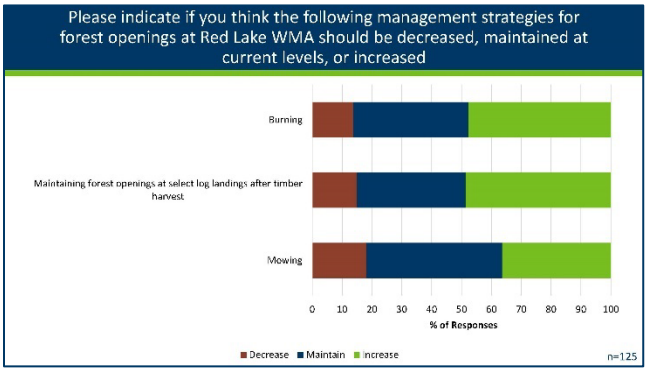
Please indicate if you think the following management strategies for forests at Red Lake WMA should be decreased, maintained at current levels, or increased



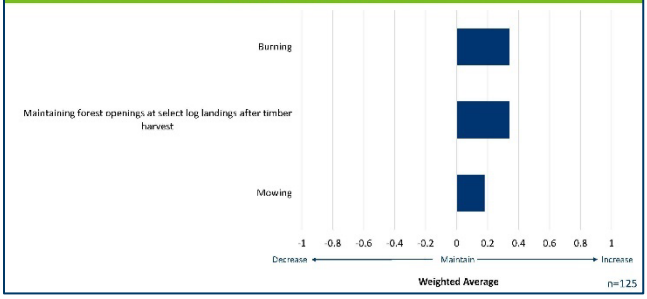
Please enter any comments you have regarding management strategies for forests at Red Lake WMA

- Protect mature forests
- Create a balanced forest for an even mix of all ages
- Forest management for timber vs wildlife

Please indicate if you think the following management strategies for forest openings at Red Lake WMA should be decreased, maintained at current levels, or increased



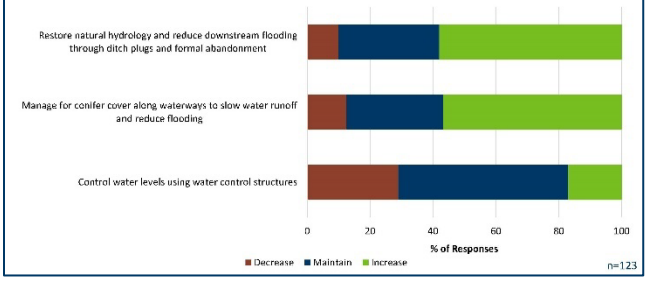
Please indicate if you think the following management strategies for forest openings at Red Lake WMA should be decreased, maintained at current levels, or increased



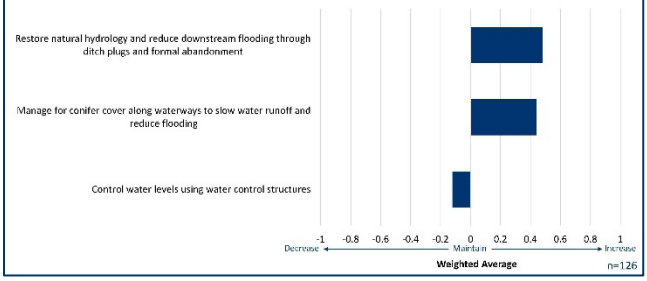
Please enter any comments you have regarding management strategies for forests openings at Red Lake WMA

- More openings vs fewer openings
- Use openings as wildlife food plots
- Use openings to create habitat for nongame birds and pollinators
- Trails create edge habitat

Please indicate if you think the following wetland management techniques at Red Lake WMA should be decreased, maintained at current levels, or increased



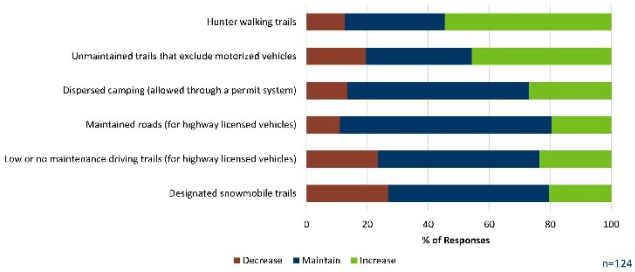
Please indicate if you think the following wetland management techniques at Red Lake WMA should be decreased, maintained at current levels, or increased



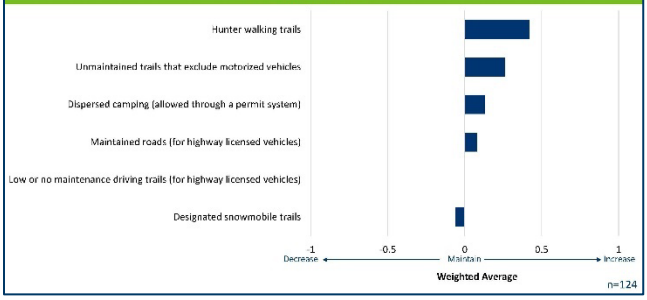
Please enter any comments you have regarding management techniques for wetlands at Red Lake WMA

- Restore functional wetlands
- Beaver management
- Hydrology and impacts to forests
- Flood retention

Please indicate if you think the following management strategies for recreation at Red Lake WMA should be decreased, maintained at current levels, or increased



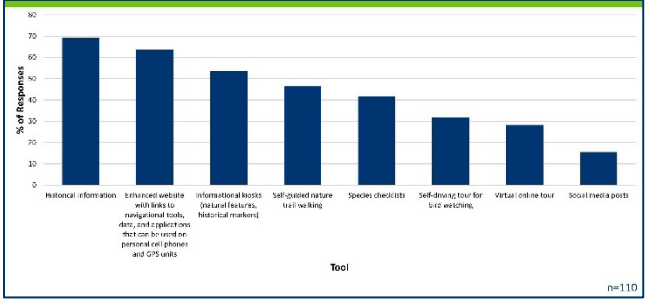
Please indicate if you think the following management strategies for recreation at Red Lake WMA should be decreased, maintained at current levels, or increased



Please enter any comments you have regarding management strategies for recreation at Red Lake WMA

- Prevent further development
- Balance motorized and non-motorized uses
- Increase/improve access
- More blueberry patches
- Simplify rules
- Aviation access

Which educational/technical tools would you like to see made available?



Please enter any comments or ideas you have regarding potential educational/technical tools at Red Lake WMA

- Website for people to share their photos from the WMA, with ability to vote for best photos/annual calendar
- A blueberry link on the website to discuss outlook for season and updates
- Kiosks with forest rules and self-serve camping permits
- Markers with numbers/names with online information
- Maps of areas for species of interest/Use of mobile apps and technology
- Maps of hunter walking trails/Trail information including allowed uses
- Consider the economic impact of non-harvest based options such as nature enjoyment and birding
- Maintaining knowledgeable cooperative staff

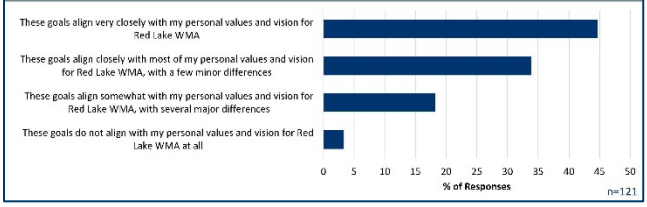
Please enter any comments or ideas you have regarding potential educational/technical tools at Red Lake WMA

- Informational kiosks don't hold up well
- Prefer no signs or kiosks to detract from the outdoor experience
- Already enough in place
- All a waste of money that far north in the middle of nowhere
- Nothing to waste more money and attract people from the Cities
- Need to educate the DNR on deer and game management
- Bringing modern applications to outdoor experiences can be self-defeating
- Keep people interested without competing with other technology

How well do these long-range goals align with your personal values and vision for Red Lake WMA?

Provide diverse and productive habitats for white-tailed deer, moose, ruffed grouse, and other forest wildlife by maintaining and developing an interspersion of forest types, age classes, and openings. Accomplishment of this goal will perpetuate native plant and animal communities in a relatively undeveloped and unique region of the state.

Provide quality public hunting, trapping, and fishing. Other forms of outdoor recreation will be accommodated only if compatible with wildlife and fish.



Please provide any ideas you have for updating the long-range for Red Lake WMA

- Reintroduction of caribou
- Increase moose and elk habitat
- Increase/decrease deer populations
- Include blueberry management
- Need concrete goals and objectives
- Management for wildlife habitat vs timber
- Provide ATV friendly experiences
- More emphasis on native plant communities/nongame species
- Consider tribal interests

Is there anything else you would like us to consider during the update of the Red Lake WMA master plan?

- Keep it wilderness
- Motorized use vs non-motorized use
- Wildlife habitat and water quality vs economic interests
- Adequately address rare and declining wildlife
- Keep public informed of goals, projects, and programs

Appendix C. Red Lake WMA Focus Group Meeting Questions and Responses (2023)

On March 14, 2023, the DNR hosted an in-person focus group meeting at Itasca State Park to receive additional input from stakeholders. The questions that were asked of the participants and a summary of their responses are listed below.

What brought you here today?

- Should have some old age forestry, so much of wildlife management is geared at young stages for diversity, but we should have some areas set aside as old growth, red pine, jack pine, black spruce. The managers will do what is right for wildlife and recreation, but the decisions regarding the WMA should be in the hands of the managers and not forestry.
- Forest health, wildlife habitat, hunting. Should be a diversity of age classes that are ecologically appropriate/guided, interspersion desired. Using timber industry is important to achieve this, but how much and where is important to include in the plan and should be ecologically guided.
- Scale of WMA is impressive, Conservation Volunteer "sense of place" issue, framed by statutes of outdoor recreation system, we do not manage for everything at every property, we need to frame how we are preserving and managing wildlife, and the habitats that go with them.
- Not concerned about specific habitat issues, wants process to be open and honest as a first step part of the process, so you understand where the users come from. Would like to see annual check-ins for goal achievement.
- Need to pay attention to the hydrology, has an impact on your neighbors, DNR used to have a good neighbor policy, some flows coming out of there now need to be paid attention to. Ditch abandonments, etc. Not sure people have an appreciation of the patterned peatlands, should include an educational component/outreach. Doug Easthouse puts on sessions at the Big Bog recreation area.
- 1W1P need to hit some requirements from statutes, good neighbor, want to achieve both goals from both plans.
- Forest Products Industry, understand current inventory, understand desired conditions, how to put into context within the landscape as a whole, manage for forest health for future generations, balance age classes, using timber harvest when possible to achieve goals.
- Look at timber harvest as a tool in the toolbox to meet a lot of goals, including forest health and wildlife. Looking forward to working together.
- Balancing age classes should only apply at an all ownership, statewide basis; not appropriate within a WMA. Two different missions. WMA planning should be done for wildlife habitat and recreation and not necessarily the balance and use of timber as a resource. WMAs are not a multi-use area. Timber harvest should be a tool, not a goal.

- Want to represent diversity of wildlife on the WMA, not just game species. Part of a globally important birding area, numerous Species of Greatest Conservation Need, boreal forest ecosystems. Appreciate that WMAs are different than state forests.
- Diversity of birds, protect habitat, Red Lake WMA is like the Sax Zim of NW MN without crowds and locals. Promote orchids and rare flowers/plants that are found there and the value of them.
- Forest management and native communities and birds and species, want to be constructive in helping the on the ground staff producing plan, meeting the needs of the WMA. Expanding outreach and recreational opportunities. Increase the appreciation of what Red Lake WMA has to offer. Peatland hydrology, understanding it better in terms of ecosystem service benefits, climate change, restoration of natural hydrology to benefit local and downstream habitat.
- Red Lake WMA is a gem from an orthonological perspective, forest peatlands (black spruce and tamarack) harvest has not been as a tool but more as a blunt instrument. Black spruce cannot continue to be harvested in traditional fashion, need alternatives. Birds respond negatively to traditional harvest methods, need more emphasis on important wildlife species using the WMA. Eastern Larch Beetle is impacting birds, need more focus.

What would you like to see addressed in the plan?

- Moved past wanting to put impoundments on the WMA, need to recognize natural water holding capacities of the habitats. Forestry practices on the WMA should be a tool of the wildlife managers and not be done to meet timber goals.
- More information about desired conditions, more about what you anticipate in the desired conditions so that a stakeholder can know that it's not up to whim, where it's going and how it will be accomplished.
- Would like to see iconic indicator species really highlighted in this plan, moose and great gray owl. Still a chance to recover moose populations here.
- Consider climate impacts, specifically during the 10-year period, but also beyond. How to become more adaptable. Carefully define desired future conditions, design what habitat development needs to take place to get to those desired conditions. Look at staffing, budget, and fleet needs to get to that place. Need to take a step back and look at landscape level context to make sure you're moving in the right direction. Address ramifications of climate change.
- All natural resource management is a business—staff, facilities, budget. DNR should show summary of DNR budget, what was used on Red Lake WMA in the past 5 years. Most game and fish positions in the field, plan needs to show how we are going to make this a shining unit for the region, and what do we need/what partners do we need to make this happen. Plan should be written to help get grants from partners.

- LGUs need to put into plans a review of their long range plan every 5 years. Recommend state plans follow the same requirement. Doesn't need to be exhaustive external exercise. This is a flagship WMA. Hydrology is important. Have a mid-plan review (like WD's do, model like 1W1P)
- Red Lake WMA is unique, incredible opportunities for extremely high-quality recreational opportunities, habitat for game and nongame species, resident and migratory species, need to be very intentional about focusing management efforts within the context of the WMA, not reactive. Ceded lands also need to be acknowledged. A strategic look at what is ecologically and biologically the most important in the area. Without that, what makes the jewel shine is lost. Important research and BMPs get updated regularly with specific site level considerations, so the ability to take those into account and take that look at what the WMA can contribute is essential.
- Avoid the generalities used in the Whitewater WMA Master Plan. Be specific, this is an exercise in numbers. We do what we measure. That means we also want to make sure the plan has measurable metrics, and this will drive adjustments and future direction.
- Needs to be commitment by the DNR to include citizens in the biennial work plans. Partners are the ones who are going to get us the money, but they need to be on board with what we're planning to do at an operational level.
- Need to identify a measuring stick, desired conditions in 1W1P needs to be specific (ex. reduction of flow), support the higher level but then focus-in in the biennial plans.
- WMA has a long history of posting good research, should continue to be open to great research issues, need to address maintenance and upkeep of Norris Camp facilities because they are key to good research.
- In addition to what I mentioned before about protecting/preserving/managing habitat for birds, wildlife, and rare plants (orchids) the MN DNR needs to adequately staff the Red Lake WMA. There are numerous opportunities to further educate and introduce the public to this unique area, but it can't be accomplished without enough staff.
- Much work is done through TNC, RGS, take advantage of that, government wants to see funds routed this way rather than hiring more permanent staff. Need to include budget specifics to get that. Trying to improve on format of plan. Need to realize that we have more info than we need, try to keep it simple, manage for suites of species, define wildlife needs and timing of timber management needed to get it. Use the GAP analysis.
- Priorities help guide NGOs. Manage for X, Y, Z in management area A. Help identify where WMA needs overlap with needs of partners. These plans show where priorities align.
- Timber management was underutilized on the WMA. Forest industries thought state could support 1 mil cords, STHA shows 870. Forest industry doesn't care where that comes from. Happy to hear it being referenced as a tool. Good for forest health, economy, etc.
- STH is not being used as it should, needs to be incorporated into all WMA planning processes.

What objectives do you want to see in the plan?

- Check with Roseau River WED and other watershed districts for modeling, they could help identify what modifications could be helpful for downstream impacts. Some of the sources of their issues are coming out of the WMA.
- Encourage reaching out to Natural Resource Research Institute, avian response via point counts, would like to see some of that make it into the plan to embrace the research and use it to identify priorities. Easy to get public input but need to emphasize that the local staff have the best perspective of what's important.
- Using forest management to manage for wildlife but that's where it ends, advocate for having pre-data but also mechanisms built in for monitoring how management affects target and nontarget species.
- Many objectives have been identified already.
- Parks uses a good planning structure. Need to identify minimum standards. Red Lake WMA is its own allowable cut unit. That should be put into the plan. Manage for NPCs but still need to live by STH numbers.
- Important to have timber harvest as a tool and not an objective. Essential for habitat management but need to be able to decide what to do with it rather than try to figure out how to meet harvest goals. The two aren't that far apart.

Action items requested

- Make 1980 plan available to the public, minimally this stakeholder group
- Post a good map online
- Stakeholders would like to see results of 2018 public questionnaire
- Schedule public input meetings around the Red Lake WMA, consider Waskish, Baudette, Roseau area
- Outline of plan would be useful to identify areas that could be addressed to take care of local questions
- Share objectives with stakeholders when available, they want to be included in process
- Include a table showing land acquisition status within the WMA
- Share a list of planning team members and their roles with stakeholders

Appendix D. Red Lake WMA Public Comment Summary (2023)

On May 19, 2023, the draft Red Lake WMA plan was published online for public review and input. The comment period remained open until June 20, 2023.

During this period, Red Lake WMA staff hosted an online plan overview and question session and an in-person open house at the Big Bog SRA Visitor Center during which attendees were encouraged to ask questions and provide input. Comments were also collected via the Engage with DNR website, U.S. mail, email, and personal communication directly to staff.

Division leadership and the planning team reviewed and discussed each comment. The table below is a thematic summary of the comments received and how we addressed those comments. In addition to the comments summarized below, members of the public made helpful comments that corrected minor factual, syntax, or other technical errors and highlighted opportunities for clarification of wording. We made all such known corrections and clarifications, with gratitude to those commenting.

The DNR appreciates and thanks all who took the time to review and comment on the plan.

Comment	Response	Detail
Executive Summary		
Executive summary should include a Division of Fish and Wildlife purpose statement.	Change Made	We agree with the comment, appreciate the feedback, and have made appropriate change(s).
Introduction		
The introduction should include more information about applicable statutes, plans, and directives, how these relate to management of Red Lake WMA, and how conflict between these is resolved.	Change Made	We agree with the comment, appreciate the feedback, and have made appropriate clarifications and change(s).
The introduction should include additional specific guiding documents.	Future Consideration	We appreciate the thoughtful feedback and comments. We cannot include an exhaustive list of all relevant guiding documents in this plan. However, we will reconsider the priority list for future plans. Some additional documents are referenced elsewhere in the plan.

Comment	Response	Detail
The introduction should include the DNR's vision for a comprehensive, state-wide WMA system management plan.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. While this is out of the scope of the Red Lake WMA plan, we are happy to report that a WMA system planning project is already in motion.
The Northern Minnesota and Ontario Peatlands Section Forest Resource Management Plan is referenced. When can we see that plan?	No Changes Made	Thank you for the question. Strategic direction for the plan has been set. The document is currently undergoing final review and will be available to the public when complete.
We agree with the long range goals presented in the introduction.	No Changes Made	We appreciate the thoughtful feedback and comments.
Area History		
Area history includes archeological information that doesn't relate to the management of the WMA.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. Archeological and cultural resources are an important part of the plan and WMA management.
The draft plan does a thorough, informative overview of the WMA's history, archeology and historic sites.	No Changes Made	We agree with the comment and appreciate the feedback.
Existing Conditions		
Existing conditions should include acres by land ownership.	Change Made	We agree with the comment and appreciate the feedback. A table showing this information has been added.
Existing conditions should include an introduction defining "habitat".	Change Made	We agree with the comment, appreciate the feedback, and have made appropriate change(s).

Comment	Response	Detail
Existing conditions should include metrics of current habitat types.	Change Made	We agree with the comment, appreciate the feedback, and have included detailed metrics, including tree species composition goals and growth stage condition goals for each Native Plant Community.
Clarification is needed regarding discussion of management of logging near road corridors versus other locations.	Changes Made	We agree with the comment, appreciate the feedback, and have made appropriate clarifications and changes.
Existing Conditions should elaborate on the importance of wildlife watching and how many sought after species rely upon older forest for at least part of their life cycle.	Changes Made	We appreciate the thoughtful feedback and comments, and have made appropriate change(s).
Existing conditions should include an infrastructure section showing current and desired infrastructure (such as boundary miles, roads, and trails)	Future Consideration	We considered the comment and appreciate the thoughtful feedback. This will be considered in future WMA planning.
Existing conditions is too detailed.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. This level of detail is appropriate for a 10 year plan.
Existing conditions section is good.	No Changes Made	We appreciate the thoughtful feedback and comments.
Existing conditions should highlight the high biodiversity and rare plant and animal species present at Red Lake WMA.	No Changes Made	We appreciate the thoughtful comment and feedback. Biodiversity and rare plants and animals are discussed in the plan.
Existing conditions should include more detail about the socioeconomic impacts of WMAs.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. The information provided is at the appropriate level of detail for the scope of this plan.

Comment	Response	Detail
I have noticed signs of deer declining and signs of moose increasing in the WMA.	No Changes Made	We appreciate the thoughtful feedback and comments. Deer population goals are out of the scope of this Red Lake WMA plan process, but your observations have been noted by the area managers.
The tables in the Existing Conditions section are helpful and informative.	No Changes Made	We appreciate the thoughtful feedback and comments.
Strategic Considerations		
Projected change in forest age classes should be incorporated into the final plan.	Change Made	We agree with the comment, appreciate the feedback, and have included detailed metrics, including tree species composition goals and growth stage condition goals for each Native Plant Community.
What is the new policy on forest habitat management on WMA?	Change Made	Thank you for the question. Clarification regarding this question has been added to the plan.
Strategic considerations section should include value and benefits of wildlife to habitat health.	Changes Made	We appreciate the thoughtful feedback and comments. Discussion of wildlife values have been added.
Strategic Considerations should include a section about partnerships.	Changes Made	We agree with the comment, appreciate the feedback, and have made appropriate change(s).
Forest health should be the top priority.	No Changes Made	We appreciate the thoughtful feedback and comments. Minnesota statutes guide WMA management priorities. Those priorities are reflected in the plan goals, objectives, and strategies.
How does use of license sale dollars and federal funds impact work WMAs?	No Changes Made	Thank you for the question. Activities paid for by license sale and federal dollars on wildlife areas are consistent with appropriate use of those funds.

Comment	Response	Detail
Non-Native Invasive Plants (NNIP) pose one of the greatest short and long-term threats to the integrity of RLWMA's habitats. This needs to be shared with policymakers to ensure adequate resources are made available to lessen the threat.	No Changes Made	We appreciate the thoughtful feedback and comments. Invasive species management at Red Lake WMA is addressed in plan. Landscape level discussions and policies are handled by the DNR at a broader level and are outside the scope of this plan.
Strategic considerations should include details about swapping rules.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. Swap rules are part of agency operation and are actively evolving; therefore, they outside the scope of this plan.
Strategic Considerations should include diseases and health issues impacting trees.	No Changes Made	We appreciate the thoughtful feedback and comments. These considerations are addressed in the plan.
The plan should be clear that when conflicting forest management interest arise, wildlife should be the priority. In statute, wildlife has the priority in the management of WMAs.	No Changes Made	We appreciate the thoughtful feedback and comments. Minnesota statutes highlighting this priority are included in the plan and the goals, objectives, and strategies of the plan reflect this priority.
The plan should provide more detail to goals and objectives, and/or staffing plans and budget.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. The scope of a ten-year plan is intentionally, necessarily broad; we will address greater detail in annual work plans.
We are pleased climate change considerations are incorporated into management decisions. We recommend WMA managers consult the Northern Institute of Applied Climate Sciences (NIACS) Wildlife and Forestry Workbooks.	No Changes Made	We appreciate the thoughtful feedback and comments. The NIACS resources were referenced in the plan objectives.
Desired Conditions		
Desired conditions are unclear and wording is confusing.	Change Made	We agree with the comment, appreciate the feedback, and have made appropriate change(s).

Comment	Response	Detail
Desired conditions included some goals and objectives that were too vague or needed more emphasis.	Change Made	We agree with the comment, appreciate the feedback, and have included detailed metrics, including tree species composition goals and growth stage condition goals for each Native Plant Community.
Desired conditions should be clear that primary forests will not be harvested.	Change Made	We considered the comment and appreciate the thoughtful feedback. Reserve language has been added to the plan.
Desired conditions should include specifics about current native plant community acreage by growth stage and detail on desired state.	Change Made	We agree with the comment, appreciate the feedback, and have included detailed metrics in the plan.
Desired conditions should include the definition of "primary forest".	Change Made	We agree with the comment and appreciate the feedback. The definition of "primary forest" has been added.
Desired conditions state all habitats require active management. This is not true of every habitat, such as peatlands.	Change Made	We agree with the comment, appreciate the feedback, and have made appropriate clarification(s).
Blocking ditches could be harmful to ecological diversity.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. All ecological benefits and impacts will be taken into account as projects are considered and developed.
Closing forest roads that get washed out will reduce access.	No Changes Made	We appreciate the thoughtful feedback and comments. References to closing washed out road is specific to the southernmost 800 feet of Spina Road.
Desired conditions should include an objective such as board feet of timber or acreage to be harvested on a yearly basis.	No Changes Made	We appreciate the thoughtful feedback. We don't use board feet of timber as a measure, timber volume taken off of the WMA is a byproduct of management and not an objective in itself.

Comment	Response	Detail
Desired conditions should include management strategies to improve invertebrate biodiversity.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. Management strategies are still be developed through ongoing research.
Desired conditions should include more selective harvests and less clear cutting.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. We agree and include multiple silvicultural practice options in the plan to best achieve wildlife habitat goals.
Desired conditions should include plans for increased access, especially for those with limited mobility.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. The plan addresses improving certain trails. The WMA has one trail maintained for people with limited mobility.
Desired conditions should include specific management considerations (such as managing for specific wildlife species, fruit bearing trees, short lived species, large diameter cavity trees, or stand types)	No Changes Made	We considered these comments and appreciate the thoughtful feedback. Considerations like this are an important part of the planning process and are included throughout the plan.
Desired conditions should include specific timelines for goals.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. The plan goals are for the 10 year period. Moe specific timelines will be addressed in annual work plans.
Site level active management plans developed from the annual stand exam review must include post-harvest treatment plans.	No Changes Made	We agree with the comment and appreciate the feedback. These details will be contained in annual work plans.
The DNR should put in food plots for wildlife.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. The DNR is moving away from food plots and focusing on managing for more natural food producing-plants, improving habitats and principles of ecosystem health.

Comment	Response	Detail
Implementation Process		
Implementation process should include detailed metrics.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. WMA Major Unit plans are strategic documents outlining the what and why for habitat management within the unit over the next 10 years. Specific management information, including the where, who, and using what tools and resources, will be spelled out in annual work plan documents.
Why is the work schedule of the Wildlife Manager included?	No Changes Made	Thank you for your question. This operational overview shows the variety of work tasks performed.
Research and Monitoring		
Research and monitoring at Red Lake WMA are valuable and should be continued.	No Changes Made	We agree with the comment and appreciate the thoughtful feedback.
General Comments		
The draft plan lacks detailed goals and metrics.	Change Made	We agree with the comment, appreciate the feedback, and have included detailed metrics in the plan.
The plan needs to acknowledge Sustainable Timber Harvest and discuss how it relates to management of Red Lake WMA.	Change Made	We agree with the comment and appreciate the feedback. We have added information on the DNR's forest modeling and planning processes and how it relates to this plan in the "desired conditions" section of the plan.
The plan should include detail and context of the Supplemental Red Lake WMAs, including history and management.	Change Made	We agree with the comment, appreciate the feedback, and have made appropriate change(s).
The plan should include maps showing the boundary and important features of Red Lake WMA.	Change Made	We agree with the comment, appreciate the feedback, and have made appropriate change(s).

Comment	Response	Detail
Appendix K in the draft plan is duplicative and does not add value.	Changes Made	We considered the comment and appreciate the thoughtful feedback. Appendix K of the draft plan has been removed.
Forest ecosystem information has been removed that was present in an earlier version of the plan. This information was useful and should be included.	Changes Made	We considered the comment and appreciate the thoughtful feedback. The information has been added back into the plan.
Is Norris Camp part of the WMA?	Changes Made	Thank you for the question. Norris Camp is used to manage the Red Lake WMA. Clarifications have been made in the plan.
The plan should include discussion on the economic value of wildlife watching.	Changes Made	We considered the comment and appreciate the thoughtful feedback. Discussion of the importance of birdwatching has been added to the plan. Exact economic value for the WMA itself is difficult to determine and is therefore not included in the plan.
The plan should include the 2018 public survey results and the 2023 focus group results.	Changes Made	We agree with the comment and appreciate the feedback. These results have been added to the Appendix.
The public comment period was not long enough. There is only one week between the close of public comment and finalization of the plan. It is hard to see how the DNR has the time and resources to thoroughly consider, evaluate and incorporate public comments. Public opinions should be part of the discourse.	Changes Made	We appreciate the thoughtful feedback and comments. The summary of comments and responses is provided in the final plan (this table). We acknowledge that members of the public have requested longer comment periods and that the time between close of public comments and plan finalization was short. We are working to improve this process for future planning projects.
Plans should include land and resource descriptions, management issues and opportunities, requirements and constraints, goals and implementation strategies, and provisions for amendment. This information is crucial to work planning, budgeting, performance	Future Consideration	We considered the comment and appreciate the thoughtful feedback. WMA Major Unit plans are strategic documents outlining the what and why for habitat

Comment	Response	Detail
review, and accountability to accomplish the statutorily mandated purposes of WMAs and AMAs.		management within the unit over the next 10 years. Specific management information, including the where, who, and using what tools and resources, will be spelled out in annual work plan documents.
The DNR should develop a state-wide WMA system plan and landscape-based assessments to guide smaller WMAs.	Future Consideration	We considered the comment and appreciate the thoughtful feedback. We are happy to report that a WMA system planning project is already in motion.
We support the objectives evaluating potential for lowland conifer old growth designation, protection and management of the Rapid River Headwaters, and Spring Fen management and study. We recognize the need for adaptive management, the Red Lake WMA Master Plan should be adapted as new information emerges.	Future Consideration	We appreciate the thoughtful feedback and comments. The DNR strives to use adaptive management strategies to keep up with changing conditions and that includes the management of Red Lake WMA.
Additional DNR leadership should sign the plan as well as the Commissioner.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. Additional DNR leadership approval is implicit in the Commissioner's signature.
Clearcut with reserves is the silvicultural harvest prescription that has the greatest potential to alter forest composition, age, and structure. Commercial thinning and uneven harvest prescriptions will change post-harvest stand characteristics, but it is assumed that post-harvest conditions will still retain the basic structure and compositional characteristics of the pre-harvest stand.	No Changes Made	We appreciate the thoughtful feedback and comments. These concepts are addressed in the plan.
Currently available public comments should have been included in the draft plan	No Changes Made	We considered the comment and appreciate the thoughtful feedback. A summary of public comment results are included in the final plan (this table).
DNR leadership should be at public comment sessions to gain context.	No Changes Made	We appreciate the thoughtful feedback and comments. Regional DNR leadership was present at the public comment sessions.

Comment	Response	Detail
Does this plan include management of the Red Lake fishery?	No Changes Made	Thank you for your question. Actions on WMAs can improve lake quality. However, the scope of this plan is the WMA only. Fisheries of Red Lake are managed separately.
I am disappointed in this plan. Local people should have been more involved in the comment process.	No Changes Made	We appreciate the thoughtful feedback and comments. The public was offered three different input opportunities: a scoping questionnaire at the beginning of the planning process, an online input session midway through the process, and a final commenting period when the draft plan was made public.
Increasing acreage of young forest habitat would lead to more successful hunts for deer and grouse, attracting more hunters to the Red Lake WMA.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. Considerations like this are an important part of the planning process.
Is camping allowed in Red Lake WMA?	No Changes Made	Thank you for the question. A special permit is required for dispersed camping. Contact the area wildlife manager for details.
Our forest does a good job of taking care of wildlife when we keep it healthy.	No Changes Made	We appreciate the thoughtful feedback and comments. Considerations like this are an important part of the planning process and are included throughout the plan.
Thank you to the planning team for your work on this plan.	No Changes Made	We appreciate the thoughtful feedback and comments.

Comment	Response	Detail
The plan does not do enough to address concerns about timber harvest.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. We believe the plan is consistent with DNR's commitment to manage WMAs to achieve fish and wildlife habitat objectives, and in some cases, to use active management techniques like timber harvest to accomplish those objectives.
The plan does not do enough to address support for timber harvest.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. We believe the plan is consistent with DNR's commitment to manage WMAs to achieve fish and wildlife habitat objectives, and in some cases, to use active management techniques like timber harvest to accomplish those objectives.
The plan includes many objectives we fully support, particularly in the service of protecting/restoring sensitive peatlands and fens.	No Changes Made	We appreciate the thoughtful feedback and comments.
The plan should address specific species or site management issues that the commenter has seen/observed (e.g., "there is X happening at Y location right now").	No Changes Made	We considered these comments and appreciate the thoughtful feedback. Where a commenter noted anything like this, we have referred the specific issue to appropriate staff for consideration and potential future action.
The plan should be clear that "other forms of compatible outdoor recreation" on WMAs do not include activities that require significant infrastructure development.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. This distinction is included in WMA statute.
The plan should include a phase out of lead ammunition and tackle use and possession.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. Where a comment references a policy or rule that is not within the scope of an individual WMA planning process, we refer the commenter to the

Comment	Response	Detail
		appropriate policy-making (e.g., legislative) or rule-making (e.g. season setting) venue. As we implement this plan, we will fully consider and incorporate as appropriate any future statutory or rule changes.
The plan should preserve and expand access the WMA as a public resource, including more roads and trails.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. The plan includes objectives that focus on maintaining and increasing trails. References to minimizing use of existing trails is in only included when referring to sensitive communities. The plan does not restrict future access.
The planning and report decision making processes were not transparent enough.	No Changes Made	We appreciate the thoughtful feedback and comments. All comments were reviewed. This appendix is a method of transparency for our comment response. We are working to improve this process for future planning projects.
The protection of the Red Lake Peatland is and should continue to be a major emphasis of the plan.	No Changes Made	We agree with the comment and appreciate the feedback.
We appreciate that the plan includes activities in which wildlife habitat can be improved through timber harvest.	No Changes Made	We considered the comment and appreciate the thoughtful feedback. We believe the plan is consistent with DNR's commitment to manage WMAs to achieve fish and wildlife habitat objectives, and in some cases, to use active management techniques like timber harvest to accomplish those objectives.

Comment	Response	Detail
We enjoy using the WMA and experiencing all its unique features and uses.	No Changes Made	We appreciate the feedback.
Wildlife should have priority in the management of WMA, per Minnesota statute.	No Changes Made	We appreciate the thoughtful feedback and comments. Minnesota statutes highlighting this priority are included in the plan and the goals, objectives, and strategies reflect this priority.

Appendix E. Acronyms and Initialisms Used in the Red Lake WMA Master Plan

Acronym	Explanation	Page First Occurs
Bat HCP	Lake States Forest Management Bat Habitat Conservation Plan	65
CCC	Civilian Conservation Corps	17
CCMP	Comprehensive Conservation Management Plan	12
Con-Con	Consolidated Conservation	15
CWD	Chronic Wasting Disease	61
DBH	Diameter at Breast Height	47
DNR	Minnesota Department of Natural Resources	1
DPA	Deer Permit Area	58
EAB	Emerald Ash Borer	67
ELB	Eastern Larch Beetle	67
END	Endangered	38
EWR	Ecological and Water Resources Division	2
FAW	Fish and Wildlife Division	1
FR	Forest Road	21
FOR	Forestry Division	70
FTC	Forest Tent Caterpillar	67
HUC	Hydrological Unit Code	31
HWT	Hunter Walking Trail	60
IBA	Important Bird Area	26
LCCMR	Legislative-Citizen Commission on Minnesota Resources	23
LSOHC	Lessard-Sams Outdoor Heritage Council	23
LUP	Land Utilization Project	12
MFRC	Minnesota Forest Resources Council	74
MNWAP	Minnesota Wildlife Action Plan	13
NIACS	Northern Institute of Applied Climate Science	73
NMOP	Northern Minnesota and Ontario Peatlands Section	12
NPC	Native Plant Community	33
NRCS	Natural Resources Conservation Service	29

Acronym	Explanation	Page First Occurs
OHV	Off-Highway Vehicle	28
OFMC	Old Forest Management Complex	93
RLG	Red Lake Game	15
RMZ	Riparian Management Zone	74
SFRMP	Section Forest Resource Management Planning	12
SGCN	Species in Greatest Conservation Need	26
SLAM	Strategic Land Asset Management	23
SNA	Scientific and Natural Area	16
SPC	Species of Special Concern	38
TB	Tuberculosis	64
THR	Threatened	38
USFS	U.S. Forest Service	79
USFWS	U.S. Fish and Wildlife Service	10
WMA	Wildlife Management Area	1
WNS	White Nose Syndrome	65

Appendix F. Climate Data for Red Lake WMA

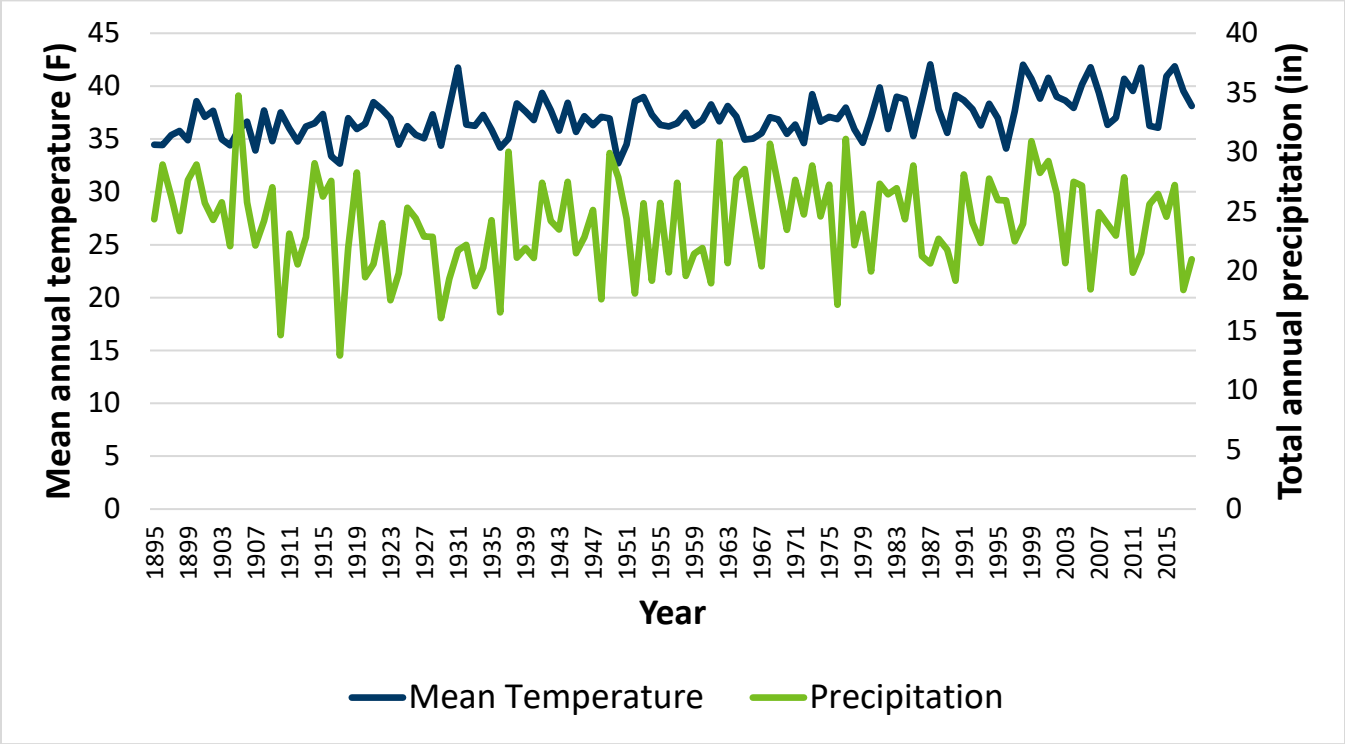
Temperature, precipitation, and snowfall for the Red Lake WMA vicinity, 1981-2010.

Month	Average low temperature (F)	Average high temperature (F)	Average precipitation (inches)	Average snowfall (inches)
January	-7	15	0.63	9.49
February	-1	22	0.59	7.53
March	13	35	0.98	6.54
April	28	53	1.42	4.65
May	40	65	2.95	0.30
June	50	74	4.21	0
July	54	79	3.62	0
August	53	77	3.7	0
September	43	66	2.95	0
October	31	52	2.17	2.88
November	18	35	1.22	5.35
December	0	20	0.75	9.98
Mean	26.8	49.4	N/A	N/A
Total	N/A	N/A	25.19	46.70

Temperature and precipitation data from U.S. Climate Data for Roosevelt, MN, 1981-2010

Snowfall data from Camp Norris DNR NWS Reporting Station, 2001-2018

Mean annual temperature and total annual precipitation at Red Lake WMA, 1895-2018



Data from *MNDNR Minnesota Climate Trends* for Rapid River and Upper/Lower Red Lake Major Watersheds geographic unit

Appendix G. Conservation Status Ranks

Rank Code	Rank Label	Rank Description
S1	Critically Imperiled	At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
S2	Imperiled	At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
S3	Vulnerable	At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
S4	Apparently Secure	Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure	Common; widespread and abundant.

Appendix H. Complete Bird Checklist for Red Lake WMA

Birds of Red Lake WMA	Sp	Su	Fa	Wi	Nest
☐ American Crow	C	C	C	U	*
☐ Common Raven	U	U	C	C	*
☐ Horned Lark			R		
☐ Tree Swallow	A	A	A		*
☐ Cliff Swallow	U	U	U		*
☐ Barn Swallow	C	C	C		*
☐ Black-capped Chickadee	A	A	A	A	*
☐ Boreal Chickadee	U	U	U	U	*
☐ Red-breasted Nuthatch	C	C	C	C	*
☐ White-breasted Nuthatch	C	C	C	C	*
☐ Brown Creeper	U	U	U		*
☐ House Wren	C	C	C		*
☐ Winter Wren	U	U	U		*
☐ Sedge Wren	C	C	C		*
☐ Marsh Wren	C	C	C		*
☐ Golden-crowned Kinglet	C	C	C	R	*
☐ Ruby-crowned Kinglet	U	U	U		*
☐ Eastern Bluebird	U	U	U		*
☐ Veery	A	A	A		*
☐ Gray-cheeked Thrush	U		U		
☐ Swainson's Thrush	U	U	U		*
☐ Hermit Thrush	C	C	C		*
☐ Wood Thrush	R	R	R		*
☐ American Robin	C	C	C		*
☐ Gray Catbird	C	C	C		*
☐ Brown Thrasher	C	C	C		*
☐ European Starling	R	R	R	R	*
☐ Bohemian Waxwing	C		U	C	
☐ Cedar Waxwing	C	C	C		*
☐ Golden-winged Warbler	U	U	U		*
☐ Tennessee Warbler	R	R	R		*
☐ Orange-crowned Warbler	R		R		
☐ Nashville Warbler	A	A	A		*
☐ Northern Parula	U	U	U		*
☐ Yellow Warbler	C	C	C		*
☐ Chestnut-sided Warbler	C	C	C		*
☐ Magnolia Warbler	U	U	U		*
☐ Cape May Warbler	R	R	R		*
☐ Yellow-rumped Warbler	C	C	C		*
☐ Black-throated Green Warbler	C	C	C		*
☐ Blackburnian Warbler	C	C	C		*
☐ Pine Warbler	U	U	U		*
☐ Palm Warbler	C	C	C		*
☐ Bay-breasted Warbler	R	R	R		*
☐ Blackpoll Warbler	R		R		
☐ Black-and-white Warbler	C	C	C		*
☐ American Redstart	A	A	A		*
☐ Ovenbird	A	A	A		*
☐ Northern Waterthrush	R	R	R		*

Birds of Red Lake WMA	Sp	Su	Fa	Wi	Nest
☐ Connecticut Warbler	C	C	C		*
☐ Mourning Warbler	C	C	C		*
☐ Common Yellowthroat	A	A	A		*
☐ Wilson's Warbler	A	R	A		*
☐ Canada Warbler	C	C	C		*
☐ Scarlet Tanager	U	U	U		*
☐ Eastern Towhee	U	U	U		*
☐ American Tree Sparrow	C		C	R	
☐ Chipping Sparrow	C	C	C		*
☐ Clay-colored Sparrow	C	C	C		*
☐ Vesper Sparrow	U		U		
☐ Savannah Sparrow	A	A	A		*
☐ Grasshopper Sparrow	U	U	U		*
☐ Le Conte's Sparrow	C	U	C		*
☐ Nelson's Sharp-tailed Sparrow	R	R	R		*
☐ Fox Sparrow	C		C		
☐ Song Sparrow	C	C	C		*
☐ Lincoln's Sparrow	C	C	C		*
☐ Swamp Sparrow	C	C	C		*
☐ White-throated Sparrow	A	A	A		*
☐ Harris's Sparrow	C		C	R	
☐ White-crowned Sparrow	C		C		
☐ Dark-eyed Junco	A	C	A	U	*
☐ Lapland Longspur	U		U		
☐ Snow Bunting	C		C	U	
☐ Rose-breasted Grosbeak	C	C	C		*
☐ Indigo Bunting	U	U	U		*
☐ Bobolink	C	C	C		*
☐ Red-winged Blackbird	A	A	A		*
☐ Western Meadowlark	C	C	C		*
☐ Yellow-headed Blackbird	U	U	U		*
☐ Rusty Blackbird	C	R	C		*
☐ Brewer's Blackbird	A	A	A		*
☐ Common Grackle	U	U	U		*
☐ Brown-headed Cowbird	C	C	C		*
☐ Baltimore Oriole	U	U	U		*
☐ Pine Grosbeak	C	R	C	C	
☐ Purple Finch	C	U	C	C	*
☐ Red Crossbill	U	U	U	U	*
☐ White-winged Crossbill	U	U	U	U	*
☐ Common Redpoll	C		C	C	
☐ Hoary Redpoll				U	
☐ Pine Siskin	C	C	C	A	*
☐ American Goldfinch	C	C	C	C	*
☐ Evening Grosbeak	R	R	R	R	*
☐ House Sparrow	R	R	R		*

Accidental
(Seen only once or twice in the area)
Black-throated Blue Warbler

MN Dept. of Natural Resources
Division of Fish and Wildlife, mndnr.gov

MNDNR

RED LAKE WILDLIFE MANAGEMENT AREA

BIRD Checklist

Photo by Kathy Clark

Connecticut Warbler

Birding Opportunities at Red Lake Wildlife Management Area

The Red Lake Wildlife Management Area (WMA) is the largest in the state, covering 321,771 acres in Lake of the Woods and Beltrami counties. The Red Lake Game Preserve was established by the Minnesota legislature in 1929. The area has been open to public hunting and trapping since 1957.

The unit is managed primarily for white-tailed deer, ruffed grouse, and other forest wildlife species. Public uses include hunting, berry picking, and wildlife and wildflower observation. The area is very remote and is accessible only by forest roads and walking trails.

The Red Lake WMA is a mosaic of habitat types, including lowland conifer (black spruce, tamarack), lowland brush, open bog/fen, bottomland hardwoods along streams/rivers (silver maple, ash, and balm of Gilead), and upland forests of mixed deciduous/conifer. A portion of the WMA is adjacent to Upper Red Lake. Several bog lakes and three artificial impoundments are also included within the WMA.

Continued on page 2

(Continued from cover page)

Birds of Red Lake are typical of the boreal/coniferous/deciduous forest. There are 197 bird species found on the WMA, with 149 of these species presumed nesting. Unique species of the Red Lake WMA include: Boreal Owl, Great Gray Owl, Sharp-tailed Sparrow, Three-toed Woodpecker, Spruce Grouse, Connecticut Warbler, Northern Goshawk, Black-backed Woodpecker, and Boreal Chickadee. The best time for viewing many of these unique species is in the spring or early summer.

Birding in this remote area can be a richly rewarding adventure.

Contact Information

Wildlife Area Manager, Red Lake WMA
Box 100, Roosevelt, MN 56673
(218) 783-6861

Season and Abundance Key

The **seasons** in the checklist are defined as follows:
Sp (Spring) = March, April, May
Su (Summer) = June, July
Fa (Fall) = August, September, October, November
Wi (Winter) = December, January, February

Abundance codes are defined as follows:
A = Abundant - 50/day or in excess of 250 in a season
C = Common - 6-50/day or from 25 to 250 in a season
U = Uncommon - 1 to 5/day or from 5 to 25 in a season
R = Rare - Season counts of no more than 5
Nest - An asterisk indicates that nesting or breeding has been observed

The names and taxonomic arrangement of species follows that of the Checklist of the Birds of Minnesota (January 2009), prepared by the Minnesota Ornithological Records Committee. Field documentation of birds were compiled from the Red Lake WMA master plan and personal observations by Steve Merchant, Thom Soule, Mike North, Beth Siverhus and Gretchen Mehmel. Checklist developed by the DNR Wildlife GIS Group in Bemidji, April 2012.

Date:

Weather:

Observers:

Notes:

Fold # 2

Birds of Roseau River WMA	Sp	Su	Fa	Wi	Nest
Greater White-fronted Goose	R		R		
Snow Goose	C		C		
Canada Goose	A	C	A		*
Trumpeter Swan	C	C	C		*
Tundra Swan	R		R		
Wood Duck	C	C	C		*
Gadwall	R	R	R		*
American Wigeon	U	U	U		*
American Black Duck	A	A	A		
Mallard	A	A	A		*
Blue-winged Teal	C	C	C		*
Northern Shoveler	U	U	U		*
Northern Pintail	U	U	U		
Green-winged Teal	C	C	C		*
Canvasback	U		U		
Redhead	U		U		
Ring-necked Duck	A	A	A		*
Greater Scaup	U		U		
Lesser Scaup	C		C		*
White-winged Scoter	R		R		
Bufflehead	C	U	C		
Common Goldeneye	C	C	C		*
Hooded Merganser	C	C	C		*
Common Merganser	U				
Ruddy Duck	R	R	R		
Gray Partridge	R	R	R		
Ruffed Grouse	A	A	A	C	*
Spruce Grouse	C	C	C	C	*
Sharp-tailed Grouse	C	C	C	C	*
Common Loon	U	U	U		
Red-necked Grebe	C	C	U		
Red-necked Grebe	C	C	U		
Pied-billed Grebe	C	C	C		*
Eared Grebe	R	R	R		
Western Grebe	R	R	R		
American White Pelican	U	C	U		
Double-crested Cormorant	U	U	U		
American Bittern	C	C	C		*
Great Blue Heron	C	C	C		*
Turkey Vulture	C	U	C		*
Osprey	U		U		
Bald Eagle	U	U	C	U	*
Northern Harrier	C	C	C		*
Sharp-shinned Hawk	U	U	U		*
Cooper's Hawk	R	R	R		*
Northern Goshawk	U	U	U	U	*
Broad-winged Hawk	C	C	C		*
Red-tailed Hawk	C	C	C		*
Rough-legged Hawk	C		C	R	
Golden Eagle	R		R		
American Kestrel	C	C	C		*
Merlin	R	R	U		*
Peregrine Falcon	R	R	U		
Yellow Rail	R	R	R		
Virginia Rail	R	R	R		

Fold # 1

Birds of Roseau River WMA	Sp	Su	Fa	Wi	Nest
Sora	U	U	U		*
American Coot	C	C	C		*
Sandhill Crane	C	C	C		*
Killdeer	C	C	C		*
Solitary Sandpiper	U		U		
Spotted Sandpiper	U	U	U		
Upland Sandpiper	R	R	R		
Wilson's Snipe	C	C	C		*
American Woodcock	C	C	C		*
Wilson's Pharalope	R	R	R		*
Franklin's Gull	R		R		
Ring-billed Gull	U		U		
Black Tern	C	U	C		*
Mourning Dove	C	C	C		*
Black-billed Cuckoo	U	U	U		*
Eastern Screech-Owl	R	R	R	R	
Great Horned Owl	C	C	C	C	*
Snowy Owl			R	R	
Northern Hawk Owl	R	R	R	R	*
Barred Owl	C	C	C	C	*
Great Gray Owl	U	U	U	U	*
Long-eared Owl	R	R	R	R	*
Short-eared Owl	U	U	U	R	*
Northern Saw-whet Owl	C	C	C	C	*
Common Nighthawk	U	U	U		*
Eastern Whip-poor-will	C	C	C		*
Chimney Swift	U	U	U		*
Ruby-throated Hummingbird	C	C	C		*
Belted Kingfisher	C	C	C		*
Red-headed Woodpecker	R	R	R		*
Yellow-bellied Sapsucker	C	C	C	U	*
Downy Woodpecker	C	C	C	C	*
Hairy Woodpecker	C	C	C	C	*
American Three-toed Woodpecker	R	R	R	R	*
Black-backed Woodpecker	U	U	U	U	*
Northern Flicker	C	C	A		*
Pileated Woodpecker	C	C	C	C	*
Olive-sided Flycatcher	C	C	R		*
Eastern Wood-Pewee	C	C	C		*
Alder Flycatcher	A	A	A		*
Least Flycatcher	A	A	A		*
Eastern Phoebe	U	U	U		*
Great Crested Flycatcher	C	C	C		*
Eastern Kingbird	C	C	C		*
Northern Shrike	U		U	U	
Blue-headed Vireo	U	U	U		*
Warbling Vireo	U		U		*
Philadelphia Vireo	R		R		
Red-eyed Vireo	A	A	A		*
Gray Jay	C	C	C	C	*
Blue Jay	C	C	C	C	*

Appendix I. Identified Tree Diameter Thresholds for Cavity Dependent Wildlife based on Several Studies

Threshold (cm)	Species	What	Source
15	Downy woodpecker	Minimum size, VA, and Atlantic Canada	Connor et al. 1975, Towers et al. 1992
17	Hairy woodpecker	Minimum size, BC, aspen only	Harestad and Keisker 1989
19	Yellow-bellied sapsucker	Minimum size, SE MN, 88% aspen	Adkins Giese 1999
20	Hairy woodpecker	Minimum size, SE MN, mixed deciduous	Adkins Giese 1999
20	Yellow-bellied sapsucker	Minimum size, BC, >87% aspen	Harestad and Keisker 1989
21	Hairy woodpecker	Minimum size, MN, aspen only	North 2021
21	Yellow-bellied sapsucker	Minimum size, MN, aspen only	North 2021
21	Yellow-bellied sapsucker	Mean size, Atlantic Canada, mixed deciduous	Warren 2004
21.5	Yellow-bellied sapsucker	Minimum size, AB, aspen only	Cooke and Hannon 2012
21.5	Northern flicker	Minimum size, AB, harvested aspen	Cooke and Hannon 2012
24	Northern flicker	Minimum size, AB, unharvested aspen	Cooke and Hannon 2012
25	Woodpecker guild	Threshold of greater use than availability, BC	Harestad and Keisker 1989
25	Hairy woodpecker	Minimum size, Atlantic Canada, mixed deciduous	Warren 2004
25	Ruffed grouse	Minimum size drumming log per guidelines	Gullion 1984, MNDNR 2014
25	Big brown bat	Minimum tree roost dbh	Swingen et al. 2017
25-35	Northern long-eared bat	Modal tree roost dbh	Swingen et al. 2017
25.1	Downy woodpecker	Minimum size, BC, aspen only	Martin et al. 2004

Threshold (cm)	Species	What	Source
25.4	Pileated woodpecker	Minimum size, Atlantic Canada, mixed deciduous	Towers et al. 1992
25.5	Yellow bellied sapsucker	Mean size, WY, >90% aspen	Loose and Anderson 1995
26	Pileated woodpecker	Minimum size, BC, aspen only	Harestad and Keisker 1989
26.4	Marten	Minimum maternal den size, aspen and all trees (n=35)	Erb et al. 2015
27	Downy woodpecker	Mean size, MN, aspen only (n=5)	M. North, unpubl. data
27.5	Hairy woodpecker	Mean size, BC, aspen only	Harestad and Keisker 1989
30	Yellow bellied sapsucker	Mean size, SE MN, 88% aspen	Adkins Giese 1999
30	Bat Guild	Modal tree roost dbh for all bats combined	Swingen et al. 2017
30.3	Hairy woodpecker	Mean size, BC, aspen only	Martin et al. 2004
30.9	Hairy woodpecker	Mean size, AB, aspen only	Cooke and Hannon 2012
31	Yellow bellied sapsucker	Mean size, Atlantic Canada, mixed deciduous	Towers et al. 1992
32.3	Hairy woodpecker	Mean size, WY, >90% aspen	Loose and Anderson 1995
32.8	Hairy woodpecker	Mean size, Atlantic Canada, mixed deciduous	Towers et al. 1992
32.8	Yellow bellied sapsucker	Mean size, BC, >87% aspen	Harestad and Keisker 1989
33	Hairy woodpecker	Minimum size, SE MN, mixed deciduous	Adkins Giese 1999
33	Pileated woodpecker	Minimum size, VA deciduous	Connor et al. 1975
33.4	Pileated woodpecker	Minimum size, AB, aspen only	Cooke and Hannon 2012
33.6	Yellow bellied sapsucker	Mean size, VT, 68% aspen	Runde and Capen 1987

Threshold (cm)	Species	What	Source
33.8	Hairy woodpecker	Mean size, MN, aspen only	North 2021
34	Yellow bellied sapsucker	Mean size, MN, aspen only	North 2021
34.3	Yellow bellied sapsucker	Mean size, AB, aspen only	Cooke and Hannon 2012
34.5	Fisher	Minimum maternal den size, aspen and all trees (n=82)	Erb et al. 2015
35	Guild	Management threshold for PIWO, YBSA, HAWO	Cooke and Hannon 2012
35	Pileated woodpecker	Minimum size, MN, aspen only (n=3)	North 2021
35	Northern long-eared bat	Modal tree roost dbh	Swingen et al. 2017
35.3	Yellow bellied sapsucker	Mean size, BC, aspen only	Squire and Bunnell 2018
35.4	Northern flicker	Mean size, BC, 96% aspen	Martin et al. 2004
35.6	Hairy woodpecker	Mean size, Atlantic Canada, mixed deciduous	Warren 2004
36.5	Northern flicker	Mean size, AB, harvested areas	Cooke and Hannon 2012
37	Yellow bellied sapsucker	Mean size, Atlantic Canada, mixed deciduous	Warren 2004
38.4	Northern flicker	Mean size, AB, unharvested areas	Cooke and Hannon 2012
40	Wood duck	Proportion trees with suitable cavities increases exponentially	Zlonis et al. 2020
40.4	Marten	Mean maternal den size, aspen only (n=14)	Erb et al. 2015
40.5	Pileated woodpecker	Mean size, BC, aspen only	Harestad and Keisker 1989
42	Pileated woodpecker	Minimum size, SE MN, mixed deciduous (n=4)	Adkins Giese 1999
42.9	Marten	Mean maternal den size, all trees (n=35)	Erb et al. 2015
44.5	Pileated woodpecker	Mean size, Atlantic Canada, mixed deciduous	Towers et al. 1992
44.8	Pileated woodpecker	Mean size, BC, aspen only	Martin et al. 2004
44.8	Pileated woodpecker	Mean size, AB, aspen only	Cooke and Hannon 2012

Threshold (cm)	Species	What	Source
50	Wood duck	Probability of suitable cavity ≥10% for aspen	Zlonis et al. 2020
50	Fisher	Mean maternal den size, BC, aspen only (n=20)	Weir et al. 2012
50.3	Fisher	Mean maternal den size, MN, aspen only (n=52)	Erb et al. 2015
50.8	Fisher	Mean maternal den size, MN, all trees (n=82)	Erb et al. 2015
50.8	Barred owl	Minimum recommended dbh suitable for nesting	Allen 1987

Appendix J. Mammal Species Known or Suspected to Occur on or Near Red Lake WMA

Common Name	Scientific Name	Habitat	State Status	Federal Status
Snowshoe Hare	*Lepus canadensis*	F,B,W	None	None
Masked Shrew	*Sorex cinereus*	F,B,W,P	None	None
Water Shrew	*Sorex palustris*	F,B,W	None	None
Arctic Shrew	*Sorex arcticus*	F,B,W	None	None
Pygmy Shrew	*Microsorex hoyi*	F,B,W	None	None
Short-tailed Shrew	*Blarina brevicauda*	F,B,W,P	None	None
Star-nosed Mole	*Condylura cristata*	B,W	None	None
Big Brown Bat	*Eptesicus fuscus*	F,B,W,P	SPC	None
Red Bat	*Lasiurus borealis*	F,B,P,W	SGCN	None
Hoary Bat	*Lasiurus cinereus*	F,B,P,W	SGCN	None
Little Brown Myotis	*Myotis lucifugus*	F,B,P,W	SPC	None
Northern Long-eared Bat	*Myotis septentrionalis*	F,B,P,W	SPC	END
Gray Wolf	*Canus lupus*	F,B,P,W	None	THR
Coyote	*Canis latrans*	F,B,P,W	None	None
Red Fox	*Vulpes vulpes*	F,B.P	None	None
Gray Fox (possible)	*Urocyon cinereoargenteus*	F,B,P	None	None
Bobcat	*Lynx rufus*	F,B,W	None	None
Canada Lynx (Occasional)	*Lynx canadensis*	F	SPC	THR
Mountain Lion (Occasional)	*Puma concolor*	F,B,P,W	SPC	None
Striped Skunk	*Mephitis mephitis*	F,B,P	None	None
River Otter	*Lontra canadensis*	W	None	None
Least Weasel (possible)	*Mustela nivalis*	F,B,P,W	SPC	None
Ermine (Short-tailed Weasel)	*Mustela erminea*	F,B,P,W	None	None

Common Name	Scientific Name	Habitat	State Status	Federal Status
Long-tailed Weasel (possible)	*Mustela frenata*	F,B,P,W	None	None
Mink	*Neovison vison*	W	None	None
Badger	*Taxidea taxus*	P	SGCN	None
Fisher	*Pekania pennanti*	F	None	None
Pine Marten	*Pekania americana*	F	None	None
Raccoon	*Procyon lotor*	F,B,P	None	None
Black Bear	*Ursus americana*	F,B,P,W	None	None
Moose	*Alces alces*	F,B,W	SPC	None
White-tailed Deer	*Odocoileus virginianus*	F,B,P,W	None	None
Elk (Occasional)	*Cervus elaphus*	F,P	SPC	None
Porcupine	*Erethizon dorsatum*	F,B,P,W	None	None
Beaver	*Castor canadensis*	W	None	None
House Mouse	*Mus musculus*	F,B,P	None	None
Woodland Jumping Mouse	*Napaeozapus insignis*	F	None	None
White-footed Mouse	*Peromyscus leucopus*	F,B	None	None
Deer Mouse	*Peromyscus maniculatus*	F,B,P	None	None
Meadow Jumping Mouse	*Zapus hudsonius*	B,W,P	None	None
Meadow Vole	*Microtus pennsylvanicus*	B,P	None	None
Southern Red-backed Vole	*Clethrionomys gapperi*	B,P	None	None
Northern Bog Lemming	*Synaptomys borealis*	W	SPC	None
Southern Bog Lemming	*Synaptomys cooperi*	W	None	None
Muskrat	*Ondatra zebethicus*	W	None	None
Northern Flying Squirrel	*Glaucomys sabrinus*	F	None	None
Thirteen-lined Ground Squirrel	*Ictidomys tridecemlineatus*	P	None	None
Franklin's Ground Squirrel	*Poliocitellus franklinii*	B,P	SGCN	None

Common Name	Scientific Name	Habitat	State Status	Federal Status
Woodchuck	*Marmota monax*	B,P	None	None
Eastern Gray Squirrel (Occasional)	*Sciurus carolinensis*	F	None	None
Least Chipmunk	*Eutamius minimus*	F	None	None
Eastern Chipmunk	*Tamias striatus*	F	None	None
Red Squirrel	*Tamiasciurus hudsonicus*	F	None	None

Habitat Key: F=Forest, B=Brushlands, W=Wetlands, P=Prairies and Grasslands

END=endangered, THR=threatened, SPC=special concern, SGCN=Species of Greatest Conservation Need (all of Minnesota's endangered, threatened, and special concern species are SGCN, those listed as SGCN in the table are species not on the Minnesota's endangered, threatened, and special concern list)

Appendix K. Fish Species Known or Suspected to Occur at Red Lake WMA

Common Name	Scientific Name
Bigmouth Shiner	*Notropis dorsalis*
Black Crappie	*Pomoxis nigromaculatus*
Blacknose Dace	*Rhinichthys obtusus*
Blacknose Shiner	*Notropis heterolepis*
Blackside Darter	*Percina maculata*
Bluegill	*Lepomis macrochirus*
Brassy Minnow	*Hybognathus hankinsoni*
Brook Stickleback	*Culaea inconstans*
Brown Bullhead	*Ameiurus nebulosus*
Central Mudminnow	*Umbra limi*
Common Shiner	*Luxilus cornutus*
Creek Chub	*Semotilus atromaculatus*
Fathead Minnow	*Pimephales promelas*
Finescale Dace	*Phoxinus neogaeus*
Hornyhead Chub	*Nocomis biguttatus*
Iowa Darter	*Etheostoma exile*
Johnny Darter	*Etheostoma nigrum*
Largemouth Bass	*Micropterus salmoides*
Logperch	*Percina caprodes*
Longnose Dace	*Rhinichthys cataractae*
Northern Brook Lamprey	*Ichthyomyzon fossor*
Northern Pike	*Esox lucius*
Northern Redbelly Dace	*Chrosomus eos*

Common Name	Scientific Name
Pearl Dace	*Margariscus margarita*
Pumpkinseed	*Lepomis gibbosus*
Sand Shiner	*Notropis stramineus*
Shorthead Redhorse	*Moxostoma macrolepidotum*
Silver Lamprey	*Ichthyomyzon unicuspis*
Silver Redhorse	*Moxostoma anisurum*
Smallmouth Bass	*Micropterus dolomieui*
Tadpole Madtom	*Noturus gyrinus*
Walleye	*Sander vitreus*
Western Blacknose Dace	*Rhinichthys obtusus*
White Sucker	*Catostomus commersonii*
Yellow Perch	*Perca flavescens*

Appendix L. Reptiles and Amphibians Known or Suspected to Occur at Red Lake WMA

Taxa	Common Name	Scientific Name	Red Lake WMA Status	State Status
Amphibian	Eastern Tiger Salamander	*Ambystoma tigrinum*	Present	None
Amphibian	Blue-spotted Salamader	*Ambystoma laterale*	Present	None
Amphibian	American Toad	*Anaxyrus americanus*	Common	None
Amphibian	Canadian Toad	*Anaxyrus canadensis*	Possible	None
Amphibian	Cope's Gray Tree Frog	*Hyla chrysoscelis*	Present	None
Amphibian	Gray Tree Frog	*Hyla versicolor*	Present	None
Amphibian	Green Frog	*Lithobates clamitans*	Upper Red L.	None
Amphibian	Mink Frog	*Lithobates septentrionalis*	Present	None
Amphibian	Spring Peeper	*Pseudacris crucifer*	Common	None
Amphibian	Boreal Chorus Frog	*Pseudacris maculata*	Present	None
Amphibian	Northern Leopard Frog	*Lithobates pipiens*	Present	None
Amphibian	Wood Frog	*Lithobates sylvaticus*	Common	None
Reptile	Snapping Turtle	*Chelydra serpentina*	Common	SGCN
Reptile	Painted Turtle	*Chrysemys picta*	Common	None
Reptile	Prairie Skink	*Plestiodon septentrionalis*	Possible	None
Reptile	Red-bellied Snake	*Storeria occipitomaculata*	Present	None
Reptile	Smooth Green Snake	*Opheodrys vernalis*	Possible	SGCN
Reptile	Plains Garter Snake	*Thamnophis radix*	Possible	None
Reptile	Common Garter Snake	*Thamnophis sirtalis*	Common	None

SGCN=Species of Greatest Conservation Need