

MANAGEMENT PLAN

2010 - 2015

LAKE SUPERIOR National Estuarine Research Reserve



LAKE SUPERIOR NATIONAL ESTUARINE RESEARCH RESERVE MANAGEMENT PLAN



2010-2015

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This Management Plan has been developed in accordance with National Oceanic and Atmospheric Administration (NOAA) regulations, including all provisions for public involvement. It is consistent with the congressional intent of Section 315 of the Coastal Zone Management Act of 1972, as amended, and the provisions of the Wisconsin Coastal Management Program.



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LAKE SUPERIOR NATIONAL ESTUARINE RESEARCH RESERVE

2010-2015



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List of Acronyms

CFR	Code of Federal Regulations
CTP	Coastal Training Program
CZMP	Coastal Zone Management Plan
CZMA	Coastal Zone Management Act
ERD	Estuarine Reserves Division
GIS	Geographic Information System
GLSLCI	Great Lakes and St. Lawrence Cities Initiative
K-12	Kindergarten through twelfth grade
KEEP	K-12 Estuarine Education Program
LSNERR	Lake Superior National Estuarine Research Reserve
LSRI	Lake Superior Research Institute
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NERR	National Estuarine Research Reserve
NERRS	National Estuarine Research Reserve System
NOAA	National Oceanic and Atmospheric Administration
OCRM	Ocean and Coastal Resource Management
RAB	Reserve Advisory Board
SMF	Superior Municipal Forest
SNA	State Natural Area
SWMP	System-Wide Monitoring Program
UWEX	University of Wisconsin – Extension
UWS	University of Wisconsin – Superior
WCMP	Wisconsin Coastal Management Program
WDNR	Wisconsin Department of Natural Resources

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2 | ACKNOWLEDGEMENTS

This first Management Plan for the new Lake Superior National Estuarine Research Reserve is dedicated to the memory of two key contributors to the shared vision that guided this process.

Karen Danielsen (1958-2009) Karen was a strong believer in the benefits that would be brought to the upper Great Lakes region with the designation of a NERR on Lake Superior. As the forest ecologist/botanist for the Great Lakes Indian Fish and Wildlife Commission she was an active participant in the grassroots effort to garner support for the LSNERR, as well as a member of advisory committees during the site selection process.

Kathleen Morgen (1946-2009) As a UWEX environmental educator, Kathleen helped develop the first Lake Superior freshwater estuary curricula for K-12 students and contributed through her teaching to the foundational work supporting the LSNERR designation.



EXECUTIVE SUMMARY

The State of Wisconsin has partnered with the National Oceanic and Atmospheric Administration (NOAA) to designate portions of the St. Louis River Freshwater Estuary as a National Estuarine Research Reserve (NERR). With passage of the Coastal Zone Management Act (CZMA) of 1972, the federal government officially recognized the national significance of coastal resources and authorized the federal Coastal Zone Management Program (CZMP) and the National Estuarine Research Reserve System (NERRS). Since 1972, twenty-seven reserves have been designated as part of the NERRS. The NERRS works with federal and state authorities to establish and operate Reserves and provide for their long-term stewardship. The Wisconsin NERR is officially referred to as the Lake Superior National Estuarine Research Reserve (LSNERR or Reserve). The State of Wisconsin has designated the University of Wisconsin-Extension (UWEX) to be the lead state agency for the Reserve.

This Management Plan describes the Reserve and how it will be managed by UWEX, in cooperation with its partners, from 2010 to 2015. The plan provides an overview of key management issues for the Reserve during its first five years of operation. In addition, the plan contains the collective vision, mission, guiding principles, goals, objectives, and outcomes for the LSNERR. This plan reflects the collective input of UWEX and a variety of partner agencies, organizations, and interested citizens.

LSNERR Overview

The LSNERR is situated on the freshwater estuary at the confluence of the St. Louis River and Lake Superior, the largest and most pristine of the Great Lakes. The Reserve is a diverse, large complex that

contains a variety of representative terrestrial and aquatic habitats allowing for extensive research and educational opportunities. The boundaries of the LSNERR include land and water areas that are significant to supporting the Reserve's goals and will protect the integrity of core areas for long-term research and monitoring. The Reserve will provide opportunities for research and monitoring, experiential learning, and training while continuing to contribute to the protection of the ecological



health of the St. Louis River Freshwater Estuary and Lake Superior coastal habitats.

The St. Louis River is bordered by Wisconsin and Minnesota for 23 miles and has a largely forested watershed that is 1,872,807 acres in size. The combination of ecosystems within the Lower St. Louis River—estuarine wetlands and aquatic habitats, baymouth bar complex, and surrounding upland forest—are very unusual in Lake Superior, the Upper Midwest, the Great Lakes region, and the world. Many of the ecosystems and native species are rare and/or declining across their ranges. This concentration of such diverse ecosystems, along with the location on the western end of Lake

Superior, makes this freshwater estuary a critical migratory stopover and an important breeding area for many species. In spite of human impacts, the Lower St. Louis River ecosystem is both regionally and globally significant. Great Lakes wetland systems are unique from a global perspective, and the St. Louis River Freshwater Estuary is one of the largest such complexes on the Lake Superior shore, representing a significant source of productivity for the entire Lake Superior ecosystem. The freshwater estuary and its tributaries are unusual in having such a variety of habitat types supporting a large and diverse assemblage of native fish species.

Management Planning Process

The development of the LSNERR Management Plan was a careful and deliberate process consistent with NOAA's guidelines. Five committees contributed to the development of the LSNERR Management Plan, including a Steering Committee, Coordination Team and three advisory committees. The advisory committees were formed with an emphasis on inclusiveness and broad expertise and comprised of more than 90 members representing a diverse, knowledgeable, and dedicated cross-section of professionals from many federal, state, tribal, and local agencies and organizations, as well as citizen stakeholders.

This Management Plan places particular emphasis on program integration and partner collaboration. These concepts have been emphasized throughout the process of establishing the LSNERR. While the LSNERR boundaries are located solely on Wisconsin waters and lands, there is a clear need and demonstrated desire to collaborate across state boundaries by both Wisconsin and Minnesota partners. As a result, Minnesota-based stakeholders have also been involved with the process to designate the LSNERR and have been members of the various committees. Once designated, Wisconsin

will continue to work closely with Minnesota partners and will explore potential methods for long-term engagement between Minnesota partners and the Reserve.

In addition to collaboration and integration with external partners, this plan also strives to achieve internal integration and collaboration within the LSNERR. The Management Plan objectives integrate across program sectors (research, education and stewardship) to ensure cross-disciplinary and cross-sector Reserve programming. The mission, vision, guiding principles, and goals for the Reserve reflect the principles of program integration and partner collaboration.

The LSNERR Management Plan has been organized using an objectives- and outcomes-based planning framework. The Management Plan's objectives are broad statements that describe what the LSNERR intends to accomplish within the first five years. Each objective has associated outcomes describing the specific impacts, products, or results associated with each of the objectives. The LSNERR Reserve Manager and staff will identify specific actions as they implement the Management Plan using the objectives and outcomes.

LSNERR Administration

Administration of a NERR is accomplished through federal, state, and local partnerships. At the national level, NOAA is responsible for the administration of the NERRS. NOAA provides funding to eligible state agencies for the establishment and continued operation of reserves, as well as funding for construction and land acquisition activities; provides program guidance and oversight including review and approval of management plans; and conducts periodic evaluations to validate that operations are consistent with NERR goals and objectives.

The LSNERR will be administered by UWEX, the Reserve's designated lead agency for

the State of Wisconsin, in cooperation with NOAA and other partners. A Memorandum of Understanding (MOU) between UWEX and NOAA will establish the roles and responsibilities of both agencies. The Reserve staff for the first five years of LSNERR operation will include a Reserve Manager, Interim Assistant Reserve Manager, Research Coordinator, Monitoring Coordinator, Education Coordinator, and Coastal Training Program Coordinator and a Website Technician. Additional positions may be created as appropriate.

A Reserve Advisory Board (RAB) will provide advisory guidance to UWEX and LSNERR staff for management, research and monitoring activities, stewardship activities, and educational programs based on the approved Reserve Management Plan. The RAB shall be comprised of one member from each of the key partners: the city of Superior, Douglas County, Fond du Lac Band of Lake Superior Chipewa, University of Wisconsin Sea Grant Institute, University of Wisconsin – Superior (UWS), Wisconsin Coastal Management Program (WCMP), and the Wisconsin Department of Natural Resources (WDNR). The RAB will help enable the development and maintenance of partnerships and cooperative efforts with other research and educational institutions. The RAB will have the ability to create committees or subcommittees as necessary to gather technical information or community input related to LSNERR activities. In addition, the RAB will help ensure consistency with state-tribal intergovernmental agreements and ceded territory treaty rights.

LSNERR Facilities

Upon designation, facilities for the LSNERR will be located at the Lake Superior Research Institute (LSRI) on the UWS campus. An analysis of long-term facilities needs for the Reserve will be completed during the initial five years of operation to help determine future LSNERR facilities needs.



Current options which could potentially be used to address facility needs include:

- Construction on existing LSNERR properties
- Renovation of UWS campus buildings
- Acquisition and renovation of appropriate waterfront facilities

In addition, the Superior Municipal Forest (SMF) with its extensive trail network, outdoor classroom, and other resources, will be an important part of LSNERR educational programming. It provides an established resource for developing programming and engaging LSNERR visitors in experiential learning activities.

INTRODUCTION

Purpose and Scope of the Lake Superior NERR Management Plan

This Management Plan describes the LSNERR and how it will be managed by UWEX, in cooperation with its partners, from 2010 to 2015. The Plan provides an overview of key management issues for the Reserve during its first five years of operation. Included within the Plan are descriptions of the following:

- ◆ Proposed boundaries for the Reserve, including core and buffer areas and future boundary expansion opportunities
- ◆ Existing ownership and resources within the Reserve
- ◆ Reserve administrative structure
- ◆ Strategies for program integration and partner collaboration
- ◆ Existing public access for the Reserve and plans for evaluating future access needs
- ◆ Existing facilities for the Reserve and potential options for future facilities
- ◆ Existing resource protection, restoration, and manipulation plans for the Reserve

In addition to the above, the Plan contains the collective vision, mission, guiding principles, goals, objectives, and outcomes for the LSNERR. This Management Plan has four goals, which state the long-term intentions of the LSNERR and extend beyond the five-year time frame of this document. The Management Plan's objectives are broad statements that describe what the LSNERR intends to accomplish in the first five years. Each objective has associated outcomes, describing the specific impacts, products, or results associated with each of the objectives. The vision, mission, guiding principles, goals, objectives, and outcomes reflect the collective input of UWEX, Memorandum of Understanding (MOU) partners, and engaged stakeholders, including the LSNERR management planning advisory committees.

This Management Plan has been developed in accordance with NOAA regulations, which includes all provisions for public involvement. It is consistent with the congressional intent of Section 315 of the Coastal Zone Management Act (CZMA) of 1972, as amended. The plan will be instrumental in guiding the future direction of the LSNERR. The implementation of this plan will be evaluated in subsequent required program evaluations as stated in the federal regulations, 15 Code of Federal Regulations (CFR) Part 921.40 (Appendix 1).

Description of the Lake Superior NERR

The LSNERR is the only NERR located in Wisconsin and within NOAA's Lake Superior Biogeographical Subregion. It joins Old Woman Creek on Lake Erie as the second Great Lakes freshwater estuary in the NERR System. LSNERR is situated on the most western tip of Lake Superior, and represents portions of the St. Louis River Freshwater Estuary. The St. Louis River is the largest United States tributary to Lake Superior and flows 179 miles through a 3,634 square mile watershed within Wisconsin and Minnesota eventually creating 23 miles of boundary between the two states.

The 16,697-acre LSNERR will serve as a field laboratory where scientists can study naturally functioning systems and where students and the general public can learn about freshwater estuarine ecology. As a transition zone between land and water, the Reserve contains a variety of habitats including sedge meadow, emergent marshes, barrier beach, upland coniferous forests, lowland hardwoods, and open water areas of the freshwater estuary, river, and near shore Lake Superior.

Great Lakes Freshwater Estuaries

FRESHWATER ESTUARIES

Freshwater estuaries occur where rivers and Great Lakes water mix in shallow wetlands located near the mouth of a river. These unique coastal landforms are important components of surrounding communities. They support fish and wildlife populations, offer recreational opportunities, contribute to improved water quality, and provide economic and social benefits.

Estuary science has, for the most part, been focused on areas where freshwater from a river mixes with saltwater from the ocean. A wide range of scientists and organizations have increasingly recognized the concept of another estuary-type system occurring at the intersection of freshwater rivers and large freshwater "seas" such as the Great Lakes. NOAA, WDNR, and other state and federal natural resource agencies recognize Great Lakes freshwater estuaries. These systems have also been described and studied in numerous articles and represent an ecological system with important relevance to the Great Lakes region.ⁱ

Many definitions for freshwater estuaries exist, and, not surprisingly, the definitions vary. However, three common characteristics are frequently used to define these systems: **1)** a drowned river mouth; **2)** a zone where lake and river waters mix; and **3)** influence from seiche or wind tides. A fourth characteristic that some, but not all, freshwater estuaries have is a bar or spit that can partially and/or periodically enclose the river mouth.ⁱⁱ



1) Drowned River Mouth

A drowned river mouth is a river mouth (the end of a river where it enters another water body, such as one of the Great Lakes) that becomes submerged or flooded. At the end of the most recent Ice Age, massive amounts of ice up to several hundred feet thick retreated from much of the Great Lakes Basin. As the ice retreated, the earth's crust, which had been pushed down by the weight of the ice, started to very slowly rebound. The rebounding of the earth's crust is still occurring today. Post-glacial rebound, also known as isostatic rebound, is occurring more rapidly along the northeastern and eastern portions of Lake Superior causing uplift in the earth's crust that "tilts" the Basin toward the southwest, thereby flooding lake water into river mouths along the southwestern shore, creating drowned river mouth systems. The drowned river mouth is an important characteristic of freshwater estuaries, providing specific habitat niches for a variety of plants, fish and wildlife.

According to a 1995 study by the United States Geological Survey titled, Rapid Submergence of Lake Superior Shorelines, the water levels in the southwestern portions of Lake Superior have risen approximately 15 to 18 feet over the past 2000 years. They estimate that the lake level rise in those areas is occurring at a rate of one inch per decade and that rising Lake Superior water levels associated with the rebounding of the earth's crust will continue to flood low-lying river mouths and expand wetlands.

2) River-Lake Transition Zone

Freshwater estuaries have a zone of transition, where river water meets and mixes with lake water. The mixing of water in this transition zone creates unique characteristics that influence important ecological processes. For example, stream water typically has a higher temperature and more suspended solids than Great Lakes water. The mixing of river and lake water in a freshwater estuary can affect water temperature, turbidity, and chemical composition, which influences water density, currents, and the transport of sediments, nutrients, and contaminants.

3) Seiche and Wind Tides

The Great Lakes exhibit an important natural phenomenon called a seiche. A seiche is an oscillation, or periodic back-and-forth movement of water, that occurs in large water bodies. One way to visualize a seiche is to imagine a bowl of water that is gently shaken. After shaking the bowl, the water continues to move back and forth. The same phenomenon happens in the Great Lakes, only the factors "shaking" the Great Lakes are atmospheric disturbances such as a change in barometric pressure. In water bodies as large as the Great Lakes, the back-and-forth movements are continuous and seiche effects can be observed on a daily basis. The intervals, or periods, between seiche peaks on the Great Lakes can range from minutes to more than eight hours. Seiches cause changes in water surface elevations of a few inches to several feet depending upon atmospheric conditions and location. Freshwater estuaries experience frequent wet and dry periods, especially near the water margins, due to seiche effects.

A wind tide, or storm surge, is a vertical rise in water level on the leeward, or downwind, side of a water body as a result of strong winds. Storm surges on the Great Lakes can produce a change in water level of up to eight feet under extreme conditions. Given their association with storms and

high winds, the effects of a wind tide are often more dramatic than the effects of a seiche. Wind tides can also be a contributing factor to seiche effects.

Seiche and wind tides are important to freshwater estuaries because the water level fluctuations they produce are key to maintaining the diversity of habitats found within the freshwater estuary, as well as providing a means of mixing water and nutrients. When a seiche causes intrusion of lake water into a river, it causes opposing flow between unidirectional river current (moving horizontally) and oscillating lake current (moving vertically).ⁱⁱⁱ The seiche causes an exchange of water between the lake and the river, and contributes to stratification within the river as colder lake water flows beneath warmer (and therefore, less dense) river water.

4) Baymouth Bars and Barrier Spits

Freshwater estuaries are commonly separated from the adjacent main body of water by a baymouth bar or barrier spit. Spits and bars are accumulations of sand and gravel that can form entirely or partly across the mouth of a river. Many, although not all, freshwater estuaries are partially or periodically enclosed by bars or spits.

The lakeward side of baymouth bars is typically composed primarily of sand, while the landward side consists of finer sediments. Baymouth bars can shelter the freshwater estuary from the high-energy wind and waves of the Great Lakes and influence the mixing of lake and river water.

VALUE OF FRESHWATER ESTUARIES

Freshwater estuaries are an integral part of the Great Lakes' natural ecosystem and important components of surrounding communities. They support abundant fish and wildlife populations, contribute to improved water quality, offer recreational opportunities, and provide other economic benefits.

Fish and Wildlife

Freshwater estuaries are both the nursery and kitchen for abundant and diverse populations of fish and wildlife that rely on them for shelter, food, and spawning areas. The fisheries of the Great Lakes and its connected river systems are closely linked to freshwater estuaries. The coastal wetlands associated with freshwater estuaries provide important rearing and refuge areas for a variety of fish species. For example, over 90 percent of the approximately 200 species of fish in the Great Lakes are directly dependent on coastal wetlands for some part of their life cycle.^{iv}

The diversity of habitats, water depths, sediment types, and other natural features found in freshwater estuaries make them important for many wildlife species. Great Lakes coastal wetlands, like those associated with freshwater estuary systems, have long been recognized as places of increased biodiversity and abundant wildlife.^v

Freshwater estuaries are especially important for many species of birds. Great Lakes coastal wetlands with a high mixture of different habitats, such as the marshes, submerged aquatic vegetation beds, and open water areas frequently found in freshwater estuaries, are considered very valuable for waterfowl feeding, nesting, and migrating.^{vi} The Great Lakes also serve as a corridor for migrating songbirds, shorebirds, and raptors.^{vii} The coastal wetlands of freshwater estuaries offer critical food and shelter for these migrants.

Water Filters

Freshwater estuaries are important for cleansing water on its way to the Great Lakes. When river water reaches a freshwater estuary, it is carrying the various chemicals, nutrients, sediment, and detritus that have washed off the watershed. As the water velocity slows and the water spreads out into the surrounding water of the estuary, sediments and contaminants settle out of the water column and wetland vegetation and aquatic organisms absorb nutrients and convert chemicals into less harmful forms. The coastal wetlands within a freshwater estuary can function as flood storage, sediment traps, and water filters.

Community Connections

Many of Wisconsin's communities, such as Green Bay, Milwaukee and Superior, developed adjacent to Wisconsin's major coastal rivers and associated freshwater estuaries. These areas offered important navigation routes and valuable sources of water and food for indigenous people and early immigrants. People are still attracted to these water resources today. The 2000 United States Census found that approximately 37% of Wisconsin's population resides in coastal counties.^{viii} Many of the tribal reservations in Wisconsin encompass or are near freshwater estuaries, including the Oneida, Bad River, and Red Cliff Reservations. Likewise, the members of the Fond du Lac Band of Lake Superior Chippewa in Minnesota have a connection to the St. Louis River Freshwater Estuary that dates back several centuries.

Freshwater estuaries are important components of their surrounding communities and provide economic benefits for Wisconsin's citizens. Even though community members may not use the term "freshwater estuary" to describe them, communities identify with these areas in significant ways. Freshwater estuaries and their associated coastal wetlands are locally important for activities such as hunting, fishing, boating and tourism. They are also important for economic development and for their aesthetic qualities.

Lake Superior NERR Key Attributes and Setting

The Lower St. Louis River is one of the largest and most important freshwater estuary systems.^{ix} In spite of human impacts, the Lower St. Louis River ecosystem is both regionally and globally significant.^x Great Lakes wetland systems are unique from a global perspective, and the St. Louis River Freshwater Estuary is one of the largest such complexes on the Lake Superior shore, representing a significant source of productivity for the entire Lake Superior ecosystem. The combination of ecosystems within the Lower St. Louis River—estuarine wetlands and aquatic habitats, baymouth bar complex, and surrounding upland forest—are very unusual in Lake Superior, the Upper Midwest, the Great Lakes region, and the world.

Minnesota Point and Wisconsin Point, which are part of the St. Louis River complex, are examples of baymouth bars, also sometimes referred to as baymouth barrier spits or sand spits. Not surprisingly, the plant communities supported by these baymouth bars are endemic to the Great Lakes and are rare and declining across their ranges.

The concentration of such diverse ecosystems, along with its location on the western end of Lake Superior, makes this freshwater estuary a critical migratory stopover and an important breeding area for many species. The freshwater estuary and its tributaries are remarkable in having such a variety of aquatic habitat types supporting a large and diverse assemblage of native fish species. Many of the ecosystems, such as native pine barrens, and native species, such as the peregrine falcon, are rare or declining across their ranges.

Seiche has a large influence on the St. Louis River Freshwater Estuary. The change in water level as a result of a seiche is typically less than one foot, with areas of the freshwater estuary closest to the lake most strongly influenced. A strong seiche can reverse the flow of the St. Louis River up to 11 miles upstream. River currents, which are 1-3 cm/sec under no or very low seiche conditions, can increase by a factor of 20 during high seiche conditions.^{xi}

HISTORICAL SETTING

Through the centuries, many tribes and cultures fought for control of the St. Louis River Freshwater Estuary.^{xii} The abundant natural resources attracted different groups to the area. Prior to European settlement, the region was home to the Fond du Lac Band of Lake Superior Chippewa and remains so today, with tribal reservation lands located adjacent to the City of Cloquet, Minnesota, approximately 20 miles west of Duluth, Minnesota. Archaeologists maintain that ancestors of the present day Chippewa (also known as Ojibwe and self-referred to as the Anishanabe) have resided in the area since at least 800 A.D. The Lakota and Anishanabe “co-habited” the area for a time and also fought each other for territory.



According to Anishanabe migration stories, the ancestors of the Anishanabe once resided on “a moon-shaped island near the mouth of a freshwater river, which flowed in the great salt sea” (the Atlantic seaboard). The people traveled westward until they found “the land where food grows upon the water.” The food they found was wild rice (manoomin), which grew abundantly in the lakes, rivers and wetlands surrounding Lake Superior (Gitchi-Gami). Wild rice continues to be culturally significant to the Anishanabe and wild rice restoration in the St. Louis River is an important priority for the Native American community. Another native species, the lake sturgeon, has been utilized by Native American people in Wisconsin for centuries. Many tribes in northern and eastern Wisconsin held lake sturgeon in high esteem as an important source of food each spring.^{xiii}

The great migration story also tells of the people following a giant “Miigis (turtle) shell,” which rose from the waters for the people to follow until it sank back into the waters to let the people rest.^{xiv} Every time the Miigis shell set a fire was built. The Miigis shell set in the St. Louis River Bay at the beginning of the Sixth Fire, so the Bay area became known as “the land of the Sixth Fire.” During the time of the Sixth Fire, the Anishanabe came together to practice sacred holy rites on a small island

within the St. Louis River Bay at a place called Spirit Island. To this day, Spirit Island is considered a holy place and is sacred to the many tribes that make up the Lake Superior, Mississippi, and Pillager Anishanabe. Consequently, burial mounds were placed on Spirit Mountain in Duluth and in Superior near where the Bong Bridge is located today. The mounds in Superior, however, were all destroyed; the material was used to fill in wetlands for development. The entire area was considered sacred. Encampments were located all around Spirit Island, including Minnesota Point and Wisconsin Point.

The St. Louis River Freshwater Estuary's abundant fish, game, wild rice, and waterfowl provided a large enough food base to allow for a permanent population base at Gete-oodena (the Ojibwe word for the city of Superior, literally meaning "old town").^{xv} During the fur trade era hundreds of people within the area supported Gete-oodena, allowing tribal members to take advantage of the community's size and its strategic position at the center of the St. Louis River and Nemadji fur trade corridors. In addition, the Anishanabe village at Fond du Lac was the gateway to central Minnesota by way of the St. Louis River (Gitchi-Gami-zibi). The estuary was crucial for giving indigenous people the resources needed for trade and daily living, including food, medicines and red clay for making pottery.

At the end of Wisconsin Point, a 17th century Fond du Lac tribal burial ground once existed. The human remains were relocated in 1919 to the St. Francis Cemetery near the Nemadji River in Superior. Currently, stone markers commemorate the historic burial grounds on Wisconsin Point and visitors still honor those who were buried on Wisconsin Point by placing significant items such as tobacco, beads, feathers, and walking sticks. The Fond du Lac Band of Lake Superior Chippewa is currently in the process of acquiring 17 acres of land at the end of Wisconsin Point, though this land does not include the burial ground. The Fond du Lac Band is especially interested in opportunities to use the land for cultural and historical interpretive purposes, and to bring attention to the problem of how the relocated ancestral remains are in danger of eroding into the Nemadji River.

French fur traders established the first trading posts in the estuary starting in the 1690s. The Hudson's Bay Company, North West fur trading post, and American Fur Trade post were all established along the St. Louis River. Once the treaties of 1836, 1837, 1842, and 1854 were signed between the United States government and various Chippewa tribes, the area changed rapidly with the arrival of thousands of European immigrants. The Handbook of Wisconsin, published in 1855, documents the St. Louis River's pre-European settlement environment:^{xvi}

"The head of Lake Superior is about twelve miles wide, and forms two semi-circular points. The Southern, or Wisconsin point, is four miles long, and the northern, or Minnesota point, is eight miles long. The St. Louis and Left Hand (Nemadji) Rivers meet and discharge their waters into the Lake between these points. Inside of the points the river forms a bay eight miles long, and from one to two miles wide, with from six to twenty-four feet of water. The points are from twenty to sixty rods wide, sandy grounds, covered with yellow pine and an undergrowth of whortleberry. These are the great summer camping grounds of the Chippewa Indians, and here large quantities of the Siskarwit, Trout and Whitefish are caught in the Lake and around the entry to the Bay. The St. Louis River is navigable for Lake steamers for eighteen miles to the American Fur Company's post, sometimes called Fond du Lac, and is a succession of bays, islands covered with blue joint grass, bayous, and channels, among which a stranger would easily be lost in the attempt to navigate it without a guide. The Left Hand River is a narrow, deep stream, and can be navigated with keel boats for a distance of ten miles. These rivers abound in the Muskelonge, Pickerel, Pike, Bass, and other river fish."



Development of the river shoreline and reconfiguration of the Duluth-Superior Harbor began in earnest in 1872 when a ship canal for Duluth was cut through the baymouth bar that had separated the river and Lake Superior.^{xvii} The next quarter of a century saw both the Duluth and the Superior lake entries entirely reconstructed, and the basins and channels in both Superior Bay and St. Louis Bay dredged into the basic contours they possess today. Dredging had significant effects on both the shoreline and the riverbed. Since initial dredging in the late 1800s, over 69,500,000 cubic yards of clay and mud mixed with sand have been dredged from the river bottom and used as fill to create docks, to replenish eroded areas on Minnesota and Wisconsin Points, and to form new islands.

Although ongoing maintenance dredging and industrial and commercial activities still result in changes to the river, the major dredging and shoreline reconstruction activities took place within a relatively short period of time, between 1870 and 1920.^{xviii} By 1902, the harbor had 17 miles of shipping channels excavated to a standard depth of 20 feet, and by 1960 most channels had been dredged to a depth of 27 feet—a very significant change to this once-shallow freshwater estuary.

Despite this human influence on the freshwater estuary, the LSNERR lands and connecting waterways include numerous occurrences of rare species and community types.^{xix} Within the Wisconsin portion of the St. Louis River watershed, there are records from the WDNR Natural Heritage Inventory Program for nine rare natural communities and six endangered species, nine threatened species, and 37 species of special concern; of these, two are federally listed as threatened and one is federally listed as endangered. The species include the Caspian tern, piping plover, dune thistle, fairy slipper, mystery vertigo, Franklin's ground squirrel and wood turtle. A table of these species can be found in Appendix 2. The lake sturgeon is listed as a rare species in the United States, a species of special concern in Minnesota and is on a watch list for Wisconsin. The Lake Sturgeon Rehabilitation Plan, a lake-wide effort in Lake Superior, seeks to maintain, enhance and rehabilitate self-sustaining populations where the species historically occurred.^{xx}

DEMOGRAPHICS

The St. Louis River Freshwater Estuary has shaped the area's rich cultural heritage and historic traditions. With a 2000 census population of 275,486, the Duluth-Superior Metropolitan Statistical Area ranked as the 163rd largest metropolitan area in the United States.

As of 2000, approximately 27,000 people resided in the city of Superior. There were 11,609 households out of which 27.9% had children under the age of 18 living with them. The population was closely divided between married and unmarried people.

The population in the year 2000 was predominately white (94.26%) with 2.23% Native American, 0.84% Asian, 0.68% Black or African American, 0.04% Pacific Islander, 0.26% from other races, and 1.69% from two or more races. The area has a significant population of European decent, especially from Sweden, Norway and Finland, while in the year 2000, only 0.83% of the population was Hispanic or Latino.

The City's population density in 2000 was approximately 741 people per square mile. The breakdown of the population by age was as follows: 22.7% under the age of 18, 12.9% from 18 to 24, 27.9% from 25 to 44, 21.6% from 45 to 64, and 15.0% 65 years of age or older (Figure 1). The median age was 36 years.

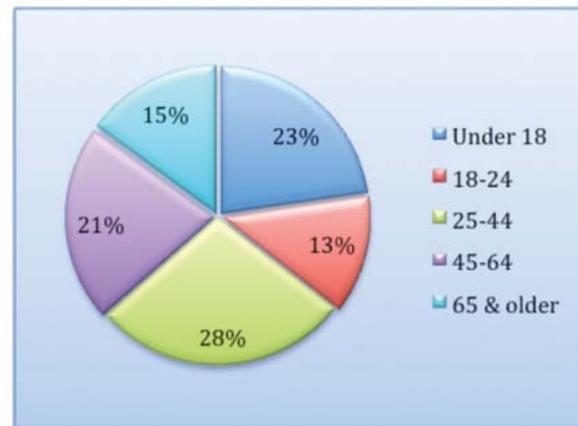


Figure 1. City of Superior Population by Age (2000)

In 2009, employment in the service industry surpassed other sectors and added diversity to the manufacturing and shipping base of the economy. The “Twin Ports” cities of Duluth, Minnesota and Superior, Wisconsin have become a regional retail and service center for banking, shopping, education, governmental services, and medical care for northern Minnesota and northern Wisconsin. Arts and entertainment offerings as well as year-round outdoor recreation have contributed to expansion of the tourist industry. Some 3.5 million visitors each year, drawn in large part by the beauty and natural amenities of the St. Louis River and Lake Superior, contribute more than \$400 million to the local economy.

Overview of the National Estuarine Research Reserve System

NERRS is administered by the U.S. Department of Commerce, NOAA, as authorized by Section 315 of the CZMA of 1972. The overall mission of the NERRS is to promote stewardship of the nation's estuaries through science and education using a system of protected areas. This is to be achieved by building federal, state, and community partnerships and promoting management and stewardship of our estuarine and coastal habitats through scientific understanding linked with public education. This is accomplished through a combination of research, education, and public outreach. The reserves serve as laboratories and classrooms where the effects of both natural and human activity can be monitored and studied.

Designation of a NERR does not result in the total preservation of the area or necessarily preclude any further development. Each NERR develops its own Management Plan that takes into consideration the beneficial consumptive (e.g., resource harvest) and non-consumptive (e.g., recreational) uses and the compatibility with adjacent land uses.

As stated in the NERRS regulations (Appendix 1), 15 CFR Part 921.1(a), the NERRS mission is:

The establishment and management, through federal-state cooperation, of a national system of Estuarine Research Reserves representative of the various regions and estuarine types in the United States. Estuarine Research Reserves are established to provide opportunities for long-term research, education, and interpretation.

Federal regulations, 15 CFR Part 921.1(b), provide five specific goals for the Reserve System:

- 1) Ensure a stable environment for research through long-term protection of NERR resources;
- 2) Address coastal management issues identified as significant through coordinated estuarine research within the Reserve System;
- 3) Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;
- 4) Promote federal, state, public and private use of one or more reserves within the Reserve System when such entities conduct estuarine research; and
- 5) Conduct and coordinate estuarine research within the Reserve System, gathering and making available information necessary for improved understanding and management of estuarine areas.

NERRS Strategic Plan

The NERRS has developed a Strategic Plan to guide the development and management of NERR sites.^{xxi} The guiding principles supporting this mission are:

- ◆ Strong partnerships between NOAA, state agencies and universities, and other local partners are critical to the success of the Reserve System.
- ◆ The Reserve System integrates science, education and stewardship on relevant topics to maximize the benefits to coastal management.
- ◆ Reserves serve as a catalyst and a focal point for demonstrating and facilitating objective problem solving and best management practices.
- ◆ Reserves engage local communities and citizens to improve stewardship of coastal areas.
- ◆ Reserves implement an ecosystem-based management approach.

The strategic plan also identified the following goals for the NERRS for 2005-2010:

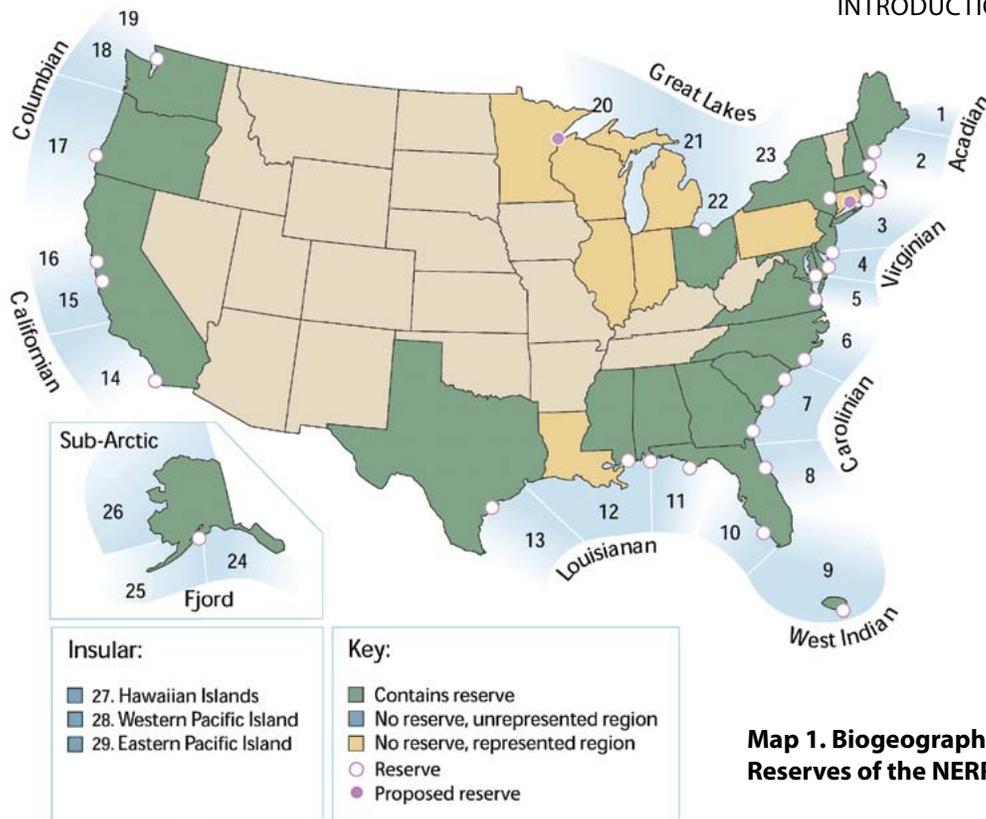
- ◆ Strengthen the protection and management of representative estuarine ecosystems to advance estuarine conservation, research and education.
- ◆ Increase the use of reserve science and sites to address priority coastal management issues.
- ◆ Enhance people's ability and willingness to make informed decisions and take responsible actions that affect coastal communities and ecosystems.

Biogeographic Regions

The coastlines of the United States and its territories have been divided into 29 areas based on their biologic and geographic characteristics as defined in 15 CFR Part 921.3 of the federal regulations (Appendix 1). The LSNERR is located in the Lake Superior Biogeographic Subregion of the Great Lakes Biogeographic Region.

The typology system of the NERRS describes and classifies estuaries by ecosystem types and physical characteristics. Freshwater estuaries of the Great Lakes are not easily classified by the NERRS typology, which was developed to describe marine coastal systems. However, the LSNERR contains the following representative ecosystem types: Maritime Forest-Woodland (Northern Coniferous Biome, Temperate Deciduous Forest Biome), Coast Shrublands, Coastal Grasslands, Coastal Marshes, and Coastal Swamps. The Reserve also contains representative physical characteristic types, including the following basin types: Exposed Coast, Sheltered Coast, Bay, River (subject to wind tide/seiches), and Perched Wetlands (unique to clay plain wetlands of the region). The following basin structures are represented at the LSNERR site: Coastal Plains Estuary, and Bar-bounded Estuary. The inlet type is Restricted (by Wisconsin and Minnesota Points) and Permanent, and the bottom composition of the site is Sand and Mud. The hydrographic characteristics of the site include a Stratified Circulation, with the tide type clearly dominated by wind/storm tides and related seiche. Surface water runoff from the St. Louis River watershed is the primary source of freshwater into the estuarine system. The chemical characteristics of the LSNERR are especially difficult to classify within the NERRS typology because of the unique nature of freshwater estuaries. Great Lakes freshwater estuaries are characterized by pH and conductivity differentials between the incoming river water and the lake water.

The LSNERR site represents a new biogeographic sub-region (Map 1) for the NERRS and contributes to the NERRS estuary typological balance and, as a result, represents a priority and valuable addition to the NERRS.



Map 1. Biogeographic Regions and Reserves of the NERR System

Acadian – Southern Gulf of Maine

- Wells Reserve, Maine (1984)
- Great Bay Reserve, New Hampshire (1989)

Virginian - Southern New England

- Waquoit Bay Reserve, Massachusetts (1988)
- Narragansett Bay Reserve, Rhode Island (1980)
- Hudson River Reserve, New York (1982)

Virginian – Middle Atlantic

- Jacques Cousteau Reserve, New Jersey (1998)
- Delaware Reserve (1993)

Virginian – Chesapeake Bay

- Chesapeake Bay Reserve, Maryland (1985,1990)
- Chesapeake Bay Reserve, Virginia (1991)

Carolinian – North Carolina

- North Carolina Reserve (1985,1991)

Carolinian – South Atlantic

- North Inlet-Winyah Bay Reserve, South Carolina (1992)
- ACE Basin Reserve, South Carolina (1992)
- Sapelo Island, Georgia (1976)

Carolinian – East Florida

- Guana Tolomato Matanzas Reserve, Florida (1999)

West Indian – Caribbean

- Jobos Bay Reserve, Puerto Rico (1981)

West Indian – West Florida

- Rookery Bay Reserve, Florida (1978)

Louisianan – Panhandle Coast

- Apalachicola Reserve, Florida (1979)
- Weeks Bay Reserve, Alabama (1986)

Louisianan – Mississippi Delta

- Grand Bay Reserve, Mississippi (1999)

Louisianan – Western Gulf

- Mission-Aransas Reserve, Texas (2006)

Californian – Southern California

- Tijuana River Reserve, California (1982)

Californian – Central California

- Elkhorn Slough Reserve, California (1979)

Californian – San Francisco Bay

- San Francisco Bay, California (2003)

Columbian – Middle Pacific

- South Slough Reserve, Oregon (1974)

Columbian – Puget Sound

- Padilla Bay Reserve, Washington (1980)

Great Lakes – Lake Erie

- Old Woman Creek, Ohio (1980)

Great Lakes – Lake Ontario

- St. Lawrence River, New York (Proposed)

Great Lakes – Lake Superior

- Lake Superior Reserve, Wisconsin (2010)

Fjord – Aleutian Islands

- Kachemak Bay Reserve, Alaska (1999)

National Estuarine Research Reserve System Administrative Framework

The Estuarine Reserves Division (ERD) of the Office of Ocean and Coastal Resource Management (OCRM) of NOAA administers the Reserve System. The Division establishes standards for designating and operating reserves, provides support for reserve operations and system-wide programming, undertakes projects that benefit the Reserve System, and integrates information from individual reserves to support decision-making at the national level. As required by federal regulation, 15 CFR Part 921.40, OCRM periodically evaluates reserves for compliance with federal requirements and with the individual reserve's federally approved Management Plan.

The ERD provides support for four system-wide programs: the System-Wide Monitoring Program (SWMP), the Graduate Research Fellowship Program, Coastal Training Program (CTP), and the K-12 Estuarine Education Program (KEEP). They also provide support for reserve initiatives on restoration science, invasive species, and reserve-specific research, monitoring, education, and resource stewardship initiatives and programs.



MANAGEMENT PLAN OVERVIEW

Summary of Management Planning Process

The development of the LSNERR Management Plan was a careful and deliberate process consistent with NOAA's guidelines (Appendix 1). The management planning process, although separate from the site selection process, was informed by the input of the site selection and public involvement teams that participated in the LSNERR site selection process. From this foundation, five committees comprised of more than 90 members provided input on the programmatic priorities and administrative framework described by this plan.

UWEX led the development of the Management Plan, with support from the WCMP. A Steering Committee, consisting of members from the city of Superior, Douglas County, Fond du Lac Band of Lake Superior Chippewa, Minnesota Department of Natural Resources, UWEX, University of Wisconsin – Sea Grant, UWS, WCMP and WDNR, provided oversight for the planning process and the plan content. Three advisory committees provided technical input on the priorities for the LSNERR.

The planning process incorporated information and recommendations from existing plans including, but not limited to, the Lower St. Louis River Habitat Plan,^{xxii} Wisconsin's Great Lakes Strategy^{xxiii} and Wisconsin's Great Lakes Freshwater Estuary Needs Assessment.^{xxiv} Table 4 in the Management Plan Objectives and Outcomes section (page 58) shows each objective and how it correlates to these partner plans. University of Michigan–Ann Arbor graduate student Bryan Sederberg conducted a preliminary education needs assessment (Appendix 3) during the management planning process. The needs assessment methodology utilized a combination of literature review and interviews with members of the educational community located in the Duluth-Superior region and along Wisconsin's Lake Superior shoreline. An inventory of existing programming was conducted and 21 representatives from 13 organizations identified several potential themes for the educational aspects of the LSNERR, including:

- ◆ Coordination of Area Education Programs
- ◆ Professional Development
- ◆ Teacher Training and Curriculum Development
- ◆ Adult Education
- ◆ Focusing Education Programs on the Working Freshwater Estuary

Information from this education needs assessment was also incorporated into the LSNERR planning process.

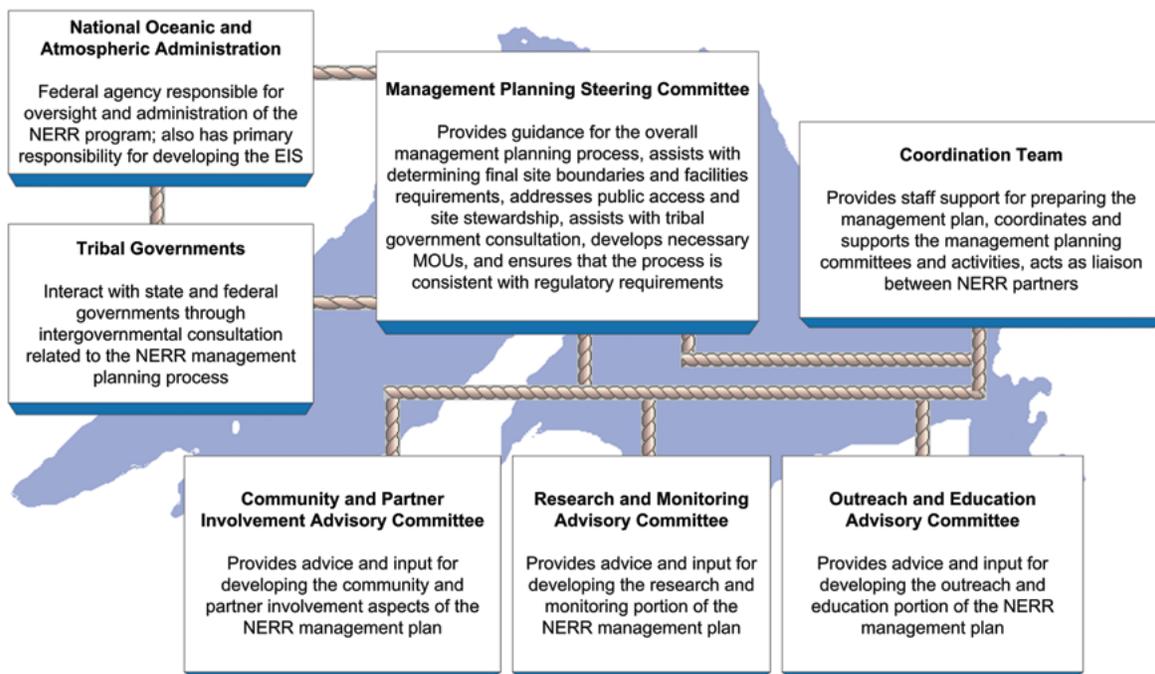
Definition and Role of Committees

Five ad-hoc committees contributed to the development of the LSNERR Management Plan: the Steering Committee, Research and Monitoring Advisory Committee, Outreach and Education Advisory Committee, Community and Partner Involvement Advisory Committee, and the Coordination Team (Figure 2). The three advisory committees were formed with an emphasis on inclusiveness and broad expertise. Many of the committee members had also participated in the site selection process. The committees were comprised of more than 90 members representing a diverse, knowledgeable, and dedicated cross-section of professionals from many federal, state, tribal, and local agencies and organizations, as well as interested citizen stakeholders (Appendix 4). The responsibilities and membership of these committees can be found in Appendix 5. These ad-hoc committees were created specifically to assist with the LSNERR management planning process and will be dissolved after completion of the process.

The three advisory committees identified potential actions for the LSNERR Management Plan (Appendix 6). This information contributed to the identification of final Objectives and Outcomes as described in a later section. All of the actions identified by the advisory committees could not be included in this plan because of the temporal and practical constraints inherent in developing a new NERR and associated five-year Management Plan; however, all of the identified actions are being included in an appendix to this Management Plan so they can be used to help inform and guide future Management Plans of the LSNERR.

Figure 2. LSNERR Management Planning Ad-hoc Committee Structure

Management Planning Committee Structure



Tribal Consultation

Where an agency action may affect Indian lands or off-reservation treaty rights, the federal trust duty includes a substantive duty to protect these lands and treaty rights to the fullest extent possible. Consultation is the process of seeking, discussing, and considering the views of tribes, and when feasible, seeking agreement. Consultation is built upon a meaningful exchange of ideas and not just simply providing information. Consultation principals include recognizing the unique legal relationship of the United States to federally recognized Indian tribes, and conducting consultation on a government-to-government basis in recognition of tribal sovereignty. In addition, tribes are not just another interested party or government agency and tribal consultation is not public involvement. It is the government agency's responsibility to seek the views of the tribes early in the scoping process. Both the tribes and agencies have a responsibility to provide their views in a suitable format and in a timely fashion. The underlying laws that inform consultation include the wording in the relevant treaties, as well as the National Environmental Policy Act and Section 106 of the National Historic Preservation Act (Appendix 7).

Informal tribal consultation may take the form of letters, conference calls, or face-to-face meetings with the purpose of seeking, discussing, and considering views of the tribes. Formal consultation, when necessary, will occur between the Tribal Chair and the Administrator of NOAA or the Governor of Wisconsin. Any party to the consultation (tribes or agency) may invite another party to the consultation, provided the intent is to enhance the discussion and improve the understanding for an exchange of ideas and information. A record of consultation (e.g. meeting minutes) will be provided by the agency and the tribe will have the opportunity to provide feedback.

The Lake Superior Chippewa retain treaty rights in their ceded territories. Specifically, these are off-reservation hunting, fishing and gathering rights in lands the Anishanabe ceded to the United States in the Treaties of 1836, 1837, 1842, and 1854. These rights, which the Anishanabe have always had, were reserved by the bands and guaranteed by the United States to ensure that the tribes could meet subsistence, economic, cultural, spiritual, and medicinal needs.

The United States Supreme Court and other federal courts have affirmed these rights. The bands may exercise them in the ceded areas of Michigan, Minnesota and Wisconsin and are entitled to 50 percent of available resources to meet their needs. The treaty rights can only be exercised in a way that conserves natural resources and protects public health and safety. The bands have enacted off-reservation natural resource management plans and conservation codes to meet these goals. The Great Lakes Indian Fish and Wildlife Commission and 1854 Treaty Authority assist the bands in coordinating their regulations and management activities with federal and state governments and among the bands themselves.

On February 27, 2004, Wisconsin Governor Jim Doyle issued Executive Order 39, which relates to an affirmation of the government-to-government relationship between the State of Wisconsin and Indian Tribal Governments located within the State of Wisconsin. State of Wisconsin tribal consultations occurred throughout the Reserve designation process and were led by the Wisconsin Department of Administration.



In addition to the formal consultation process, tribes, tribal entities, and band members actively participated in the various advisory committees during the LSNERR site selection and management planning process. Tribal participation was a valuable contribution to the process and their continued involvement will be instrumental to the success of the LSNERR. The Fond du Lac Band of Lake Superior Chippewa, with their strong ties to the St. Louis River Freshwater Estuary, will serve on the Advisory Board and will enter into a MOU with UWEX and other partners on the Reserve Advisory Board. In addition, NOAA and the Fond du Lac Band of Lake Superior Chippewa have entered into a Memorandum of Agreement (MOA) related to the preparation of a federal Environmental Impact Statement (as required by the National Environmental Policy Act of 1969) for NOAA's proposed action to designate a NERR on the Lower St. Louis River in Wisconsin (Appendix 8).

No action regarding the designation or implementation of the LSNERR will affect the rights of Anishanabe Tribes to hunt, fish, trap, and gather within the designated LSNERR area. These rights are guaranteed by treaty or otherwise part of existing law, and are therefore beyond the scope of this designation. All parties recognize that management actions related to this site must conform to the law regarding these rights. As part of its overall efforts to discharge the federal government's trust responsibility and treaty obligations, all parties will consult with affected Indian Tribes on a government-to-government basis to ensure the protection of these rights (Appendix 9).

Program Integration and Partner Collaboration

This Management Plan places particular emphasis on program integration and collaboration. These concepts have been emphasized throughout the process of establishing the LSNERR. A variety of partner agencies, organizations, and citizens participated in the site selection process and the management planning process (Table 1). In addition, U.S. Congressman Obey, U.S. Senator Feingold, U.S. Senator Kohl, WI State Senator Jauch, WI State Representative Milroy, WI State Representative Sherman, WI Governor Doyle and/or the staff from their offices were engaged in the process through management planning meetings and/or briefings. The level of engagement demonstrates the interest and commitment of individuals, organizations, agencies, and local, state and tribal governments.

1854 Treaty Authority	St. Louis River Alliance (St. Louis River Citizens Action Committee)
Ashland County, Wisconsin	Sugarloaf
Bad River Band of Lake Superior Chippewa	Superior Schools
Bois Forte (Nett Lake) Band of Lake Superior Chippewa	The Nature Conservancy – Minnesota Chapter
Citizens of Wisconsin	United States Coast Guard
Citizens of Minnesota	United States Fish and Wildlife Service
City of Superior, Wisconsin	United States Geological Survey
Douglas County, Wisconsin	United States Coast Guard
Environmental Protection Agency	United States Fish and Wildlife Service
Fond du Lac Band of Lake Superior Chippewa	University of Michigan
Great Lakes Aquarium	University of Minnesota
Great Lakes Indian Fish and Wildlife Commission	University of Minnesota Duluth – Center for Freshwater Research & Policy
Lac Courte Oreilles Ojibwe Community College	University of Wisconsin – Extension
Midwest Energy	University of Wisconsin – Sea Grant Institute
MinnAqua Program	University of Wisconsin – Superior
Minnesota's Lake Superior Coastal Program	University of Wisconsin Superior – Lake Superior Research Institute
Minnesota Department of Natural Resources	University of Wisconsin – Madison
Minnesota Pollution Control Agency	Washburn K12 Administration
Minnesota Sea Grant	West Wisconsin Land Trust
National Oceanic and Atmospheric Administration	West Wisconsin Land Trust
National Park Service	Wisconsin Coastal Management Program
Natural Resource Foundation	Wisconsin Department of Administration
Natural Resources Research Institute	Wisconsin Department of Natural Resources
North West Regional Planning Commission	Wisconsin Department of Tourism
Northern Great Lakes Visitor Center	Wisconsin Department of Administration
Northland College	Wisconsin Department of Natural Resources
Red Cliff Band of Lake Superior Chippewa	Wisconsin Department of Tourism

Federal regulations require that Reserves be governed by a relationship between the federal government and a single state partner. The St. Louis River, however, is bordered by both Wisconsin and Minnesota and greater than 90% of the St. Louis River watershed is located in Minnesota. While the LSNERR boundaries are located solely on Wisconsin waters and lands, there is a clear need and demonstrated desire to collaborate across state boundaries by both Wisconsin and Minnesota partners.

As a result, Minnesota-based stakeholders have been involved with the process to designate a NERR on Lake Superior, and have been members of the various LSNERR committees. Once designated, Wisconsin will continue to work closely with Minnesota partners and will develop strategies for long-term engagement between Minnesota partners and the Reserve. These strategies may include actions such as incorporation of additional Minnesota partners in the multi-partner MOU, additional membership on the Reserve Advisory Board and other actions.

In addition to collaboration and integration with external partners, this plan also strives to achieve internal integration and collaboration within the LSNERR. The Management Plan objectives integrate across the program sectors (research, education and stewardship) to ensure cross-disciplinary and cross-sector Reserve programming. The LSNERR Reserve Manager and LSNERR staff will work collaboratively across program sectors to fulfill the goals of the Reserve.

Lake Superior NERR Mission, Vision, and Guiding Principles

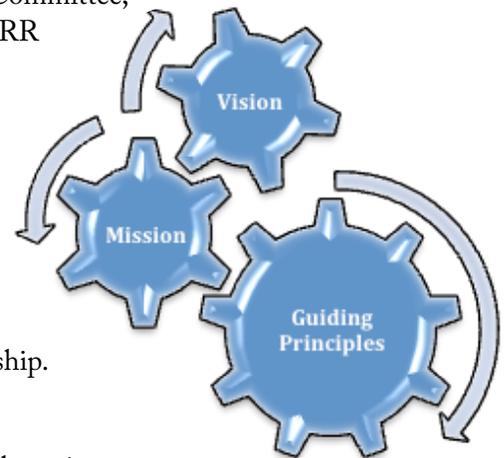
A clear vision, mission, and guiding principles, are important aspects of a Management Plan. At the beginning stages of the site selection process, the Site Selection Advisory Teams discussed the long-term benefits of a NERR on Lake Superior, regardless of its location. The results of those discussions provided the guiding principles for the LSNERR. The Steering Committee, with input from the Advisory Committees, developed the LSNERR Vision and Mission.

Vision: The LSNERR is an international leader in advancing understanding and stewardship of Great Lakes freshwater estuaries and coastal resources.

Mission: The LSNERR works in partnership to improve the understanding of Lake Superior freshwater estuaries and coastal resources and to address the issues affecting them through an integrated program of research, education, outreach, and stewardship.

LSNERR Guiding Principles:

- ◆ Promote understanding, appreciation, and protection of the unique estuary systems of Lake Superior
- ◆ Demonstrate the application of watershed principles
- ◆ Create a vital community asset and a destination for visitors
- ◆ Become a model for long-term community involvement and inter-governmental cooperation
- ◆ Conduct research of local, statewide, regional, national, and international importance
- ◆ Provide leadership for integrated research, management, and educational outreach related to freshwater estuaries



Lake Superior NERR Goals

The four goals identified are long-term intentions of the LSNERR and go beyond the five-year timeframe of this Management Plan. These goals, focusing on Lake Superior freshwater estuaries and coastal resources and issues, link closely to the NERRS program sectors of research, education and stewardship.

Goal 1 – Conduct applied research and monitoring to increase the understanding of Lake Superior freshwater estuaries and coastal ecosystems

Goal 2 – Educate youth, students, community members, and visitors about Lake Superior freshwater estuaries and coastal resources and improve their ability to address coastal issues

Goal 3 – Increase the ability of community leaders and other decision makers to address critical Lake Superior coastal management issues

Goal 4 – Protect and enhance the ecological health of the St. Louis River Watershed and Lake Superior coastal habitats



ADMINISTRATION

Federal Administration Background

Administration of a NERR is accomplished through federal, state, and local partnerships. At the national level, NOAA is responsible for the administration of the NERRS. NOAA's ERD works with state agencies in developing a national network of estuarine research reserves. NOAA provides funding to eligible state agencies for the establishment and continued operation of reserves, as well as funding for construction and land acquisition activities; provides program guidance and oversight including review and approval of management plans; and conducts periodic evaluations to validate that operations are consistent with NERR goals and objectives.

LSNERR Administrative Structure

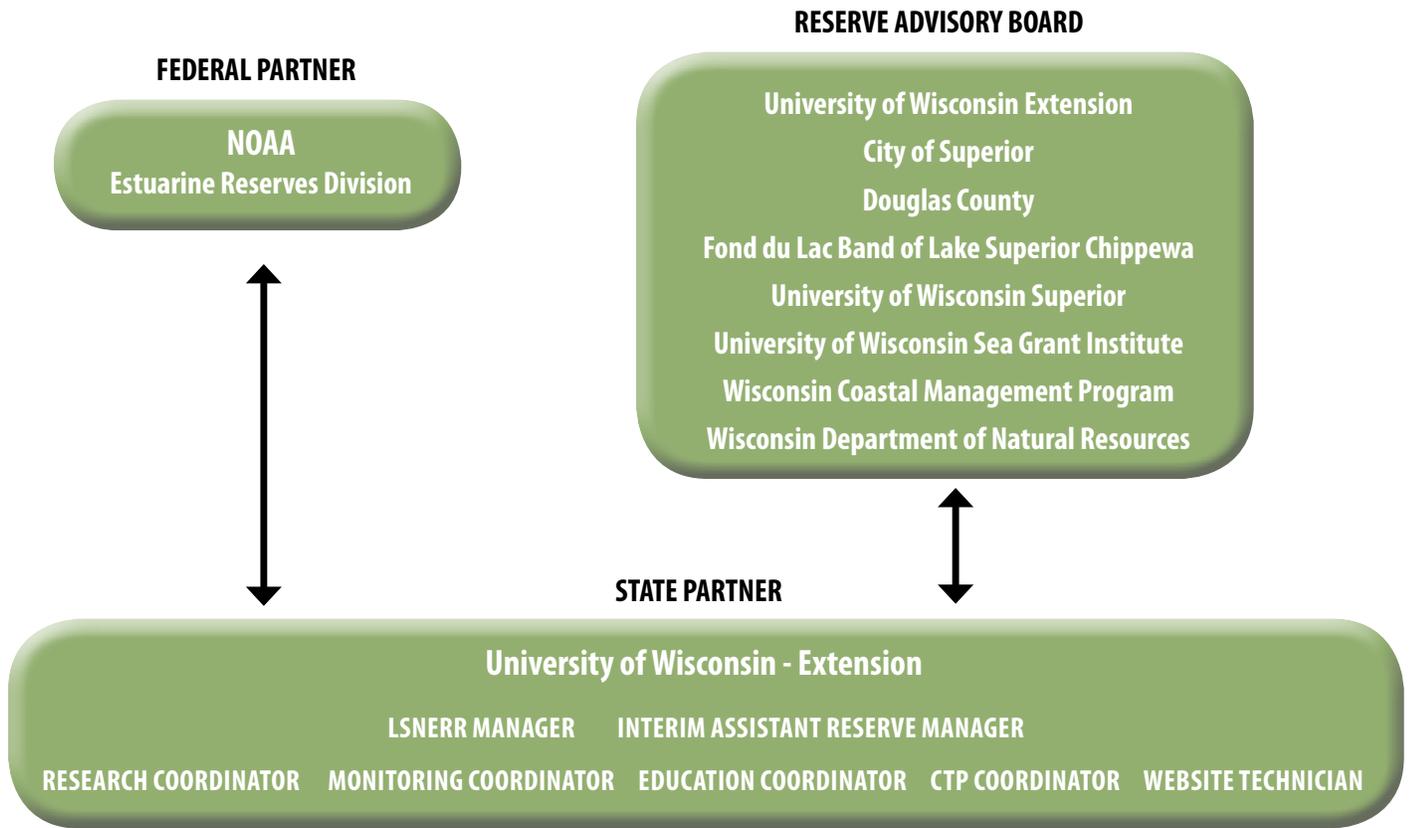
The LSNERR will be administered by UWEX, the Reserve's designated lead agency for the state of Wisconsin. An MOU between UWEX and NOAA will establish the roles and responsibilities of both agencies (Appendix 10). Other key state and local partners for the Reserve include the city of Superior, Douglas County, Fond du Lac Band of Lake Superior Chippewa, University of Wisconsin Sea Grant Institute, UWS, WCMP, and WDNR. These partners either own land within the LSNERR boundaries, and/or have mutual long-term interests in the project. The multi-party MOU that describes the relationship between these partners as it relates to the LSNERR can be found in Appendix 11.

The administrative framework for the Reserve is shown in Figure 3. While this framework shows a relatively linear structure, the LSNERR administrative framework will be, in practice, based on program integration. Thoughtful integration of research, education, and stewardship programming will be a focal point of the LSNERR and will be reinforced through the management plans and operational strategies of the LSNERR.

Reserve Staff

The Reserve staff for the first five years of LSNERR operation are listed and described in the subsequent sections. Additional positions may be created and advisory committees may be developed as appropriate. Reserve staff will be highly qualified individuals. The level of education and experience will vary with different levels of administrative responsibilities. The Reserve manager and coordinators will hold at least a Masters degree in an appropriate field for their position; however, a Ph.D. is preferred for these positions. A brief summary of likely duties and responsibilities for the Reserve staff is shown below; a more comprehensive listing for key staff can be found in Appendix 12.

Figure 3. Administrative Framework of the LSNERR



RESERVE MANAGER

The Reserve Manager is responsible for the implementation of this Management Plan and supervision of Reserve staff. This individual directs, coordinates, and supervises all aspects of Reserve operations and management including administrative, research, stewardship, and education activities. The Reserve Manager is also the lead liaison with NOAA and the RAB, as well as with federal, state, and local entities in working to achieve the goals of the LSNERR.

RESEARCH COORDINATOR

Planning, implementing and evaluating the LSNERR research program is the responsibility of the Research Coordinator. This person interacts with potential research advisory committees and other research institutions and individuals to fulfill the research objectives of the LSNERR, in addition to serving as a liaison with the scientific community, promoting data utilization and acting as the primary contact for scientists performing research in the Reserve. Collaboration with NOAA and other Reserves on research initiatives across the NERRS is expected. This individual reports directly to the Reserve Manager and works with the Monitoring, Education and CTP Coordinators to develop integrated programming.

MONITORING COORDINATOR

The Monitoring Coordinator is responsible for the planning, implementation, and evaluation of the Reserve monitoring programs. The SWMP and the associated monitoring stations are the priority for this position, which collaborates with NOAA and other Reserves on monitoring activities. The Monitoring Coordinator reports to the Reserve Manager and works closely with potential monitoring advisory committees and the Research, Education and CTP Coordinators regarding the monitoring priorities and integrated programming at the Reserve.

EDUCATION COORDINATOR

The LSNERR education program is planned, implemented, and evaluated under the direction of the Education Coordinator through on-site and educational outreach activities and the development of educational facilities including trails and exhibits. This individual works with NOAA and other Reserves to collaborate on the national NERR estuary and coastal ecosystems science curriculum. In order to fulfill the Reserve's education objectives, the Education Coordinator works with the community through potential education advisory committees, environmental education institutions, and individuals. The Education Coordinator works closely with the Research, Monitoring and CTP Coordinators to develop integrated Reserve programming.

CTP COORDINATOR

The responsibilities of the CTP Coordinator include the planning, implementation, and evaluation of programming that provides scientific information and skill-building training to coastal resource decision-makers. Professional training focused on NERRS priority issues such as coastal habitat conservation and restoration, mitigation, biodiversity, water quality and quantity, and sustainable resource management is conducted by the CTP Coordinator. The program targets a range of audiences, including land-use planners, elected officials, regulators, land developers, engineers, community groups, environmental non-profits, and coastal businesses and provides information and skill-building opportunities through a variety of formats.

A priority for the CTP Coordinator is to conduct initial analyses for the CTP. Initial analyses will include a market analysis and needs assessment. The market analysis will identify other training providers and partnership opportunities. The needs assessment will evaluate the training needs of the target audience. Upon completion of the assessments, an implementation strategy and marketing plan will be crafted. The CTP Coordinator will work collaboratively with the Research, Monitoring, and Education Coordinators to integrate research, monitoring, stewardship, and education activities that have objectives relevant to coastal management decision-makers.

ADDITIONAL STAFFING

During the first year of operation an Interim Assistant Reserve Manager and Website Technician will be hired. The Interim Assistant Reserve Manager will provide transitional support to the Reserve Manager. A Website Technician will be responsible for establishing an on-line presence for the LSNERR.

Reserve Advisory Board

The RAB will provide advisory guidance to UWEX and LSNERR staff for management, research and monitoring activities, stewardship activities, and educational programs based on the approved Reserve Management Plan. The RAB will also help enable the development and maintenance of partnerships and cooperative efforts with other research and educational institutions. In addition, they will ensure consistency with state-tribal intergovernmental agreements and ceded territory treaty rights. The RAB shall be comprised of one member from each of the key partners: the city of Superior, Douglas County, Fond du Lac Band of Lake Superior Chippewa, University of Wisconsin Sea Grant Institute, UWS, WCMP and WDNR. Each of these partners has been closely involved with the site selection and designation process for the Reserve and has agreed to continue their involvement as described and detailed in the LSNERR multi-party MOU (Appendix 11). The RAB will also have the ability to create committees or subcommittees as necessary to gather technical information or community input related to LSNERR activities.

Description of Advisory Board Partners

UNIVERSITY OF WISCONSIN-EXTENSION

Through UWEX, all Wisconsin people can access university resources and engage in lifelong learning, wherever they live and work. UWEX is a unique partnership of counties, the U.S. Department of Agriculture, and the University of Wisconsin working together to help people put knowledge to work. It reflects the vision that has become known as The Wisconsin Idea.

This partnership brings education to people where they live, through Extension offices across Wisconsin. UWEX supports educational programs for farmers, businesses, communities, families, and young people. UWEX uses education to help people understand and solve problems. Educational programs reflect local issues and apply research-based knowledge from the University of Wisconsin, other universities and the United States Department of Agriculture to help address them.

UWEX has been working with WCMP and WDNR on the Wisconsin Freshwater Estuary Initiative. The Initiative is a statewide effort to increase our understanding and stewardship of Great Lakes freshwater estuaries. One means to reach the goal of the Initiative is through the designation of a NERR on Lake Superior. UWEX is the lead state agency for the LSNERR and is responsible for the implementation of the Management Plan.

CITY OF SUPERIOR

Superior, population 27,170, is a community covering 46-square miles in northwest Wisconsin along the shores of Lake Superior and the St. Louis River. Surrounded by outstanding natural resources, Superior offers 96 miles of shoreline on which its citizens work, play, and learn. The City is the home of UWS and the Lake Superior Research Institute (LSRI). LSRI is an educational center for environmental research, education, and public information on the Great Lakes Region.

Superior's city leaders are proud of the community connection to the Lake and the St. Louis River. They have actively protected large tracts of shoreline and inland property, most notably the State Municipal Forest (SMF) and Wisconsin Point. Mayor Dave Ross is a member of the Board of Directors of the Great Lakes and St. Lawrence Cities Initiative (GLSLCI), a collective of international community leaders representing eight states and two provinces, whose mission is the protection and restoration of the Great Lakes. A 2006 survey snapshot conducted by GLSLCI showed that the City spends in excess of \$3 million annually protecting Lake Superior.

With significant interest in the waters that surround Superior, its citizens and leaders have strongly supported the designation of a LSNERR. In the fall of 2007, the Superior Common Council and the Douglas County Board of Supervisors formally resolved to support the establishment of a NERR in Superior. The LSNERR is expected to strengthen the knowledge, stewardship, and leadership in understanding this unique watershed.

DOUGLAS COUNTY

Douglas County, located in northwestern Wisconsin, covers approximately 1,300 square miles and is bordered by Carlton County, Minnesota to the west, Burnett and Washburn Counties to the south, Bayfield County to the east, and Lake Superior to the north. Unique natural resource characteristics found in Douglas County include the following:

- ◆ Largest county forest in Wisconsin (3rd largest in United States)
- ◆ Largest municipal forest in Wisconsin (one of the largest in United States)
- ◆ Most "Land Legacy Sites" (sites in Wisconsin that are identified by the WDNR as critical to meeting conservation and recreation needs for the next fifty years) of any county in Wisconsin
- ◆ Most "Wetland Gems" (high quality habitats identified by the Wisconsin Wetlands Association for their representation of wetland types that historically made up Wisconsin's landscape) of any county in Wisconsin



A representative of Douglas County will be a LSNERR advisory board member as county-owned property is included within the designated LSNERR boundary. Douglas County supports the mission and values of the LSNERR. As stated in the Douglas County Land & Water Resource Management Plan, the county has three conservation-based goals: **1)** protect and enhance surface waters and wetlands to preserve and restore their water quality, ecological functions, and recreational and scenic values; **2)** protect and understand groundwater quality to supply clean water for drinking and recharging surface waters and wetlands; and **3)** prevent the introduction and spread of aquatic and terrestrial invasive species to protect aquatic habitat and resource values through support and implementation of the Douglas County Aquatic Invasive Species Strategic Plan. Furthermore, the county has adopted, as guiding principles, the following statements:

- ◆ Uphold the protection of natural resources while considering the importance of the Douglas County economy
- ◆ Facilitate partnerships and support efforts of other organizations where consistent with land and water resource priorities
- ◆ Emphasize education to increase understanding of natural resource concerns and the methods to address these concerns, and encourage beneficial changes in behavior
- ◆ Restore and protect native habitats while meeting water quality objectives
- ◆ Utilize information and recommendations in partner organization water quality and habitat management plans
- ◆ Embrace Wisconsin's public trust doctrine that lakes and rivers are public resources owned in common by all Wisconsin citizens
- ◆ Plan for the potential impacts of climate change in all activities

FOND DU LAC BAND OF LAKE SUPERIOR CHIPPEWA

The Fond du Lac Reservation, established by the LaPointe Treaty of 1854, is one of six Reservations inhabited by members of the Minnesota Chippewa Tribe. The Band is headed by the Reservation Business Committee, which includes one chairperson, a secretary/treasurer, and three district representatives. The Fond du Lac Resource Management Division manages on- and off-Reservation resources, including the St. Louis River Freshwater Estuary. Within the Division, the Environmental Program's Office of Water Protection manages water quality and wetland issues within Reservation boundaries. Fond du Lac has three "treatment-as-a-state" determinations under the federal Clean Water Act, which means the tribe has federally approved water regulations, including water quality certification standards for on-Reservation projects. Because of the connection Fond du Lac has with the areas proposed for inclusion in the LSNERR, a representative from the Fond du Lac Environmental Program Office of Water Protection will serve on the LSNERR Advisory Board.

UNIVERSITY OF WISCONSIN - SEA GRANT INSTITUTE

The Sea Grant College Program, administered by NOAA, is a national program of research, outreach, and education dedicated to scientific inquiry for the practical use and conservation of the nation's ocean, Great Lakes, and coastal resources. Administered at the UW Aquatic Sciences

Center by the UW Sea Grant Institute in Madison, the program's funds are awarded on a competitive, peer-reviewed basis to public and private universities and colleges in Wisconsin. Research competitions are held biennially, supplemented by annual national strategic investment competitions. Outreach is conducted statewide through the Wisconsin Sea Grant Advisory Services Program and the Madison-based communications office. The Advisory Services program is organized around subject area specialists, four of whom also have a responsibility to provide general support to a multi-county area through field offices located on various University of Wisconsin campuses (UWS; UW-Green Bay; UW-Manitowoc; UW-Milwaukee). The current 2010-14 Wisconsin Sea Grant Strategic Plan for research, outreach and education is centered on three focus areas: Improve Great Lakes Ecosystem Health; Enhance Coastal Community Sustainability and Resilience; and, Support Sustainable Fisheries and Aquaculture. Together with the Minnesota Sea Grant, UW Sea Grant conducted a regional call for research proposals in support of the LSNERR. Both programs hope to continue to develop coordinated research and outreach activities with LSNERR.

UNIVERSITY OF WISCONSIN-SUPERIOR

UWS is located in the northwest corner of Wisconsin in the city of Superior. UWS was established in 1893 and joined the University of Wisconsin System in 1971. Enrollment is approximately 2,800 students. UWS has a reputation for excellence through its academic programs and research efforts. UWS is home to LSRI as well as two other research centers focused on transportation and Great Lakes maritime commerce.

LSRI was created in 1967 with a mission focused on environmental research, environmental education, and public outreach for the Great Lakes Region. Major research efforts have focused on water quality monitoring, assessment of stream and coastal wetland aquatic communities, Great Lakes monitoring of plankton and benthos, ballast water treatment research, biodiesel fuel research, invasive species monitoring, and toxicity testing. LSRI anticipates expanding research opportunities with the establishment of the NERR. Faculty and researchers will work closely with the LSNERR staff to identify research needs and to work in partnership with NERR researchers.

Additionally, LSRI maintains a 58-foot research vessel (*L.L. Smith, Jr.*), an invertebrate taxonomy laboratory, analytical chemistry labs, aquatic animal culturing laboratory, aquatic toxicology testing lab, and a computer/data management center. The *L.L. Smith, Jr.* is used extensively for both research and education. Educational programs provide participants with an opportunity to study the biology of Lake Superior and learn about local and regional environmental issues. The *L.L. Smith, Jr.* educational programs have been developed for students, local government officials, and the public. On-board scientists give introductory lectures and slide shows while en route to sampling sites on Lake Superior. The *L.L. Smith, Jr.* and the LSRI laboratory facilities will be available for outreach programming and research conducted by LSNERR staff.

Additionally, UWS owns a 72-acre parcel of land on the south shore of Lake Superior that includes Dutchmen's Creek. This parcel of land was named the Nelson Outdoor Laboratory in 2007. The area is to be used to enhance the instruction, research, and public service missions of the University. This land is available for use by the LSNERR as the mission of a NERR is in sync with the operating agreement for the Nelson Outdoor Laboratory.

Students majoring in natural science programs have opportunities to participate in LSRI research projects as student research assistants, interns, or temporary employees upon graduation. The Department of Natural Sciences includes majors in biology; broad field science; cell/molecular biology; ecology, aquatic biology, and fishery science; plant science; chemistry; geography; geology; and physics. Faculty and students in the natural and social sciences will have expanded opportunities for research and outreach within the LSNERR.

WISCONSIN COASTAL MANAGEMENT PROGRAM

The WCMP, in the Wisconsin Department of Administration, is a networked program that coordinates state, regional, and local agencies to improve Great Lakes coastal management. The WCMP supports the management, protection, and restoration of Wisconsin's coastal resources, and increases public access to the Great Lakes. The WCMP's goals are:

- ◆ To improve the implementation and enforcement of existing state regulatory and management policies and programs
- ◆ To improve the coordination of existing policies and activities of governmental units and planning agencies on matters affecting key coastal uses and areas
- ◆ To strengthen local governmental capabilities to initiate and continue effective coastal management consistent with identified state standards and criteria
- ◆ To provide a strong voice to advocate the sustainable use of the coastal environment and the recognition in federal, state, and local policies of the uniqueness of the coastal environment
- ◆ To increase public awareness and opportunity for citizens to participate in decisions affecting Great Lakes resources

The WCMP's relationship to the LSNERR is to provide a statewide perspective on coastal management issues in an advisory role to the Reserve manager, and to participate with the NERR in the integrated national network of ocean and coastal management programs.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

The WDNR is dedicated to the preservation, protection, effective management, and maintenance of Wisconsin's natural resources. It is responsible for implementing the laws of the state and, where applicable, the laws of the federal government that protect and enhance the natural resources of our state. It is the one agency charged with full responsibility for coordinating the many disciplines and programs necessary to provide a clean environment and a full range of outdoor recreational opportunities for Wisconsin citizens and visitors.

The WDNR will be a LSNERR Advisory Board Member, as well as a landowner within the LSNERR boundaries with properties on the Red River Breaks and Wisconsin Point components.

BOUNDARIES AND ACQUISITION

Boundary Criteria

NOAA boundary requirements are outlined in the federal register (915 CFR 921.11). These requirements are summarized below:

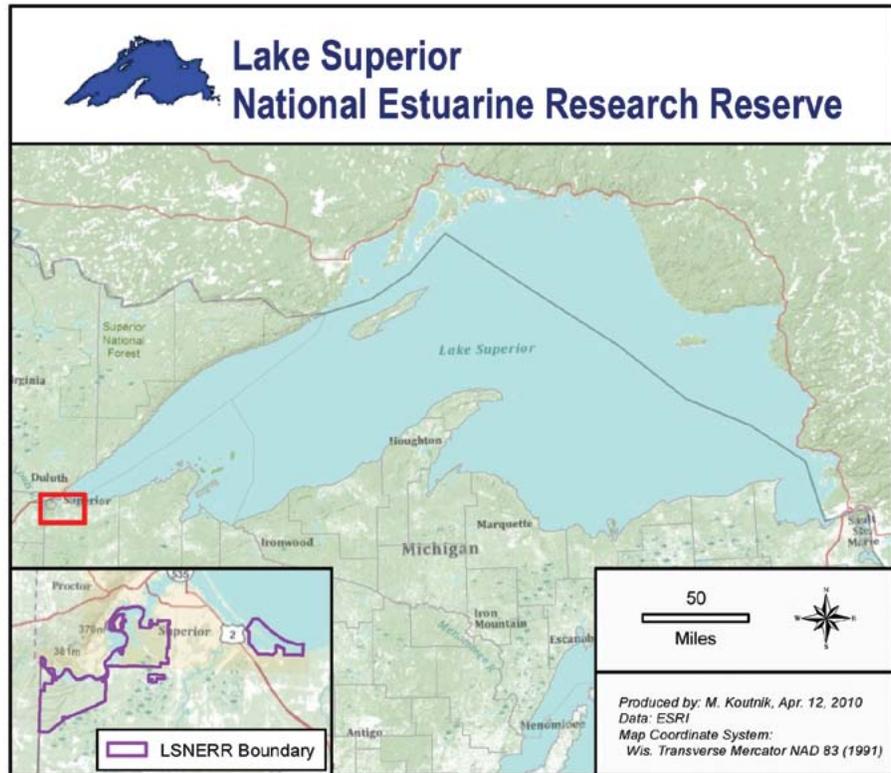
- ◆ **Key Land and Water Areas that Approximate an Ecological Unit:** Reserve boundaries must encompass an adequate portion of key land and water areas of the natural system to approximate an ecological unit and should encompass resources representative of the total biogeographic habitat.
- ◆ **Encompass Areas with Adequate Controls:** NOAA regulations require that there be a level of control over uses and activities to ensure that the ecological integrity of the Reserve is maintained for sustained research and education. Specifically, the regulations state that Reserve boundaries must encompass the area within which adequate control has or will be established by the managing entity over human activities occurring within the Reserve.
- ◆ **Management Considerations:** The administrative burden and responsibility for operating a Reserve and associated research, stewardship, and educational programs should be a significant consideration in the site selection process and in the delineation of the Reserve boundaries. Given the limited funds available to support Reserve programs, it is also important to develop a reasonable boundary that will establish a credible Reserve without creating an overwhelming administrative burden.
- ◆ **Research/Monitoring and Education Needs and Goals:** The research/monitoring and education needs and goals of the Reserve are an important consideration in developing a boundary. These needs and goals define the purpose of establishing a Reserve and should play a primary role in defining boundaries.

Description

The LSNERR is situated on the freshwater estuary at the confluence of the St. Louis River and Lake Superior. (Map 2) Lake Superior is the largest of the Great Lakes, and the most pristine.^{xxv} The Reserve is a diverse, large complex that contains a variety of representative terrestrial and aquatic habitats. It possesses a unique combination of pristine and altered areas, allowing for maximum research and educational opportunities. The boundaries of the LSNERR include land and water areas significant to supporting LSNERR activities and will protect the integrity of core areas for long-term research and monitoring. The boundaries also include land and water areas that provide opportunities for research and monitoring, experiential learning, and training programs. In addition, the boundaries include land and water areas that contribute to the protection of the ecological health of the St. Louis River Freshwater Estuary and Lake Superior coastal habitats.

Map 2. LSNERR Geographical Location

As stated previously, the St. Louis River is bordered by Wisconsin and Minnesota. The largely forested St. Louis River watershed is 1,872,807 acres in size. Given that 97.6% of the St. Louis River watershed is located in Minnesota^{xxvi}, addressing relevant research, education and stewardship needs will require close collaboration between Minnesota and Wisconsin. Although the LSNERR boundaries are located solely in the Wisconsin waters and lands, there is a need and demonstrated desire to collaborate across state boundaries by both Wisconsin and Minnesota partners.



Boundary

The LSNERR site is located on the southwestern coast of Lake Superior (Map 3) and contains approximately 16,697 acres of terrestrial (7,886 acres), wetland (4,136 acres), and aquatic (4,675 acres) habitats. These areas, under four public entity ownerships, consist of the following components (Map 4):

- ◆ **Red River Breaks** containing lands owned by Douglas County and WDNR
- ◆ **Pokegama-Carnegie Wetlands** containing lands owned by WDNR
- ◆ **Pokegama Bay** containing lands owned by the city of Superior and Douglas County
- ◆ **Wisconsin Point** containing lands owned by the city of Superior, Douglas County, UWS, and the WDNR

The Port of Duluth-Superior is the largest and busiest port on the Great Lakes.^{xxvii} The Reserve boundary does not include areas that are directly affected by the working port and waterfront industrial and commercial uses. Most of these areas are privately owned and state control is not practical or desirable.

CORE AND BUFFER AREA

Federal regulations state that Reserve boundaries generally encompass two areas: key land and water areas (or “core area”) and a buffer area (915 CFR 921.11). The LSNERR core area (Map 5) was selected based on the following criteria:

1. Vital to the function of the St. Louis River Freshwater Estuary
2. Maintains a sufficient level of control to ensure the long-term viability of the LSNERR for research and natural processes
3. Encompasses resources representative of the total St. Louis River Freshwater Estuary system
4. Contributes to the preservation of a full range of significant physical, chemical and biological factors essential to the diversity of fauna, flora and natural processes occurring within the St. Louis River Freshwater Estuary determined through:
 - a. Lower St. Louis River Habitat Plan
 - b. Wisconsin’s Lake Superior Coastal Wetlands Evaluation
 - c. SNA designation directly on the waters of the St. Louis River

The buffer area was selected based on the following criteria:

1. Ability to protect the core area and provide additional protection for species that rely on the core area
2. Located adjacent to, surrounding, or is essential to the integrity of the core area
3. Maintains a sufficient level of control to support the long-term viability of the LSNERR for natural processes, as well as research and education

The core (9,196 acres) and buffer (7,501 acres) areas consist of the following parts of the proposed boundary areas:

Red River Breaks (approximately 6,926 acres): The core area includes all adjacent islands and wetlands within the St. Louis River, the area of the St. Louis River within Wisconsin’s boundary, the uplands of the St. Louis and Red River Streambank Protection Area within one mile of the river’s shoreline, and the lands owned by Douglas County in Special Use designation. The buffer area is within the WDNR St. Louis and Red River Streambank Protection Area and located directly south of the core. (Map 6)

Pokegama-Carnegie Wetlands (approximately 226 acres): This entire component is buffer area and is a dedicated State Natural Area (SNA). (Map 7)

Pokegama Bay (approximately 6,723 acres): The core area is identified by the boundary of the Dwight’s Point and Pokegama Wetlands SNA within the SMF, connecting waters of the St. Louis River upstream to the Red River Breaks, and areas owned by Douglas County and identified as Oliver Marsh. The buffer is the remaining areas within the SMF not identified as core areas. (Map 8)

Wisconsin Point (approximately 2,822 acres): The core area consists of all land within the Reserve boundary on Wisconsin Point that is owned by the city of Superior and WDNR, areas adjacent to Allouez Bay owned by Douglas County, and water portions of Allouez Bay. The buffer area consists of Douglas County lands located on the Lake Superior shoreline, land surrounding Dutchman Creek that is owned by UWS, and Lake Superior waters bordering this component. (Map 9)

SITE COMPONENTS

The site is a combination of four land components and portions of the connecting waterways. Each component of the Reserve possesses a unique combination of habitats (Map 10); descriptions of the LSNERR habitats and their sources can be found in Appendix 13. The following descriptions of each site component, unless otherwise stated, were taken with permission from the WDNR publication, *A Data Compilation and Assessment of Coastal Wetlands of Wisconsin's Great Lakes, Final Report*.^{xviii}

Red River Breaks

St. Louis and Red River Streambank Protection Area – WDNR ownership

This rough, deeply dissected, red clay landscape drained by the Red River and its tributaries borders the St. Louis River prior to reaching the city of Superior. Much of the site is forested; the dominant tree species is pole-sized trembling aspen (*Populus tremuloides*). The canopy is rather sparse, with a dense understory of speckled alder (*Alnus incana*) prominent in many stands. Conifers, which were formerly dominant in this area, presently occur as scattered individuals or in small stands. In poorly drained “flats” on the level ridges between ravines there are patches of black ash-dominated hardwood swamp and thickets of speckled alder and other tall wetland shrubs. Areas of standing water are infrequent, but where present support small emergent marshes and broad-leaved sedge meadows. The lower slopes of the steep-sided ravines are often springy, sometimes supporting remnant stands of white cedar (*Thuja occidentalis*) and unusual herbs. Several springs flow with brightly colored orange water, the result of the presence of iron bacteria. Some of the small terraces above the streams in the ravine bottoms contain mature stands of large white spruce (*Picea glauca*), black ash (*Fraxinus nigra*), and balsam poplar (*Populus balsamifera*).

Along the St. Louis River there are stands of emergent macrophytes, shrub swamp, and small patches of black ash swamp. At least ten species of rare plants have been documented on the site. The area supports a representative diversity of the region's birds, including large populations of many neotropical migrants.

Upper portions of the LSNERR from Fond du Lac downstream to Oliver feature extensive emergent marshes. These are typically located inside the main channel's meanders, but also occur in protected, shallow bays along the upland shore. Wild rice (*Zizania aquatica*) and sweet flag (*Acorus calamus*) are locally common. The deeper waters of the marsh complexes support submergent and floating-leaved macrophytes. The patches of marsh associated with the main channel are often bordered by a natural levee adjoining the flowing river. Where well developed, the levees are vegetated with tall wetland shrubs and lowland hardwoods.

The site is used heavily by waterfowl in early fall. Foraging birds during the nesting season include bald eagle, osprey, common tern, merlin, and belted kingfisher. The Wisconsin shoreline is almost entirely undeveloped, and includes a large block of rough, forested, roadless terrain. Portions of the St. Louis and Red River Streambank Protection Area are bordered by Fond du Lac State Forest and Jay Cooke State Park. There is a primitive road in the Fond du Lac State Forest that I access to the property. There are not currently any ATV trails leading to St. Louis and Red River Streambank Protection Area, but the Fond du Lac State Forest has an existing large network of trails.

Douglas County Special Use Area – Douglas County ownership

Located along the shore of the St. Louis River, this small 8-acre parcel is contiguous to the St. Louis and Red River Streambank Protection Area to the east and is managed by Douglas County as “special use lands” under the state’s County Forest Law, which recognizes the value of the land for conservation, rather than timber production.

St. Louis River

The portions of the St. Louis River within the State of Wisconsin and adjacent to the St. Louis and Red River Streambank Protection Area and Pokegama Bay, and connecting the two sites, are included in the proposed NERR boundary. The portions of the St. Louis River downstream of the Pokegama Bay, including the entire Duluth–Superior Port, are not included in the proposed boundary. The St. Louis River/Nemadji Rivers Watershed Plan description offered by WDNR describes the St. Louis River as follows:^{xxx}

The St. Louis River is the largest tributary stream entering Lake Superior from the United States. After descending the Duluth escarpment at Fond du Lac, Minnesota, the river becomes a meandering estuary with little current due to the geologic drowning of its river valley beneath the waters of Lake Superior, creating a natural harbor at its mouth. The lower 23-mile reach of the river bounds Wisconsin and Minnesota. Numerous islands and embayments characterize this part of the river. The estuary is a tremendous resource for wildlife, with its backwaters and islands providing nesting habitat for numerous waterfowl and other birds, as well as nursery and spawning areas for aquatic life.

The portion of the St. Louis River Freshwater Estuary near the mouth of the Red River and St. Louis and Red River Streambank Protection Area includes some of its last remaining shoreline wetlands, which provide prime breeding habitat for wildlife and fish, including some 300 species of birds, threatened and endangered species, game species and an estimated 50,000–90,000 spawning walleye. Lake sturgeon has been reintroduced in the area recently.



Pokegama Carnegie Wetlands

Pokegama Carnegie Wetlands SNA - WDNR ownership

The Pokegama Carnegie Wetlands SNA is part of the largest and most intact of the red clay wetlands in northwest Wisconsin. The extensive, poorly drained, red clay flats in the headwaters of the Pokegama and Little Pokegama rivers support a large wetland mosaic of shrub swamp, sedge meadow, emergent marsh, and small ponds. Of special significance are the many populations of rare plants occurring in the site's wetlands. Many of the rarities are represented by large or multiple populations. It is important to recognize that some of these species are not widespread in the Lake Superior region, but are concentrated in the vicinity of the city of Superior. In addition, the site's wetlands are home to a wide variety of amphibians and birds.



Pokegama Bay

Superior Municipal Forest - city of Superior ownership

The SMF contains a wealth of natural features unusual in the context of an urban-industrial center. More than 4,400 acres, the site is one of the largest municipal forests in the United States, and remains only slightly modified by human influence. Among the most significant of the many natural features present within the site are stands of mature coniferous forest, extensive emergent marsh, and wet clay flats supporting a mixture of shrub swamp and wet meadow habitats. The shrub swamp and meadow complex provides habitat for several rare plants. The dominant plants are typical of Lake Superior region stands on red clay and include speckled alder, willows, lake sedge, and bluejoint grass.

In 1996, 2,620 acres of this site were designated as a SNA. This designation encompassed much of the mature forest and marsh, and also included a part of the wet clay flats in which rare plants occur.

Pokegama and Kimball's Bays are long, serpentine bays. These bays are adjacent to the SMF and were identified by the Lake Superior Binational Program as habitat important to the integrity of Lake Superior. Pokegama Bay spans some 200 acres and contains the largest remaining population of wild rice in the estuary. Wetlands and emergent aquatic vegetation line the bays, which are used extensively by waterfowl.

Oliver Marsh - Douglas County ownership

This large marsh in the St. Louis River Freshwater Estuary extends from the village of Oliver to the SMF. A narrow, natural levee developed on the outside bend of a channel meander and is partially vegetated with shrubs and small lowland hardwoods. This separates the northern portion of the marsh from the main channel. The emergent beds are generally composed of tall, narrow-leaved plants, especially bulrushes, bur reeds, lake sedge, cattails, sweet flag and arrowheads. Pockets of wild rice

occur in several protected bays fed by tiny streams draining the uplands to the east. A deep central lagoon, between the natural levee and the emergent beds adjacent to the upland shore, harbors significant stands of floating-leaved and submergent aquatic plants such as waterweed, wild celery, yellow water lily and pondweeds.

Oliver Marsh is managed by Douglas County and designated as “special use lands” under the state’s County Forest Law.

Wisconsin Point

Wisconsin Point-city of Superior ownership

Wisconsin Point is the eastern portion of a long baymouth bar separating the waters of Lake Superior from Allouez Bay. Major site features include several miles of open sand beach and dunes, small interdunal wetlands, and a xeric forest of white pines and red pines. Wisconsin Point and adjacent Allouez Bay receive heavy visitation by migrating birds in the spring; this area has been identified as an Important Bird Area of Wisconsin.

Wisconsin Point Wildlife Management Area – WDNR ownership

The Wisconsin Point Wildlife Management Area was established in 1989 for the primary purpose of providing nesting and young-rearing habitat for common terns (WI Endangered Species) and piping plovers (WI and Federal Endangered Species). Both species require habitat that includes areas of sparse vegetation for nesting. Habitat management on the property has included construction of a tern nesting area on the peninsula in Allouez Bay and vegetation management (control) on most of the remaining portion of the property. None of the habitat management has been successful in attracting either terns or plovers to nest on the property. Common terns successfully nest on the Interstate Island Wildlife Management Area in the St. Louis River Freshwater Estuary and piping plovers no longer nest in the estuary. Since 2005 habitat management has been discontinued on the property. No decision has been made on future management of the property.

Lake Superior Frontage – Douglas County Ownership

This parcel is located on Lake Superior and contiguous to city of Superior property on the west and UWS property on the east. The landscape of this parcel is largely forested wetland elevated on a 40-foot bluff above a sandy beach that is contiguous with Wisconsin Point dunes. The wetland forest is a mixture of deciduous and coniferous trees and a scrub-shrub complex. It is managed by Douglas County and designated as “special use lands” under the state’s County Forest Law.

Nelson Outdoor Laboratory – UWS ownership

This parcel of land is owned and managed by UWS. The area is to be used to enhance the instruction, research, and public service missions of the University. This land is available for use by the LSNERR as the mission of a NERR is in sync with the operating agreement for the Nelson Outdoor Laboratory. Within the border of the city of Superior, adjacent to Wisconsin Point, Dutchman Creek runs for three miles and empties into Lake Superior at the Nelson Outdoor Laboratory. It has higher flows than other city of Superior streams and is relatively turbid. Though its riparian area is relatively

undeveloped, it still receives stormwater inputs from private landowners who live along the creek. It cuts through sand beaches before reaching the lake, creating a place for high-quality coastal wetlands. During low flows, the river mouth is often disconnected from Lake Superior.^{xxxii}



Lake Superior

The waters of Lake Superior extending from the shoreline of this component to one-half mile from shore are included in the boundary of the Reserve. This near-shore area provides an important buffer to the Reserve core area and offers potential opportunities for research, monitoring, and education activities.

Allouez Bay

The eastern end of the bay is shallow and contains a large marsh with patches of sedge meadow and a

drowned tamarack swamp near the base of Wisconsin Point. Several streams, Bear Creek, Bluff Creek, and the Nemadji River, empty into the bay. The marsh is dominated by tall native graminoids, such as bur reeds, bulrushes, spikerush, sedges, and cattails. Broad-leaved arrowhead is also among the dominant species. Deep areas within and on the margins of the emergent marsh support populations of floating-leaved and submergent aquatic macrophytes. Sedges dominate the portions of the wetland nearest the shore. Tamarack snags are scattered throughout parts of this area.

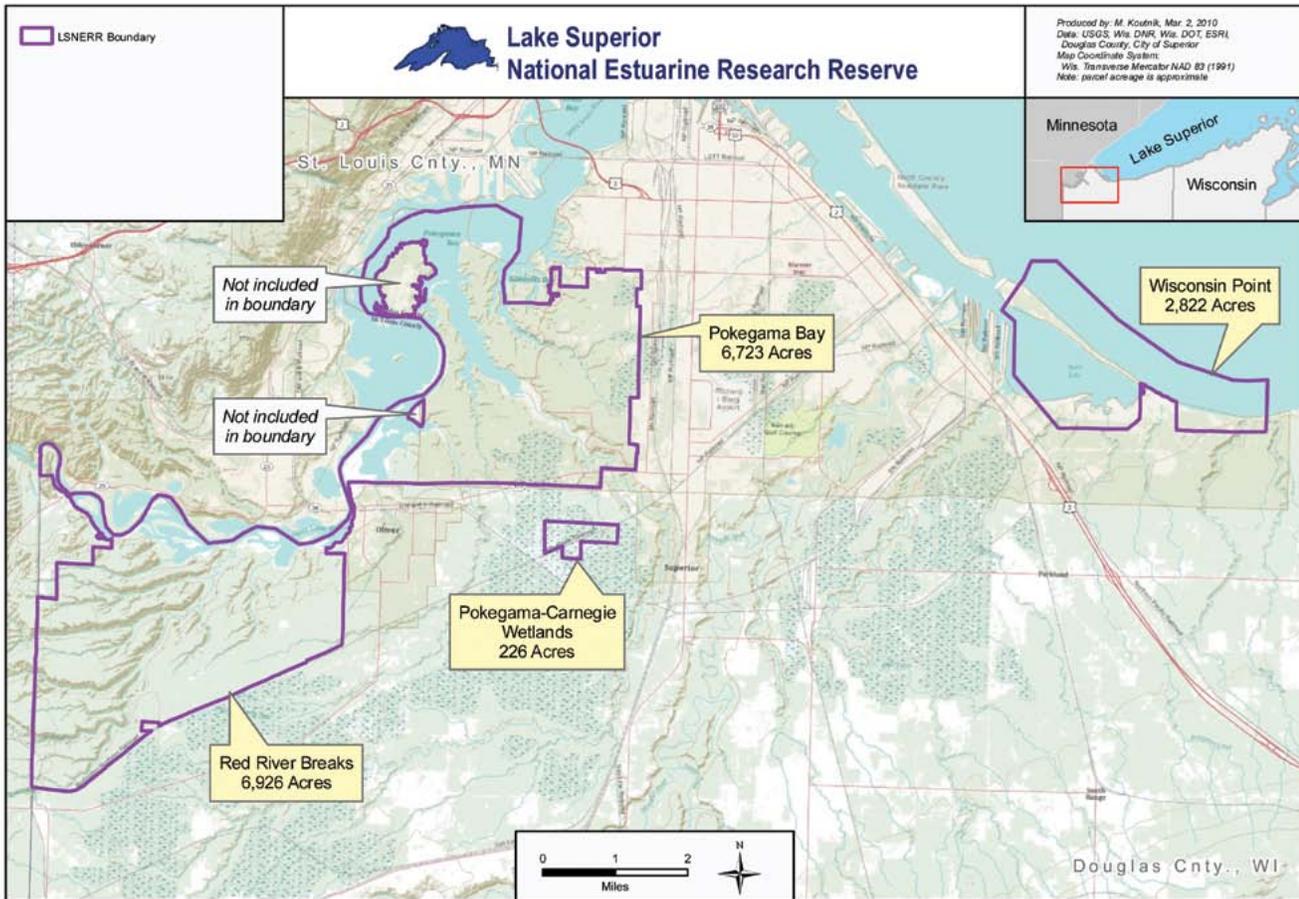
It is possible that this wetland formerly contained extensive mats of wire-leaved sedges, but eutrophication, sedimentation, and other disturbances led to changed conditions which aided the spread and eventual dominance of the coarser, more nutrient tolerant emergents. Nevertheless, this wetland is composed mostly of native species, and plant diversity and wildlife values are quite high. In the early spring, substantial numbers of water birds of many kinds congregate here.

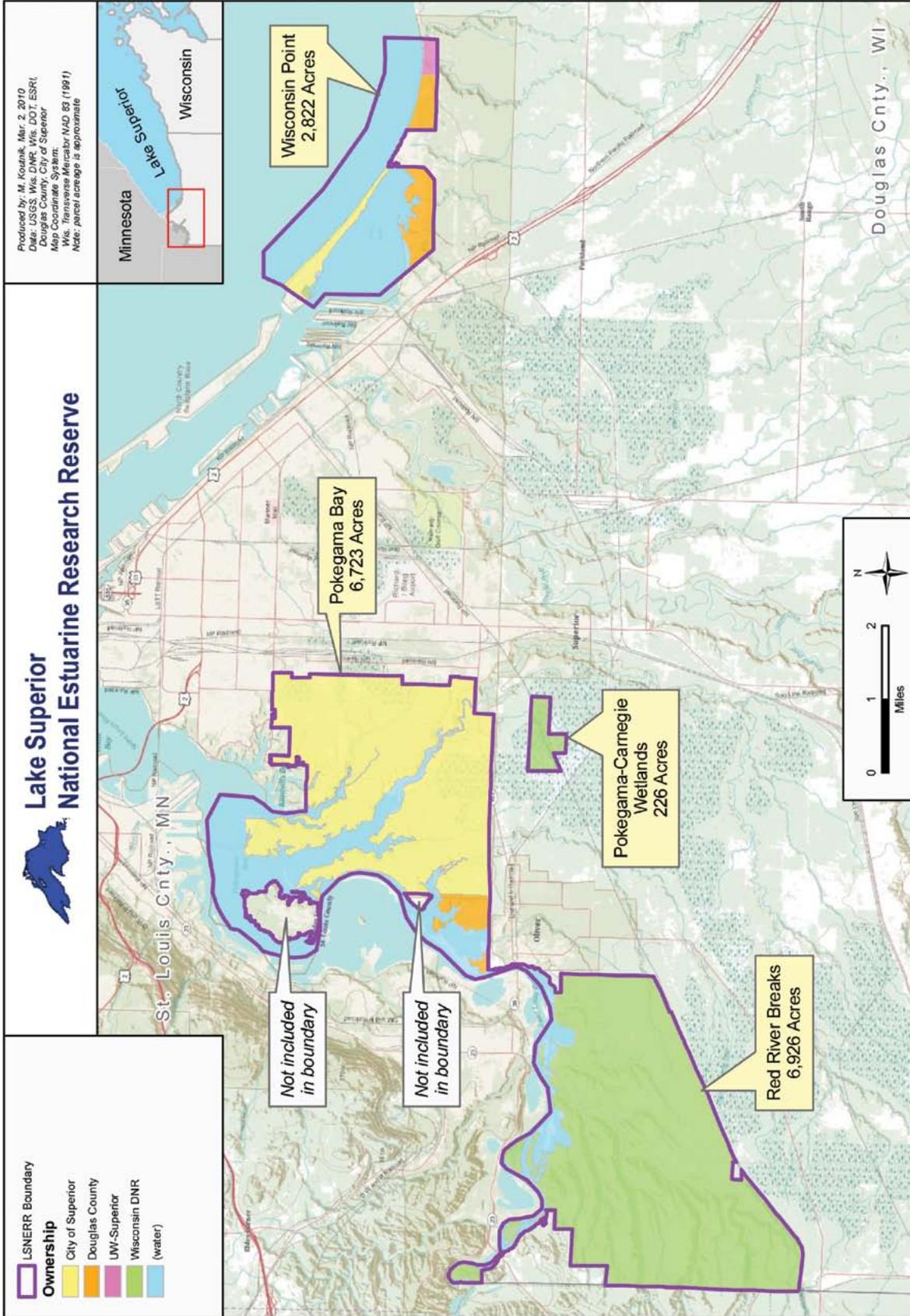
This site may be especially significant in years when the break-up of ice on Lake Superior is late, and little open water is available inland. The marsh also supports many nesting birds, including uncommon marsh species and a few rare invertebrates. This area supports many rare species and hosts major concentrations of migratory birds in the spring.

Future Boundary Modifications

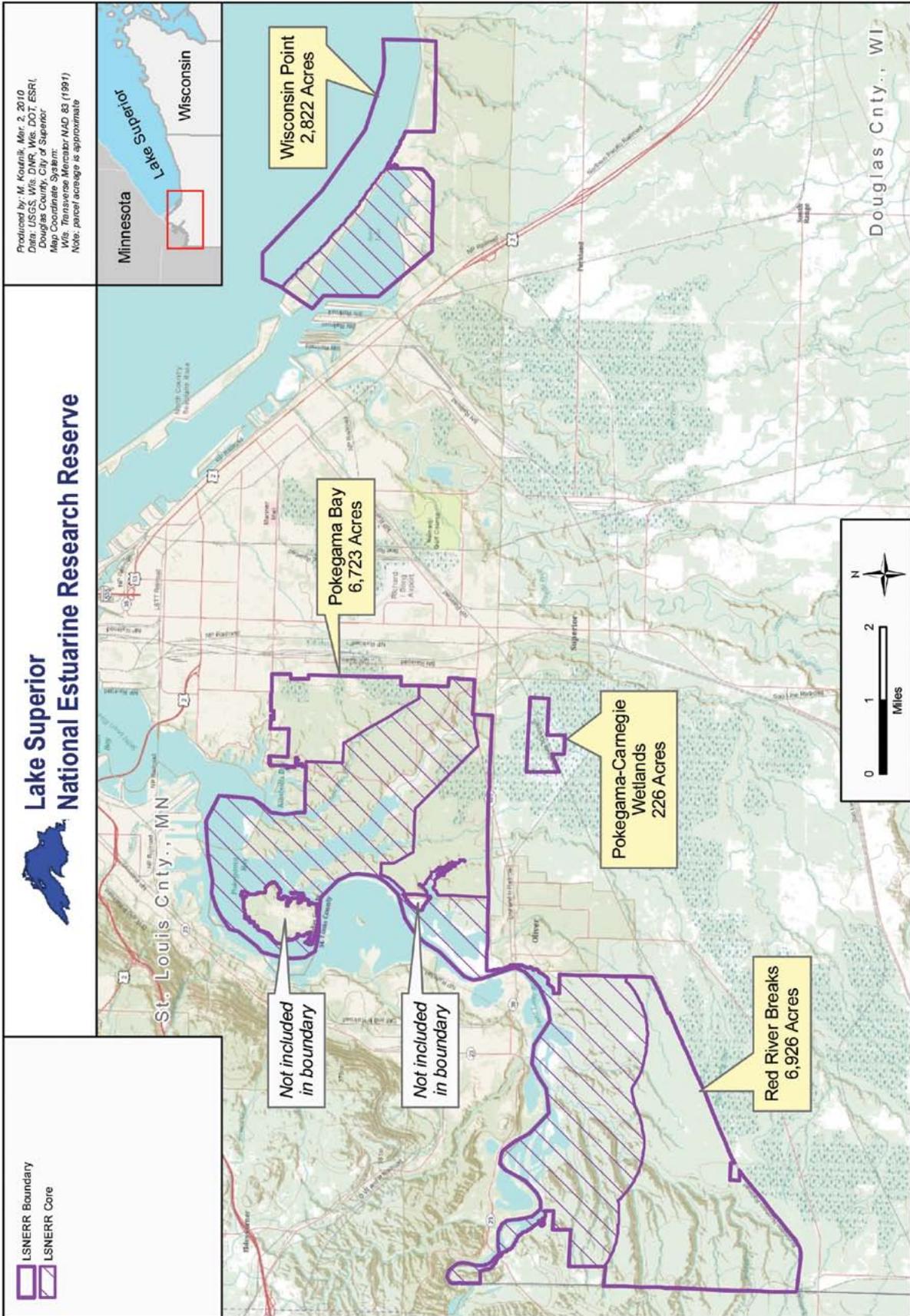
The Reserve consists of lands in public ownership and Wisconsin waters. Potential additions to the LSNERR boundaries may be considered. Any additions must be able to help fulfill the mission of the LSNERR. Additions must also meet NOAA's boundary requirements outlined in the federal register (915 CFR 921.31) and previously summarized at the beginning of this chapter. As stated in the federal regulations (915 CFR 921.33), boundaries of a NERR site also may be adjusted to remove areas previously approved as within a NERR site boundary but that no longer meet the needs or requirements of the Reserve.

Map 3. LSNERR Boundaries





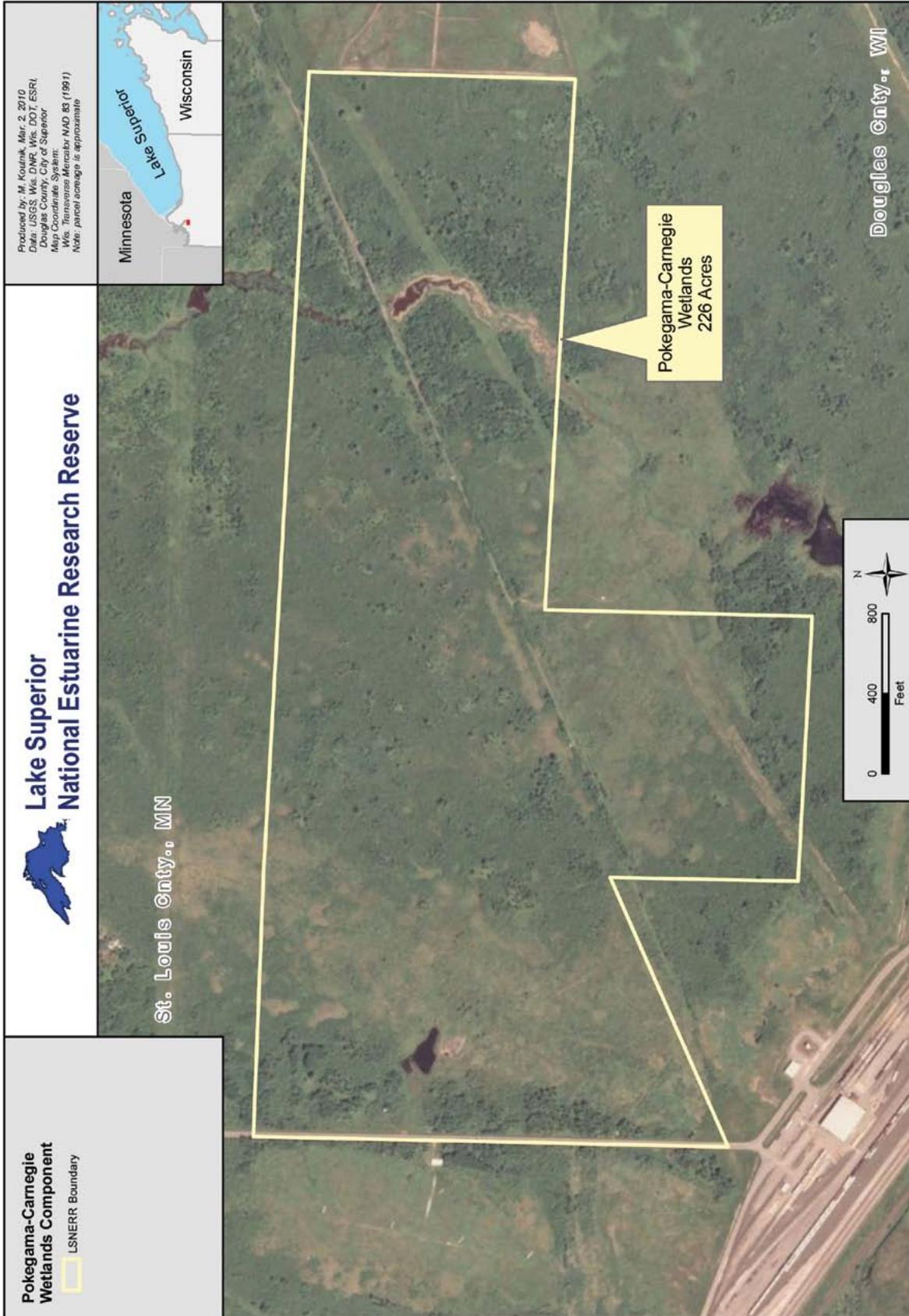
Map 4. LSNERR Land Ownership



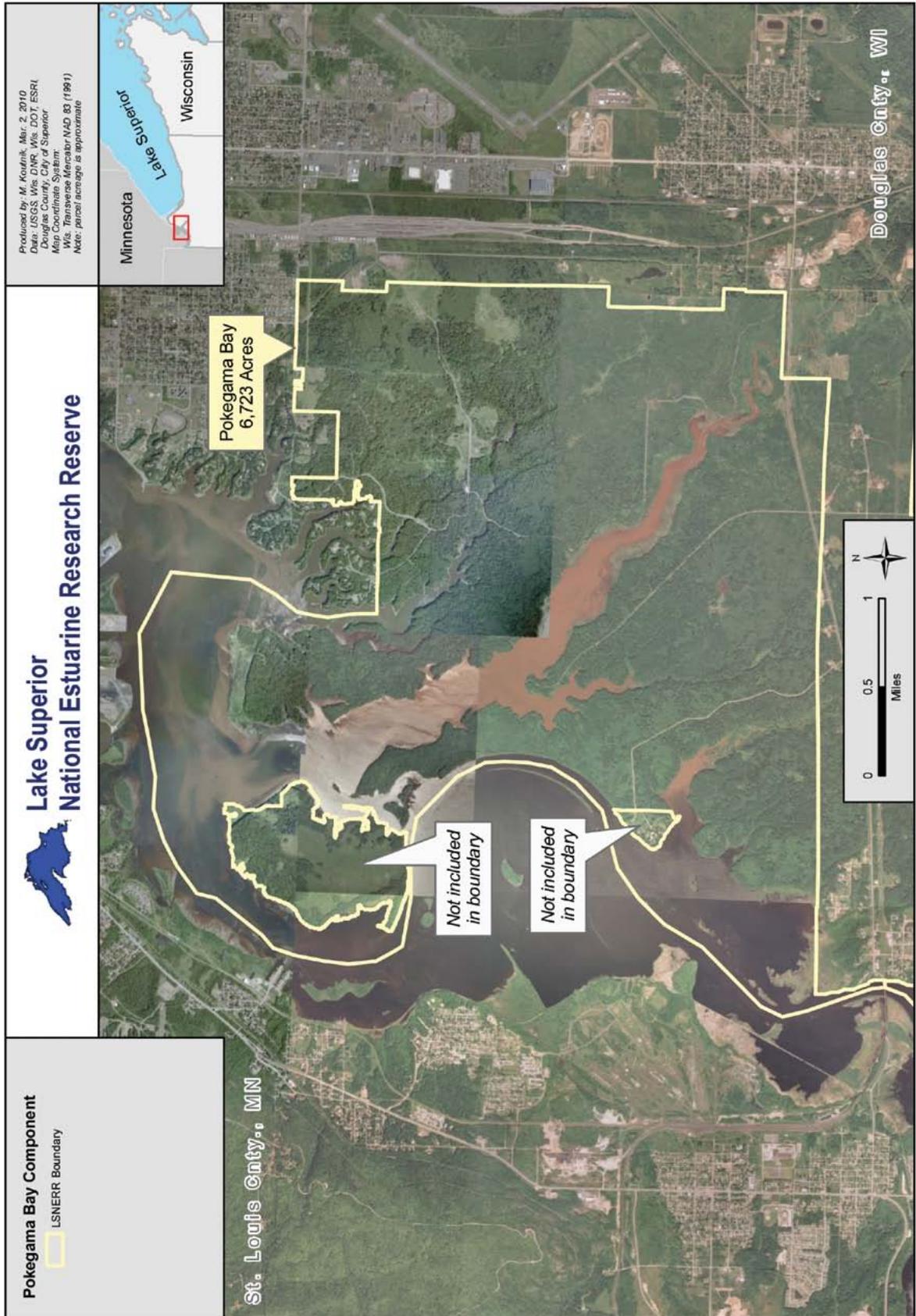
Map 5. LSNERR Boundaries with Core and Buffer Areas



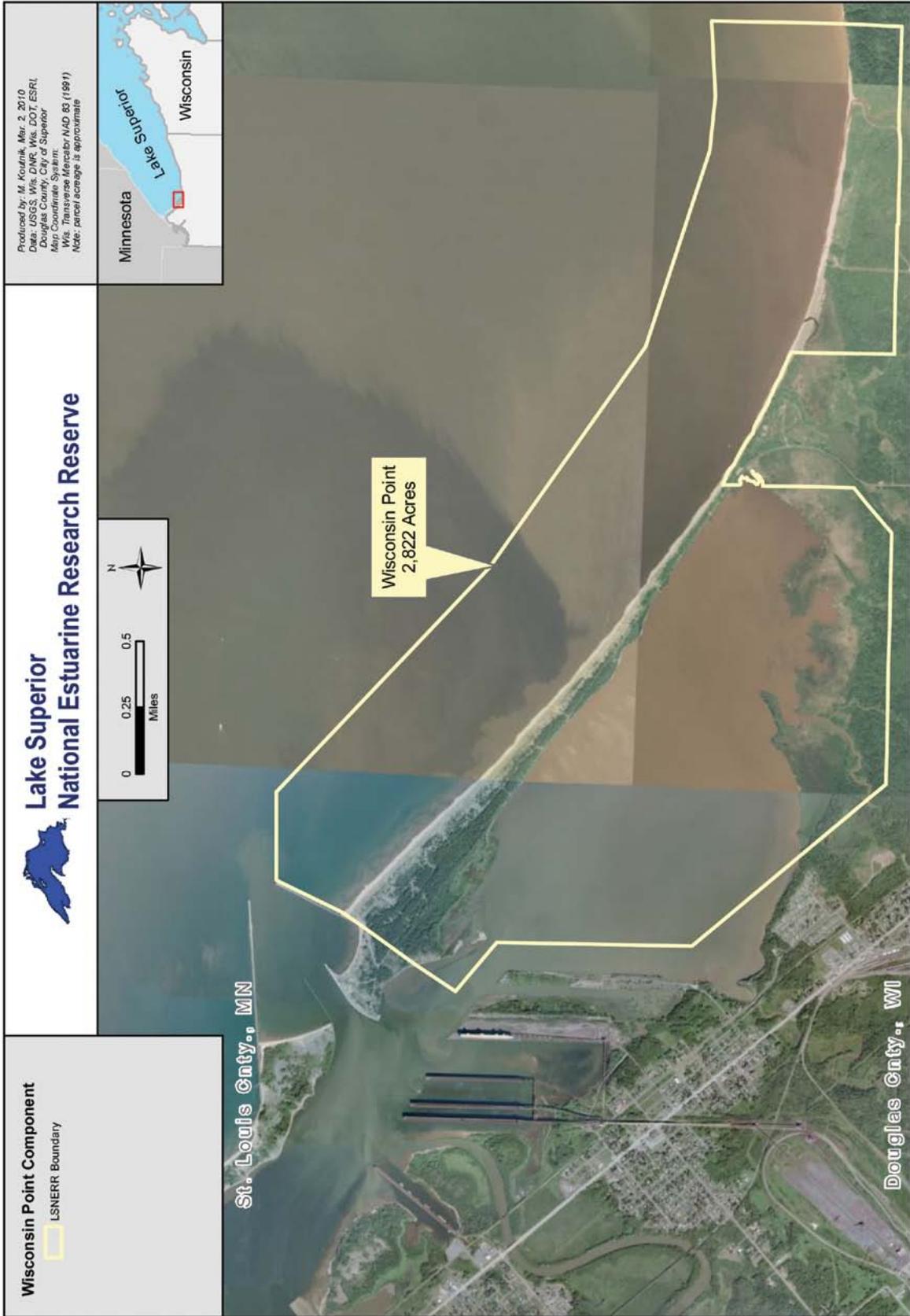
Map 6. Red River Breaks Component



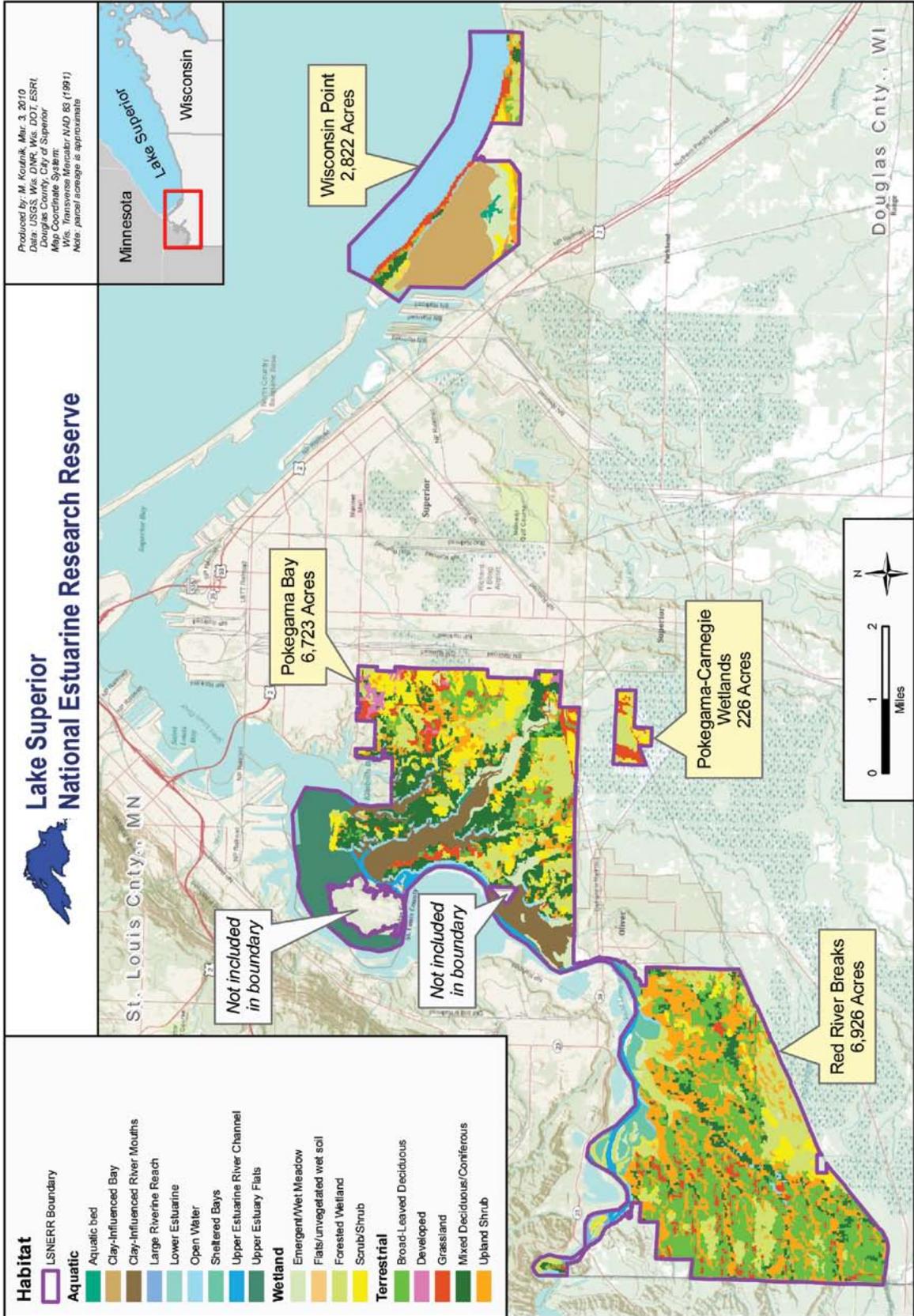
Map 7. Pokegama Carnegie Wetlands Component



Map 8. Pokegama Bay Component



Map 9. Wisconsin Point Component



Map 10. LSNERR Habitat

FACILITIES AND CONSTRUCTION

Introduction

The LSNERR is responsible for providing the facilities necessary to fulfill the Reserve's mission and support its research and education programs. LSNERR facility plans include existing facilities that will be available upon designation for Reserve programming needs, potential interim facilities that may be needed from 2010 to 2015, and longer-term facilities options that will be explored to address future Reserve programming needs. During the first five years of operation, the LSNERR will closely examine long-term facilities needs and will develop a prioritized list of these needs. Facility development will proceed as funds become available based upon that prioritized list of needs. All facilities will comply with federal, state, and local codes and regulations. In addition, any new facilities will be designed and constructed using sustainable building principles and in a manner that minimizes environmental impacts to the extent feasible.

Standard Reserve Facility Composition

NERRS has identified the facilities necessary to support the basic requirements of a typical Reserve based on a 2004 inventory and assessment of existing Reserves. The Standard Reserve facilities configuration in Table 2 identifies the common facilities and average square footage at existing Reserves and provides a basis for new reserves, such as the LSNERR, to plan for long-term facility needs. The LSNERR will use this information while conducting the long-term facilities assessment.

Administration & Support		Research		Education	
Offices & Meeting space	2,925 ft ²	Laboratory	2,453 ft ²	Exhibit & Reception	2,061 ft ²
Kitchen	376 ft ²	GIS operations	177 ft ²	Offices	640 ft ²
Storage	1,206 ft ²	Office	789 ft ²	Classroom	1,321 ft ²
Restroom	584 ft ²	Outside Storage	1,317 ft ²	Storage	253 ft ²
Maintenance	2,159 ft ²	Inside Storage	428 ft ²	Auditorium	1,116 ft ²
Other	2,321 ft ²	Dorms	1,846 ft ²	Library	306 ft ²
		Other	1,193 ft ²	Other	1,350 ft ²

Existing Facilities

UW-Superior Lake Superior Research Institute (LSRI)

Upon designation, facilities for the LSNERR will be located at the LSRI on the UWS campus. The analysis of the long-term future facilities needs, referenced in the introduction to this section, will identify facility needs such as office space, laboratories, dorms, classrooms, and equipment storage, which may be necessary for the successful operation of the LSNERR. The analysis will also determine the extent to which the LSNERR continues to be housed at UWS. While it is likely that there may be a longer-term LSNERR physical presence at UWS, decisions have not been made regarding which components of the LSNERR might have a long-term presence at the campus. Plans are in place, however, for locating the LSNERR at UWS upon designation, thereby ensuring that the LSNERR will have an initial facilities base for NERR operations.

LSRI is housed in two buildings: McCaskill and Barstow Halls. McCaskill Hall houses an aquatic taxonomy lab, an aquatic toxicology lab and culture unit, an analytical chemistry lab and storage areas for sampling equipment. Barstow Hall houses additional analytical chemistry labs and an aquatic invasive species lab. Staff offices are located in both buildings. The space available in these two buildings totals approximately 11,000 ft². In addition to this space, classrooms and meeting rooms are available for education and outreach programs in McCaskill and Barstow Halls as well as in the Student Center.

A remodeling project is scheduled to begin on campus in January 2011 and will last approximately 9-12 months. The total amount of space after remodeling will be approximately 7,500 ft². Although the floor space is less than what is currently available, the remodeling project has been specifically designed to integrate LSRI and initial LSNERR operations and will result in a more efficient and effective use of space. Facilities including offices, laboratories, classrooms, meeting rooms, and equipment storage will continue to be available to LSNERR staff during the renovations. Classrooms and meeting rooms for education and outreach programs will continue to be available after the LSNERR has moved into its remodeled space.

LSRI equipment available for use by NERR staff includes a 58-foot research vessel, two 18-foot flat-bottom boats and a 16-foot deep-V hull vessel. Sampling equipment includes sediment dredges and core samplers, plankton nets, electro shockers, fish trawls, gill nets, seines, multi-probe and other portable field meters, D-frame nets, and water quality sampling equipment.



Superior Municipal Forest (SMF)

The SMF offers a number of amenities that will be used to augment LSNERR education and outreach programming. Those amenities include the following:

- ◆ An interconnected, extensive web of trails providing opportunities to explore the freshwater estuary forested riparian areas (a brochure showing the trail network can be found in Appendix 15)
- ◆ 16 miles of groomed cross-country ski trails
- ◆ A 1.6 mile hard-surfaced trail that runs east/west on the north side of the property
- ◆ Pedestals featuring educational messages and benches located along the trails
- ◆ An outdoor classroom with seating for 60 students
- ◆ Four parking lots that offer capacity for approximately 97 vehicles
- ◆ Canoe access points; city of Superior boat launch facilities are available at nearby sites
- ◆ A world-class archery range

The SMF, with its extensive trail network, outdoor classroom, and other resources, will be an important part of LSNERR educational programming. It provides an established resource for developing programming and engaging LSNERR visitors in experiential learning activities.

Future Needs

LSNERR will formally identify future facility needs through a planning process. Although this planning process will provide us with the details of what facilities will be needed, it is already known that additional facilities and space will be required in order to provide the necessary space to implement a successful LSNERR program. While those long-term facilities are being planned for, there may be a need for facilities to satisfy space requirements. As the LSNERR grows during its first five years of operation, interim facilities will likely become more necessary, including items like additional storage, expanded laboratory and educational facilities, and increased office space for staff.

Current options which could potentially be used to address facility needs include:

- ◆ Construction on existing LSNERR properties
- ◆ Renovation of UWS campus buildings
- ◆ Acquisition and renovation of appropriate waterfront facilities

PUBLIC ACCESS

Section 921.13(a) of the NERRS regulations requires planning for public access as part of the Reserve Management Plan. Current public access sites and resources within the Reserve are highlighted in Table 3 for each component of the LSNERR. Public access to the Reserve will be determined by, and compatible with, the public access policy of each of the agencies having title to the lands in question (i.e., UWS, city of Superior, Douglas County and WDNR). Specific policies for access for education, stewardship, research, and monitoring will be determined through coordination with each of the NERR partners and the LSNERR Advisory Board.

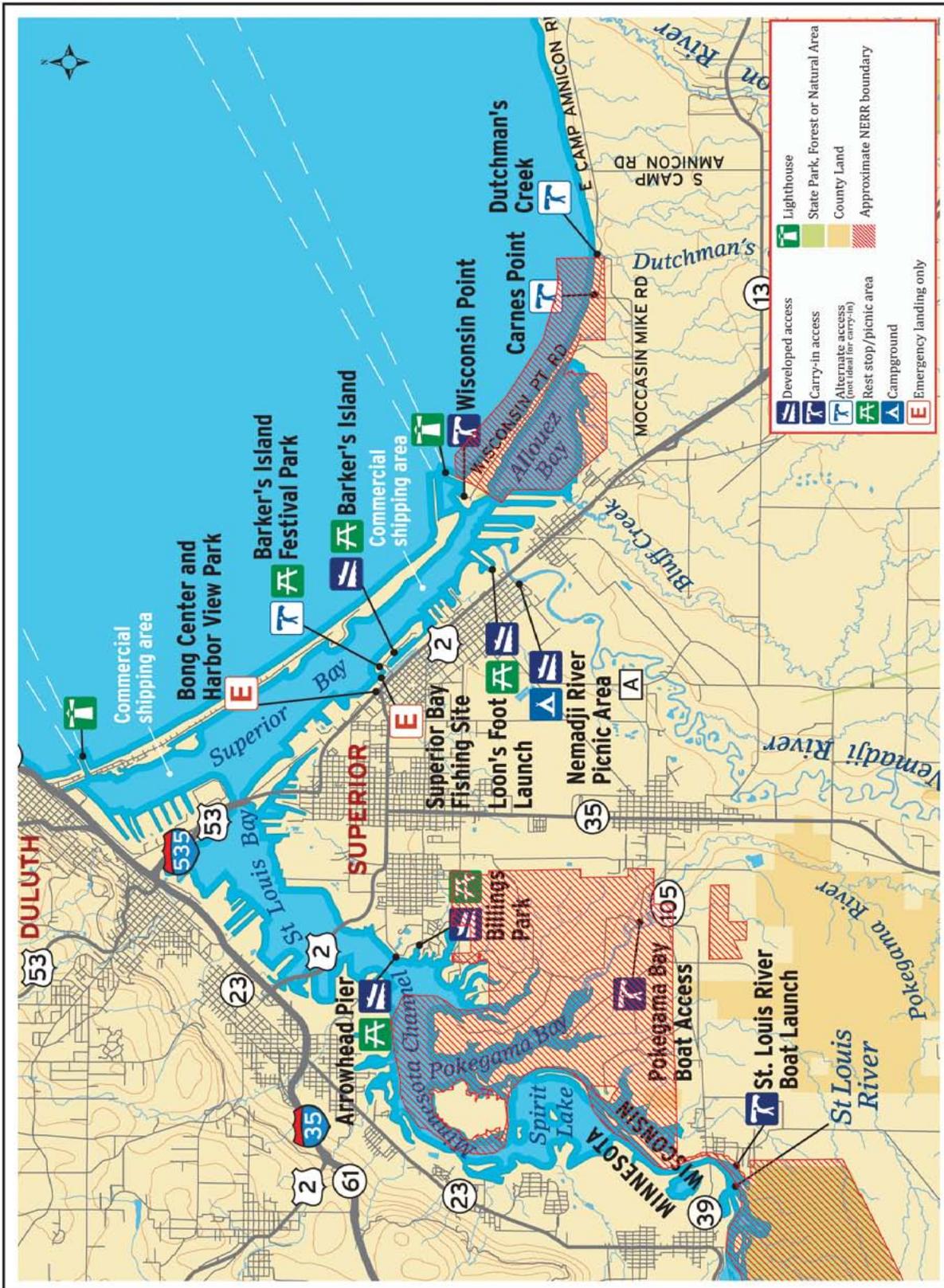
Tribal treaty rights, including access to ceded lands for hunting, fishing, and gathering will not be changed or impeded in any way by the LSNERR designation. Band members will continue to exercise their usufructuary rights on LSNERR lands as they did before the LSNERR designation and management and enforcement of treaty resources will continue under tribal law.

Access to the Freshwater Estuary Outside of the LSNERR Boundaries

The St. Louis River Freshwater Estuary is a large system with various water access points in both Wisconsin and Minnesota. The St. Louis River Alliance, formerly the St. Louis River Citizens Action Committee, produced an *On-The-Water Guide for Canoeists, Kayakers and Boaters*, that details access points on the Minnesota and Wisconsin shores of the Lower St. Louis River. (Appendix 14)

The Northwest Regional Planning Commission is also in the process of completing a South Shore Public Access Study for the Wisconsin shore of Lake Superior. They have produced a Water Trail map that details access points, including areas within the St. Louis River Freshwater Estuary (Map 11). They also developed an interactive on-line Water Trail map and book (<http://maps.nwrpc.com/coastal/public-access-study/new-public-access-site>) with photos and detailed information on types of access, locations, parking and contact information.

Table 3. Types of Public Access and Use by LSNERR Component		Public Access and Use															
		Unimproved Boat Access	Vehicle Access	Fishing	Wildlife Viewing	Archery Range	Deer Hunting - Bow	Deer Hunting - Gun	Small Game Hunting	Waterfowl Hunting	Sand Beach	Ski Trails	Hiking Trails	Bike Trails	Snowmobile Trails	ATV Trails	Access for Ability Impaired
LSNERR Component by Ownership	Red River Breaks																
	WDNR (St. Louis and Red River Streambank Protection Area)						✓	✓	✓	✓							
	Douglas County						✓	✓	✓	✓							
	Pokegama Carnegie Wetlands																
	WDNR (Pokegama-Carnegie SNA)						✓	✓	✓	✓							
	Pokegama Bay																
	City of Superior (Superior Municipal Forest)	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
	Douglas County (Oliver Marsh)						✓	✓	✓	✓							
	Wisconsin Point																
	City of Superior	✓	✓	✓	✓					✓	✓		✓				✓
	WDNR				✓					✓							
	Douglas County						✓	✓	✓								
	UWS (Nelson Outdoor Laboratory)		✓		✓						✓						



Map 11. Public Access to the St. Louis River Freshwater Estuary

PUBLIC ACCESS INFORMATION PROVIDED BY NORTHWEST REGIONAL PLANNING COMMISSION FROM DATA GATHERED FOR THEIR SOUTH SHORE PUBLIC ACCESS STUDY.

MANAGEMENT PLAN

OBJECTIVES & OUTCOMES

The LSNERR Management Plan has been organized using a “goals”, “objectives”, and “outcomes” based planning framework. The LSNERR goals, which were identified earlier in this document, describe the long-term intentions of the Reserve. The Management Plan’s objectives are broad statements that describe what the LSNERR intends to accomplish within the first five years. Each objective has associated outcomes describing the specific impacts, products, or results associated with each of the objectives. The LSNERR Reserve Manager and staff will identify specific actions as they implement the Management Plan using the objectives and outcomes stated below. UWEX and NOAA evaluation tools will be used to measure performance of the LSNERR and its ability to reach target audiences. Appropriate NERRS performance measures will be prepared and submitted to the Estuarine Reserves Division (ERD).

Planning Definitions:

Goal – Long-term intentions of the NERR; these can span longer than the five-year time frame

Objective – Broad statements describing what the LSNERR intends to accomplish during the first five years

Outcome – Specific statements describing the impacts, products, or results associated with each of the objectives

LSNERR Objectives and Outcomes for 2010 to 2015

OBJECTIVE 1: Conduct baseline or foundational research and activities needed for longer-term research and monitoring directed at improving the understanding of the St. Louis River Freshwater Estuary, its interactions with Lake Superior, and the short- and long-term ecological changes within Lake Superior freshwater estuaries and coastal ecosystems.

Outcome 1A: The LSNERR will complete an inventory of existing physical, chemical, biological, social, and cultural information for the LSNERR in order to build a foundation to guide future research and education activities.

Outcome 1B: The LSNERR will develop a geographic information system (GIS) and associated geospatial-temporal database for the St. Louis River Freshwater Estuary and contributing watershed that incorporates existing and new data from diverse sources. In addition, the LSNERR will begin work on a physical and hydrologic model of the St. Louis River Freshwater Estuary system that will be integrated into the GIS platform.

Outcome 1C: Information regarding past, current, and potential watershed land use patterns and impacts will be incorporated into a GIS platform for the St. Louis River Freshwater Estuary and used to identify and prioritize watershed management and research needs.

Outcome 1D: The LSNERR will conduct new research and collect data to enable a comprehensive site description and characterization of the St. Louis River Freshwater Estuary and will use this information to prepare and publish baseline habitat maps and a site profile.

Outcome 1E: The LSNERR will collaborate with other partners to identify a group of reference sites that cover a range of conditions and are appropriate for long-term study and comparison to the St. Louis River Freshwater Estuary system.

Outcome 1F: The LSNERR will establish a monitoring program following SWMP protocols.

Outcome 1G: The LSNERR will conduct new research examining the interactions between the St. Louis River Freshwater Estuary and Lake Superior. Areas of research could include, but are not limited to, seiche dynamics, food web processes, invasive species, climate change, and historic changes to the system.

OBJECTIVE 2: Improve understanding of the socio-economic aspects of the St. Louis River Freshwater Estuary.

Outcome 2A: The LSNERR will develop a research strategy that enables further identification and quantification of the socio-economic benefits and ecosystem services provided by the St. Louis River Freshwater Estuary.

Outcome 2B: The LSNERR will produce outreach materials that characterize and describe the socio-economic resources of the St. Louis River Freshwater Estuary.

OBJECTIVE 3: Increase public awareness of the ecological and cultural significance of the St. Louis River Freshwater Estuary.

Outcome 3A: The LSNERR will establish a publically accessible library of ecological and cultural resources relevant to the LSNERR.

Outcome 3B: The LSNERR will identify St. Louis River Freshwater Estuary interpretive needs in collaboration with other environmental education centers in the Lake Superior area and create at least one new interpretive resource.

Outcome 3C: The LSNERR will develop web-based educational materials and applications designed to improve public awareness of the ecological and cultural significance of the St. Louis River Freshwater Estuary.

Outcome 3D: The LSNERR will work with partners to investigate the potential need for, and benefits of, a Master Naturalist Program at the LSNERR. If deemed appropriate after this analysis, a Master Naturalist Program will be established at the LSNERR.

OBJECTIVE 4: Increase educator and student understanding of Great Lakes freshwater estuaries and coastal habitats.

Outcome 4A: The LSNERR will work with area educators to develop continuing education programming related to Lake Superior freshwater estuaries and coastal resources. Initial focus areas will include an introduction to Great Lakes freshwater estuaries, aquatic invasive species, and potential climate change impacts.

Outcome 4B: The LSNERR will work with partners to conduct a market analysis and needs assessment related to Lake Superior freshwater estuary and coastal resource K-12 curriculum and lessons plans. This process will be conducted in a manner consistent with KEEP.

Outcome 4C: Based upon the outcomes of the market analysis and needs assessment, the LSNERR will work with partners to develop appropriate curriculum, distribute the curriculum to schools, and conduct training for educators related to the curriculum.

Outcome 4D: The LSNERR will work with the NERRS Graduate Research Fellowship program to develop and sponsor graduate research at the Reserve.

OBJECTIVE 5: Provide research-based educational outreach programming and skills training that address the Lake Superior coastal management issues and needs of community leaders and other decision makers.

Outcome 5A: The LSNERR will work with partners to conduct a market analysis and needs assessment that identifies the coastal management issues and training needs of coastal decision-makers.

Outcome 5B: The LSNERR will develop a NERRS CTP based upon the results of the market analysis and needs assessment.

OBJECTIVE 6: Conduct stewardship activities that protect and enhance the ecological health of the LSNERR.

Outcome 6A: The LSNERR will work with management partners to conduct an assessment of LSNERR stewardship needs.

Outcome 6B: The LSNERR will design and begin implementation of applied research, monitoring, and management programs that address stewardship needs of the St. Louis River Freshwater Estuary, riparian habitats, and watershed.

Outcome 6C: The LSNERR will work with partners to identify potential needs related to toxins and contaminants and their impacts on the St. Louis River Freshwater Estuary and will develop a strategy to address those needs.

OBJECTIVE 7: Incorporate citizen-science programs and volunteer monitoring into LSNERR research and monitoring activities.

Outcome 7A: The LSNERR will establish citizen science and volunteer monitoring programs to address relevant issues.

Outcome 7B: The LSNERR will explore the feasibility of establishing a Citizen Research Center at the LSNERR.

Outcome 7C: The LSNERR will explore the feasibility of establishing a formal, connected network of Wisconsin freshwater estuary sites. Partnering sites would be included in coordinated outreach, applied research, and monitoring programs designed to encourage and foster local stewardship of freshwater estuary resources at the community level.

Program Integration

As mentioned previously, the LSNERR will emphasize integration of research, education, and stewardship programming. As a result, the objectives and outcomes for the LSNERR often incorporate multiple program areas and are not discretely organized by program. The integration of each of the objectives across research, education, and stewardship programming areas is shown in Table 4.

Table 4. Integration of LSNERR Management Plan Objectives		NERR Program Sectors			Partner Plan Correlation		
		Research	Education	Stewardship	WI Great Lakes Strategies ^{xxi}	Lower St. Louis River Habitat Plan ^{xx}	Freshwater Estuary Needs Assessment ^{xxii}
P = Primary Programming Area S = Secondary Programming Area							
OBJECTIVES	1 Conduct baseline or foundational research and activities needed for longer-term research and monitoring directed at improving the understanding of the St. Louis River Freshwater Estuary, its interactions with Lake Superior, and the short and long-term ecological changes within Lake Superior freshwater estuaries and coastal ecosystems	P	S	S	✓	✓	✓
	2 Improve understanding of the socio-economic aspects of the St. Louis River Freshwater Estuary	P	P	S	✓	✓	✓
	3 Increase public awareness of the ecological and cultural significance of the St. Louis River Freshwater Estuary		P	S	✓	✓	✓
	4 Increase educator and student understanding of Great Lakes freshwater estuaries and coastal habitats		P	S			✓
	5 Provide research-based educational outreach programming and skills training that address the Lake Superior coastal management issues and needs of community leaders and other decision makers		P	P	✓	✓	✓
	6 Conduct stewardship activities that protect and enhance the ecological health of the LSNERR			P	✓	✓	✓
	7 Incorporate citizen-science programs and volunteer monitoring into LSNERR research and monitoring activities	P	P	S	✓	✓	✓

Coastal Management Issues

The LSNERR will address important coastal management issues and examine key coastal ecosystem processes that affect the St. Louis River Freshwater Estuary, as well as other Great Lake freshwater estuaries. Important issues and processes that the LSNERR should address were identified by the Advisory Committees during the management planning process and include the following:

SEICHE DYNAMICS	FOOD WEB PROCESSES	INVASIVE SPECIES	CLIMATE CHANGE
LAND USE CHANGES	ECOSYSTEM SERVICES	TOXINS & CONTAMINANTS	

RESOURCE PROTECTION, RESTORATION & MANIPULATION

Introduction

The LSNERR consists of existing public property, which has an established system of authorities and management plans to ensure the protection of estuarine and watershed resources. No new authorities are proposed in this plan.

This section describes the existing protection, restoration, and manipulations of estuarine resources in the St. Louis River Freshwater Estuary. Specifically, this section satisfies the requirements of NERRS regulations 15CFR 921.13(a)(8-10).

Resource Protection Plan

The land within the Reserve boundaries is entirely publicly owned, and is protected by authorities specific to each of the landowners. These authorities provide the required long-term protection of the Reserve's estuarine resources necessary to ensure a stable environment for research. The water area within the boundaries is protected by state and local laws governing recreational and commercial uses and public access. The Lake Superior Chippewa retain treaty rights in their ceded territories. Specifically, these are off-reservation hunting, fishing and gathering rights in lands the Anishanabe ceded to the United States in the Treaties of 1836, 1837, 1842 and 1854. These rights, which the Anishanabe have always had, were reserved by the bands and guaranteed by the United States to ensure that the tribes could meet subsistence, economic, cultural, spiritual and medicinal needs. None of these uses are inconsistent with the purposes of the Reserve, and can generally continue without modification. Surveillance and enforcement is the responsibility of the respective landowners, as well as the community law enforcement departments of the city of Superior, Douglas County, GLIFWC, UWS, and the WDNR. These agencies will continue to be responsible for enforcement in their respective jurisdictions.



Specific Landowner Policies and Authorities

CITY OF SUPERIOR

Since the SMF's creation in 1949, it has evolved to become an important ecologic, recreational, and open space natural resource for the city of Superior, and the region as a whole. In 1992, the City passed a referendum creating the Municipal Forest Protection Charter Ordinance:

“The intent of this ordinance is to set aside and preserve for recreational and education activities and facilities, open for the participation and enjoyment of all citizens, the land and natural resources identified as the Superior Municipal Forest. To protect this goal it is the intent of the ordinance to exclude conflicting activities and uses. No person shall engage in any of the following activities within the Municipal Forest:

- a) Depositing any debris, garbage, rock, sand, soil or other materials;*
- b) Moving or removing sand, soil, clay, rock, or gravel;*
- c) Construct any structure for use industrially, commercially, or as a residential dwelling;*
- d) Except that these prohibitions shall not be construed to prohibit the use or maintenance of any existing roads and trails for public recreational purposes.”*

Following the creation of the Charter Ordinance, the SMF Committee prepared a management plan to guide the preservation of this unique public resource. A system of paved and unpaved trails has been developed to accommodate public access to the forest. The paved Millennium Trail is 1.6 miles long and is designed for bicycling, inline skating and walking. It is also wheelchair accessible. An outdoor classroom is located along the Millennium Trail for use by local schools and other groups for outdoor and environmental education programs. The unpaved trail system includes 16 miles of groomed cross-country ski trails and more than 12 miles of snowmobile, winter all-terrain vehicle (ATV) and ski trails, including a shared trail for snowmobiling, ATV riding and skijoring (skiing with dogs). City permits are required for skiing and skijoring. Summer ATV use is only allowed on McClure's Landing Road. Unimproved boat access to Pokegama Bay is provided at a site along Billings Drive. Please see Appendix 15 for a map of the SMF trail system. Additional allowable uses of the SMF include archery target practice within the designated archery course, and archery hunting during the state archery hunting season. A state license and City permit are required for archery hunting.^{xxxii} Waterfowl hunting during state hunting seasons is allowed within the waters of the St. Louis River south of the Arrowhead Pier boat launch and within the City.^{xxxiii}

The City manages Wisconsin Point as a recreational area of the City parks system. Limited daytime use of the park is permitted, as well as nighttime fishing for smelt (during which time camping is also allowed).^{xxxiv} Waterfowl hunting is allowed from the waters of Lake Superior and Allouez Bay, which surround Wisconsin Point. Archery hunting is allowed during the state archery hunting season. A state license and City permit are required for archery hunting.^{xxxv} Other allowable uses include waterfowl hunting within the waters of Allouez Bay and Lake Superior during state hunting seasons.^{xxxvi} Boating is regulated by state laws and by additional City ordinances that establish speed restrictions on Allouez Bay.^{xxxvii}

DOUGLAS COUNTY

Oliver Marsh is managed by the Douglas County Forestry Department. It is designated as “special-use lands” under the state’s County Forest Law, which recognizes the value of the land for conservation, rather than timber production.^{xxxviii} The Douglas County Forest Comprehensive Land-Use Plan further describes the management objectives for the class of properties called “Special Management Areas”, which includes Oliver Marsh.^{xxxix} Public access and use of Oliver Marsh, as well as additional Douglas County lands adjacent to Wisconsin Point and the St. Louis and Red River Streambank Protection Area, are regulated by Douglas County ordinances.^{xi}

Douglas County maintains a system of winter snowmobile and ATV trails, and summer ATV trails (Appendix 16). Winter trails are maintained within the SMF and along the southern boundary of the St. Louis and Red River Streambank Protection Area.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

State Natural Areas (SNAs)

Two portions of the Reserve are designated SNAs. These SNAs protect outstanding examples of native natural communities, and harbor natural features substantially similar to those that existed prior to European settlement.^{xli} Designation confers a significant level of land protection through state statutes, administrative rules, and guidelines. A higher level of protection is afforded by legal dedication of SNAs through Articles of Dedication, a special kind of perpetual conservation easement.

Laws establishing the SNA Program are found in Wisconsin Statutes, Sections 23.27, 23.28, and 23.29. Rules governing the use of SNAs are found in Wisconsin Administrative Code, Chapter NR 45.

The WDNR states that, *“Public use of SNAs is channeled in two directions: scientific research and compatible recreation. Natural areas serve as excellent outdoor laboratories for environmental education and formal research on natural communities and their component species. A permit issued by the DNR is required to conduct studies or collect specimens on SNAs. Natural areas are not appropriate for intensive recreation such as camping or mountain biking, but they can accommodate low-impact activities such as hiking, bird watching, and nature study. As such, many SNAs contain few or no amenities such as parking areas, restrooms, or maintained trails.”*^{xlii}

The Dwight’s Point and Pokegama Wetlands SNA is located entirely within the SMF. It is a designated SNA established through agreement (Appendix 17) between the WDNR and city of Superior. A management plan (Appendix 18) describes the allowable and prohibited uses within the SNA, and the goals for management and restoration of natural plant and animal communities.

The Pokegama Carnegie Wetlands SNA is located south of the SMF and is composed of two separate components. The Reserve boundaries include the smaller, northern component, which is owned and managed by the WDNR. This property is subject to a pipeline easement and is crossed by power lines along utility easements. It is a designated SNA with the following allowable and prohibited uses.^{xliii}

Allowable activities are:

- ◆ Hiking
- ◆ Hunting
- ◆ Fishing
- ◆ Trapping
- ◆ Skiing

Prohibited activities are:

- ◆ Horseback riding
- ◆ Rock climbing
- ◆ Vehicles, including bicycles, ATVs, aircraft, and snowmobiles except on trails and roadways designated for their use
- ◆ Collecting of plants (including fruits, nuts, or edible plant parts), animals, fungi, rocks, minerals, fossils, archaeological artifacts, soil, downed wood, or any other natural material, alive or dead



St. Louis and Red River Streambank Protection Area

The St. Louis and Red River Streambank Protection Area was purchased to prevent erosion and protect the St. Louis River walleye spawning area based on a St. Louis and Red River Streambank Protection Area Feasibility Study (Appendix 19). The property is managed consistent with these purposes. There are no developed public access facilities on this property, although it is open for general low-impact recreational activities. The Streambank Protection Program is part of the Knowles-Nelson Stewardship Program for land acquisition. The restrictions on the allowable uses of this land include:^{xliv}

- ◆ Alteration of vegetative cover or other natural features unless the department specifically approves the alteration.
- ◆ Planting or production of agricultural crops unless the department specifically approves the planting or production for wildlife management purposes.
- ◆ Mowing, grazing or spraying the land with chemicals, except as necessary to comply with noxious weed control laws or to control pests on an emergency basis when such control is necessary to protect public health or unless the department specifically approves the mowing, grazing, or spraying.

The WDNR also regulates and enforces the public trust doctrine in the water areas of the Reserve.^{xlv} Both Lake Superior and the St. Louis River are subject to the protections of the public trust doctrine as outlined in the State Constitution. The water areas of the Reserve will be managed under this authority.

UNIVERSITY OF WISCONSIN – SUPERIOR

The Nelson Outdoor Laboratory property is owned by UWS and managed as an instructional and research area for the Department of Natural Sciences. An unimproved public access site located at the mouth of Dutchman Creek is used for swimming and beach access, and can be used as a canoe or kayak launch. Activities at the Nelson Outdoor Laboratory are governed by local ordinances and state administrative rules^{xlvi} as well as UWS campus regulations.^{xlvi}

Existing Resource Restoration Activities

There are few resource restoration activities within the Reserve boundaries. The SMF contains twelve sites identified as locations of wetland creation or restoration projects to mitigate development under the city of Superior Special Area Management Plan (SAMP) that expired in 2008.^{xlvi} It is unclear how many of these creations/restorations were implemented. The current SAMP does not identify any restoration or mitigation sites within the Reserve boundaries.^{xlvi}

The St. Louis River watershed includes numerous resource restoration activities. The St. Louis River is identified by the International Joint Commission as an Area of Concern, with a Remedial Action Plan for restoring targeted beneficial uses.¹ The Lower St. Louis River Habitat Plan, which establishes goals and objectives that “protect, enhance, and restore ecological functions and maximize biodiversity” of the lower St. Louis River,^{li} has informed many of the Reserve management objectives, as described in the previous section.

Existing Resource Manipulations

Existing resource manipulations largely consist of utility facilities and corridors, and activities associated with the Port of Duluth-Superior.

Utility Corridors

Buried petroleum product pipelines cross the St. Louis River in the vicinity of the Village of Oliver, and are located in corridors within the St. Louis and Red River Streambank Protection Area and the Pokegama Carnegie SNA. These pipelines are operated by Enbridge Energy Partners. An electricity transmission line corridor crosses the Pokegama Carnegie SNA.

Railroads

A short segment of Burlington Northern railroad crosses the southwest corner of the St. Louis and Red River Streambank Protection Area. Many other railroads and railyard facilities are located in the vicinity of the Reserve, due to the conglomeration of transportation and shipping facilities at the Port of Duluth-Superior.

Port of Duluth-Superior

The lower St. Louis River Freshwater Estuary has been highly modified from its pre-settlement form and function through the development of extensive port facilities and harbor improvements. The Port of Duluth-Superior is the largest and busiest port on the Great Lakes.^{lii} The U.S. Army Corps of Engineers (USACE) maintains a navigation channel that extends through the Superior Entry at the end of Wisconsin Point, through the harbor area, and upriver to Spirit Lake. The main channel is maintained to 27 feet to accommodate the largest cargo ships. Dredging has an obvious effect on the lower estuary, but this is limited mostly to the commercial and industrial areas of the port. The proposed Reserve boundaries are located upriver and outside the USACE project area.

The 2003 Superior Port Land Use Plan describes the current and future land uses for the port facilities within the city of Superior. The plan emphasizes the importance of protecting natural habitat areas within the St. Louis River watershed and focuses development in areas previously developed for maritime industries and in areas closest to the harbor entrances.^{liii}

Indirect impacts on the estuarine resources related to the port activities include aquatic invasive species, introduced and spread through water ballast in ships. Of the 87 non-native species introduced to Lake Superior since 1883, 35% arrived in ballast water. Significant non-native, invasive species include Eurasian ruffe, round goby, zebra mussel, quagga mussel, and spiny water flea.^{liv}



END NOTES

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