

Bay of Green Bay National Estuarine Research Reserve Draft Management Plan

2027-2031

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PREPARED BY

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ACRONYMS

ADA – Americans with Disabilities Act

AOC – Area of Concern

CFR – Code of Federal Regulations

DNR – Department of Natural Resources

KEEP – K-12 Estuary Education Program

MA/NA - Market Analysis and Needs Assessment

MOU – Memorandum of Understanding

NERRS – National Estuarine Research Reserve System

NOAA – National Oceanic and Atmospheric Administration

OCM – Office for Coastal Management

PCB – Polychlorinated Biphenyls

PFAS – Perfluoroalkyl and Polyfluoroalkyl Substances

SNA – State Natural Areas

SWMP – System-Wide Monitoring Program

TOTE – Teachers on the Estuary

UW-Green Bay – University of Wisconsin-Green Bay

WCMP – Wisconsin Coastal Management Program

WDNR – Wisconsin Department of Natural Resources

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EXECUTIVE SUMMARY

PLAN PURPOSE AND SCOPE

This Management Plan reflects the collective mission, values, vision, goals, and objectives of the Green Bay National Estuarine Research Reserve (hereafter referred to as Green Bay NERR or Reserve). The geographic scope of the plan includes the three natural area components of the Green Bay NERR, representing a range of ecological conditions across the Green Bay estuary: the Peshtigo River, Lower Green Bay, and Sturgeon Bay. The programmatic scope extends beyond the natural area boundaries to encompass people, programs, and natural resources within the Bay of Green Bay watershed, the Universities of Wisconsin, and the state of Wisconsin.

The Management Plan guides the administration of Reserve operations, resource stewardship, research, education, training and public engagement, and future infrastructure for the next five years. This plan also describes the necessary activities toward stewardship and improved public access to natural areas included within the Reserve's boundaries.

The goals, objectives, and action strategies within the Management Plan reflect the collective input of the Green Bay NERR Steering Committee, UW-Green Bay faculty and staff, and partners who have contributed to designation efforts since it began in 2016. The plan is aligned with other plans of regional significance, such as the Green Bay Planning Group Master Plan (2014), Northern Lake Michigan Coastal Regional Master Plan (2018), the Conservation Blueprint for the Fox, Wolf, Green Bay Region (2021), as well as the NERRS Strategic Plan. The goals and objectives included in the Management Plan are linked to strategies and metrics that will be used to measure progress and success in accomplishing the identified objectives at the completion of the plan in 2032.

RESERVE CONTEXT

The Green Bay NERR is located within the Green Bay estuary, an arm of Lake Michigan in the Laurentian Great Lakes. The Green Bay ecosystem is defined by principal riverine contributions from the Fox River, draining the Fox-Wolf Watershed, and smaller inputs from the Suamico, East, and Peshtigo Rivers. The Duck Creek Delta sits at the base of Green Bay and is an ecologically significant wetland complex that has experienced significant restoration and revitalization actions. The Lower Bay Component of the Green Bay NERR sits almost entirely within the boundaries of the Lower Green Bay and Fox River Area of Concern. The remediation and removal of Beneficial Use Impairments toward delisting the Area of Concern offers programmatic opportunities for the Reserve to contribute toward long-term monitoring and continued restoration of shorelines and estuary habitats.

The Green Bay watershed is the ancestral and contemporary homeland of federally recognized First Nations, including the Menominee Indian Tribe of Wisconsin, the Oneida

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Nation, the Stockbridge-Munsee Community Band of Mohican Indians, Ho-Chunk Nation, and the Forest County Potawatomi. Tribal staff and enrolled members are key partners in the Reserve's programs.

The Green Bay NERR is the third reserve within the Great Lakes and the sole representative for the Lake Michigan-Huron biogeographic region. Considered one of the world's largest freshwater estuaries, the Green Bay NERR is an ecological transition zone between land and water, and it is a composite of unique coastal ecosystem types, representative of the Green Bay freshwater estuary and similar estuaries found within the Lake Michigan-Huron Biogeographic Great Lakes region. The lands and waters of the Reserve total 36,502 acres, comprising 11,428 acres of uplands and wetlands and 25,074 acres of open water within the Bay of Green Bay.

Of the land acres within the Reserve, the majority (9,336 acres) are managed by the Wisconsin Department of Natural Resources (DNR). The other landowning partners include Brown County, Door County Land Trust, Universities of Wisconsin (managed by UW-Green Bay), Northeast Wisconsin Land Trust, City of Green Bay, Crossroads at Big Creek, Village of Howard, Sturgeon Bay School District (managed by Crossroads at Big Creek), and Town of Scott.

For each landowning partner, the total acreage within the Reserve and the representative percentage of the total land area of the Green Bay NERR are listed below.

- Wisconsin Department of Natural Resources (9,336 acres, 82% of the total land area of the Green Bay NERR)
- Brown County (978 acres, 9%)
- Door County Land Trust (424 acres, 4%)
- Universities of Wisconsin (191 acres, 2%)
- Northeast Wisconsin Land Trust (130 acres, 1%)
- City of Green Bay (129 acres, 1%)
- Crossroads at Big Creek (108 acres, 1%)
- Village of Howard (110 acres, 1%)
- Sturgeon Bay School District, managed by Crossroads at Big Creek (20 acres, <1%)
- Town of Scott (2 acres, <1%)

The Reserve does not own land and operates in partnership with the groups listed above. The Oneida Nation of Wisconsin and the Menominee Indian Tribe of Wisconsin are close partners of the Green Bay NERR. The Green Bay estuary contains the Port of Green Bay, which is the westernmost port of Lake Michigan. The Port generates an estimated annual economic impact of $217 million (2022) and supports 1,620 jobs.

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The Green Bay NERR was officially designated by the National Oceanic and Atmospheric Administration (NOAA) in **[Add upon designation].** It is operated by the University of Wisconsin-Green Bay. Reserve administration is achieved through federal, state, and local partnerships. At the federal level, NOAA is responsible for the administration of the NERR System through the Office for Coastal Management (OCM). NOAA provides funding allocated by Congress to eligible state agencies for the operation of reserves and construction activities. NOAA also provides program guidance, oversight, and conducts periodic evaluations. At a state level, the Green Bay NERR is operated by the University of Wisconsin-Green Bay. A Memorandum of Understanding (MOU) between the University of Wisconsin Board of Regents and NOAA establishes the roles and responsibilities of both agencies (Appendix A). The Green Bay NERR is also one of 30 National Estuarine Research Reserves across the US and, as a member of the system, works to address challenges of national significance.

Note that throughout this Management Plan, the terms 'bay' and 'Green Bay Estuary' are used interchangeably to refer to the portion of the Bay of Green Bay within Wisconsin. This includes the entire southern, western, and eastern shorelines of the Bay of Green Bay touching Brown, Door, Kewaunee, Oconto and Marinette Counties.

PRIORITY COASTAL MANAGEMENT ISSUES AND RESERVE GOALS

The collective programs of the Green Bay NERR reflect an acknowledgment of the Reserve's role in the stewardship of coastal ecosystems within the Green Bay estuary, Lake Michigan, and the Great Lakes. The Reserve programs will focus on the following key issues related to our geographic area of focus:

- Preparing Great Lakes communities for long-term ecosystem change and variability
- Restoring sustainable and holistic land-water connections
- Preserving biodiversity through improved ecological integrity and ecosystem resiliency
- Enhancing the Bay of Green Bay's sense of place and connection to quality of life

Over the next five years, the Reserve will address these issues through scientific research and community collaboration. Specific goals for the Green Bay NERR program include:

Goal 1: Strengthen community adaptation and preparation for projected impacts of climate change and fluctuating water levels.

Goal 2: Reduce excessive sediment, nutrient, and contaminant loadings into the bay from watershed inputs.

Goal 3: Strengthen the ability of native and non-invasive species to access terrestrial, wetland, and aquatic habitats, and improve interconnectedness of ecosystem components.

Goal 4: Restore wetlands, submerged aquatic and benthic habitats, and promote diverse species assemblages.

Goal 5: Foster historical awareness and contemporary connections between people and the Bay of Green Bay.

Goal 6: Promote the sustainable, beneficial uses of the bay for regional communities.

This management plan has been developed in accordance with NOAA regulations, which include 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. The plan will be instrumental in guiding the future direction of the Green Bay NERR by its administration and staff, and its implementation will be evaluated in subsequent required program evaluations (15 CFR Part 921.40).

RESERVE PROGRAMS OVERVIEW

In alignment with the NERR System, the Green Bay Reserve will operate core programs across four sectors (Research, Education, Stewardship, and Training and Engagement) that integrate with one another to reach the goals of the Reserve through collaboration, communication, shared programs, and shared priorities. Each reserve across the NERR System operates programming within these four sectors.

As the Green Bay NERR launches, we expect that each program will continue to define its role and audience within the larger operation of the Reserve.

RESEARCH

The Research Program will serve as a regional hub for applied science, fostering collaborative, high-impact studies that strengthen understanding of land-water connections, climate resilience, large-scale restoration, and the effects of watershed inputs on the bay. With strategically located facilities and robust infrastructure, the program will enable researchers, students, and partners to generate data that supports user-informed, science-based decision-making. Through monitoring, modeling, and applied studies, the Reserve will guide strategies that improve water quality, restore ecosystems, and advance community well-being, while linking institutions, agencies, and communities in support of biodiversity and long-term sustainability.

EDUCATION

The Education Program will connect learners of all ages to the bay's dynamic ecology and human history through place-based programming. Offerings will integrate storytelling, technology, and community perspectives to highlight the bay's ecological significance, restoration achievements, and history, including the voices and knowledge of First Nations communities in alignment with Wisconsin Act 31 standards.

Programming will foster a sense of place and connection to the bay, laying the foundation for lifelong care and responsibility for its well-being. Reserve staff will engage students in exploring what stewardship means to them, how to get involved, and how to lead. Education Program staff will partner with local clubs and outdoor groups to support hands-on community learning. Career and technical education will also be prioritized, ensuring alignment with student interests and regional workforce needs.

Through formal and informal learning on the water, along the shoreline, and in classrooms, the Education Sector will inspire shared understanding and cultivate the next generation of Great Lakes stewards.

STEWARDSHIP

The Stewardship Program will advance restoration and conservation efforts that enhance ecological resilience, improve water quality, and honor the bay's historical connections. By promoting integrated practices and developing best management strategies with regional partners, the program will strengthen both environmental and community well-being.

Stewardship will be broadly defined, recognizing that everyone from individuals and families to businesses and civic groups, has a role in caring for the bay. Partnerships with the business sector will highlight shared values, create mutual benefits, and encourage collective responsibility for the ecosystem.

TRAINING AND ENGAGEMENT

The Training and Engagement Program will build the capacity of professionals, decision-makers, and organizations across Northeast Wisconsin to respond to changing ecosystem conditions through science-based planning and management. Accessible training, technical support, and collaboration will strengthen the region's ability to protect coastal resources, reduce nutrient loading, and adapt to fluctuating water levels and climate change. By collaborating with county and municipal officials, organizations, and agency partners, the Training and Engagement Program will strengthen local leadership and inform local decision-making.

The Program will work with communities to identify needs and co-create practical solutions to water and coastal challenges that affect daily life and long-term sustainability. Aligning with workforce development goals, it will connect emerging skills to regional priorities, creating pathways for individuals to apply expertise to issues such as water quality, shoreline resilience, and ecosystem management. Training will integrate social science with monitoring and research, examining what people value across the watershed and how those values can inform the study and management of ecological processes.

The Reserve's value lies in helping communities transition from identifying problems to implementing solutions. While grounded in the Green Bay estuary, its training and tools will be applicable to other coastal systems, offering scalable approaches that benefit the Great

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Lakes region and beyond. As a convening force, the Reserve will unite stakeholders and amplify collective action across watershed and coastal networks.

RESERVE NICHE

The Green Bay NERR occupies a unique and strategic position in advancing freshwater science, innovation, and regional collaboration within the world's largest freshwater estuary. For thousands of years, the bay has sustained communities and is an active working waterfront shaped by a legacy of human and industrial use. Cleanup of its tributaries and open waters, combined with its distinctive ecology (enclosed on three sides and characterized by dynamic biogeochemical processes), offers powerful opportunities to highlight restoration successes and explore adaptive management strategies in response to environmental change.

The Reserve will build on this history to bring together diverse stakeholders around shared goals. Staff will advance a community-focused, vibrant future for the bay and its surrounding communities. The inclusion of Tribal perspectives and recognition of significant areas will deepen the relevance of the Reserve's work and strengthen community connections to place.

A Legacy of Restoration and Innovation

Green Bay has a long history of large-scale ecological restoration. Notable successes include the Fox River cleanup (the world's largest river remediation effort), the delisting of the Menominee River Area of Concern, and progress toward delisting the Lower Green Bay and Upper Fox River AOC. These efforts provide a strong foundation for future learning and collaboration.

The Reserve will serve as a center for demonstration and applied learning, providing opportunities to study restoration actions and translating local successes into scalable models for the Great Lakes region and beyond. By training the next generation of practitioners and incorporating adaptive management, the Green Bay NERR will help shape best practices in ecosystem recovery and resilience.

Role of the Reserve

Serving as an information "front door" for freshwater work in the bay, the Reserve will coordinate multi-partner and multi-agency efforts to enable data sharing, collaborative science, and informed decision-making. Supported by strategically located infrastructure near the bay, including laboratories, field sites, freshwater operations, and student accommodations, the NERR will host research and immersive learning experiences.

The Visitor and Education Center will further this mission by serving as a launching point for understanding, appreciating, and exploring the bay. Interpretive programs that share First Nations history and the global importance of the estuary will offer visitors insights into environmental change, ecological health, and the bay's contributions to regional identity, well-being, and economic vitality.

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The Reserve will maintain a physical presence throughout the estuary, offering accessible visitor experiences, interpretive signage, shoreline learning spaces, and research sites. Programs will support both formal and informal education, reaching learners of all ages and backgrounds. Technology will extend the reach of these efforts, connecting people to the bay and its stories in engaging and accessible ways.

Preparing for the Future

As a proving ground for emerging freshwater technologies, including advanced sensors and monitoring systems, the Reserve will support scalable solutions to complex water challenges affecting the bay, the Great Lakes, and global freshwater estuaries. This work will strengthen Northeast Wisconsin's freshwater economy through strategic partnerships with industry, academia, and government agencies.

TRIBAL ENGAGEMENT COORDINATION AND CONVENING

The Bay of Green Bay has been home to Indigenous peoples for thousands of years. The Reserve's Tribal partners trace their history to several locations around the Green Bay estuary. The Menominee Nation, the Ho-Chunk Nation, the Forest County Potawatomi Nation, and later, the Oneida Nation have all called the bay home, and the Green Bay estuary figures prominently in the creation beliefs of the Menominee and Ho-Chunk. It is the responsibility of the Reserve to ensure proper representation for our Tribal partners in the Reserve's decision-making, programming, and stewardship. Representatives will be included in conversations regarding the caretaking, management, and restoration efforts.

The NERR will employ a Tribal Engagement Coordinator with support from Oneida Nation grants. This position will develop and support long-term relationships between Tribes and the Green Bay NERR. The NERR Tribal Engagement Coordinator will ensure Tribal community interests are represented in the Reserve's planning, programs, and activities.

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INTRODUCTION TO THE RESERVE SYSTEM

The National Estuarine Research Reserve System is a network of 30 protected estuarine areas that represent different biogeographic regions and estuarine types within the United States (Figure 1). Reserves are protected for long-term research, education, and coastal stewardship. The Reserve System, created by the Coastal Zone Management Act of 1972, currently protects over one million acres of estuarine lands and waters. The system is managed in accordance with federal regulations pursuant to 15 CFR § 921.

Each reserve has a unique boundary based on the nature of its ecosystem. The boundaries include the land and water areas needed to protect an intact ecological unit. Reserves classify their land and water areas as either "core" or "buffer," which determines the level of protection, and the types of activities allowed within each area. Each reserve develops the programming most appropriate for its location while also delivering required system-wide programs focused on research and monitoring, education, training and engagement, and stewardship.

The Reserve System is a partnership program between the National Oceanic and Atmospheric Administration and the coastal states. NOAA provides funding, national guidance, and technical assistance for reserve operations and system-wide programs, facilities construction and land acquisition, graduate fellowships, and collaborative science projects. The state partner manages reserve resources on a daily basis and works collaboratively with local and regional partners. NOAA also leads projects that integrate data or support decision-making at the national level.

Each reserve is required to develop a management plan that contains the goals, objectives, and strategies for that reserve. Management plans are updated every five years and must be approved by NOAA. These plans enable the reserves and NOAA to track progress and realize opportunities for growth. Each plan describes how the reserve will carry out its foundational research, education, training, and stewardship programs. Each plan also outlines administration, resource protection, public access, land acquisition, and facility plans, as well as restoration and resource manipulation plans if applicable. The plans also incorporate strategies designed to help the reserve contribute to the system's national goals. NOAA periodically evaluates reserves for compliance with federal requirements and their approved management plan.

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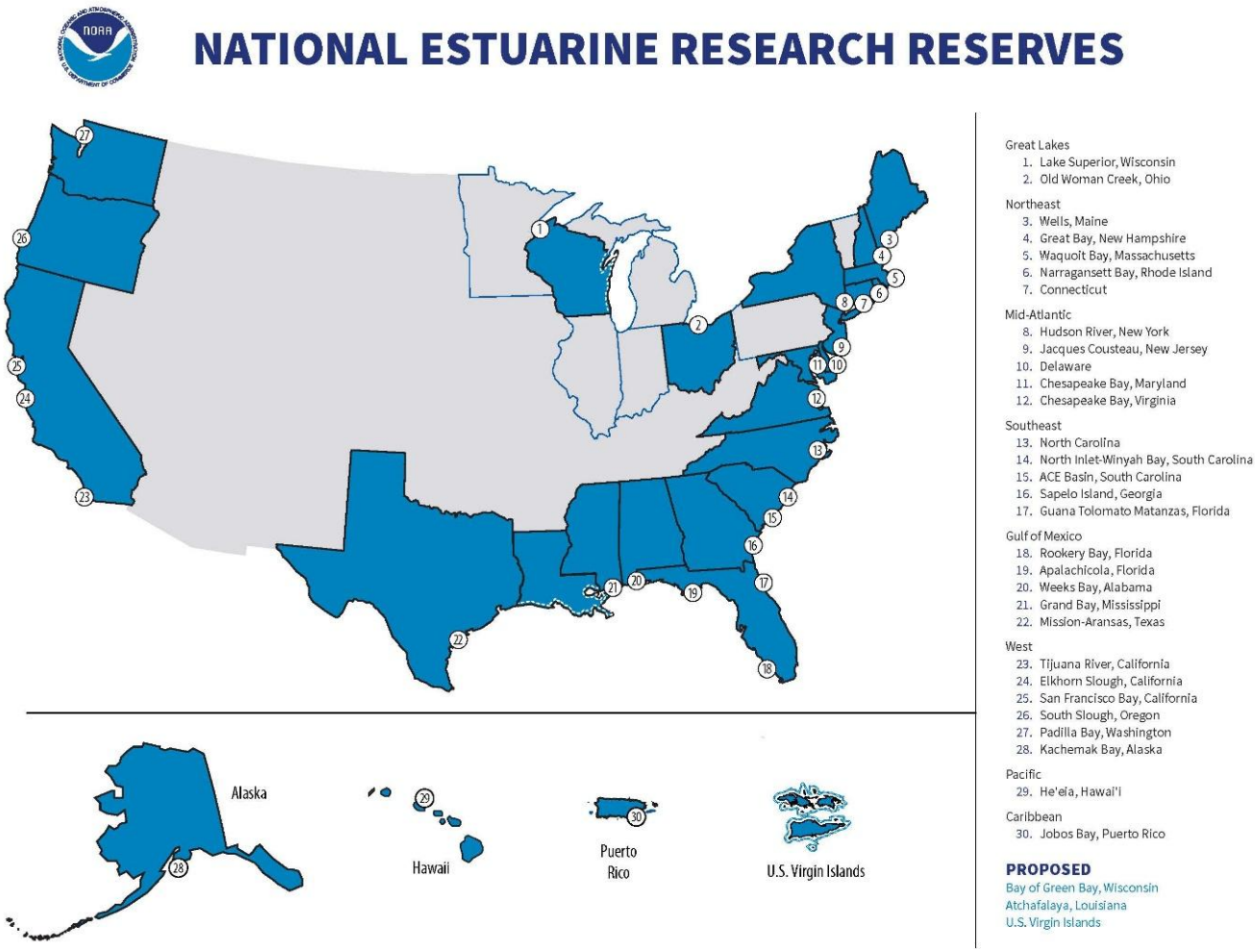


Figure 1: National Estuarine Research Reserve System

The NERRS Strategic Plan describes the following goals for the system:

*Protecting Place*s: Enhance and inspire stewardship, protection, and management of estuaries and their watersheds in coastal communities through place-based approaches.

Applying Science: Improve the scientific understanding of estuaries and their watersheds through the development and application of reserve research, data, and tools.

Educating Communities: Advance environmental appreciation and scientific literacy, allowing for science-based decisions that positively affect estuaries, watersheds, and coastal communities.

INTRODUCTION TO THE GREEN BAY NATIONAL ESTUARINE RESEARCH RESERVE

DESIGNATION HISTORY AND LOCAL MANAGEMENT

Interest in establishing a water-focused research center on the Bay of Green Bay began in the summer of 2015, when a group of engaged citizens, along with governmental and non-governmental organizations, convened to explore the need for an accessible, collaborative water-terrestrial research center. This group met three times and participated in a larger collaborative meeting at the University. These discussions identified four critical unmet needs that such a center could address: laboratory facilities for field researchers, temporary housing for visiting scientists, community outreach and K–12 programming, and enhanced environmental stewardship. The meetings also highlighted the long-standing need for greater coordination of scientific research and increased integration of the arts, humanities, and social sciences within the Green Bay estuary and its watershed.

As a result of these efforts, a proposal was submitted to the Wisconsin Coastal Management Program and subsequently funded under the Green Bay Freshwater Research Initiative. The proposal emphasized the ecological and cultural importance of the Green Bay ecosystem to Northeastern Wisconsin. The estuary supports outdoor recreation and strengthens the region's sense of place but continues to face substantial challenges from historic ecological degradation. Significant federal, state, non-governmental, and private investments have targeted remediation efforts in the region, including the $1.5 billion Fox River cleanup completed in 2020 and the reconstruction of the Cat Island Chain. Numerous restoration projects within the Area of Concern (AOC) and surrounding watershed continue to advance the region's environmental health.

The success of these initiatives depends on broad, collaborative partnerships. The Green Bay ecosystem represents both the opportunities and complexities that arise when a significant natural resource intersects with a growing metropolitan area and an intensive agricultural economy. The Green Bay NERR was conceived as a means of addressing these needs. The Reserve would serve as a centralized hub for research and restoration coordination, integrate the arts and humanities into environmental stewardship, connect natural resource issues to community well-being, and support the growth of Northeast Wisconsin's blue economy.

UW–Green Bay took a leadership role in advancing the effort, coordinating support and submitting a letter of interest on behalf of the State of Wisconsin to NOAA. The formal designation process began in March 2019 with a letter from Governor Tony Evers expressing the state's interest in establishing a NERR in the Bay of Green Bay, with UW–Green Bay serving as the lead state agency. In July 2019, NOAA responded with a letter from Dr. Neil Jacobs, Assistant Secretary of Commerce for Environmental Observation and Prediction, officially inviting the State of Wisconsin and UW–Green Bay to begin the site selection

process for a National Estuarine Research Reserve in the Green Bay coastal region of Lake Michigan.

Following NOAA's invitation, the site selection process commenced in fall 2020, led by UW–Green Bay and overseen by the Green Bay NERR Steering Committee (formerly called the Site Coordination Committee). Details of this process are documented in the Green Bay NERR Site Nomination Document. On September 26, 2022, the Steering Committee voted to nominate natural area sites for inclusion in the Green Bay NERR. Governor Evers publicly announced his intent to nominate these sites via a press release on October 28, 2022, and NOAA Administrator Dr. Richard Spinrad formally accepted the nomination on December 12, 2023.

Background on the natural and physical characters of the Green Bay estuary to be used in the Draft Environmental Impact Statement were submitted to NOAA in December 2024. The first draft of the Draft Management Plan was submitted to NOAA in October 2025. NOAA approved the Final Environmental Impact Statement and Final Management Plan on **[date once finalized]**, and the Green Bay NERR designation was completed on **[designation date once finalized]**. The University of Wisconsin–Green Bay serves as the lead agency for both the designation and management of the Green Bay NERR on behalf of the State of Wisconsin.

ECOLOGICAL ATTRIBUTES

The Green Bay NERR lies within the Green Bay estuary, a semi-enclosed bay of Lake Michigan. Green Bay stretches 120 miles from the Bay de Noc in Michigan to the Fox River in Wisconsin, separated from Lake Michigan by the Garden and Door Peninsulas and the Grand Traverse Islands. These features are part of the Niagara Escarpment and influence the bay's water exchange and current patterns.

The bay covers 1,626 square miles, comprising 7% of Lake Michigan's surface but receiving 33% of its watershed runoff and nutrient load. The Reserve spans parts of Brown, Door, Kewaunee, Marinette, and Oconto counties in Wisconsin and includes three non-contiguous components:

Peshtigo River Component: A largely undisturbed estuary with a natural river mouth, marshes, open water, and forests.

Lower Bay Component: A seiche-influenced estuary with restored coastal plains and bar-bounded features, including the Duck Creek Delta and Cat Island Chain. Habitat quality varies from restored areas in the south to less disturbed northern stretches.

Sturgeon Bay Component: A distinct ecological area with smaller watersheds, ridge-and-swale habitats, and rare plant species not found elsewhere in the NERR system.

The Reserve contains diverse habitats, including submerged vegetation, wetlands, shrub-carr, swamps, and forests, that are shaped by fluctuating Bay water levels. Located at the

intersection of multiple ecoregions and geological features, the Reserve offers a unique opportunity to study Great Lakes estuarine systems.

GEOMORPHOLOGY

The Great Lakes were formed by glacial activity. When the last ice sheet covering the upper Great Lakes began to melt, it revealed a topographically diverse and irregular landscape of glacial drift. This terrain included lakes, wetlands, and an emerging, poorly defined drainage network. Seepage areas, drainage water bodies (both clustered and isolated), and varied surface water flow paths formed alongside glacial features like marginal moraines, eskers, drumlins, and kames. These features offered a rich variety of habitats for colonizing plants and animals (Finley 1976).

As the ice retreated, tundra species that had survived south of the glacial edge began re-colonizing newly exposed uplands, wetlands, and open water areas. Following this wave, two major movements of forest species spread across the upper Great Lakes region over the past 11,000 years.

The original pre-glacial land surface is now largely hidden beneath an uneven mantle of glacial drift-rock and soil debris left behind as the glaciers melted. Surface water flowing from the glacier's edge followed opportunistic paths, carving channels of varying widths into the unorganized terrain. Wetlands formed abundantly in this geologically young, poorly drained landscape, either as part of connected systems or isolated within closed depressions.

Finley (1976) described the landscape west of Green Bay as undulating, with broad gentle rises and wide, shallow basins, a description that still fits. This gently sloping terrain, transitioning from uplands to nearshore waters, supports a wide and dynamic zone of ecological diversity.

In contrast, the eastern side of the bay features a narrow strip of lowland backed by the steep, often exposed face of the Niagara Escarpment. Sheltered bays like Little Sturgeon Bay, along with natural breaks in the escarpment, create ideal conditions for coastal emergent and submergent wetland plant communities.

HYDROGRAPHY

The Peshtigo River drains a 2,908 km^2 watershed in northeastern Wisconsin and flows southeast into Green Bay just south of the Wisconsin–Michigan border. About 78% of the watershed remains forested or in wetland, with most of the rest in agriculture. Several hydroelectric dams along the river create large recreational reservoirs while affecting downstream flow, sedimentation, and aquatic connectivity. Near its mouth, the river forms a complex estuary with meandering and braided channels crossing a deltaic plain. At high water levels (581'), the estuary expands into a broad, indistinct wetland system nearly 5.5 km wide, while at low water, it is confined to a narrow 0.2 km main channel.

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The Lower Bay Component includes the west shore near Duck Creek and the east shore around Point au Sable and Wequiock Creek. These areas feature emergent wetlands, riparian forests, and shallow aquatic habitats, with scattered residential and light commercial development. Point au Sable extends about 1 km into southern Green Bay and supports diverse estuarine wetlands at the mouth of Wequiock Creek, which drains a 39 km^2 watershed dominated by agriculture (63%), followed by wooded wetlands and pasture (Stroud Water Research Center 2022). A shallow shoal arcs offshore from Point au Sable toward Long Tail Point but is interrupted by the Fox River shipping channel.

In the Sturgeon Bay Component, Big Creek and Strawberry Creek enter the bay from the east. Prior to 1882, construction of the Sturgeon Bay Ship Canal, both creeks discharged entirely into Green Bay. The canal now links the bay to Lake Michigan, altering estuarine flow patterns based on water levels. Big Creek drains a 24.5 km^2 watershed, primarily in row crops and pasture, with some wooded wetlands and upland forest. Strawberry Creek, smaller and more naturally confined, drains a 9.2 km^2 watershed dominated by wooded wetlands, reflecting its low-lying topography (Stroud Water Research Center 2022).

CLIMATE AND WEATHER

The Green Bay NERR experiences a cold temperate to low boreal climate with four distinct seasons, warm, humid summers and cold, snowy winters. Summer temperatures in July and August typically reach highs near 25°C (mid-70s to mid-80s °F), with nighttime lows around 15°C (high 50s to low 60s °F). The cold season spans from early December to early March, with daily highs below 3°C (37°F). January is the coldest month, averaging lows of -10°C (13°F) and highs of -3.3°C (26°F), though periodic lows near -29°C (-20°F) are not uncommon. Sturgeon Bay, influenced by the thermal mass of Lake Michigan, experiences fewer temperature extremes with slightly milder winters and cooler summers compared to the Peshtigo River and Lower Bay Components. This lake effect also explains the variation in USDA Plant Hardiness Zones: Zone 5a (-28.9 to -26.1°C) for Lower Bay and Peshtigo River Components, and the slightly warmer Zone 5b (-26.1 to -23.3°C) for Sturgeon Bay. Despite proximity to Green Bay, winter ice cover reduces temperature moderation at the Lower Bay and Peshtigo sites. Precipitation is evenly distributed throughout the year, with April through June seeing the rainiest days.

Climate projections show a shift toward a hotter, wetter climate. Under a reduced emissions scenario, Green Bay's 2080 climate will resemble present-day Medford, Oklahoma in a high-emissions scenario: 6.9°C (12.4°F) warmer and 17.6% wetter (University of Maryland Center for Environmental Science, 2026). Models predict slightly more annual precipitation, particularly in early spring, with more frequent and intense rainfall events. By mid-century, winter precipitation in Wisconsin is expected to increase by 25% (Wisconsin Initiative on Climate Change Impacts, 2011).

Climate-related impacts identified for the Green Bay ecosystem by the Wisconsin Initiative on Climate Change Impacts include:

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- Rising air and water temperatures increasing evapotranspiration
- Shorter winters and earlier springs
- Increased winter and spring precipitation
- More frequent storm events
- Declining average and record water levels

KEY HABITATS

The Green Bay NERR encompasses a variety of habitat types categorized into three main classifications: upland/inland, transitional/wetland, and aquatic. Upland and inland habitats within the Reserve boundaries include forested areas, idle and forage grasslands, agricultural lands, and limited areas of both low- and high-intensity developed lands. Transitional and wetland habitats consist of forested palustrine areas, scrub/shrub wetlands, and forested wetlands. Aquatic habitats comprise the open waters of Green Bay as well as emergent/wet meadows and inland open water areas within the land boundary. The overall habitat composition of the Reserve is approximately 13% upland/inland, 58% transitional/wetland, and 29% aquatic. See Figure 2, 3, and 4 for habitat types within the three components of the Reserve.

This distribution reflects both the natural variability in Great Lakes water levels and existing land use patterns around the bay. The lands and waters within the Reserve were selected to include a significant extent of transitional and wetland habitat, ensuring that even during periods of low lake levels (up to six feet below the long-term average), a continuous wetland buffer remains between upland areas and open Bay waters. The relatively small proportion of upland habitat is due to the limited availability of contiguous, undeveloped public land surrounding the bay.

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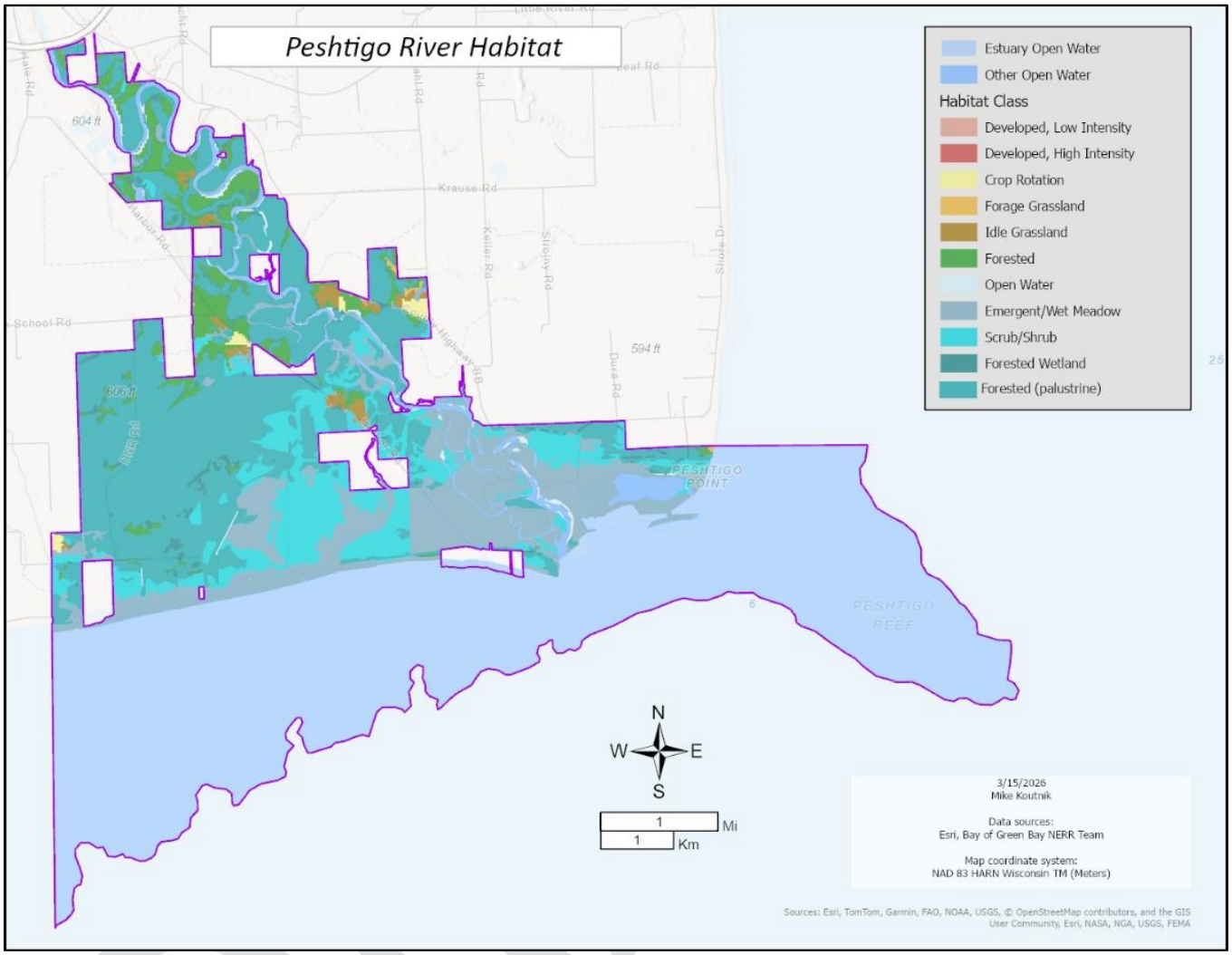


Figure 2: Habitat map for the Peshtigo River Component

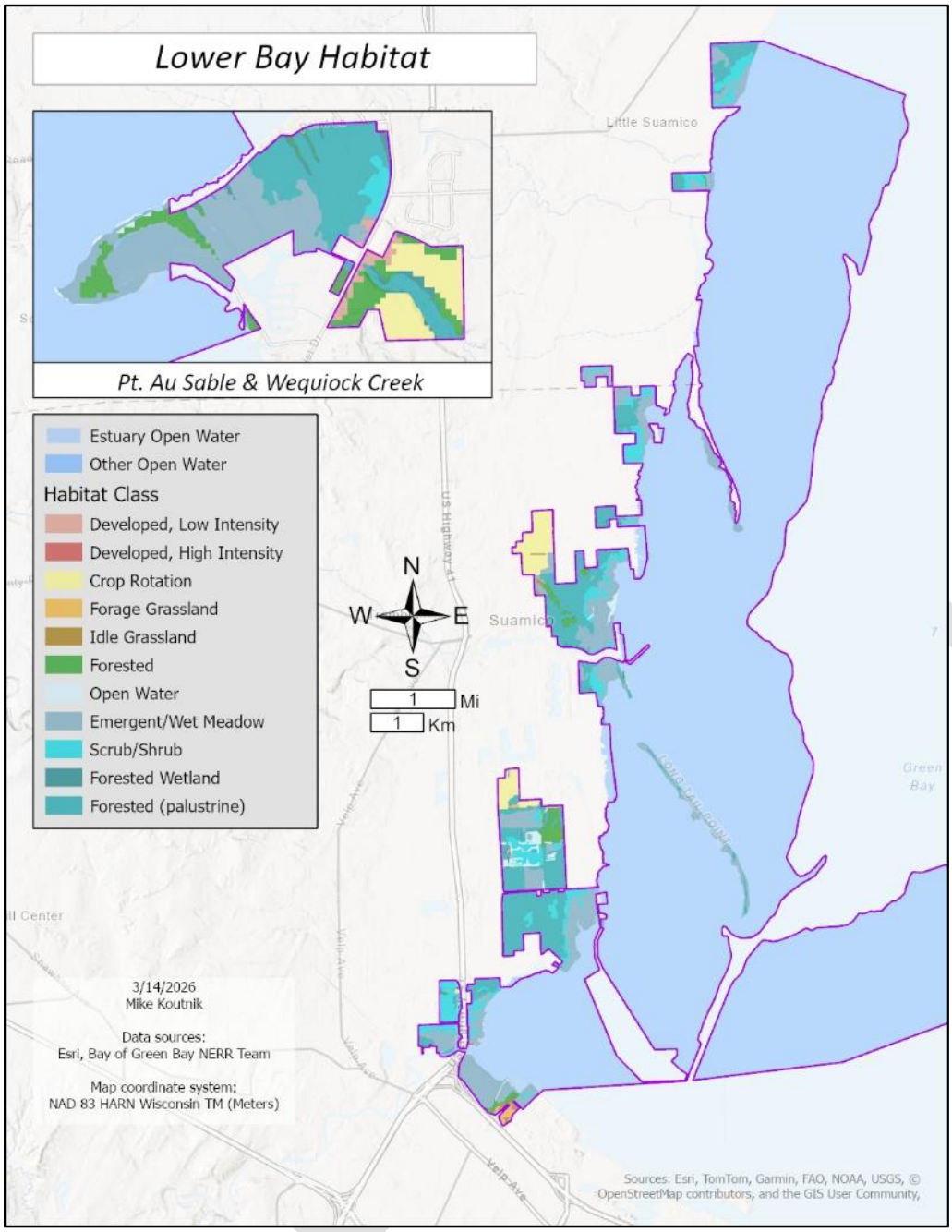


Figure 3: Habitat map for the Lower Bay Component

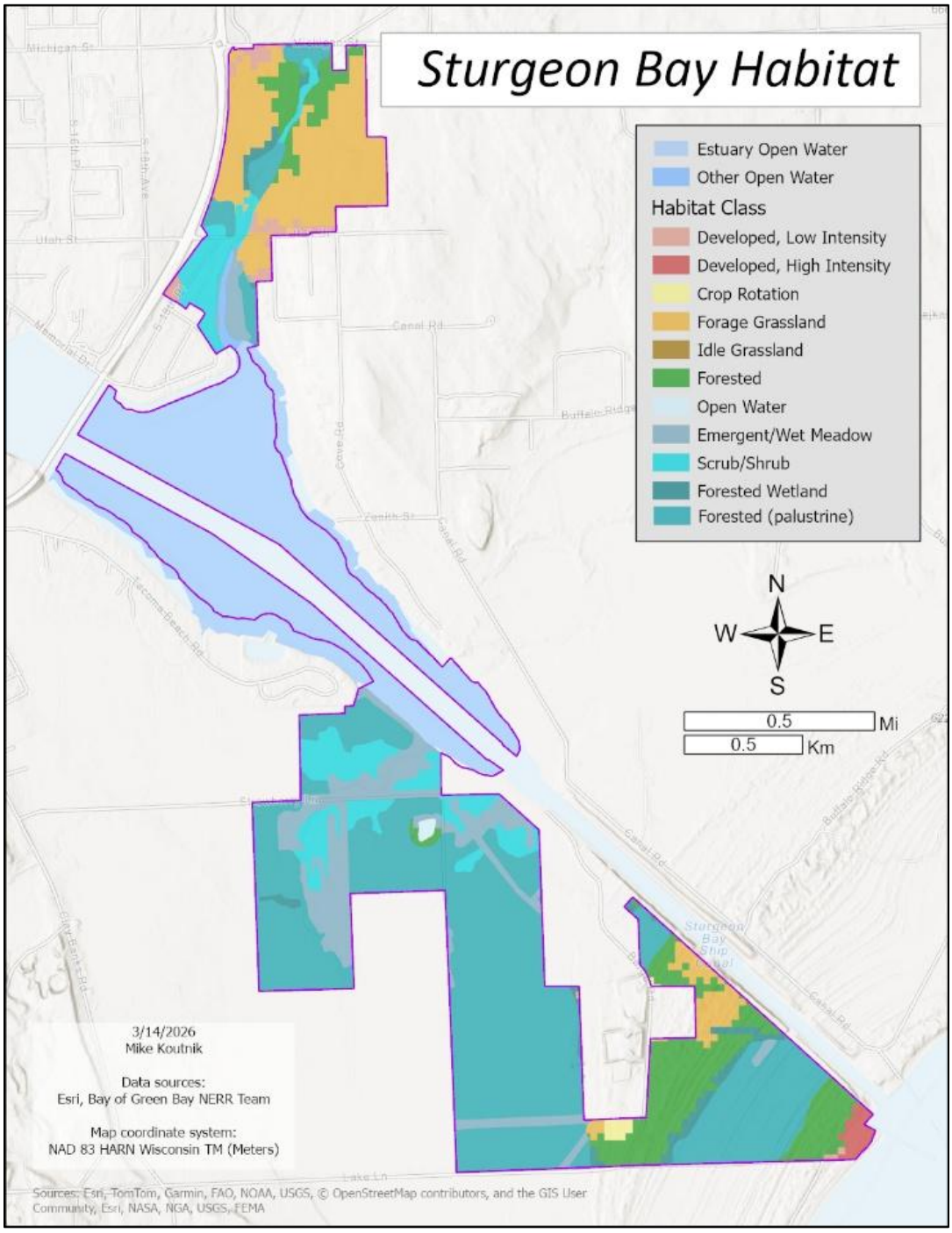


Figure 4: Habitat map for the Sturgeon Bay Component

SOCIAL ATTRIBUTES

The Green Bay estuary holds deep cultural, spiritual, and historical significance for many Tribal nations. The Green Bay NERR is located within the traditional homelands of the Menominee people, whose origin story begins at the mouth of the Menominee River, flowing into the northern portion of the bay. Similarly, Ho-Chunk oral traditions identify the Red Banks along Green Bay as a site of origin, underscoring the longstanding relationship between Tribal communities and this landscape.

Today, the Reserve's programmatic footprint overlaps with the territories of several Tribal nations, including the Menominee Indian Tribe of Wisconsin, Oneida Nation, Stockbridge-Munsee Community Band of Mohican Indians, Forest County Potawatomi, Ho-Chunk Nation, and the Brothertown Indian Nation.

Recognizing and honoring the enduring presence, sovereignty, and contemporary stewardship of Tribal nations is central to the Reserve's values. Tribal knowledge, perspectives, and priorities contribute meaningfully to understanding and managing the estuary, and will be incorporated into the Reserve's conservation, education, and research initiatives.

POPULATION DEMOGRAPHICS

The five Wisconsin counties encompassing the Green Bay NERR region have a combined population of 400,250 (2020 Census). The population density is about 132 people per square mile, with 166,412 total households. The City of Green Bay is the region's largest population center, with 107,395 residents and 46,857 households. The median age is 46 years, with 22% of the population under 20, 45% between 20 and 59, and 30% aged 60 or older. Within the region, 92% of residents identify as white-only. Brown County, which includes the City of Green Bay and much of the southern Bay NERR component, has the most diversity, with 9.7% of its population identifying as Hispanic or Latinx. Notably, Brown, Door, and Oconto counties have higher percentages of American Indian residents (1–1.2%) than the national average (0.8%).

Northeastern Wisconsin has long had a strong manufacturing base, with 23% of the workforce employed in the sector, followed by education and health services (19.4%) and trade, transportation, and utilities (17.7%). The region's economy is deeply tied to its natural resources, particularly forests and waterways. Historically driven by timber, the area evolved into the nation's largest pulp, paper, and converting corridors. Home to major companies like Green Bay Packaging and Georgia-Pacific, the paper and converting industry alone generates nearly $3 billion in annual economic output.

THREATS AND STRESSORS

The Green Bay Reserve faces a variety of natural and human-caused stressors that pose significant threats to the ecological integrity of its conservation targets. These primary

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threats were identified by The Nature Conservancy in the *Green Bay Integrity Assessment* (The Nature Conservancy, 2006) and remain a focus of management and restoration efforts.

- *Agricultural Runoff, Nutrient Loading, and Nonpoint Source Pollution Management*
  Runoff from agricultural and urban areas carries sediment, nutrients, and other pollutants into the estuary, degrading water quality and negatively affecting aquatic and terrestrial biotic communities. Managing nonpoint source pollution remains a high priority for the Reserve.

- *Aquatic and Terrestrial Invasive Species*
  Invasive species threaten the ecological health of the Green Bay estuary and the broader Great Lakes system. Notable aquatic and terrestrial invaders include sea lamprey, round goby, zebra and quagga mussels, garlic mustard, emerald ash borer, and Phragmites. More recent concerns within the Reserve include European frogbit and reed canary grass. Active treatment and restoration efforts are ongoing throughout Reserve lands and waters to mitigate these impacts. Addressing invasive species and preserving biodiversity are key elements of the Green Bay NERR's Priority Coastal Management Issues (see Chapter 4).

- *Land-Use Change and Habitat Degradation*
  The Green Bay watershed is composed of approximately 50% agricultural land, 35% urban areas, and 15% natural forests and wetlands. Population growth, particularly in Brown County, continues to place pressure on the surrounding landscape. Land-use change can fragment or degrade wetland and riparian habitats, reducing ecosystem services and resilience. Understanding the effects of these changes is a central concern for the Reserve's management.

- *Climate Change*
  Climate projections for the Green Bay region indicate a range of anticipated changes, including increased summer precipitation, a longer growing season, altered soil moisture regimes, more frequent and intense storm events, and shifting wind patterns. While some changes may present new economic opportunities, they also pose complex ecological challenges. Monitoring and adapting to climate change impacts will remain a long-term focus for the Reserve's research and stewardship activities.

RESERVE BOUNDARY

The Green Bay estuary is defined by two important gradients: 1) a disturbance gradient from minimally impacted habitats in the northern portion of the bay to restored habitats in Lower Green Bay, and 2) the south-to-north gradient capturing the nutrient-rich waters of the Fox-Wolf watershed entering Green Bay at the mouth of the Fox River, meeting the nutrient-poor waters entering the bay from Lake Michigan and flowing in a counter-

clockwise pattern around Green Bay. The lands and waters selected for inclusion in the Green Bay NERR were chosen with consideration of these gradients.

The Green Bay NERR is organized into three component areas by geography: the **Peshtigo River Component, Lower Bay Component,** and **Sturgeon Bay Component**. Maps of the Reserve boundaries and core and buffer delineations can be found in Figure 6, Figure 7, and Figure 8.

The size of each component area is:

- **Peshtigo River Component** - 13,403 acres (6,560 land/wetland; 6,843 open water in the bay)
- **Lower Bay Component** – 22,247 acres (4,210 land/wetland; 18,037 open water in the bay)
- **Sturgeon Bay Component** - 852 acres (658 land/wetland; 194 open water in the bay)

The Reserve is located entirely within the boundaries of Wisconsin and no federal land holdings are included within the Green Bay NERR. The boundaries were selected to include upland, transitional, and aquatic habitats in proportions reflective of the Green Bay estuary and approximating an ecological unit characteristic of a Great Lakes freshwater estuary. The Lower Green Bay and Fox River Area of Concern overlap most of the Lower Bay Component (Figure 9). Restoration is occurring inside the AOC on lands within the Reserve boundaries and priorities and activities described throughout this Management Plan reflect active restoration within the Area of Concern.

The Reserve boundary comprises 36,502 acres of land and water. Of the total acres, 25,694 acres (70% of the total area) are core, and 10,808 (30%) are buffer (Figure 5).

LAND OWNERSHIP AND CORE AND BUFFER AREAS

Within the Green Bay NERR, more than 9,300 acres of land and wetlands are managed by the Wisconsin Department of Natural Resources. Key DNR-managed areas include:

Peshtigo River Component: Peshtigo Harbor State Wildlife Area, Bloch Oxbow State Natural Area, and Badger Gift Lands.

Lower Bay Component: Peats Lake, Sensiba, Tibbet-Suamico, and Little Tail Units within the Green Bay West Shores Wildlife Area, and the Suamico River State Habitat Area.

Sturgeon Bay Component: Strawberry Creek estuary and Big Creek State Habitat Area.

An additional 977 acres are managed by Brown County, including the Barkhausen Waterfowl Preserve. Other landowners include the Door County Land Trust, Crossroads at Big Creek, the City of Green Bay, Village of Howard, Town of Scott, Sturgeon Bay School District, and the Universities of Wisconsin.

Under 15 CFR § 921.11, the NERR boundaries include *core areas*, critical to estuarine function, and *buffer zones*, which provide additional ecological protection and accommodate environmental shifts. Core and buffer areas were delineated based on ecological condition and existing land management.

In the **Peshtigo River Component**, nearly the entire area is designated as core due to its large, undisturbed wetland and estuarine habitat.

In the **Lower Bay Component**, core areas include primary estuarine features, while buffer areas extend into managed lands with dikes or other infrastructure.

In the **Sturgeon Bay Component**, core areas include land near the Big and Strawberry Creek estuaries, particularly those under conservation ownership and with minimal public access or disturbance. Adjacent lands with greater recreational use or infrastructure are classified as buffer.

Figure 10 shows the land-owning partners for the entire Reserve, and Figure 11, 12, and 13 show land-owning partners for each component area.

Allowable Activities in Core Areas
Permitted activities vary by location and land management regulations but generally include:

- Research and monitoring
- Scientific collection
- Off-trail land access with conditions
- Water access
- Fishing
- Canoeing and kayaking
- Controlled hunting events with permits

HABITAT AND LAND USE TYPE

Land use adjacent to areas within the Reserve varies significantly among the three component areas. Lands around the Peshtigo Harbor site are primarily forested, with some nearby lands under crop rotation. Just north of the Peshtigo River Component is the city of Marinette, which is classified as high intensity developed. The Lower Bay Component has lands classified as mixed forest with nearby farmed land. Land areas become highly developed further south within the vicinity of the city of Green Bay. The area around Point au Sable-Wequiock Creek, on the east shore of the bay but within the Lower Bay Component, is low-intensity developed with housing and grasslands nearby. Around the Sturgeon Bay Component, land use includes both high and low-intensity development, grasslands, and forested areas. Northeast Wisconsin is a heavily agricultural region of the

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state, with farmed land within 4-6 km of most of the areas included in the Reserve. Additionally, 53 farms within the five counties surrounding the Green Bay estuary have Wisconsin Pollutant Discharge Elimination System Permits to operate Concentrated Animal Feeding Operations. Maps below show land cover (Figure 14, 15, and 16) within the Reserve's natural areas.

TARGETED WATERSHED BOUNDARY

Every reserve in the system is responsible for the development of a Targeted Watershed Boundary, which represents those watersheds that directly flow into and impact the habitats within reserves. Reserve staff will work with NOAA and the Green Bay NERR Advisory Board to define the targeted watershed boundary for the Green Bay NERR.

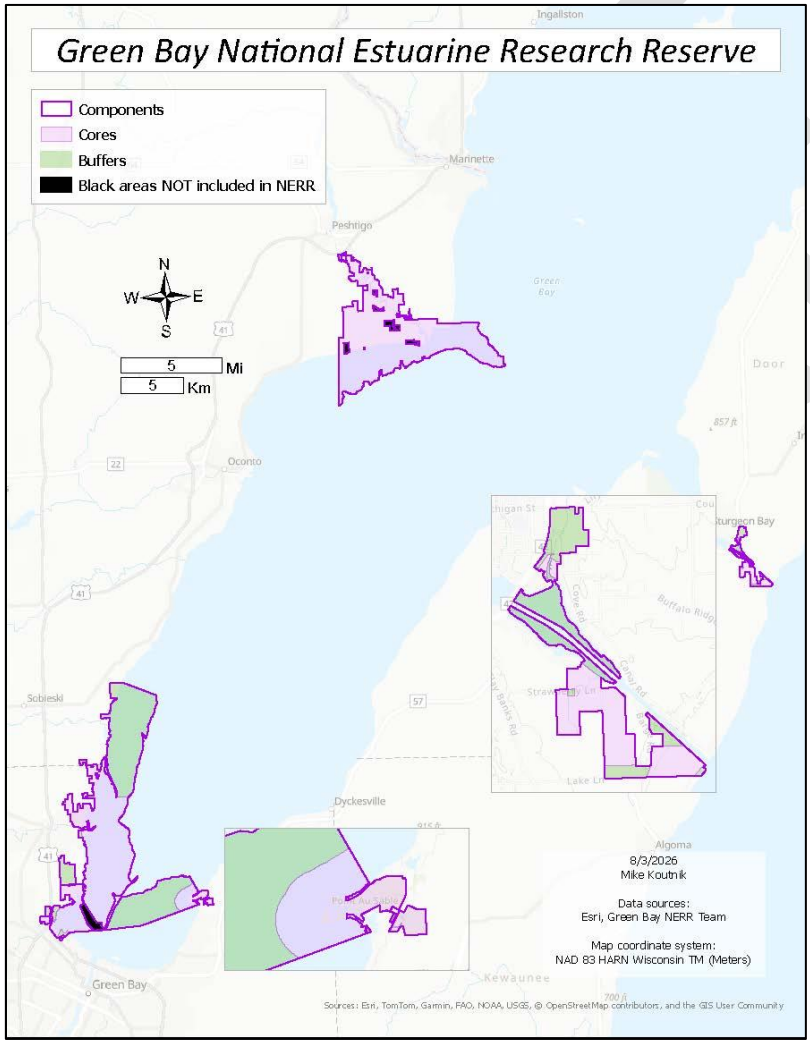


Figure 5. Core and buffer areas within the Green Bay NERR

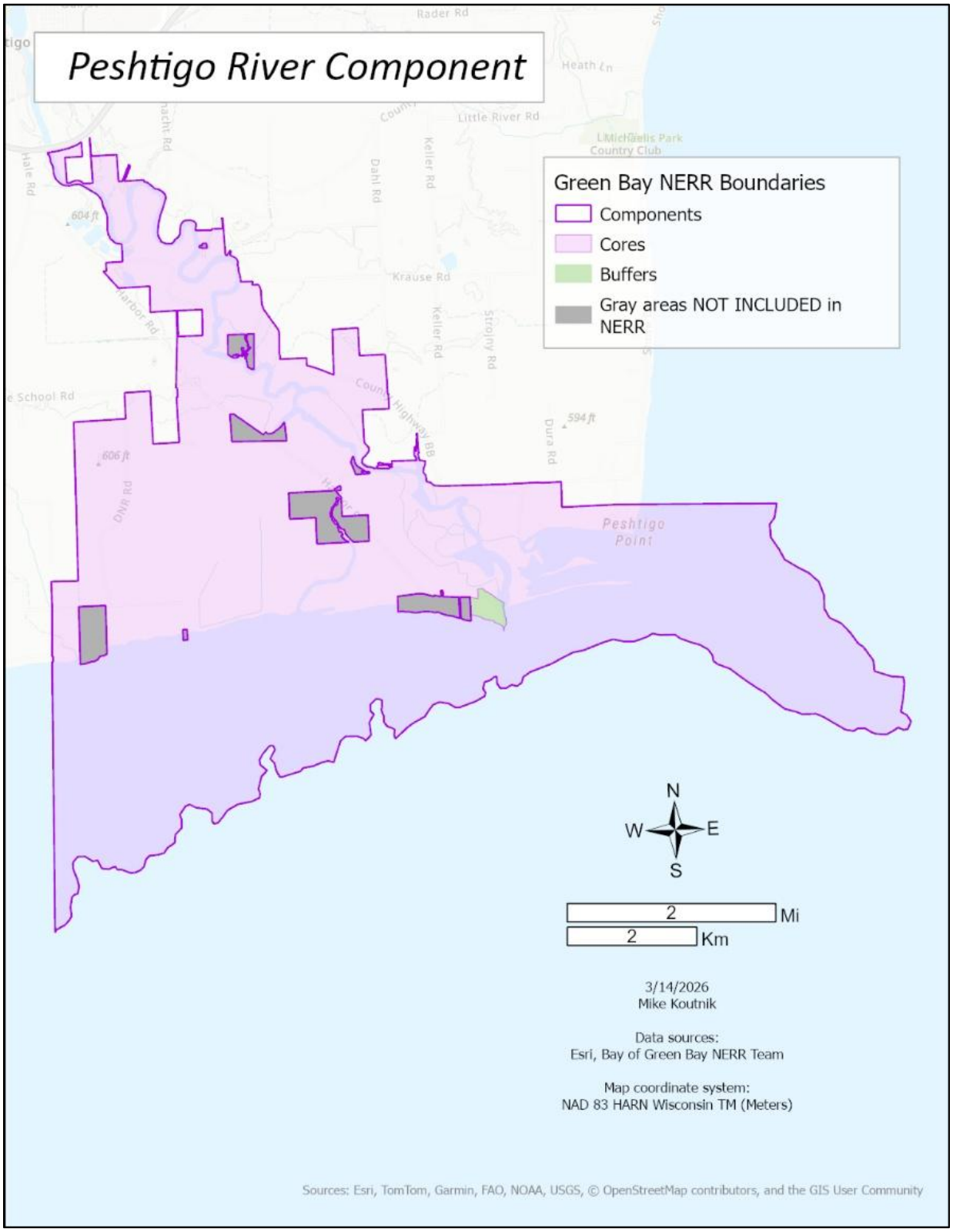


Figure 6: Core and buffer areas within the Peshtigo River Component

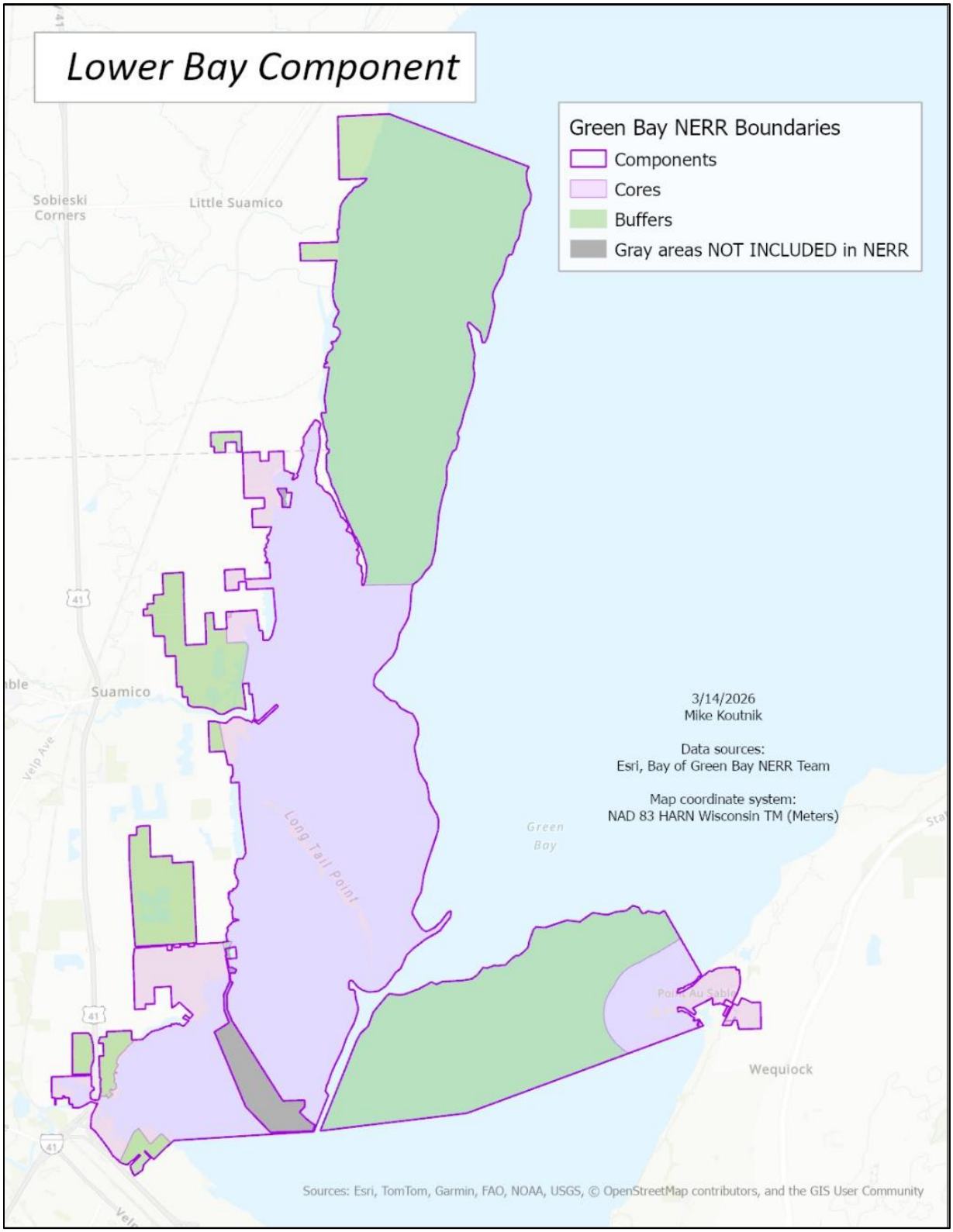


Figure 7: Core and buffer areas within the Lower Bay Component

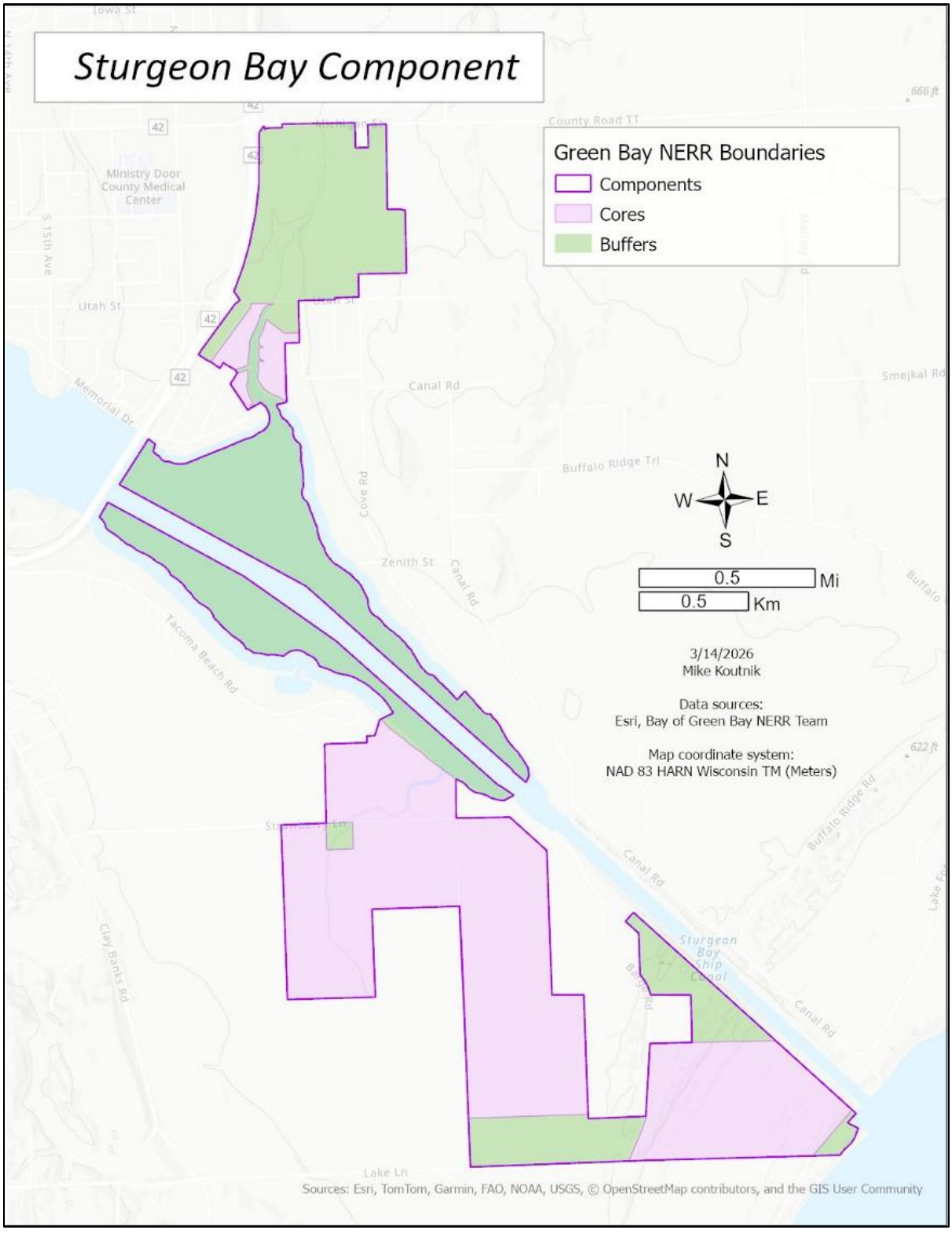


Figure 8: Core and buffer areas within the Sturgeon Bay Component

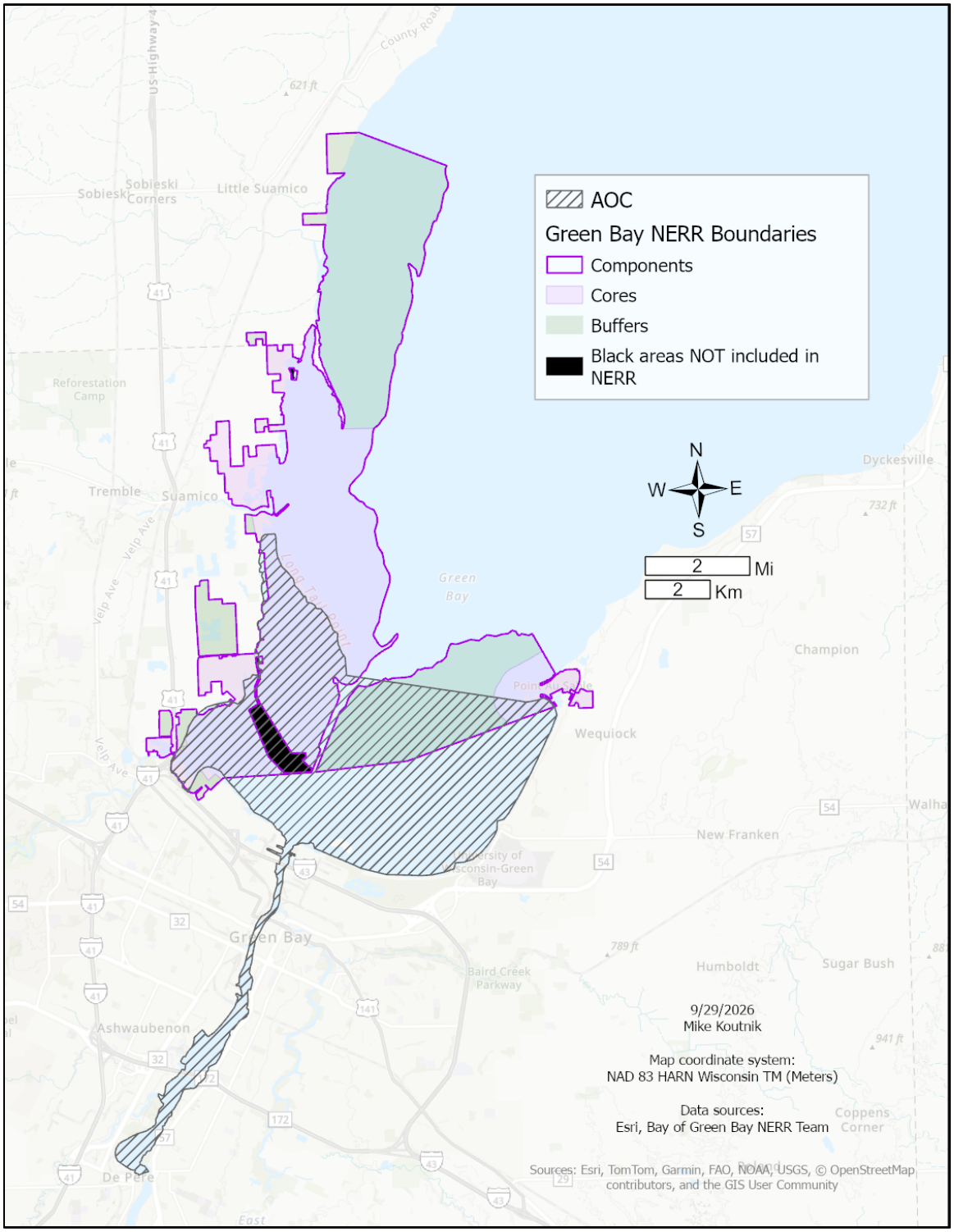


Figure 9: Overlap of the Lower Green Bay and Fox River Area of Concern and the Green Bay NERR

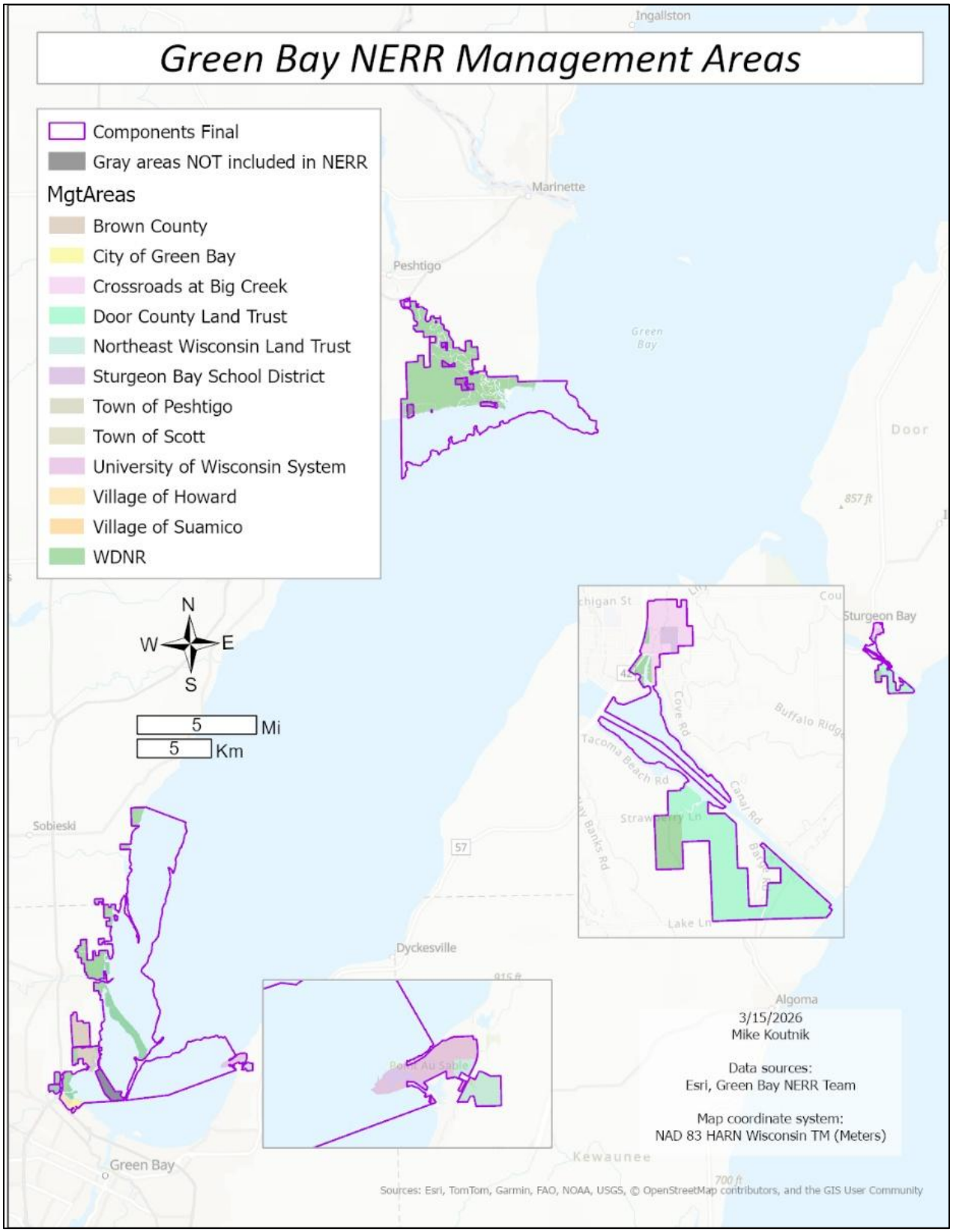


Figure 10: Lands included in the Green Bay NERR

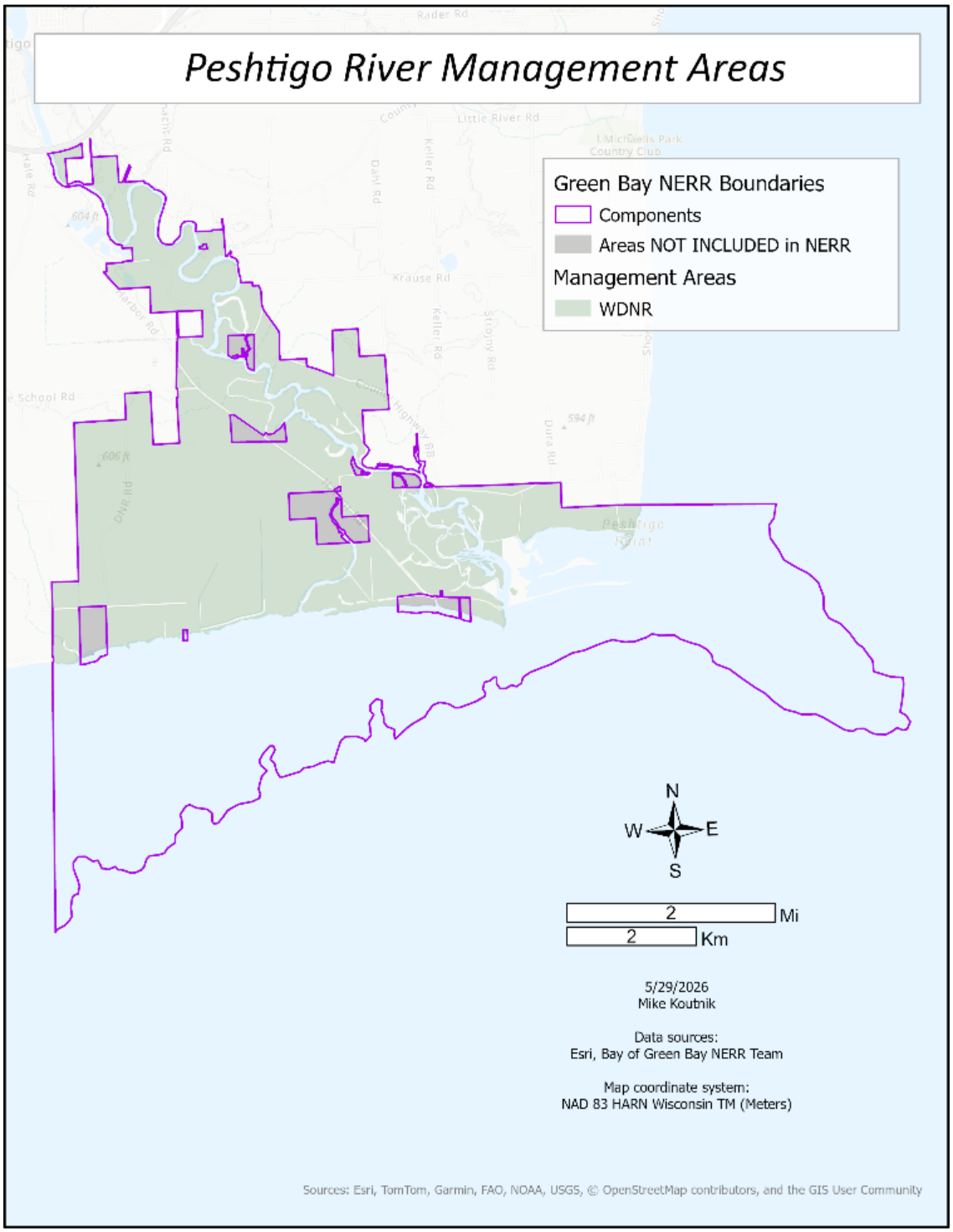


Figure 11: Lands included in the Peshtigo River Component

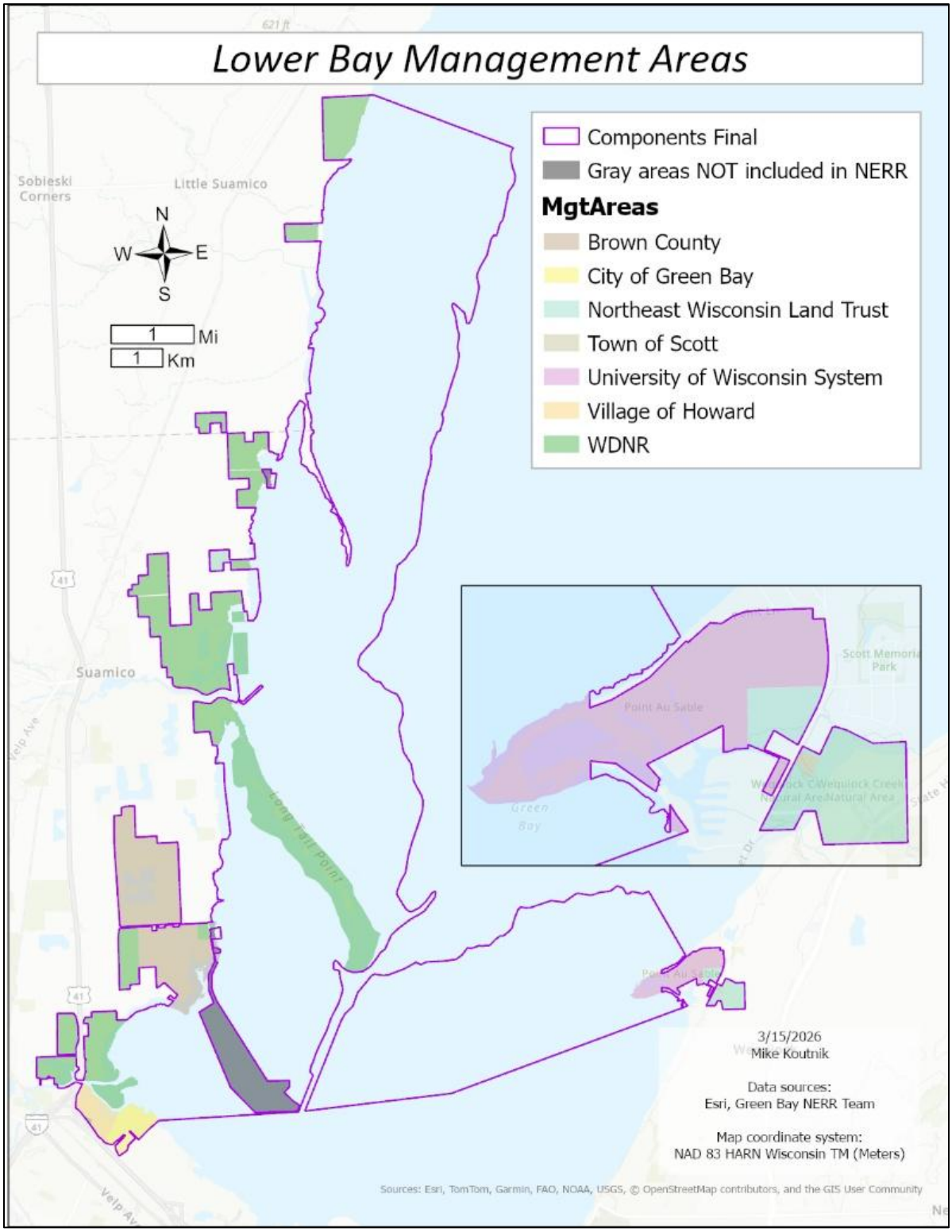


Figure 12: Lands included in the Lower Bay Component

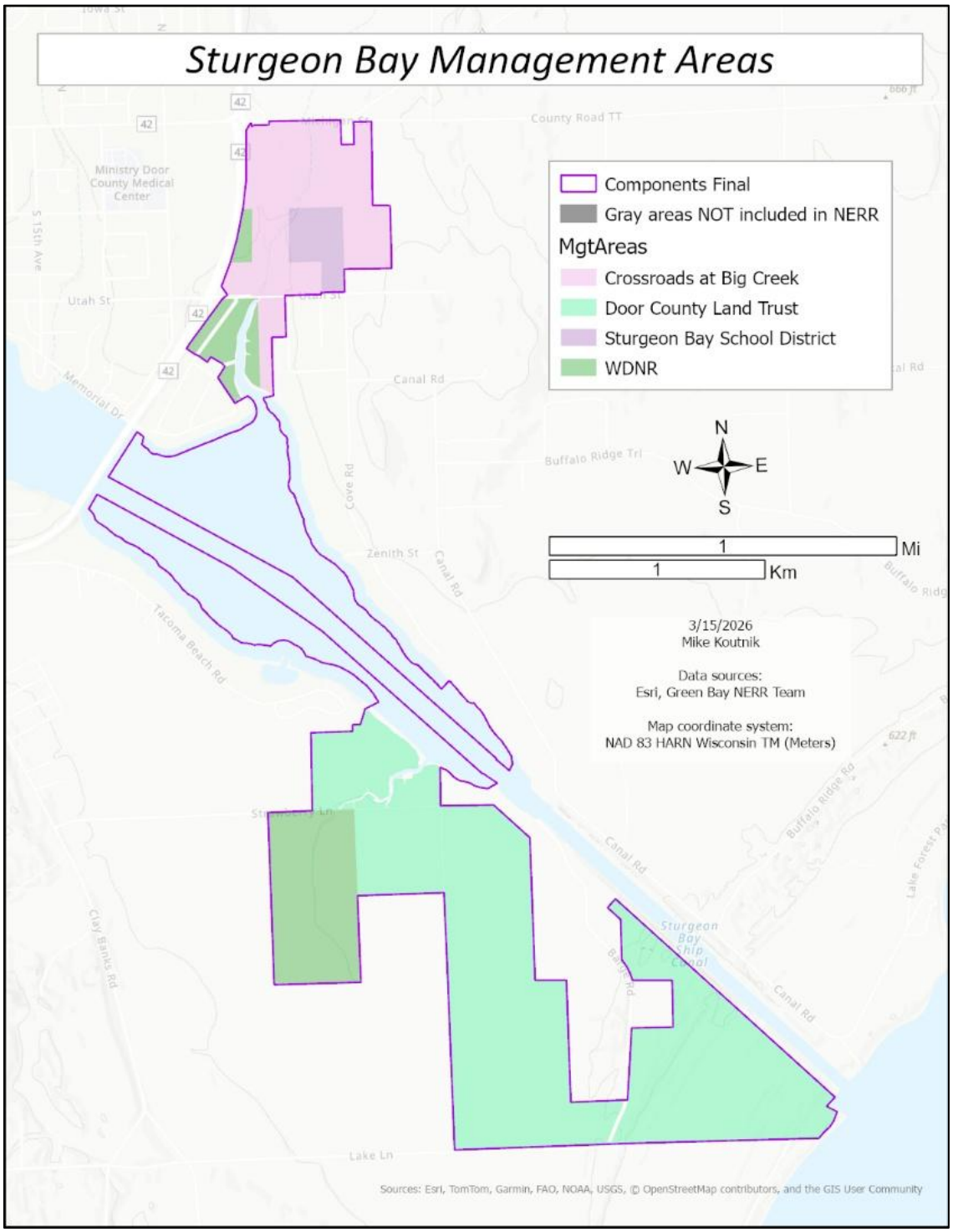


Figure 13: Lands included in the Sturgeon Bay Component

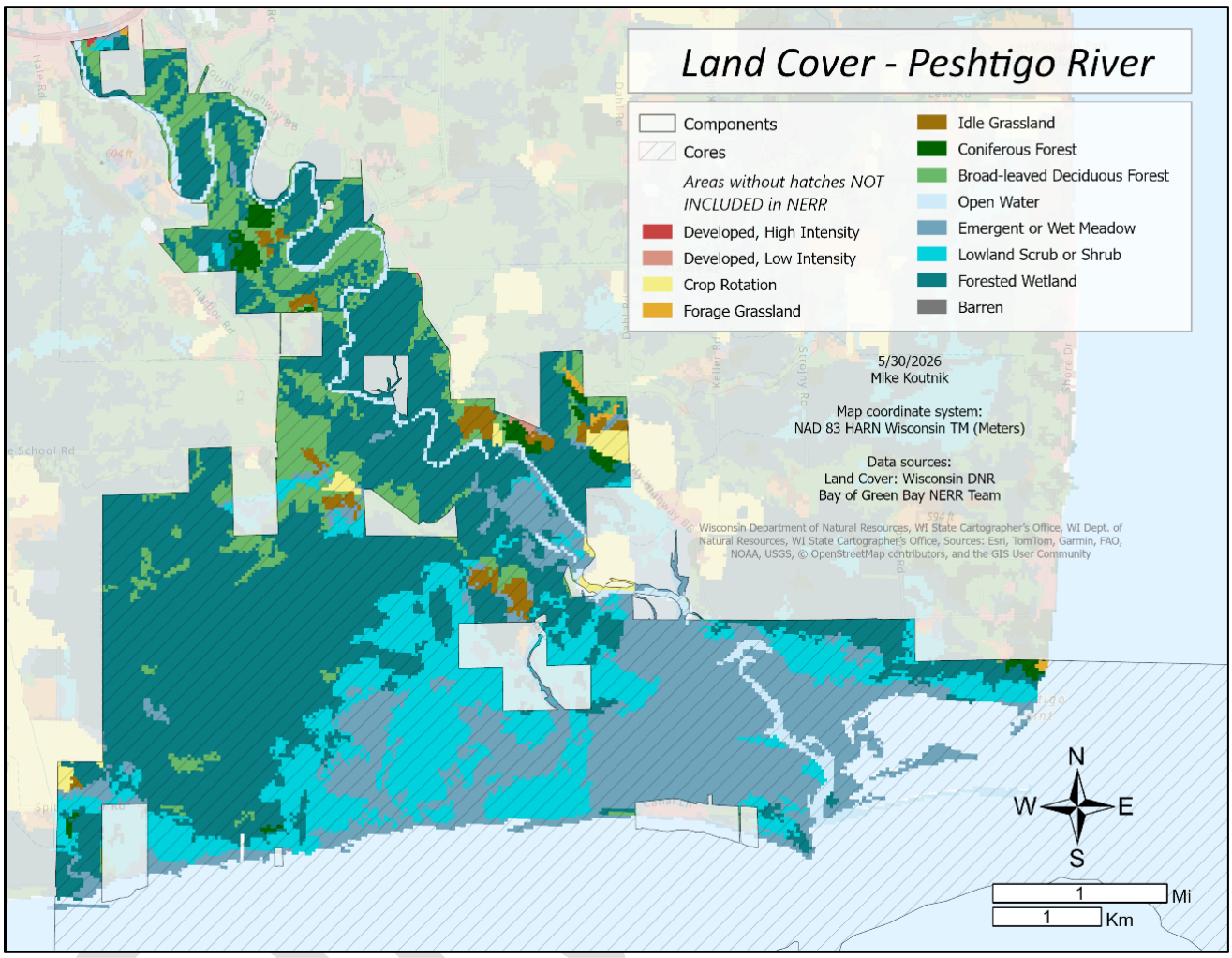


Figure 14: Composition of land cover in the Peshtigo River Component

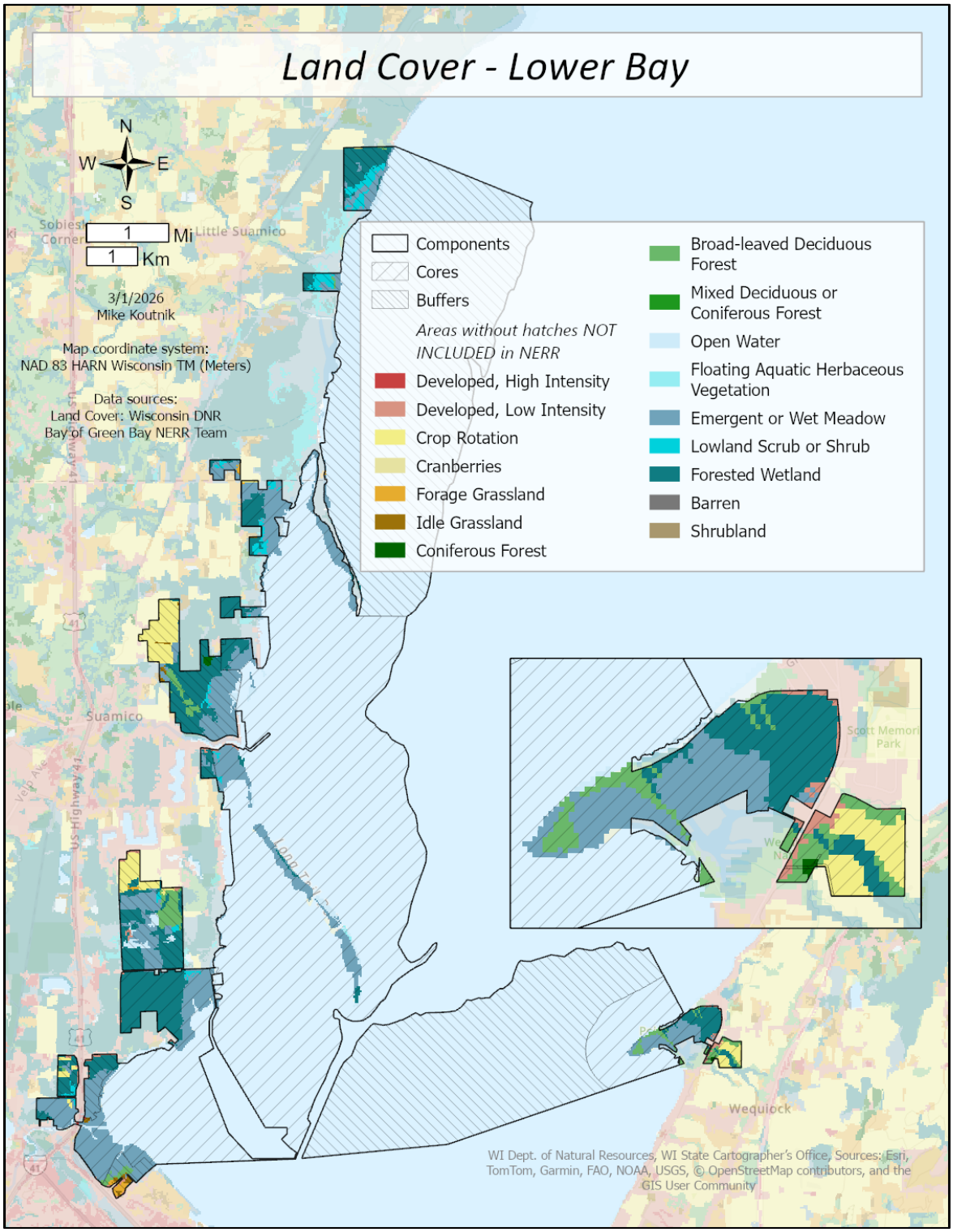


Figure 15: Composition of land cover in the Lower Bay Component

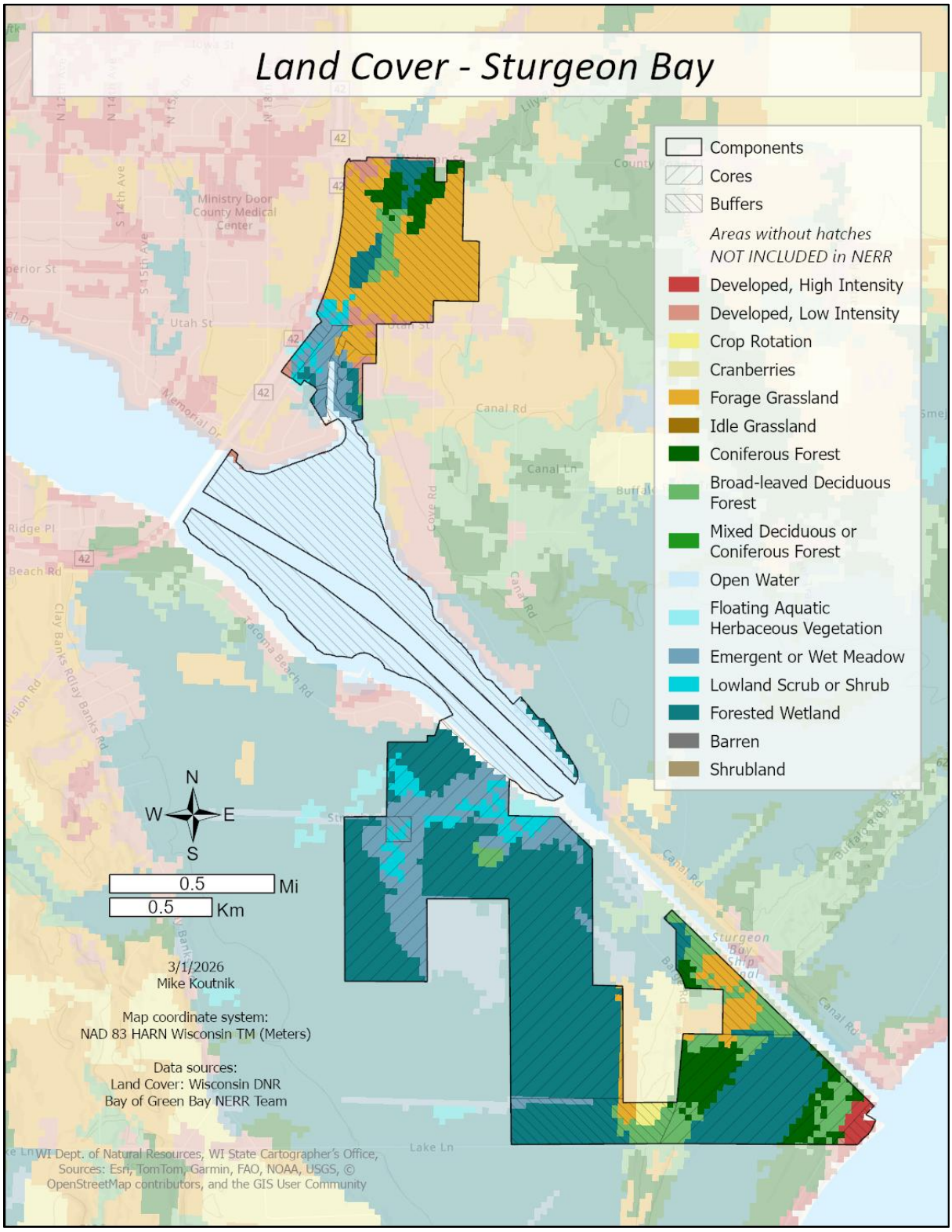


Figure 16: Composition of land cover in the Sturgeon Bay Component

STRATEGIC PLAN

VISION AND MISSION

Green Bay National Estuarine Research Reserve

Mission: In fulfillment of our responsibility to future generations, the Green Bay National Estuarine Research Reserve celebrates and advances community interests, opportunities, investments, and connections to the region's globally significant and unique freshwater resource through innovative and collaborative research, education, stewardship, and training activities that restore and sustain healthy, resilient, and working estuaries.

Values: In living out the mission, the following values are core to Reserve programs,

- Collaboration: A recognition that the challenges and opportunities surrounding our waters are of a complexity and scale that necessitate strong partnerships and solutions embedded in community.
- Holistic approaches: A commitment to adopt multidisciplinary thinking and diverse perspectives to connect, know, and value the region's globally unique freshwater estuaries.
- Generational perspectives: Awareness that freshwater has shaped the history of the region's people, is shaping our lived experiences today, and will shape our future.
- Learning: A shared belief that participation in the National Estuarine Research Reserve System enables the Green Bay estuary to serve as a model system for testing new technologies, and for creating and contributing knowledge to restore and steward estuarine systems globally.

Vision: The Green Bay National Estuarine Research Reserve will gain national recognition as a hub for freshwater estuary research and large-scale restoration, as a testing ground for relevant, emerging technologies, and as a partner that integrates diverse perspectives and approaches for celebrating and learning about freshwater estuaries.

The vision and mission of the collective programs of the Green Bay NERR reflect an acknowledgment of the Reserve's role in the stewardship of coastal ecosystems within the Green Bay estuary, Lake Michigan, and the Great Lakes. To fulfill its mission, the Reserve must continue to improve scientific understanding of the Estuary, its place in the Lake Michigan ecosystem, and the effects of natural and anthropogenic inputs on ecosystem health. The Green Bay NERR Strategic Plan provides an adaptive framework for guiding the Reserve's research, education, stewardship, and training and engagement programs during the first Management Plan cycle. This plan identifies the estuary's most pressing coastal management issues and outlines strategies to address them through research and

partnerships. Together, these priorities reflect the Reserve's role in advancing the understanding and stewardship of freshwater estuaries.

PRIORITY COASTAL MANAGEMENT ISSUES

The section below outlines the Green Bay NERR's four Priority Coastal Management issues and the associated goals, objectives, and actions.

- *Objectives* are results oriented and describe the desired change. The objectives under each priority issue and goal are organized by the Reserve's core program sectors: Research, Education, Stewardship, and Training and Engagement.
- *Actions* explain how an objective will be met from both existing programs and potential new programs developed with support from the Reserve.
- *Actions* are interdisciplinary and may span multiple program sectors. In these cases, the sector under which the actions appear reflects the primary program area responsible for leading or coordinating the work, while implementation may involve collaboration among multiple Reserve programs and regional partners.

A Market Analysis and Needs Assessment (MA/NA) will be used to identify regional partnerships and programmatic priorities for the Education Program and the Training and Engagement Program. The actions outlined in this Strategic Plan represent preliminary directions and will be evaluated in more detail during the MA/NA process. Actions and activities are expected to evolve based on input from partners, community leaders, and residents.

PRIORITY COASTAL MANAGEMENT ISSUE #1: PREPARING GREAT LAKES COMMUNITIES FOR LONG-TERM ECOSYSTEM CHANGE AND VARIABILITY

Coastal habitats along the Green Bay estuary continue to face impacts from fluctuating water levels and climate variability. This includes flooding, habitat loss, coastal erosion, and damage to shoreline properties. Communities must be prepared to adapt to changing conditions, including the potential impacts of climate change and water level variability on water quality and community resilience. This priority provides research and technical solutions to help the region adapt to ecosystem change and lake level variability. Examples of concerns and opportunities under this priority include:

- Habitat loss and degradation
- Great Lakes coastal water levels
- Climate migration for both humans and ecosystems; species range changes, hydrologic changes, and changes in landscape form and function
- Shoreline infrastructure and flooding

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- Changing ice conditions, quality, and safety
- Role of surges, wave energy, and seiches on coastal ecology and water quality
- High resolution monitoring and understanding long-term change and variability
- Data archiving in support of robust forecasting systems and models of projected future changes and their potential impacts across the ecosystem
- Best management practices for building resiliency in restoration projects and outcomes

Goal 1: Strengthen community adaptation and preparation for projected impacts of climate-driven hydrologic shifts and changing lake levels.

RESEARCH OBJECTIVE: Improve the data-informed decision-making capacity of Bay of Green Bay and Lake Michigan coastal communities as they build resiliency to and prepare for the compound impacts of climate change and fluctuating Great Lakes water levels.

Key actions

1.1 Develop and implement the NERR System-Wide Monitoring Program (SWMP) to measure present and emerging ecosystem stressors including extreme weather events, ice cover, changing water levels, habitat change, and species range changes.

1.2 Develop a coastal flooding dashboard in collaboration with NOAA Digital Coast and the East River Collaborative.

1.3 Apply downscaled climate and hydrologic models to shorter time periods to illustrate surge during high waters, ice-free winters, and other changing coastal conditions.

1.4 Align research activities with local community priorities and planning processes related to resilience and adaptation.

1.5 Work with social science researchers to identify gaps in understanding and implementing coastal resilience practices across all community sectors.

1.6 Coordinate with the Wisconsin Initiative on Climate Change Impacts and related climate research initiatives regarding projected impacts and climate migration considerations.

EDUCATION OBJECTIVE: Empower communities to take meaningful action to adapt to the combined impacts of climate change and changing water levels on the bay of Green Bay watershed using SWMP data.

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Key Actions

1.7 Develop and deliver place-based education programs that use local data, outdoor learning experiences, and classroom partnerships to increase understanding of climate-driven changes in water levels and ecosystem conditions.

1.8 Advance community engagement and interpretation initiatives that connect historical ecological knowledge, observed environmental change, and community concerns to build awareness of climate resilience in the Green Bay watershed.

STEWARDSHIP OBJECTIVE: Develop best management practices for restoration in the face of climate change and changing water levels.

Key Actions

1.9 Collaborate with regional land managers and restoration practitioners to translate Reserve and partner research into climate-resilient restoration practices and guidance for coastal habitats.

1.10 Support stewardship partnerships, including community science initiatives, volunteer monitoring, and engagement with private landowners, to strengthen restoration efforts and incorporate community values.

1.11 Advance monitoring and knowledge exchange that inform long-term restoration strategies, including water-level variability, coastal wetland dynamics, and traditional ecological knowledge related to resilience on the landscape.

TRAINING AND ENGAGEMENT OBJECTIVE: Increase the capacity of Green Bay coastal communities to plan and manage for uncertain future conditions.

Key Actions

1.12 Build relationships with partners to identify the needs of coastal communities for planning and managing uncertain future Great Lakes conditions.

1.13 Advance training and technical assistance for coastal communities by promoting the use of decision support tools such as the Great Lakes Climate Resilience Toolkit and related planning resources.

1.14 Coordinate training opportunities with municipalities, regional planners, and infrastructure managers to support climate-informed planning and management practices in coastal communities.

1.15 Expand participation in NERR System and NOAA Office for Coastal Management training programs, fellowships, and professional exchanges to strengthen regional expertise.

PRIORITY COASTAL MANAGEMENT ISSUE #2: RESTORING SUSTAINABLE AND HOLISTIC LAND-WATER CONNECTIONS

Wetlands and estuary habitats along Green Bay provide critical ecosystem services to local and regional communities while also playing a significant economic role. These habitats enhance water quality in the bay and support a rich diversity of fish and wildlife. However, the region and the Reserve face numerous challenges that require monitoring, management, education, and proactive strategies. Historical losses of riparian and wetland habitats in the estuary and its watersheds have disrupted the connection between upland and coastal habitats, negatively affecting fish and wildlife populations. Furthermore, nonpoint source pollution and runoff degrade water quality and contribute to eutrophication. This priority restores connections between the landscape, coast, and open water to improve water quality and promote healthy nearshore ecosystems. Examples of concerns and opportunities under this priority include:

- Coastal processes that connect and support beneficial bio-physical shoreline structure
- Bio-physical and energetic structures, biotic composition and dynamics for Green Bay tributary estuaries of all sizes
- Intrinsic bio-physical quality of the natural community composition, structure and dynamics of coastal habitats, such as coastal wetland gradients and transition states
- Tributary sourced sediment, nutrient, and contaminant loading, as these relate to eutrophication, dissolved oxygen conditions, harmful algal blooms and other impairing water quality issues in the bay
- Connection between sediment loading and habitat quality, particularly for the diversity of submerged aquatic vegetation
- Emerging (e.g. PFAS) and legacy (e.g. PCB) contaminants: monitoring, outcomes, lessons from cleanup
- Knowledge of the site's context and connections at all scales (hemispheric, regional, local) when addressing anadromous fish and aquatic organism lifecycles, migratory bird flyway, and breeding habitat concerns
- Human impacts on the land-margin dynamics, physical dynamics of lake level, wave energy regimes, flooding risk, mitigation, adaptation, and resilience, hardened shorelines and armoring

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- Spawning migrations for pike, suckers, whitefish, sturgeon, and waterfowl habitat and flyway
- Landscape interactions including point and nonpoint runoff, mass balances between the land and Bay, biogeochemistry of a land-water system
- Understand the connection between sediment loading on habitat quality for reefs and reef spawning habitats

***Goal 2*: Reduce excessive sediment, nutrient, and contaminant loadings into the bay from watershed inputs.**

RESEARCH OBJECTIVE: Monitor key ecosystem inputs, such as sediment and nutrient loading, and associated ecosystem states such as dissolved oxygen levels.

Key Actions

2.1 Strengthen monitoring of key watershed and estuarine inputs, including sediment, nutrients, and contaminants, by coordinating SWMP activities with state, Tribal, and regional monitoring efforts.

2.2 Advance collaborative research and modeling to improve understanding of watershed inputs, dissolved oxygen dynamics, and algal bloom conditions in the Green Bay estuary.

2.3 Work with partner institutions to apply watershed and ecosystem models that inform management strategies for reducing nutrient, sediment, and contaminant loading to the bay.

EDUCATION OBJECTIVE: Improve understanding of the watershed inputs and water quality outcomes in the Green Bay watershed through education that integrates SWMP data, successes, and Indigenous and historical perspectives.

Key Actions

2.4 Develop education and outreach programs that communicate the causes, impacts, and solutions related to nutrient, sediment, and contaminant loading in the Green Bay watershed, including PFAS, legacy contaminants, and urban runoff.

2.5 Highlight restoration successes and watershed improvement efforts through outreach programming, public reporting of data, and support partner initiatives on impact reporting, such as initiatives by the Wisconsin DNR and Fox-Wolf Watershed Alliance.

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2.6 Incorporate regional history, Tribal perspectives, and human dimensions research into education programs to strengthen understanding of how land use, policy, and community decisions influence water quality outcomes.

STEWARDSHIP OBJECTIVE: Facilitate stewardship actions that reduce sediment loading to improve water quality in Green Bay coastal estuaries.

Key Actions

2.7 Collaborate with landowning partners and watershed organizations to support restoration planning, best management practices, and green infrastructure projects that reduce sediment and nutrient loading to the bay.

2.8 Advance initiatives that improve understanding and management of water quality conditions, including monitoring of vegetation, contaminants, algal blooms, and benthic habitat indicators.

2.9 Work with regional partners to explore and implement innovative approaches for improving estuarine resilience, including shoreline sediment management, watershed scenario planning, and beneficial reuse of dredged materials.

TRAINING AND ENGAGEMENT OBJECTIVE: Increase regional technical expertise and professional capacity to target and optimize landscape conservation actions and track loading reductions to the bay.

Key Actions

2.10 Explore partnerships with conservation organizations and watershed practitioners to strengthen technical capacity for implementing conservation practices that reduce nutrient and sediment loading to the bay.

2.11 Co-develop training and decision-support tools that help practitioners and community leaders understand watershed conditions, water quality trends, and restoration opportunities in the Green Bay watershed.

***Goal 3*: Strengthen the ability of native and non-invasive species to access terrestrial, wetland and aquatic habitats, and improve interconnectedness of ecosystem components.**

RESEARCH OBJECTIVE: Identify key connections and existing or potential risks to these connections between terrestrial and aquatic ecosystems within the Green Bay estuary.

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Key Actions

3.1 Conduct research and mapping to identify key habitat connections between tributaries, wetlands, shorelines, and the bay, including barriers to aquatic organism movement and opportunities to improve connectivity.

3.2 Advance studies examining how climate variability, water level fluctuations, and species behavior influence habitat connectivity, migration patterns, and wetland dynamics.

3.3 Support development and application of hydrodynamic and landscape modeling tools that improve understanding of coastal habitat interactions and water exchange across the estuary.

EDUCATION OBJECTIVE: Demonstrate the connections between upland actions and nearshore and open water impacts using examples and findings from SWMP data.

Key Actions

3.4 Develop place-based education programs that highlight connections between upland landscapes, tributaries, wetlands, and the bay through walking tours, field experiences, and watershed interpretation.

3.5 Use restoration projects as demonstration sites to illustrate how habitat restoration, stream reconnection, and buffer improvements support water quality and aquatic habitat connectivity.

STEWARDSHIP OBJECTIVE: Improve resilient interface between the land and the water, and the capacity for interchange (water levels, species movement).

Key actions

3.6 Support restoration projects on partner lands that improve connectivity between streams, wetlands, and the bay, including culvert removal, stream restoration, shoreline improvements, and habitat enhancement.

3.7 Advance habitat restoration and conservation efforts that support migratory birds, waterfowl, and other native species dependent on connected coastal and upland habitats.

3.8 Strengthen stewardship partnerships for monitoring of wildlife populations and early detection and response to invasive species that threaten habitat connectivity; involve

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community science volunteers when appropriate to expand habitat and species monitoring.

TRAINING AND ENGAGEMENT OBJECTIVE: Provide training to communities, agencies, decision-makers and organizations to promote the conservation, restoration, and stewardship of coastal interfaces and connections.

Key Actions

3.9 Explore opportunities for training and knowledge exchange with other Great Lakes watersheds (e.g. Milwaukee estuary) that highlight approaches for restoring and stewarding connections between urban watersheds, tributaries, wetlands, and the open waters of Green Bay.

PRIORITY COASTAL MANAGEMENT ISSUE #3: PRESERVING BIODIVERSITY THROUGH IMPROVED ECOLOGICAL INTEGRITY AND ECOSYSTEM RESILIENCY

The Reserve has identified restoration as a key issue, and the Reserve will strive to be a regional leader in restoration science. Extensive remediation and restoration activities have re-established coastal wetlands and natural shorelines, while the continued introduction and establishment of non-native species have been a well-documented danger to native species. The Green Bay NERR needs to be a representative model of Great Lakes coastal wetland ecosystems regarding its biodiversity, healthy communities, and resilience to change. The Reserve must restore areas and communities distressed by non-native, invasive species and share lessons learned with regional decision-makers. This priority supports restoration efforts to improve ecosystem processes in order to support native species and ecosystem resilience. Examples of concerns and opportunities under this priority include,

- Protect existing good habitat in good conditions
- Large-scale habitat restoration, bio-physical processes restoration, monitoring and adaptive management for habitats in degraded conditions
- Invasive species, endangered species, sufficient natural community and habitat representation, habitat integrity, resilient scale for habitats, inter-habitat connectiveness and intrinsic quality
- Full life cycle habitat protection for fisheries, avian populations, benthic fauna, algal communities, and keystone species (e.g., beavers, crayfish)

- Application of new technologies to ecosystem processes and understanding, from the individual organism to population level dynamics, including ecosystem 'omics, genetic diversity, behavior, and adaptation

***Goal 4*: Restore healthy wetlands, submerged aquatic, and benthic habitats, and promote diverse species assemblages.**

RESAERCH OBJECTIVE: Understand factors limiting or promoting the successful restoration of diverse, predominantly native biotic communities in the Green Bay estuary, its wetlands, and tributaries.

Key Actions

4.1 Conduct research that advances understanding of ecological conditions influencing restoration success in coastal wetlands and tributaries, including water quality, sediment dynamics, light availability, and other abiotic factors affecting native plant communities.

4.2 Study biological interactions that influence restoration outcomes in Great Lakes systems, including invasive species dynamics, species traits that support resilience under changing conditions, and long-term changes in food webs, fisheries, and wildlife populations.

4.3 Collaborate with regional partners to evaluate restoration strategies and habitat enhancement efforts that support native species recovery, including submerged aquatic vegetation, wild rice, habitats that benefit fish, birds, and other wildlife, and controlled foraging of invasives.

4.4 Understand food that has thrived in the system and changes to food sources and food systems over time, including changes in fisheries, waterfowl, and harvested plants.

EDUCATION OBJECTIVE: Build career pathways for restoration professionals as part of TOTE programs.

Key Actions

4.5 Collaborate with social scientists to better understand how regional socioeconomic conditions depend on ecosystem health and benthic environments.

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4.6 Promote and communicate findings from reef mapping and related habitat assessment efforts.

4.7 Develop curriculum and/or programs about coastal wetlands and benthic ecosystems, including their ecological importance, their role in supporting food webs, and the impacts of invasive species on these habitats.

STEWARDSHIP OBJECTIVE: Provide coordination and funding to bring regional stewards and researchers together to promote integrated and forward-looking restoration management practices and goals.

Key Actions

4.8 Coordinate regional stewardship partnerships that connect researchers, land managers, and restoration practitioners to apply adaptive management principles and guide future restoration priorities.

4.9 Support collaborative monitoring, communication, and long-term management of restoration sites to improve ecological outcomes and inform future restoration efforts.

4.10 Advance restoration initiatives that strengthen ecosystem resilience, including habitat restoration of hemi-marsh habitat, invasive species management of phragmites and hybrid cattail, and restoration of culturally and ecologically important native species.

4.11 Explore traditional food sources and efforts to re-establish wild rice to support biodiversity and resilience.

TRAINING AND ENGAGEMENT OBJECTIVE: Disseminate new knowledge and skills to relevant decision-makers to improve the successful restoration and management of coastal systems.

Key Actions

4.12 Integrate Reserve research findings into training programs and workshops that support improved restoration planning and management across the Green Bay watershed.

4.13 Share adaptation strategies and management practices that help communities, land managers, and coastal-dependent businesses respond to changing ecosystem conditions and that consider alternative ecosystem states and realistic restoration targets.

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PRIORITY COASTAL MANAGEMENT ISSUE #4: ENHANCING THE BAY OF GREEN BAY'S SENSE OF PLACE AND CONNECTION TO QUALITY OF LIFE

We have adopted a vision for a Reserve that is holistic in the programs offered. This means a focus on not only the science of the Great Lakes but also a celebration of the many ways that water touches our lives and communities, including historical connections, art and storytelling, and the economic importance of water both in the past and for our future.

Connecting residents, visitors, and communities to the estuary is key to stewardship and long-term protection of the Green Bay estuary and the Great Lakes. Projects under this priority will consider potential adverse impacts on communities that could be unintended. Examples of concerns and opportunities under this priority include:

- Cultural connections and origin stories
- Sustainable blue economy
- Working waters & recreation – active ports, green infrastructure, water quality for recreation, shoreline and water accessibility, dredge spoils and navigation
- Integrating social concerns into problem-solving; Community science and engagement, public awareness and connection
- Changing human demands, impacts, usage – from shifting agricultural practices to expanding urban populations to increasing demands for navigation, recreation, energy, etc.

***Goal 5*: Foster historical awareness and contemporary connections between people and the Green Bay estuary.**

RESEARCH OBJECTIVE: Understand which quality-of-life benefits are most important to regional communities, connections between those benefits and the bay, and residents' understanding of potential changes to benefits under climate change scenarios. Understand community sense of place and emotional connections to the bay.

Key Actions

5.1 Coordinate with Tribal Historic Preservation Officers to better understand research needs related to cultural connections and historical perspectives associated with the Green Bay estuary.

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5.2 Conduct research that examines how regional communities define sense of place and how cultural and emotional connections to the bay of Green Bay influence perceptions of quality of life.

5.3 Evaluate relationships between water quality conditions and economic activities such as recreation, fisheries, tourism, and other bay-dependent industries.

5.4 Support fellowships and research opportunities that attract emerging scholars to study the connections between ecosystem health, economic vitality, and community well-being in the Green Bay estuary.

EDUCATION OBJECTIVE: Develop K-12 Estuary Education Programs (KEEP) that share historical connections, contemporary quality-of-life benefits, and future social opportunities associated with the Green Bay estuary.

Key Actions

5.5 Collect oral histories from the region and promote historical awareness of long-term history of human use of the bay, including Indigenous histories, fisheries heritage, and the region's evolving relationship with water and natural resources.

5.6 Share stories of restoration successes and environmental recovery to demonstrate how stewardship and restoration efforts improve ecological conditions and community well-being.

5.7 Celebrate the Area of Concern and Fox River cleanup success stories as antidotes to environmental anxiety and to promote future thinking.

STEWARDSHIP OBJECTIVE: Lead programs and develop partnerships that celebrate and elevate connections to the Green Bay estuary via stories, art, music, spirituality, history, and recreation.

Key Actions

5.8 Develop programs and partnerships that use arts, storytelling, and cultural experiences to strengthen community connections to the bay and its watersheds.

5.9 Collaborate with Tribal Nations, educators, and community organizations to share cultural histories and support programs that highlight the historical and spiritual significance of places connected to the bay.

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TRAINING AND ENGAGEMENT OBJECTIVE: Improve social science capacity and opportunities for researchers to improve our understanding of historical connections, contemporary quality-of-life benefits, and future social opportunities derived from the bay.

Key Actions

5.10 Build relationships to help the Reserve connect researchers, community organizations, and decision-makers to advance social science research and knowledge related to the bay and its communities.

***Goal 6*: Promote the sustainable, beneficial uses of the Green Bay estuary for regional communities.**

RESEARCH OBJECTIVE 1: Understand the current and future economic impact of the Green Bay estuary on the regional economy, such as fisheries, port authority, and recreation.

RESEARCH OBJECTIVE 2: Provide a setting that is attractive to outside research, including through boat access, research facilities, student assistance, and opportunities for public lectures.

Key Actions

6.1 Conduct interdisciplinary research that evaluates the economic value of the bay's natural resources, including fisheries, recreation, tourism, and water-dependent industries.

6.2 Advance technology development that improves understanding of water quality conditions affecting recreational use, including beach conditions and harmful algal bloom dynamics.

6.3 Study how coastal infrastructure, shoreline conditions, and environmental management decisions influence economic opportunities, tourism, and access to the bay.

6.4 Explore how future economic development, infrastructure planning, and climate adaptation needs influence sustainable uses of the bay, including freshwater industries, port activity, fisheries, waterfront access, transportation networks, and water storage needs.

EDUCATION OBJECTIVE: Promote careers and programs in TOTE and KEEP curricula, highlighting future economic impacts of the Green Bay estuary on the regional economy.

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Key Actions

6.5 Develop education and outreach programs that highlight the economic and cultural benefits of the bay and support students and early-career professionals in navigating career pathways in Great Lakes restoration, fisheries, recreation, tourism, and freshwater-based industries and trades.

6.6 Support place-based learning and youth programs that build knowledge of safe and responsible recreation on large water bodies.

6.7 Collaborate with Tribal Nations and regional partners to share cultural stories, traditional knowledge, and educational programs that highlight the connections between place, sustainability, and community resilience.

6.8 Promote and expand efforts to maximize revenue streams from all parts of the fish in collaboration with Wisconsin Sea Grant Programs and Strawberry Creek Chinook Facility. This could include use of salmon post-spawning collected for local food pantries for edible fish, and organic fertilizer for inedible fish.

STEWARDSHIP OBJECTIVE: Cultivate relationships with the regional business community towards shared goals for thriving working waterfronts.

Key Actions

6.9 Coordinate community stewardship activities, including citizen science and cleanup efforts, which engage residents and visitors in caring for coastal and marine environments.

6.10 Collaborate with regional partners (e.g. Wisconsin Shipwreck Coast National Marine Sanctuary, Door County Maritime Museum, Manitowoc Maritime Museum) to highlight maritime heritage and strengthen connections between coastal communities and the bay.

TRAINING AND ENGAGEMENT OBJECTIVE 1: Increase access opportunities and encourage responsible use of the Green Bay estuary, coastal ecosystems, and tributaries.

Key Actions

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6.11 Develop training and engagement programs that connect watershed stakeholders, including agricultural producers, with the Green Bay estuary to strengthen understanding of how land management practices influence coastal ecosystem health.

CONCLUSION

The Reserve's Strategic Plan is designed to be a living document that is responsive to emerging science, partner feedback, and community priorities. Reserve staff will adapt their strategies to ensure that programs remain relevant, effective, and equitable. Progress will be assessed through measurable outcomes, program reviews, and continual dialogue with partners and the public. Through assessments, the Green Bay NERR will strengthen its capacity to protect, restore, and celebrate the estuarine resources that define the Green Bay estuary and the communities it sustains.

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PROGRAM FOUNDATIONS

INTRODUCTION

The Green Bay estuary offers an unparalleled setting for estuarine research, education, stewardship, and training. Once among the most degraded freshwater estuaries in the Great Lakes, the bay has been the focus of major investments in restoration and habitat remediation. Today, the Green Bay watershed continues to evolve because of land use change, invasive species, and climate variability. UW-Green Bay has a long history of research and K-12 education programming on and around the bay. Many of the university's existing freshwater research and outreach initiatives will form the foundation of the Reserve's programming. Existing programs will serve as a strong foundation for new initiatives and partnerships in the Research and Education sectors.

Reserve program areas will integrate research, education, conservation, commerce, tourism, recreation, art, and storytelling. This approach ensures that the Reserve's work is socially relevant, grounded in the bay's ecological challenges, and connected to the culture and economic identity of the region.

Priority Coastal Management Issues

The Reserve will focus on four Priority Coastal Management Issues:

- Preparing Great Lakes communities for long-term ecosystem change and variability.
- Restoring sustainable and holistic land-water connections.
- Preserving biodiversity through improved ecological integrity and ecosystem resiliency.
- Enhancing the Bay of Green Bay's sense of place and its contributions to quality of life.

Program Goals

From this foundation, the Green Bay NERR will pursue the following goals:

1. Strengthen community adaptation and preparation for projected impacts of climate change and fluctuating water levels.
2. Reduce excessive sediment, nutrient, and contaminant loadings from watershed inputs.
3. Strengthen the ability of native organisms to access terrestrial, wetland, and aquatic habitats and improve interconnectedness of ecosystem components.
4. Restore healthy wetlands, submerged aquatic, and benthic habitats while promoting diverse species assemblages.

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5. Foster historical awareness and contemporary connections between people and the Bay of Green Bay.
6. Promote the sustainable, beneficial uses of the Green Bay estuary for regional communities.

NERR SYSTEM RESEARCH AND MONITORING PROGRAM

National Estuarine Research Reserves are created to provide a stable platform for long-term research on estuarine conditions and relevant coastal management issues. The System-Wide Monitoring Program (SWMP) delivers standardized measurements of short-term variability and long-term changes in water quality and biological systems and maps land use and land cover characteristics across all reserves. The effort is focused on three ecosystem characteristics: abiotic characteristics (water temperature, water quality, and weather); biotic characteristics (habitat types and species); and watershed and land use characteristics (land cover and elevation changes). Reserve-generated data meet federal geographical data standards and are available via the Reserve System's Centralized Data Management Office. Reserves also serve as sentinel sites for observing how coastal habitats respond to changing water levels. This program is guided by the reserves' System-Wide Monitoring Program Plan, the Reserve Habitat Mapping and Change Plan, and guidance for monitoring Coastal Habitat Response to Changing Water Levels.

The Reserve System also supports applied research through its Science Collaborative program and the Margaret A. Davidson Graduate Fellowship program. The Science Collaborative funds competitive research projects that engage end-users in the project design and address system-wide NERR research and management needs. The goal of the Davidson Fellowship is to build the next generation of leaders in estuarine science and coastal management. The fellowship provides opportunities for graduate students to conduct research within a reserve under the guidance of a mentor who also supports their professional development.

The Reserve System Strategic Plan outlines research objectives to maintain and expand biophysical and socioeconomic monitoring to track environmental change, increase the use of collaborative research to address decision-maker needs, and ensure that scientific, education, and management audiences can use the data, research results, and tools developed by the system.

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GREEN BAY NERR RESEARCH AND MONITORING PROGRAM

The Research and Monitoring Program will serve as a regional hub for applied science, fostering collaborative, high-impact studies that strengthen understanding of land-water connections, climate resilience, large-scale restoration, and the effects of watershed inputs on the bay. With strategically located facilities and infrastructure, the program will enable researchers, students, and partners to generate data that supports use-informed, science-based decision-making. Through monitoring, modeling, and applied studies, the Reserve will guide strategies that improve water quality, restore ecosystems, and advance community well-being, while linking institutions, agencies, and communities in support of biodiversity and long-term sustainability.

RESEARCH PROGRAM CONTEXT

Setting and Context: The geographic scope of the Research and Monitoring Program focuses primarily on the lands and waters within the Reserve's boundaries, with a secondary focus on the Green Bay Estuary and watershed. The Green Bay estuary is a semi-enclosed Bay of Lake Michigan. Some of Wisconsin's largest stretches of undeveloped shoreline and natural estuary can be found along Green Bay's west shore within the boundaries of the Reserve. The bay provides opportunities to research a variety of habitats, including marshes, upland forests, open water, tributary streams, a large river, Lake Michigan beach, nearshore Great Lakes ecosystem, and impacts on those habitats from agriculture and urban development within the larger watershed.

Priority Issues: The priority issues for research and monitoring include the priority coastal management issues, and the Research and Monitoring Program goals and actions identified in Chapter 4: The Strategic Plan.

Priority Audiences: The target audiences for the Research and Monitoring program are scientists and natural resource managers who will utilize the data, reports, and peer-reviewed papers that result from research activities, as well as other sectors within the Reserve. Research staff will coordinate and collaborate with other audiences across the Green Bay watershed and the Great Lakes, including city, state, and federal agencies, universities, and nonprofit organizations. The program will actively engage K–12 students and their educators, university and college students, and community members to support research and monitoring.

RESEARCH PROGRAM CAPACITY

Strategic Partnerships: Reserve partners are important collaborators and audiences for the Research and Monitoring Program, as they provide essential connections and expertise. The list below includes partners that UW-Green Bay staff, faculty, and students work with on research projects around the Green Bay estuary and watershed.

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- Green Bay NERR Education, Stewardship, and Training and Engagement Sectors
- Wisconsin Department of Natural Resources
- Ducks Unlimited
- Oneida Nation
- Menominee Indian Tribe of Wisconsin
- NEW Water
- Great Lakes Observing System
- UW–Extension
- Brown County Parks
- Brown County Extension
- University of Wisconsin–Milwaukee
- University of Wisconsin–Madison
- Cleveland State University
- U.S. Fish & Wildlife Service
- Port of Green Bay
- Wisconsin Coastal Management Program

Facilities: The Reserve's research and monitoring programs will, at least initially, use existing facilities on the University of Wisconsin–Green Bay campus. Available infrastructure includes:

- Monitoring equipment to be temporarily installed at selected sites in the estuary to test equipment and protocols of the System-Wide Monitoring Program. With initial funding from the Great Lakes Observing System, Reserve staff purchased some of the equipment required for SWMP.
- Analytical chemistry laboratory for general nutrient, carbon, and metals chemistry
- Laboratory equipped for microbiological work, radioisotope laboratory, and microscope/balances
- The annex (Facilities Management) for storing canoes, kayaks, the R/V Phoenix, and other associated watercraft supplies

RESEARCH PROGRAM DELIVERY

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PROGRAM HIGHLIGHT: ESTABLISH SYSTEM-WIDE MONITORING PROGRAM

The NERR System-Wide Monitoring Program provides standardized data on national estuarine environmental trends while allowing flexibility to assess coastal management issues of regional or local concern. The principal mission of the monitoring program is to develop quantitative measurements of short-term variability and long-term changes in water quality, biological systems, and land use/land cover characteristics of estuaries and estuarine ecosystems for the purposes of informing effective coastal zone management. The program is designed to enhance the value and vision of the reserves as a system of national reference sites and focuses on three ecosystem characteristics:

Abiotic indicators of water quality and weather: Abiotic measurements are supported by standard protocols, parameters, and approaches that describe the physical environment, including weather, water quality, hydrological, and sediment-related parameters. Required parameters to be collected include nutrients, temperature, salinity, pH, dissolved oxygen, relative humidity, barometric pressure, wind speed/direction, and precipitation. In addition, the program will collect data on under-ice dissolved oxygen, surface-groundwater well monitoring, water quality profiles of the water column, and continuous measurements of pCO_2.

Biological monitoring: As funds are available, the Reserve will include monitoring of biodiversity, habitat, and population characteristics.

Watershed, habitat, and land use mapping: The Reserve will examine the link between watershed land use and changes in land cover within the Reserve boundaries.

PROGRAM HIGHLIGHT: LONG-TERM RESTORATION RESEARCH & MONITORING

In partnership with conservation agencies and organizations leading restoration efforts, the Reserve can serve as a living laboratory to evaluate how restoration projects perform over time and to apply those lessons to future efforts. The Reserve will help answer questions about what restoration success looks like in large, dynamic freshwater systems.

Capturing the feedback loop: Long-term monitoring of benthic communities, plankton, submerged and emergent vegetation, sediment, and nutrient loading, periphyton seasonal dynamics, and the movement of Northern Pike. Northern Pike are a target species for restoration. As an apex predator that spawns using bay tributaries, the health of the fishery is an indicator of progress towards habitat improvement and the health of the bay. This monitoring will track how the system responds to restoration efforts and inform adaptive management techniques.

Addressing contaminants: Research on the effects of legacy and emerging contaminants across species will provide a clearer understanding of barriers to recovery.

Evaluating habitat enhancements: Projects such as habitat enhancements and wetland species renovation will be assessed to determine which restoration strategies and structures work best in Green Bay and can be applied across the Great Lakes.

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Defining restoration targets: Research will go beyond tracking outcomes to examine what restoration should achieve in such a vast and dynamic system, and how to clearly define targets for future projects.

Integrating Indigenous knowledge: In partnership with Tribal communities, the Reserve will work to incorporate traditional ecological knowledge into restoration planning and monitoring, strengthening the relevance of projects.

PROGRAM HIGHLIGHT: RESEARCH AND LEARNING EXPERIENCES FOR FUTURE PROFESSIONALS

The Reserve will build on the University of Wisconsin–Green Bay's strong tradition as a teaching institution and hub for freshwater science to provide research and learning opportunities that train the next generation of professionals. Reserve programs will integrate undergraduate and graduate students, post-doctoral scholars, and aquatic science classes into active research efforts, offering hands-on experiences that connect classroom learning with real-world estuarine science.

These efforts will extend across the educational pipeline, from K-12 field trips and early exposure to water careers, to hosting undergraduates from the Freshwater@UW Summer Research Opportunities Program. Looking forward, the Reserve anticipates creating new opportunities for summer internships and exchanges with other NERR sites, giving students and early-career professionals broader exposure to estuarine systems across the country. These programs will foster a continuum of learning that supports a diverse, skilled freshwater workforce connected to both the bay of Green Bay and the national estuarine research community. The Reserve will partner with the education programs at the Great Lakes Reserves and across the NERR system.

RESEARCH PROGRAM NEEDS AND OPPORTUNITIES

Through the process of engagement with partners and stakeholders to develop this management plan, the priority research and monitoring needs are incorporated into the above sections. Future needs and opportunities will continue to be evaluated in the first years of the Reserve's establishment.

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NERR SYSTEM EDUCATION PROGRAM

The National Estuarine Research Reserve System seeks to enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation. The Reserve System increases estuary literacy among students, teachers, and the public through the K–12 Estuarine Education Program and Environmental Action Education programs.

The K–12 Estuarine Education Program helps educators bring estuarine science into the classroom through hands-on learning, experiments, fieldwork, and data exploration using grade-appropriate lessons, activities, and videos. Reserves also offer teacher development programs that use established coastal and estuarine science curricula aligned with state and national science education standards. Teachers on the Estuary (TOTE) workshops give teachers the opportunity to explore coastal habitats and conduct field investigations, learn how to integrate local and national monitoring data into the classroom, and gain hands-on experience using estuary education resources.

Environmental Action Education programs focus primarily on fostering and modeling behavioral change that leads to resource conservation and advances the mission of the reserve. Such programs are specifically designed with the intention of creating behavioral change and/or fostering wise stewardship of estuaries. The goal is to help audiences make personal choices and collective actions that help them conserve, protect, and restore our estuaries and their associated watersheds. Target audiences include, but are not limited to, residents of the watershed and surrounding communities, and recreational users of the reserve. Participants in the Training and Engagement Program are not included in this category.

Reserves integrate research and monitoring into their educational and outreach efforts, providing a multifaceted, locally focused approach to engaging the community.

The Reserve System Strategic Plan outlines education objectives designed to increase the public's awareness of and participation in stewardship activities; improve educators' and students' understanding and use of the Reserve System and NOAA resources for place-based and inquiry-based learning; and grow and motivate the next generation of coastal professionals through access to programs and facilities that facilitate research, resource management, and educational opportunities.

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GREEN BAY NERR EDUCATION PROGRAM

The Education Program will connect learners of all ages to the Bay's dynamic ecology and human history through place-based programming. Offerings will integrate storytelling, technology, and community perspectives to highlight the Bay's ecological significance, restoration achievements, and history, including the voices and knowledge of First Nations communities in alignment with Wisconsin Act 31 standards.

Programming will foster a sense of place and connection to the Bay, laying the foundation for lifelong care and responsibility for its well-being. Reserve staff will engage students in exploring what stewardship means to them, how to get involved, and how to lead. Education Program staff will partner with local clubs and outdoor groups to support hands-on community learning. Career and technical education will also be prioritized, ensuring alignment with student interests and regional workforce needs.

Through formal and informal learning on the water, along the shoreline, and in classrooms, the Education Sector will inspire shared understanding and cultivate the next generation of Great Lakes stewards.

EDUCATION PROGRAM CONTEXT

In accordance with NERR Education Sector guidelines, the Reserve will conduct a formal Market Analysis and Needs Assessment (MA/NA) every five years to identify gaps in regional education services and refine the Reserve's niche. Through focus groups, surveys, and interviews, the Reserve will meet with educators and partners to understand (1) which organizations currently provide education programs and resources, and (2) where unmet needs exist in educational programming about the Green Bay estuary, including curricula, tools, resource kits, and field-based experiences. The assessment may also identify barriers to participation for communities in the Green Bay region, such as transportation limitations, cost, language access, and culturally relevant programming. Findings will inform strategies to reduce these barriers and expand access to Reserve programs. The MA/NA will guide the development of the Reserve's role in regional watershed education and help ensure that programs complement, rather than duplicate, existing efforts.

Setting and Context: The Green Bay estuary is a critical ecological and economic asset for Northeast Wisconsin. Its diverse habitat includes coastal wetlands, river deltas, and submerged aquatic vegetation. The estuary supports a variety of fish and wildlife species and sustains regional industries such as commercial and recreational fishing, tourism, shipping, and manufacturing. The bay is the ancestral homelands for Tribal nations in Wisconsin including the Menominee Nation and the Ho-Chunk Nation.

Priority Issues: The following draft priority issues will guide initial development of programming and will be refined in response to findings from the MA/NA.

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1. *Freshwater Workforce Development*: Support students and early-career professionals in navigating career pathways in freshwater science, restoration, freshwater-dependent trades, and STEM fields.
2. *Environmental Literacy and Stewardship*: Enhance understanding of estuarine ecology, watershed science, and human-environment interactions.
3. *Cultural Competency and Act 31 Implementation*: Strengthen understanding of Wisconsin's First Nations history, culture, and sovereignty and connecting this knowledge to contemporary resource management.
4. *College and Career Readiness:* Align programming with career pathways in freshwater-based industries, supporting Career and Technical Education curricula, and fostering real-world learning experiences.

Priority Audiences: Formal and non-formal education and training programs in the Reserve will target K–12 students, teachers, university and college students and faculty, coastal decision-makers, and local community members. The listed audiences were selected because they represent the stakeholders who are most impacted by the priority issues addressed by the Reserve. Priority audiences may be refined based on results from the gap analysis and in response to new connections and cross-sector collaborations across the Reserve.

- K-12 students and educators in Cooperative Educational Service Agency 7 and 8.
- Postsecondary students at University of Wisconsin–Green Bay and other northeast Wisconsin high-education institutions, with emphasis on water science disciplines.
- Wisconsin First Nations scholars and institutions.
- Workforce development programs supporting careers in land management, fisheries, environmental engineering, maritime industries, and tourism.
- Lifelong learners, communities, and regional visitors interested in stewardship, volunteerism, and community science.

EDUCATION PROGRAM CAPACITY

Staffing: A full-time Education Coordinator will lead program development, delivery, and evaluation, supported by seasonal educators, interns, and partner staff as resources allow. Capacity will grow over time through additional positions, volunteers, and new partnerships.

The Education Program will include a Tribal Engagement Coordinator, a position supported by grants from the Oneida Nation. The Tribal Engagement Coordinator will lead educational initiatives for the Green Bay NERR while also contributing to programs in the Research, Stewardship, and Training and Engagement sectors. The position's primary focus is building and sustaining relationships that support K–12 programming in coordination with Tribal

partners. In partnership with UW–Green Bay's First Nations Education Center, the Coordinator will help design programming that integrates Indigenous knowledge with environmental management and restoration science.

Internal and External Resources: The Reserve benefits from UW–Green Bay's extensive outreach and education network across its campuses in Green Bay, Manitowoc, and Sheboygan, and programs in Marinette. University expertise in environmental science, education, First Nations studies, and Great Lakes research provides a strong institutional foundation for Reserve programming.

Education will be supported by classrooms, laboratories, and meeting spaces at UW–Green Bay, and partner facilities such as Barkhausen Waterfowl Preserve, Bay Beach Wildlife Sanctuary, and Crossroads at Big Creek. Learning outdoors will include programs at coastal wetlands, estuaries, restored habitats, and research sites across the Reserve components. Technology, including data visualization tools and online modules, will enhance learning and connect participants to environmental data generated by the Reserve's research and stewardship teams.

Strategic Partnerships*:* The Reserve will work with partners to help achieve Education Program goals and objectives. Internally, the Education sector will partner with the Research sector to help share the science being done within the Reserve boundaries. Other future partnerships include:

Regional Public-School Districts: Co-developing place-based science curricula aligned with Wisconsin Academic and Career Planning and Career and Technical Education requirements. This initiative may be done in collaboration with the Cooperative Educational Service Agencies.

UW System collaborators: Facilitating internships, research projects, and dual-credit programs for high school and college students with other UW campuses.

Freshwater Collaborative of Wisconsin: Integrating site-based field experiences into freshwater workforce development initiatives.

Tribal Nations and Colleges: Co-creating relevant programming and ensuring inclusion of Traditional Ecological Knowledge.

State agencies and non-profit organizations: Build on existing offerings with the Reserve's landowning and other regional partners.

Industry: Offering site visits, job-shadowing, and career panels focused on freshwater-dependent sectors.

EDUCATION PROGRAM ALIGNMENT AND DELIVERY

The Green Bay NERR's Education Program will center on place-based experiences that connect people to the estuaries and wetlands of the bay. Programs will help learners understand how ecological systems function and why they matter to Northeast Wisconsin

communities. Audiences will include K–12 students and educators, adult learners, civic organizations, decision-makers, and visitors, reached through in-person, virtual, and mobile formats.

The Reserve will also formalize and expand existing outreach initiatives supported by partners such as the Freshwater Collaborative of Wisconsin, Ducks Unlimited, NEW Water, and the Oneida Nation.

Program outcomes and resources will be shared through the Reserve's website, partner newsletters, educational conferences, and an open-source lesson repository. Success stories and best practices will be amplified through the Freshwater Collaborative of Wisconsin and the NERR education network, ensuring contributions to both local and system-wide learning.

PROGRAM HIGHLIGHT: FRESHWATER SCHOLARS PROGRAM

Launched as a pilot in 2022 with just two students, the UW–Green Bay Freshwater Scholars Program has grown into a competitive, high-impact, paid summer experience attracting 55 applicants for 16 positions in 2026. Scholars complete 120 hours of hands-on research with university faculty and partner organizations, including the Northeast Wisconsin Land Trust, Wisconsin Sea Grant, Baird Creek Preservation Foundation, and the Oneida Nation Environmental, Land & Agricultural Division. Participants engage in fieldwork, explore water science careers through site visits and presentations, and share their work at science symposia. A new initiative within the program focuses on students at the Oneida Nation High School, with participation in an academic-year aquatic science and First Nations studies course and a summer field course that contributes to freshwater conservation projects on the Oneida Reservation.

PROGRAM HIGHLIGHT: EDUCATOR WORKSHOPS AND FIELD EXPERIENCES

A strong focus of programming will be NOAA's Teachers on the Estuary (TOTE) workshops that utilize System-Wide Monitoring Program data and field-based experiences to educators. TOTE workshops will be built from existing UW-Green Bay freshwater-focused professional development and learning opportunities that include summer and winter educator workshops, and summer paddles to connect educators with regional water resource managers. Past workshops have focused on topics including aquatic invasive species, watershed restoration, robotics, understanding the Green Bay Area of Concern, and microplastics. Workshops are hosted in partnership with collaborators from the Door County Maritime Museum, Wisconsin DNR, Ducks Unlimited, Manitowoc County Soil and Water Conservation Department, Wisconsin Sea Grant, and the Great Lakes Fishery Commission.

Through TOTE workshops and field experiences, educators will,

- Explore local coastal habitats and field-based investigations of Great Lakes issues of concern

- Interact with local scientists and experienced coastal educators for stewardship-integrated learning
- Understand Great Lakes issues of concern and their local impacts (e.g. aquatic invasive species, microplastics, historical water use and overuse, watershed models)
- Integrate SWMP data into classroom teaching to improve pedagogical content knowledge

PROGRAM HIGHLIGHT: LOWER FOX RIVER WATERSHED MONITORING PROGRAM

The Lower Fox River Watershed Monitoring Program is a collaborative network of high school teachers and students working alongside UW-Green Bay scientists to monitor water quality and ecological health in ten environmentally impaired streams within the Fox River watershed. Established in 2003 as an educational initiative connected to the Fox River cleanup, the program engages students in field research while generating valuable long-term datasets. Feedback from participating schools indicates that being part of river monitoring inspires students to be stewards of their environment and consider further studies in environmental science.

Data collected by students helps track pollutants that contribute to the seasonal dead zone in the bay, and helps build community knowledge of watershed health, pollution sources, and the effectiveness of restoration efforts. Findings from the monitoring program will be incorporated into the Reserve's KEEP offerings and, where appropriate, inform Reserve research priorities.

PROGRAM HIGHLIGHT: WILD RICE IN THE CLASSROOM

An outreach program for local educators, Tribal organizations, and K–12 students, Wild Rice in the Classroom introduces students to wild rice restoration and connects students to wetland restoration through field trips and seeding events. Monitoring has indicated wild rice seeding has supported self-sustaining populations in many locations, although environmental challenges remain at other sites that make establishment difficult.

Outreach has been an effective way to foster relationships between people, wild rice, and wetlands. It also provides opportunities for connections in relation to Wisconsin's Act 31, WI State history standards, food sovereignty, traditional ecological knowledge, and contemporary nutritional and dietetic concerns. The historical connections, contemporary cultural importance, and ecological significance of wild rice will be integrated into the Reserve's KEEP and TOTE programs and will reflect learning from UW-Green Bay's wild rice restoration and monitoring program.

EDUCATION PROGRAM NEEDS AND OPPORTUNITIES

As the Green Bay NERR Education Program develops, there is significant potential to expand its reach, deepen its relevance, and increase community connection to the estuary. During development of this Management Plan, input was solicited from participants at the 2024 Green Bay Conservation Partners Roundtable, and during monthly meetings with the Green Bay NERR Steering Committee. From these conservations came several priority needs that will guide the Reserve's programs in its initial years.

Career and workforce: Integration of environmental literacy into Academic and Career Planning and Career and Technical Education pathways; expanded field-based experiences for students in freshwater science and management; micro-credential programs in freshwater workforce skills; stronger incorporation of Indigenous perspectives into mainstream environmental education. Increasing coordination among K–12 schools, higher education, and industry partners will ensure that programs align with evolving workforce needs.

Place-based education and celebration: Dedicated naturalists to provide interpretive guidance at lands included in the Reserve; community science projects to strengthen Reserve sites and partner lands that explain the ecology, stories of restoration, and Tribal history; programming that highlights the critical ecological connections between uplands, tributaries, wetlands, and the bay for diverse, predominantly native, and resilient ecosystems; sharing ecological success stories from across the watershed, and increasing awareness among stakeholders of the bay's current and potential economic value for broader support for conservation.

Restoration education and training: Build on success and lessons learned from bay restoration to position the region as a leader in restoration education. This could include developing a community of practice or regional training opportunities around Great Lakes restoration science and workshops in restoration project management.

Sharing history and contemporary perspectives: The future Visitor and Education Center can provide a platform for storytelling, interpretive materials, and displays that highlight the bay's history, including First Nations origin stories and the vibrant economic history of the port and region.

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NERR SYSTEM STEWARDSHIP PROGRAM

The NERRS stewardship program works collaboratively with the other reserve programs to ensure the lands and waters of the research reserve system are cared for and can continue to support the plants, animals, and people that depend on the health of these places.

Caring for lands and waters within the reserve is primarily accomplished through science-based management by applying western and Indigenous knowledge to inform management approaches, within individual reserves and beyond, including adapting to environmental changes. Commonly used approaches include ecological restoration; prevention and control of invasive species; managing lands to sustain species, biodiversity and natural systems, including important cultural lifeways; conducting prescribed burns; conducting research, monitoring, or mapping that directly informs the management of natural and cultural resources. Many stewardship programs also plan or inform public access and resource use programs to minimize negative impacts to natural resources from visitor use; manage and remove land-based and marine debris; inventory and protect historic or cultural resources; provide volunteer hands-on stewardship or community science opportunities; help identify and acquire additional lands for protection; and support disaster response planning. These activities can vary across reserves due to their unique natural resources and local conditions, as well as different land ownership and administrative structures, at each site.

Stewardship and research programs work together closely to understand the condition of and changes in reserve habitats and then use this information to inform, monitor, and adapt stewardship actions. This includes land use and habitat mapping as part of the national System-Wide Monitoring Program (SWMP), inventorying and monitoring species and other natural resources, and assessing habitat condition and vulnerability, such as how wetlands respond to changing water levels, as well as testing innovative methods and locally relevant stewardship practices.

Stewardship programs work with the training programs to extend stewardship practices beyond reserve boundaries through outreach and training for community decision-makers and landowners. Education and stewardship programs collaborate to increase public awareness of good stewardship practices to support estuary health through various means, including displays, signage, written materials, education curricula, and hands-on learning opportunities.

The *Reserve System Strategic Plan* outlines objectives to improve the protection and function of coastal habitats, and inspire stewardship, protection, and management of estuaries and their watersheds in coastal communities through place-based approaches.

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GREEN BAY NERR STEWARDSHIP PROGRAM

The Stewardship Program will advance restoration and conservation efforts that enhance ecological resilience, improve water quality, and honor the bay's historical connections. By promoting integrated practices and developing best management strategies with regional partners, the program will strengthen both environmental and community well-being.

Stewardship will be broadly defined, recognizing that everyone has a role in caring for the Green Bay estuary. Partnerships with the business sector will highlight shared values, create mutual benefits, and encourage collective responsibility for the ecosystem.

STEWARDSHIP PROGRAM CONTEXT AND PARTNERS

Stewardship within the Green Bay NERR recognizes that caring for estuarine ecosystems is not a one-time effort, but a lifelong commitment. Restoration is often described in linear terms, from degradation to recovery, but the reality is more complex. New challenges continually develop, from emerging contaminants to shifting climate impacts. The Reserve will remain adaptive, and proactive, with a focus on community stewardship initiatives.

The Green Bay NERR will emphasize stewardship not only as an ecological responsibility but also as an economic necessity. Long-term care for estuarine systems requires sustainable models of support, so that stewardship is not an occasional focus but an integrated and enduring part of regional life. This vision is tied to cultivating positive public engagement, helping communities see themselves as lifelong stewards of their estuary, and ensuring that caring for the Green Bay estuary is shared, valued, and celebrated.

The stewardship program will collaborate with a wide range of regional agencies and organizations. Most significant will be partnerships with the landowners within the Reserve's boundaries, with additional partnerships around stewardship programming to include,

- Menominee Indian Tribe of Wisconsin
- Oneida Nation
- Ducks Unlimited
- Oconto Sportsmen's Club
- U.S. Fish and Wildlife Service
- Wisconsin Sea Grant

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- Wisconsin Coastal Management Program

STEWARDSHIP PROGRAMS AND OPPORTUNITIES

*Wild rice restoration and monitoring***.** Wild rice (Manōmaeh, Manoomin) is a native annual wetland grass central to the lifeways of many Indigenous Nations in Wisconsin, including the Menominee, Ojibwe, Ho-Chunk, and Potawatomi. It also provides critical ecological value for fish, wildlife, and healthy wetlands. Due to changing water quality conditions and other environmental factors, Manoomin has become increasingly rare in Northeast Wisconsin, particularly around the Green Bay estuary. A collaborative group of conservation professionals is using an adaptive management approach by seeding harvested wild rice at Green Bay's west shore coastal marshes. The team monitors restoration sites during the growing season to guide future efforts. Research from wild rice restoration and monitoring will be integrated into the Reserve's Education Program to deepen public understanding of this culturally and ecologically significant species.

Ecological monitoring and feedback for landowners. The Reserve will provide data and feedback to landowning partners and neighboring communities to inform stewardship of coastal properties. This may include assistance with mapping, tracking restoration outcomes, and monitoring sediment and nutrient loading to guide management.

Habitat improvement for recreational enhancements. Stewardship projects will integrate ecological restoration with public access, such as creating boardwalks, overlooks, signage, spawning habitats, and ADA-compliant water access. Investments in access infrastructure will strengthen community connections to the estuary.

Enhancing resilient land-water interfaces. The Reserve will work to improve shoreline resilience and the natural interchange between land and water. Supporting dynamic water levels, species movement, and hydrologic flows will increase ecological function and help buffer against climate variability.

NERR SYSTEM TRAINING AND ENGAGEMENT PROGRAM

The NERRS Training and Engagement Program provides up-to-date scientific information and skill-building opportunities to coastal decision-makers on relevant coastal management issues and facilitates collaboration among coastal communities and researchers. Audiences may vary for each reserve but generally include local elected or appointed officials, public and private lands managers, natural resource managers, coastal and community planners, social service providers, and coastal business owners and operators. They may also include such audiences as farmers, fishers and aquaculture professionals, watershed councils, professional associations, recreation enthusiasts, and interdisciplinary researchers.

The place-based nature of reserves makes them uniquely positioned to deliver pertinent information to these audiences. Each reserve tracks the audience needs and partner strengths to identify how best to interact with audiences through virtual and in-person training, or the provision of technical assistance and engagement activities that focus on identifying how best to deliver relevant training on priority issues to their area.

Partnerships are integral to the program's success. Reserves work closely with a host of local partners and several NOAA programs to determine key coastal resource issues, and the appropriate audiences and expertise needed to deliver relevant and accessible programs.

The Reserve System Strategic Plan outlines coastal training objectives designed to ensure that coastal decision-makers and environmental professionals understand and effectively apply science-based tools, information, and planning approaches that support resilient estuaries and coastal communities.

GREEN BAY NERR TRAINING AND ENGAGEMENT PROGRAM

The Training and Engagement Program will build the capacity of professionals, decision-makers, and organizations across Northeast Wisconsin to respond to changing ecosystem conditions through science-based planning and management. Accessible training, technical support, and collaboration will strengthen the region's ability to protect coastal resources, reduce nutrient loading, and adapt to fluctuating water levels and climate change. By collaborating with county and municipal officials, organizations, and agency partners, the program will strengthen local leadership and inform decision-making at local and national levels.

The program will work with communities to identify needs and co-create practical solutions to water and coastal challenges that affect daily life and long-term sustainability. Aligning with workforce development goals, the Training and Engagement Program will focus on regional priorities and creating pathways for individuals to apply expertise to issues such as water quality, shoreline resilience, and ecosystem management. Training will integrate social science with monitoring and research.

The Reserve's value lies in helping communities transition from identifying problems to implementing solutions. While grounded in the Green Bay estuary, its training and tools should be applicable to other coastal systems, offering scalable approaches that benefit the Great Lakes region and beyond. As a convening force, the Reserve will unite stakeholders and amplify collective action across watershed and coastal networks.

TRAINING AND ENGAGEMENT PROGRAM CONTEXT

Setting and Context: The Green Bay watershed encompasses agricultural lands, forests, wetlands, and expanding urban centers which rely on the bay for recreation, tourism, and transportation. Coastal communities face challenges related to nutrient and sediment loading, habitat fragmentation, flooding, and shoreline erosion. At the same time, the estuary is central to the region's identity and quality of life, providing opportunities for fishing, boating, birding, and commerce. The Training and Engagement Program will respond to this setting by providing a forum for science translation, capacity building, and cross-sector collaboration to address coastal management challenges.

Draft Priority Issues: The Training and Engagement sector does not have NOAA-required national programs and will benefit from a Market Analysis and Needs Assessment to identify regional partnerships and programmatic priorities. Once the Training and Engagement Program Coordinator has been hired, they will lead the MA/NA, and the results will inform the development and refinement of sector activities. The priority issues identified below were suggested by partners during the development of the Management Plan. These draft priority issues will be shared with partners through listening sessions, surveys, and interviews as part of the Market Analysis and Needs Assessment. A refined Training and Engagement Program Strategic Plan will be developed in response to results from the MA/NA.

1. Develop a Great Lakes Restoration Community of Practice that supports shared learning, training, and coordinated action on habitat, water quality, and climate resilience for restoration practitioners.
2. Increase the capacity of coastal communities to plan for and manage uncertain future conditions, including climate variability and changing land use patterns.
3. Expand regional technical expertise and professional training to target and optimize landscape conservation actions, and to track nutrient and sediment load reductions to the bay.
4. Enhance social science capacity and opportunities for researchers to better understand historical connections, contemporary quality-of-life benefits, and future social opportunities derived from the bay.
5. Align with Wisconsin Coastal Management Program communities of practice, including the Coastal Adaptation and Lakeshore Management and Coastal Hazards of Superior networks, for science-based decision-making that supports resilient communities and a healthy estuary.

Priority Audiences: The program will serve a wide range of audiences whose decisions directly shape the health and future of the estuary. Specific audiences will be identified through the Market Analysis and Needs Assessment. Potential audiences of interest include:

- State agency coastal and environmental managers

- The Port of Green Bay, the Cities of Sturgeon Bay, Marinette, Oconto, Brown, Kewaunee, and Door Counties
- Coastal businesses and other commercial and industrial interests whose activities are closely tied to estuarine resources
- Community and land-use planners

Through interviews and surveys for the Market Analysis and Needs Assessment, Reserve staff may identify new audiences interested in partnering. Additionally, we may find that some of these potential audiences already receive sufficient training from other sources and are not interested in or able to engage at this time.

Alignment within the Reserve: The Training and Engagement Program will develop cross-sectoral alignment with the Research, Education, and Stewardship Programs.

TRAINING AND ENGAGEMENT PROGRAM CAPACITY

Capacity: The Reserve will hire a Training and Engagement Coordinator to lead the sector.

Strategic Partnerships: Reserve staff will continue to explore and deepen relationships with the partners listed below to support program delivery. These partnerships will support co-development and delivery of training, sharing technical expertise, alignment of research and management priorities, and coordination of outreach to key audiences.

- Wisconsin Coastal Management Program
- NOAA Digital Coast
- Wisconsin Sea Grant
- Wisconsin Clean Marina Program
- The Nature Conservancy
- East River Collaborative
- Lake Superior Training and Engagement Program
- Old Woman Creek Training and Engagement Program
- City of Green Bay
- Brown County Parks
- Village of Howard
- Marinette County Land & Water Conservation Division
- City of Sturgeon Bay

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- Town of Peshtigo
- City of Oconto

Through the Market Analysis and Needs Assessment, the Training and Engagement Coordinator will identify priority partnership needs and opportunities for collaboration that advance regional training efforts. In the first five years of Reserve operations, the Training and Engagement Program will intentionally expand its partnership network by building new relationships.

TRAINING AND ENGAGEMENT PROGRAM DELIVERY

During the first year of the Reserve's operation, the Training and Engagement Coordinator will lead the Market Analysis and Needs Assessment. As part of the needs assessment we will explore the best delivery system (e.g., virtual, hybrid, in-person) to meet audience needs. The Coordinator will work with Reserve staff, the Reserve Manager, and with NOAA OCM to deliver trainings of regional interest and make tools accessible to local audiences. They will work closely with staff to determine where the program can support, and be supported by work within the Research, Education, and Stewardship sectors.

TRAINING AND ENGAGEMENT NEEDS AND OPPORTUNITIES

An early priority for the Training and Engagement Program will be to lead the Market Analysis and Needs Assessment with landowning and community partners, and potential new partnerships not currently engaged with the Reserve or UW-Green Bay staff and faculty. A needs assessment will help us understand community and audience learning needs, while a market analysis will help identify the Reserve's niche in the broader training provider landscape.

Results from the MA/NA will lay the foundation for a responsive and adaptive program by ensuring that future training and engagement activities are guided by identified priorities, aligned with partner capacity, and positioned to address emerging challenges across the bay and its watershed.

TRAINING AND ENGAGEMENT EVALUATION STRATEGIES

The Market Analysis and Needs Assessment will serve as an evaluation tool to understand partner and community needs for training and engagement activities. A combination of methods will be used to assess community needs,

- Listening sessions with northeast Wisconsin conservation partners. This could include hosting a Conservation Café table at the annual Green Bay Conservation Partners Roundtable will be the initial starting point.
- Follow-up interviews with existing partners following the Roundtable, and interviews with other community groups suggested by Roundtable participants.

- A survey generated from listening session and interview feedback, to determine priority needs and opportunities for enhancing existing training and engagement programs. The survey will be distributed via email lists from the Green Bay Conservation Partners, the Green Bay NERR, the UW-Green Bay Water Educators network, and through shared distribution efforts by regional partners.

Once the MA/NA is complete and programming developed and delivered, the Training and Engagement Program Coordinator and staff will implement additional evaluation strategies to assess the impact of new programming around training, technical assistance, communities of practice, etc. Evaluation strategies will be developed to align with the evaluation efforts of the other sectors; the coordinator may consult with the UW-Madison Division of Extension Program Development & Evaluation staff for advice and recommendations.

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ADMINISTRATIVE PLAN

The Green Bay National Estuarine Research Reserve administrative plan outlines the organizational relationships and human resources needed to fulfill the Reserve's mission. The Reserve's management framework enables coordination and cooperation among entities involved with Reserve programs and activities, ensures consultative decision-making, provides compliance with applicable regulations, and integrates the Reserve's major program areas. Program areas administered by the Reserve include research and monitoring, education, stewardship, training and engagement, facilities and administration, and visitor and volunteer services.

OBJECTIVES AND ACTIONS

Objective: Provide and enhance the administrative structure needed to fulfill the Reserve's mission and conform to federal and state law and University of Wisconsin agreements.

Key actions:

- Maintain an administrative structure that provides an effective and efficient process to formulate and implement policies and programs.
- Implement administrative and financial procedures and programs to ensure efficient management of Reserve personnel and funds.
- Provide an administrative structure and financial support necessary to advance the quality and continual professional development of personnel.
- Provide an administrative structure that encourages the integration of research and monitoring, education, stewardship, and training and engagement.
- Review and evaluate all programs and the strategic plan annually, making adjustments as needed.
- Serve as a community liaison for regional partnerships and collaborations while representing NERR System.
- Provide adequate staffing to accomplish the full range of responsibilities of a Reserve.
- Design and support workplace policies and programs that result in committed people fulfilling their professional potential.
- Provide adequate funding to accomplish the full range of responsibilities of a Reserve.
- Ensure long-term financial stability for carrying out the Reserve's programs, including pursuing donor development opportunities.

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ORGANIZATIONAL FRAMEWORK

The Ecosystems Program within the Stewardship Division of NOAA's Office for Coastal Management administers the NERR system. The Ecosystems Program 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 15 CFR § 921.40, NOAA periodically evaluates reserves for compliance with Federal requirements and with the individual reserve's Federally approved management plan. The lead state agency for the Green Bay NERR, the University of Wisconsin–Green Bay, provides the administrative support and direction for Reserve activities. Reserve staff fosters institutional partnerships that facilitate the achievement of Reserve goals. These partnerships include other NOAA-affiliated programs within Wisconsin, tribal partners, state agencies like the Wisconsin Department of Natural Resources, organizations, and community support through programs and volunteers.

RESERVE MANAGEMENT AUTHORITY

The Green Bay NERR is managed as a cooperative partnership between the National Oceanic and Atmospheric Administration and the State of Wisconsin. The University of Wisconsin–Green Bay administers the Reserve, as described in an MOU between NOAA and the University of Wisconsin–Green Bay (Appendix A).

UNIVERSITY OF WISCONSIN–GREEN BAY

The Reserve is administered by the Office of Graduate Studies and Grants & Research within UW–Green Bay (Figure 17). The Reserve Manager reports to the Vice Chancellor of Graduate Studies & Research and works with Graduate Studies administrative and support staff to meet the NOAA award's state match requirements in support of program, finances, staff, and operations. The Vice Chancellor of Graduate Studies & Research is the Principal Investigator for the Reserve's NOAA operational award and works closely with the Reserve Manager to implement the Reserve's programs. Reserve staff collaborate with UW–Green Bay staff, faculty, students and affiliated programs to integrate the Reserve's programs with UW–Green Bay academic and community outreach priorities.

The University of Wisconsin–Green Bay is a regional comprehensive within the Universities of Wisconsin System. Serving over 11,000 undergraduate, graduate, and doctoral students and over 85,000 continuing education learners annually, UW–Green Bay offers roughly 200 academic degrees, programs, and certificates. The UW-Green Bay footprint includes 16 counties and four campuses. With four campus locations in Northeast Wisconsin, the University's access mission welcomes all students who want to learn from every corner of the world.

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In addition to UW–Green Bay, a set of local, state, and regional partners with land dedicated as part of the Reserve's boundary and/or with long-term strategic interest in the Reserve, serve as core members of the Reserve's Advisory Board under a multi-party MOU (Appendix B). The Reserve consults with NOAA and reports to UW–Green Bay leadership.

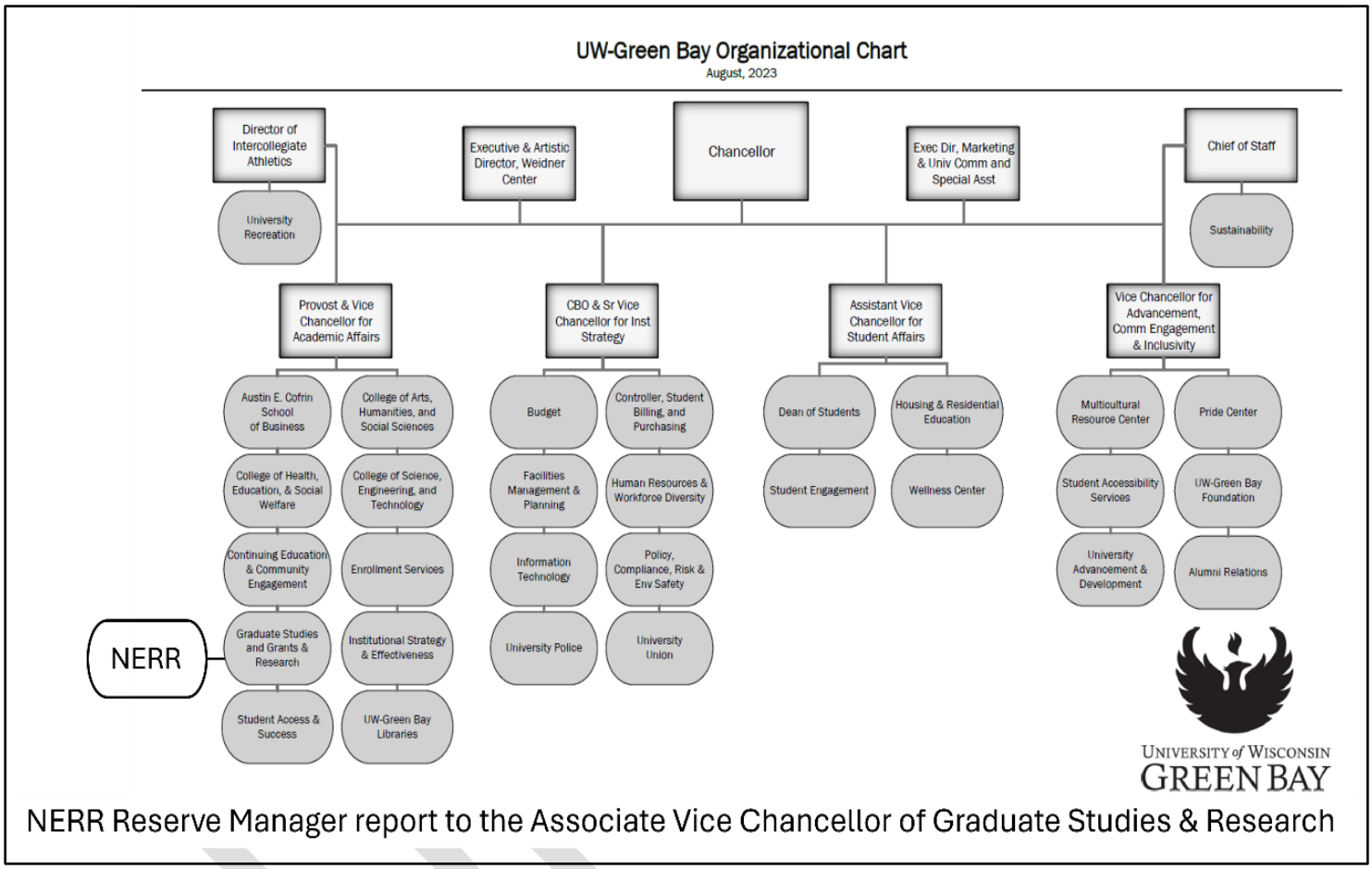


Figure 17: Organizational chart of the University of Wisconsin-Green Bay

NOAA/OCM ROLES AND RESPONSIBILITIES

The National Estuarine Research Reserve System operates as a federal-state partnership. UW–Green Bay is responsible for managing the Reserve, including developing site-specific policies, and NOAA provides overall system policies and guidelines, cooperates with and assists the state, and reviews its program regularly. NOAA staff, particularly the program specialist for a state's reserve, communicate directly and regularly with state reserve staff. Regular communication aids federal and state staff and familiarizes NOAA and state personnel with reserve management procedures and policies.

Additionally, NOAA provides funding for the implementation of each Reserve's federally approved management plan. Performance reports, financial reports, and final reports are

required for each cooperative agreement. NOAA personnel carefully review these reports and associated communications to ensure compliance with program policies, specific grant conditions, and the achievement of grant objectives.

NOAA's Office for Coastal Management (OCM) administers the National Estuarine Research Reserve System. The Reserve collaborates with NOAA's OCM through the Stewardship Division and Ecosystems and NERRS Programs. The Reserve Manager works directly with a NOAA OCM program liaison on matters pertaining to the Reserve's state–federal partnership, operations grant funding, NERRS metrics reporting, and the periodic evaluation of the Reserve operations for compliance with federal requirements and the Reserve's management plan. Reserve staff work directly and regularly with NOAA sector leads for their programmatic areas as well as their counterparts across the NERR System. Reserve staff also collaborate with the NOAA liaison and regional NOAA partners to coordinate efforts with Coastal Zone Management (CZM) Authority programs in Wisconsin and to communicate Reserve activities across the Great Lakes CZM community.

RESERVE ADVISORY BOARD

The Reserve is required by NOAA to develop and maintain an advisory board charged with supporting the implementation of the Reserve's Management Plan. Reserve Advisory Board membership is composed of the major land-holding partners, and strategic programmatic partners. Land-holding partners will make up 5-7 seats on the thirteen-member advisory board, with priority given to partners with most land included within the Reserve boundaries. The RAB terms and charges will be developed in consultation with NOAA.

Over time representatives from other organizations and partnerships will be added to the Reserve Advisory Board to balance and reflect the watershed impact of the Green Bay NERR. Initial members may include the Oneida Nation, Menominee Indian Tribe of Wisconsin, Wisconsin Department of Natural Resources, City of Green Bay, Brown County, Wisconsin Sea Grant, Wisconsin Coastal Management Program, University of Wisconsin–Madison Extension, University of Wisconsin–Milwaukee, Door County Land Trust, Crossroads at Big Creek, Northeast Wisconsin Land Trust, and Ducks Unlimited (Figure 18).

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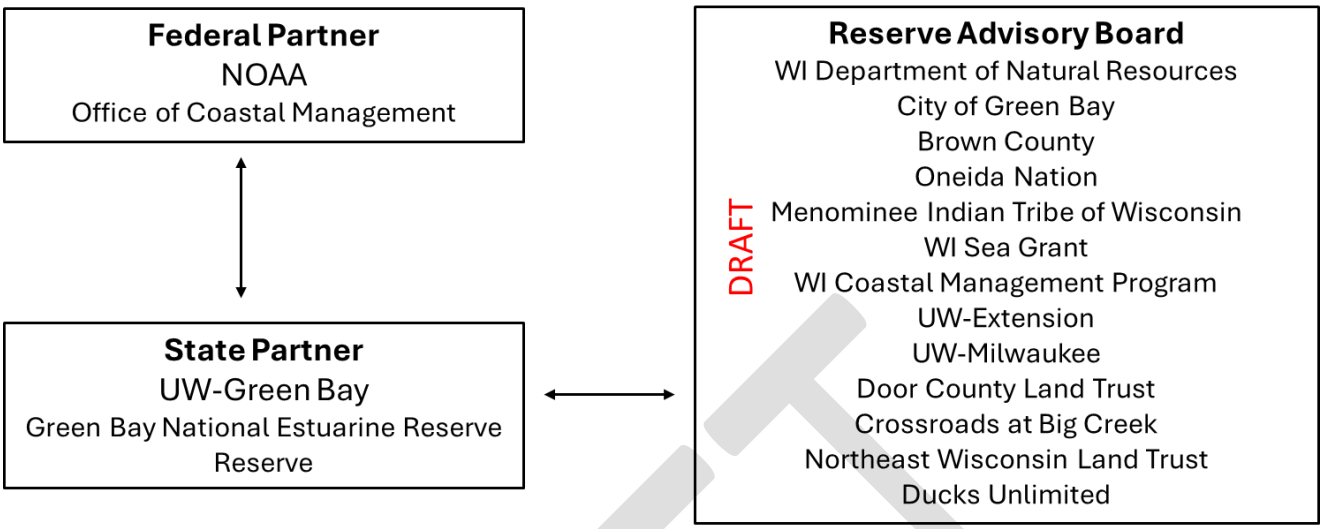


Figure 18: Organizational chart of the Green Bay NERR

RESERVE STAFF AND PARTNERSHIPS

The Reserve core staff include a Reserve Manager, Research Coordinator, and Education Coordinator. Additional staff include: a Training and Engagement Coordinator, whose position is dependent upon funding from University of Wisconsin–Madison Extension; a Tribal Engagement Coordinator, whose position is dependent upon funding from the Wisconsin Tribal Gaming Funds; and a Stewardship Coordinator, whose position is funded from UW–Green Bay match.

REQUIRED CORE STAFF

Reserve Manager: Coordinate and supervise all aspects of operations and management. Duties include general administration, funding management, state, federal, or private reporting requirements, and overseeing research, education, stewardship, training, and volunteer activities.

Research Coordinator: Oversee the operation and implementation of the Reserve's research and monitoring program, coordinate with partner research programs, interpret research results, promote the use of the Reserve by other researchers, and interact with other research institutions to increase the connectedness of research activities through the region and the Great Lakes. Unique to the Green Bay NERR's mission, this individual will also advance the Reserve's technologically focused approaches, including as a proving space for new sensor and other technologies. This could include data visualizations and 'classrooms of the future.' Until a Monitoring Coordinator is hired the priority for this position will be the design, setup, and coordination of the Reserve's System-Wide Monitoring Program (SWMP).

Education Coordinator: Lead the daily operation and implementation of the Reserve's education programs, including on-site and outreach activities. This may include K–12 programs in collaboration with area schools, programs for university and college students, and community education. As required of all sites in the NERR system, the Education Coordinator will lead Teacher on the Estuary (TOTE) programs for local and regional educators.

OTHER KEY STAFF

Coastal Training Program Coordinator: Lead the translation and delivery of scientific data and information to coastal communities. The coordinator will collaborate with other coastal training organizations and individuals to fulfill coastal training objectives and to connect science and stewardship information in a manner useful to local communities.

Tribal Engagement Coordinator: Build relationships and design programs supporting and in collaboration with the Reserve's Tribal partners, with a priority focus on working with the Oneida Nation and the Oneida Nation school system.

Stewardship Coordinator: Initiate collaborations with landowning partners and other coastal land managers on stewardship activities and other land-water programs within the Green Bay NERR's boundaries and across the region to support the Reserve's mission and objectives.

Reserve staff will actively mentor K–12, undergraduate, and graduate students and present them with hands-on learning experiences in all operational areas of the Reserve whether in the lab, in the field, or through community education and outreach. University student staff are budgeted into each operational award for the Reserve. Undergraduate and graduate students can be employed in support of all sectors and, typically, each Reserve core staff member will have at least one student worker or intern throughout the year. The research and monitoring intensive summer field season leads to multiple student employees during this season.

FUTURE STAFFING NEEDS

As the research, education, stewardship, and training programs grow, the Reserve would benefit from additional staff. Future positions by priority may include:

Monitoring Coordinator: Lead sampling activities in support of the NERR System-Wide Monitoring Program. Tasks include maintaining SWMP equipment, sample collection, data reporting, and QA/QC.

Financial Specialist: Support Reserve activities with invoicing, purchasing, scheduling, business-office support, and some grants management.

Community Engagement Coordinator: Collaborate with the Reserve's research programs to provide social, cultural, and economic research expertise and support interdisciplinary

efforts. This includes realizing the Reserve's holistic vision by working with partners to incorporate art, music, storytelling and other forms of expression into Reserve programs.

Volunteer and Community Science Coordinator: Design and manage community science initiatives and other activities that incorporate volunteers.

Watershed Coordinator: Initiate programs in the Reserve's targeted watershed and organize partners for coordinated activities within the watershed.

Seasonal Monitoring Technician: Assist the Monitoring Coordinator to support the Reserve's SWMP activities.

STRATEGIC PARTNERSHIPS

The Reserve collaborates with many partners to achieve its goals and objectives. The partners listed below identify critical partners whose resources, expertise, or shared missions are critical to meeting Reserve goals. This is not intended to be all-inclusive, but rather a list of existing partners that UW-Green Bay faculty, staff, and students are engaged with around estuary-focused research, education, and stewardship initiatives.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

The Wisconsin Department of Natural Resources is charged with preserving, protecting, restoring, and enhancing the natural resources of Wisconsin. DNR partners with organizations and individuals to manage fish, wildlife, forests, parks, air and water resources, while promoting a sustainable and healthy environment. DNR is a land-holding partner in the Reserve with over 8,000 acres included in the Reserve. As the Reserve's largest land-holding partner, NERR staff work closely with WDNR land managers on research, stewardship, and outreach activities. DNR's Office of Great Waters has a representative on the Reserve's steering committee and served on the site selection committee.

WISCONSIN COASTAL MANAGEMENT PROGRAM

The Wisconsin Coastal Management Program (WCMP), in the Department of Administration, is a NOAA-affiliated and networked program dedicated to preserving and improving access to the natural and historic resources of Wisconsin's Great Lakes coasts. The program coordinates state, regional, and local agencies to improve Great Lakes coastal management. WCMP's annual granting program provided funding for designation outreach activities, and program staff serve on the Reserve's steering committee and served on the site selection committee.

WISCONSIN SEA GRANT COLLEGE PROGRAM

The Wisconsin Sea Grant College Program, administered by NOAA, is part of a national network of 34 university-based programs with a partnership in every coastal and Great

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Lakes state. Wisconsin Sea Grant is headquartered at the University of Wisconsin–Madison and is a program of basic and applied research, education and outreach, and technology transfer focused on the stewardship and sustainable use of the Great Lakes. Wisconsin Sea Grant has collaborated extensively with the Green Bay NERR on outreach activities such hosting an educator workshop on microplastics, providing grant support for interdisciplinary education programs, and serving on the NERR steering committee.

UNIVERSITY OF WISCONSIN–MADISON EXTENSION

Extension's mission is to connect people with the University of Wisconsin. Extension has supported the Green Bay NERR from its inception by providing partial funding for UW–Green Bay staff time towards designation activities. Extension's Associate Dean of Agriculture, Natural Resources, and Community Development serve on the NERR steering committee, and Extension provides support for the Reserve's Training and Engagement Program Coordinator. Additionally, the Natural Resource Institute within Extension is the administrative home for the Lake Superior National Estuarine Research Reserve, and Extension staff at the Lake Superior Reserve are close partners to the Green Bay NERR.

ONEIDA NATION

The Oneida Nation is a sovereign government and federally recognized tribe of the United States. The Nation is originally from upstate New York, relocating to what would become the state of Wisconsin in the 1820s following the loss of nearly 5 million acres of their original homelands during the Revolutionary War. This band of Oneidas became recognized as the Oneida Tribe of Indians of Wisconsin, now referred to as the Oneida Nation, establishing the 65,400-acre Oneida Indian Reserve along Duck Creek. The Nation entered their final treaty with the United States in 1838, before Wisconsin's statehood. Oneida has been involved in the Green Bay NERR from the earliest efforts of designation, sending a letter of support to NOAA in January 2019, three months before the State of Wisconsin's letter of interest to NOAA. The Chairman of the Oneida Nation serves on the NERR steering committee, and Oneida supports the Reserve's Tribal Engagement Coordinator via Wisconsin Tribal Gaming Funds.

MENOMINEE INDIAN TRIBE OF WISCONSIN

The Menominee Indian Tribe of Wisconsin is a sovereign government and federally recognized tribe of the United States. The Menominee Tribe's culture, history, and residency in Wisconsin and parts of Michigan dates back 10,000 years. At one time the tribe occupied over 10 million acres. The present Menominee Reservation was established in 1854 in a treaty with the United States, leaving the tribe with a little over 234,000 acres of land. The Menominee Nation operates the Menominee Tribal School, a K–8 grade tribally administered school, and College of Menominee Nation, chartered by the Menominee Tribal Legislature in 1993. College of Menominee Nation is a partner with UW–Green Bay

and NERR staff on research and outreach programs. Menominee's Director of Land Management serves on the NERR steering committee.

NEW WATER

NEW Water is the brand of the Green Bay Metropolitan Sewerage District with a mission to serve Northeast Wisconsin through pollution prevention, operational innovation, and community outreach. Across two facilities, NEW Water collects and treats an average of 41 million gallons of wastewater a day. NEW Water has a long-term water quality monitoring program that works with farmers and communities in the watershed. The Public Affairs and Education Manager for NEW Water served on the NERR site selection committee.

DUCKS UNLIMITED

Ducks Unlimited conserves, restores, and manages wetlands and associated habitats for waterfowl. In Wisconsin, Ducks Unlimited has supported extensive wetland habitat restoration in the lower bay and is a long-time partner of UW–Green Bay staff and faculty on restoration and wild rice habitat projects. Ducks Unlimited' s Manager of Conservation Programs in the Great Lakes served on the NERR site selection committee.

UNIVERSITY OF WISCONSIN–MILWAUKEE SCHOOL OF FRESHWATER SCIENCES

The School of Freshwater Sciences at the University of Wisconsin–Milwaukee advances fundamental science and training of the next generation of freshwater sciences and atmospheric science professionals. UW–Milwaukee School of Freshwater Sciences faculty and students are long-time research partners of UW–Green Bay and co-manage water monitoring buoys in the lower bay along with UW–Green Bay faculty. The founding dean of the School of Freshwater Sciences is a member of the NERR steering committee.

VOLUNTEER ROLES AND RESPONSIBILITIES - FRIENDS OF THE GREEN BAY NATIONAL ESTUARINE RESEARCH RESERVE

A future Friends of the Green Bay NERR (hereafter called Friends Group) will take on both tactical and strategic objectives in support of the Reserve. Among these are raising funds, advocating on behalf of Reserve interests, recruiting and coordinating volunteers to support Reserve operations, and obtaining equipment to support Reserve operations.

The Friends Group will be established to support the strategic and tactical objectives for the Reserve. The group will be a membership-based, nonprofit, nonstock corporation (State of Wisconsin) devoted to supporting the mission and operation of the Green Bay National Estuarine Research Reserve with 501(c)(3) nonprofit status. The Friends Group will be a participant in a two-party MOU of mutual benefit between the Reserve and the University of Wisconsin–Green Bay. The Friends Group will be governed by a Board of Directors led by an Executive Committee of four officers. The Friends Group will adopt policies to guide its operations. The Friends Group will establish insurance to protect the

group and its directors. The Friends Group will adopt a strategic plan designed to guide the organization for at least three years.

The Friends Group will share a vision of a healthy coastal environment with the Reserve and is dedicated to the vision that the coastal watersheds and estuaries are understood, valued, and thriving. The Friends Group will take strategic activities in support of the Reserve.

ACTIVITIES OF THE FRIENDS OF THE GREEN BAY NERR

- Conduct advocacy efforts in support of the Reserve's mission.
- Participate in calls and programs of the Friends and Foundations group of the National Estuarine Research Reserve Association
- Sponsor Reserve events, such as conferences, seminars, and various other public events.
- Pursue partnerships and collaborations with other organizations to support the Reserve mission.
- Facilitate engagement of students from local educational institutions in supporting the Reserve mission.
- Solicit volunteers to support the future Visitor and Education Center and boat operations.
- Recruit and coordinate volunteers for activities that will support the Reserve mission.
- Recruit active members and engage them in productive activities in support of the Reserve.
- Develop significant funding proposals and help advance larger initiatives in support of the Reserve mission.
- Solicit the donation of goods, real property, and services that support the Reserve mission, or that can be sold, with funds obtained going to support the Reserve mission. Examples include vehicles, equipment, software, graphic designs and communication services, etc.
- Solicit financial support from the community and conduct fundraising events.
- Operate a gift shop to raise funds for Reserve programs.

VESSEL AND VEHICLE PLAN

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The Reserve will contract for use of university vehicles and vessels that are part of UW–Green Bay's fleet. The Reserve will adopt UW–Green Bay's rules for Vehicle Use on University Business: Driving and Vehicle Use on University Business.

The College of Sciences, Engineering, and Technology and Natural and Applied Sciences maintain a fleet of self-operated small boats for aquatic research projects. The boats are contractable for project use to all UW–Green Bay researchers who have been certified to operate them. Boats are maintained by College of Sciences, Engineering, and Technology faculty and staff sponsors in good working conditions and meet all federal and state safety and licensing requirements. Users are required to complete a certification process prior to using the boats. In some circumstances, temporary certification may be issued while the certification process is being completed.

The University of Wisconsin–Green Bay staff and faculty follow a *Guide for Small Boat Operators and Boat Operator Agreement*, which is intended to introduce all boat users to the UW–Green Bay boat fleet and operating procedures. Users are expected to be familiar with the information presented in the guide and to operate the boats using these guidelines.

COMMUNICATION PLAN

In the early years of the Reserve's operation, the Communications Plan aims to foster public engagement with the Green Bay NERR. This will be achieved by raising awareness and providing updates about the Reserve's context, needs, benefits, plans, events, and success stories. Additionally, it will inform target audiences about how they can support the Reserve through contributions of effort, funding, and expertise. Beyond highlighting the work of the NERR, communication from the Reserve will serve as a resource for information about the watershed, promoting opportunities via traditional and social media channels to cultivate a sense of connection with the estuary.

OBJECTIVES AND STRATEGIES

All staff members will contribute to communication efforts to promote their programs and achieve goals outlined in the Management Plan. Staff will work closely with UW–Green Bay Marketing & University Communications to ensure messaging and materials are professional, consistent, and effective.

OBJECTIVE 1: INCREASE ACCESS TO SCIENTIFIC, SOCIAL, AND EDUCATIONAL INFORMATION TO RAISE AWARENESS ABOUT THE GREEN BAY ESTUARY AND WATERSHED.

Strategies

- Deliver information through diverse media channels (e.g., television, brochures, videos, social media, events) with audience-specific messaging.

- Maintain an updated and accessible web presence through a dedicated Reserve website that serves as a clearinghouse for research updates, programs, and facilities.
- Utilize communication practices and styles that are clear and tailored to the intended audience.
- Align messaging and strategy with University of Wisconsin–Green Bay Communications and Marketing.

OBJECTIVE 2: DESIGN AND IMPLEMENT A MARKETING STRATEGY FOR THE GREEN BAY NERR VISITOR AND EDUCATION CENTER.

Strategies

- Draft an executive summary outlining the Visitor and Education Center's marketing and advertising goals, timeline for completion, and key performance indicators to measure progress.
- Identify the Visitor and Education Center's target market and user needs.
- Conduct a market analysis to identify potential collaborators and similar organizations.
- Perform a SWOT analysis for the Visitor and Education Center.
- Clarify the Visitor and Education Center's niche within the market.
- Select preferred marketing channels for outreach.
- Establish growth goals.
- Develop a budget to support marketing efforts.

TARGET AUDIENCES

Each Reserve program area will define its target audiences for programming, outreach, and communication strategies. As programs grow, new audiences will be identified and engaged. Communication tactics will be customized to effectively reach relevant audiences for each initiative, event, or research discovery. There will be some overlap between strategic partners and target audiences, particularly within large organizations like the Wisconsin Department of Natural Resources. For example, as the largest landowning partner in the Reserve, DNR's land managers will partner on stewardship actions, while staff within the DNR's Environment Management Division are a target audience for training opportunities. Below are preliminary lists of target audiences for each program area.

RESEARCH AND MONITORING

- UW–Green Bay staff, faculty, and students
- Natural resource managers from federal and state agencies and Tribal governments
- State and federal agencies
- NOAA/NERRS/NERRA
- Regional and national granting agencies
- Community partners (e.g., Green Bay Conservation Partners)
- Regional municipalities
- The Great Lakes research community with a focus on Lake Michigan research institutions

EDUCATION

- Regional K–12 educators, students, and administrators
- UW–Green Bay staff, faculty, students, and alumni
- Freshwater Collaborative of Wisconsin and UW system schools
- Northeast Wisconsin colleges and universities
- Regional adult and youth community members
- Visitors to the estuary
- Local and state decision-makers

STEWARDSHIP

- Land use planning and permitting staff (e.g., Bay-Lake Regional Planning Commission)
- EPA Region 5, Wisconsin Department of Natural Resources, and other agency personnel
- Community and landowning partners
- Local residents
- Northeast Wisconsin decision-makers
- Emergency responders and disaster planning professionals

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CONTINGENCY AND HAZARD RESPONSE PLAN

As a program within the University of Wisconsin–Green Bay, the Reserve will adopt the University's Emergency Plan: University of Wisconsin-Green Bay Emergency Plan.

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FACILITY DEVELOPMENT PLAN

PURPOSE OF FACILITIES

Facilities play a vital role in supporting the mission and operations of the Green Bay NERR by providing space for research, education, stewardship, and training programs, as well as opportunities for public interaction with the estuary. During the first years of the Reserve's existence, programs will primarily utilize existing facilities on the University of Wisconsin–Green Bay's campuses (Green Bay, Manitowoc, and Sheboygan), as well as infrastructure offered by landowning and strategic partners.

The Green Bay NERR will initially repurpose existing buildings and shared-use spaces, maximizing existing University investments. This approach aligns with the Reserve's goal to serve as a regional hub for excellence in Great Lakes coastal research and education.

Facilities will be developed and managed to function as a central hub and catalyst for education, research, tourism, and recreation, supporting the Reserve's role in generating meaningful regional benefits. These facilities will provide a visible and welcoming presence that strengthens community connections to the Bay of Green Bay while enabling effective coordination among Reserve staff and partners. Facilities will offer meaningful visitor experiences, support classroom-based and field-based learning, and provide the infrastructure necessary for high-quality research and monitoring activities.

Facility development will prioritize opportunities for on-water, in-estuary, and shoreline learning experiences, ensuring that visitors, students, and researchers can directly engage with the bay's ecosystems. Spaces will be designed to foster connection to the estuary, highlighting its ecological, cultural, and economic importance to the region and inspiring stewardship and protection. Interpretive and educational elements will reflect a diversity of perspectives, including the knowledge, histories, and connections of Indigenous peoples, and will incorporate technology to enhance interaction and accessibility.

Operational considerations will ensure that facilities are located to support Reserve activities, including maintaining a manageable driving distance between laboratories, natural areas, and monitoring sites to facilitate frequent fieldwork and equipment maintenance. Facilities will also provide convenient access to dormitory space, laboratories, and essential amenities to support students, interns, and visiting scholars, reinforcing the Reserve's role as a center for learning, collaboration, and workforce development.

CURRENT FACILITIES

The University of Wisconsin–Green Bay campus has identified spaces that will support the Green Bay NERR. Additionally, future agreements with strategic and landowning partners will provide space for additional educational and outreach programming, as well as research activities. Currently available spaces on campus include:

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Staff Offices: Assigned private offices, shared desks, and flexible workspaces.

SWMP Lab and Equipment Workspace: Room for maintaining water quality monitoring instrumentation.

Indoor Storage: For field gear, educational materials, and seasonal supplies.

Outdoor Storage: Covered area for boats and field equipment.

Other UW-Green Bay facilities are available to the Reserve. These include:

- STEM Innovation Center Boardroom (Brown County and UW–Green Bay partnership)
- University Union Phoenix Rooms and Christie Theatre
- Cofrin Center for Biodiversity breakout space
- Cofrin School of Business Boardroom
- UW–Green Bay, Manitowoc Campus: Commons and University Theatre

These facilities can be reserved to support meetings, conferences, symposia, educator training, and student events. The UW–Green Bay campus offers accessible public parking, restrooms, lactation spaces, and catering options. Locations of UW-Green Bay facilities can be found on this campus map: University of Wisconsin-Green Bay Campus Map

The Reserve also anticipates leveraging space at partner sites for outreach and educational programming, including Barkhausen Waterfowl Preserve, Ken Euers Nature Area, Wequiock Creek Natural Areas, Crossroads at Big Creek, and the Door County Maritime Museum.

FACILITY CHALLENGES AND GAPS

While existing University of Wisconsin–Green Bay campus assets and partner facilities provide a strong foundation for initial operations, several facility gaps are anticipated as Reserve staffing, programming, and partnerships expand. Additional office and laboratory space will be needed to accommodate staff and visiting researchers, alongside dedicated classroom and interpretive spaces to support public programming, school groups, and the development of museum-quality exhibits.

As the Reserve increases its role as a regional convening space, there will be a need for conference and meeting facilities, as well as flexible spaces capable of hosting larger community events. With large equipment purchases the Reserve will need secure outdoor storage for boats, field equipment, and monitoring assets essential to research and stewardship activities.

Across the Reserve's footprint, enhanced signage, interpretive exhibits, and coordinated access improvements will be important to create a cohesive and navigable visitor experience among the three Component Areas. Without addressing these infrastructure needs, facility limitations may constrain the Reserve's ability to fully realize its

programmatic vision and deliver integrated research, education, stewardship, and training programs.

PLANNED FACILITIES AND INFRASTRUCTURE

The University of Wisconsin–Green Bay has facilities for the Reserve's initial program needs, but additional facilities may be needed within five years after designation. The Reserve will develop a long-term facility strategy during its initial years of operation. This effort will be informed by established guidance on facility needs within the National Estuarine Research Reserve System and will help prioritize investments that support both immediate operational requirements and future growth.

During the first years of operation, the Green Bay NERR will install the necessary SWMP infrastructure. Reserve staff and the Reserve Advisory Board will evaluate needs and opportunities for future facilities and pursue solutions as feasible to enhance or develop facilities both for short and long-term needs. The University may consult with regional and local leaders as to the location and design of facilities.

All facilities will comply with federal, state, and local codes and regulations. The Green Bay NERR will look for energy efficiency, efficient use and reuse of materials, and recycling of used materials, and will strive to adopt sustainable development principles:

- Net zero or net positive energy performance.
- Low-impact, ecologically appropriate design.
- Climate-adaptive materials and siting of infrastructure.
- Stormwater and wastewater management via onsite technologies.
- Public-facing displays that interpret green infrastructure and sustainable design.

STRESSORS ON INFRASTRUCTURE

CLIMATE VULNERABILITY

Both natural and climate-induced stressors impact shoreline infrastructure across the bay. A primary consideration with future climate impacts is the location of future facilities. Some areas of the Green Bay estuary are prone to flooding, and the shoreline is exposed to high winds, fluctuating Great Lakes water levels, seiche effects, storm surge, and ice shoves. The combination of natural stressors and anticipated climate change impacts in the Great Lakes will be considered in the location and design of the Reserve's built infrastructure. The Wisconsin Initiative on Climate Change Impacts (WICCI) offers helpful guidance and considerations around infrastructure issues in Wisconsin in an online resource: Wisconsin Initiative on Climate Change Impacts Infrastructure Working Group.

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NON-CLIMATE VULNERABILITY

Notable non-climate stressors that may affect the Reserve's infrastructure over time include:

Facilities Maintenance and Support: As Reserve facilities expand, maintenance responsibilities and associated operational costs must be integrated into UW–Green Bay's long-term planning and budgeting.

Visibility Across Competing Initiatives: Within a geographic region active in Great Lakes research, ensuring Reserve facilities remain recognized, prioritized, and supported will require consistent communication, outreach, and partnership engagement.

Prolonged Project Timelines: State-funded projects require significant lead time and approval from within a competitive funding environment, which could limit organizational nimbleness in meeting emerging needs. Facility initiatives should consider this risk and potential mechanisms by which partnerships could reduce or minimize this challenge.

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RESOURCE PROTECTION PLAN

INTRODUCTION

The Reserve System regulations (15 CFR § 921.1) specify that,

- Reserves shall be open to the public to the extent allowed by state and federal law
- Multiple uses are allowed to the degree compatible with Reserve purpose and use levels prescribed in the management plan
- The management plan shall identify uses requiring a state permit, as well as areas where uses are encouraged or prohibited.

Protecting the natural resources of the Green Bay NERR underpins all programmatic efforts in research, education, stewardship, and training. The lands and waters of the Reserve are representative of the freshwater estuarine ecosystems of the Great Lakes and are protected through a combination of state and local authorities, landowner regulations, and public trust protections. This chapter outlines the existing management authorities, allowable and prohibited uses, permitting requirements, and the surveillance and enforcement mechanisms governing the various lands within the Reserve.

MANAGEMENT AUTHORITIES

The Green Bay NERR encompasses only public lands and waters managed by ten land-holding partners. These properties are protected through a range of policies, statutes, and local ordinances that provide long-term resource protection across the Reserve's components. No land was purchased for the Reserve; instead, existing public holdings with relevant ecological value, public access, and legal protections were selected. The upland and aquatic areas are covered under authorities specific to each landowner and are sufficient to meet NOAA's requirements for long-term conservation, research, and education. Land within the Reserve will continue to be managed in accordance with the rules and regulations of the landowning entity.

Open water areas, including portions of Green Bay and Lake Michigan, are protected under Wisconsin's Public Trust Doctrine, which guarantees public access and regulates commercial and recreational activities for the benefit of all citizens.

LANDOWNER POLICIES AND REGULATIONS

Each component of the Reserve includes specific units managed for conservation and recreation. The following summary outlines primary uses, protections, and management practices by component.

PESHTIGO RIVER COMPONENT

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The Peshtigo River Component encompasses the DNR-owned and managed Peshtigo Harbor Unit, which contains several State Natural Areas (SNAs) and a Special Management Area.

These areas represent some of the most ecologically intact estuarine and riparian habitats in Northeastern Wisconsin and are protected for their biodiversity, cultural significance, and contributions to long-term research and habitat restoration. The unit has a long history of human use, including the presence of Native American artifacts. The DNR's Peshtigo Unit would benefit from surveys of historical resources to better document and interpret the history of the First Nations who called these areas home. Originally utilized by the Menominee, this area also contains one of the few naturally occurring, indigenous wild rice beds on Green Bay. Within the Peshtigo Component are sub-units, all of which are managed by the Wisconsin DNR. They include:

- *Bloch Oxbow State Natural Area* features a meander cutoff and floodplain forest that supports rare and sensitive species. It provides critical wildlife habitat and offers an example of a dynamic riverine wetland system. This site is a dedicated SNA.
- *Peshtigo Harbor Lacustrine Forest State Natural Area* includes one of the best remaining examples of northern hardwood forest transitioning into Great Lakes coastal wetlands.
- *Peshtigo River Delta Marshes State Natural Area* protects the vast, emergent wetland complex at the river mouth, serving as a migratory bird stopover and fish nursery.
- *Badger Gift Lands* protects coastal wetlands, river uplands, and diverse wildlife habitats and is designated as a Special Management Area.

The three State Natural Areas are managed under the authority of the Wisconsin Department of Natural Resources and protected by Wis. Admin. Code NR 45, which restricts uses that could degrade ecological integrity or interfere with scientific monitoring. These areas preserve high-quality wetland, floodplain forest, and deltaic systems characteristic of the Lower Peshtigo River and coastal bay. Visitors are advised to consult official signage and DNR materials for specific seasonal or site-based restrictions. The sensitive nature of the SNAs and adjacent habitats requires low-impact, responsible use aligned with conservation goals.

Allowable uses at the SNAs include hiking, fishing, hunting, trapping, wildlife viewing, wild edible collection for personal use, cross-country skiing, snowshoeing, and scientific research with a DNR-issued permit.

Prohibited activities include camping, campfires, unauthorized collection of natural materials, horseback riding, bicycles or motorized vehicles off designated roads or trails,

geocaching[1], and rock climbing. Collection of plants (except wild edibles) or animals for scientific purposes requires a valid scientific collector's permit from the DNR.

The Special Management Unit is protected through Articles of Dedication, a special kind of perpetual conservation easement under Wisconsin State Statute 23.29. See the relevant Wisconsin State Statue for more details.

LOWER BAY COMPONENT

DNR-managed units in the Lower Bay Component include Tibbet-Suamico, Sensiba, Long Tail, and Peats Lake. These areas are protected for wetland conservation, fish spawning, waterfowl habitat, and invasive species control. These units are open to the public for compatible recreational activities in accordance with DNR regulations.

- *The Sensiba Unit* includes managed impoundments and provides critical stopover habitat for migratory birds. Public access may be seasonally restricted to protect sensitive waterfowl areas.
- *The Long Tail Unit* contains the ruins of a historic lighthouse and is of interest for heritage interpretation and restoration. Use is limited to non-motorized activities unless otherwise posted, in accordance with DNR rules.
- *The Peats Lake Unit* and adjacent areas are largely undeveloped, emphasizing wetland preservation and fish spawning. Access to these areas may be limited to foot travel or non-motorized watercraft.

Allowable uses include hunting, trapping, fishing, hiking, birdwatching, and snowshoeing. Scientific research may be conducted with a DNR-issued permit. Motorized boat access is allowed in the bay and rivers within Sensiba, Long Tail Point, and Peats Lake Units; impoundments are generally too small and shallow for motorized boats. Public access infrastructure is supported in part through partnerships with local governments, including the Village of Suamico and Brown County.

Prohibited activities include camping, campfires, unauthorized motorized vehicle use (e.g., ATVs, snowmobiles, drones), collection of plants or animals without a permit, and unpermitted construction or placement of structures. Visitors are encouraged to review posted site rules and consult official DNR maps prior to visiting.

Some state-owned areas have seasonal restrictions on access impacting lands and waters within the Reserve. These include: 1) NR11.06, portions of the Sensiba Unit are a wildlife

[1] Note that geocaching is not allowable at State Natural Areas, but other state lands allow geocaching with a permit: Geocaching in Wisconsin

refuge with seasonal restrictions on access, and 2) NR11.08 portions of the open waters of Lower Green Bay are designated as no entry wildlife, refuge, rookeries, and special areas[2].

The Lower Bay Component also includes lands that are managed by entities other than the DNR. These areas are listed below with the management authority in parentheses.

- *Ken Euers Nature Area (City of Green Bay)* encompasses approximately 117 acres of restored coastal wetlands, providing one of the few public access points to the bay within the city limits. The area features walking trails and shore fishing opportunities. Restoration has included the removal of invasive species, installation of woody breakwaters to protect shorelines, and seeding of wild rice to enhance waterfowl habitat. These improvements have made the area a popular spot for birdwatching, photography, and environmental education. Motorized recreation is prohibited to maintain the area's ecological integrity. Ken Euers Nature Area is zoned as a Parks and Recreational Area by the City of Green Bay; there are no conservation easements or deed restrictions. The existing site conditions would likely preclude the City from converting the property to anything other than parkland or a natural area. The City of Green Bay's long-term plan for the area includes promoting and developing further passive recreational uses and habitat restoration.
- *Barkhausen Waterfowl Preserve and Fort Howard Paper Foundation Wildlife Area (Brown County)* spans over 920 acres of forest, meadows, and wetlands along the west shore of Green Bay. It offers more than nine miles of scenic trails for hiking, cross-country skiing, and snowshoeing. The preserve is home to the West Shores Interpretive Center, which provides educational programs and hands-on exhibits about the local ecosystem. A notable feature is the Sensory Woods, designed to connect visitors of all abilities with nature through sensory experiences. Dogs are allowed on leashes south of Lineville Road. Motorized recreation is not permitted, ensuring the protection of wildlife habitats. The area is within the historical homelands of the Menominee Indian Tribe of Wisconsin and Ho-Chunk Nation, and lands were used for hunting, fishing, and camping. These properties are owned by Brown County and managed by Brown County Parks. Wisconsin Statute Chapter 27[3] (Public Parks and Places of Recreation) provides authority to the general manager of a County Park System to create plans and manage parklands. In Wisconsin, county park systems revolve around Comprehensive Outdoor Recreation Plans. The Brown County Board adopted via resolution a Comprehensive Outdoor Recreation Plan. The Brown County Comprehensive Outdoor Recreation Plan resolution for 2023-2028 was adopted by the Brown County Board of Supervisors on February 21, 2024.
- *Duck Creek Conservation Corridor (Village of Howard)* includes restored wetlands, riparian woodlands, and grassland buffers along the lower reaches of Duck Creek.

[2] See DNR guidelines and maps for NR11.06 and NR11.08, relevant to Green Bay NERR areas in Brown County: Wisconsin DNR NR 11.06 and 11.08.

[3] See Wisconsin Statue Chapter 27.04 for details on the County authority.

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Managed by the Village of Howard, the corridor connects to the broader Green Bay West Shores Wildlife Area and includes public trails, boardwalks, and interpretive signage. Restoration efforts have focused on improving fish passage, wetland hydrology, and native plant diversity. The area supports birdwatching, hiking, and nature education, with no motorized access allowed to protect sensitive habitats. Areas of Duck Creek had been a Menominee Indian Village. The Oneida people who moved to Wisconsin in 1822 settled in the Duck Creek area because of the natural resources to sustain 'a good way of life' (C. Cornelius, 2013), and reservation lands are located along Duck Creek.

Because of the Door Creek Conservation Corridor's location within the bay, the parcel is protected by a dual-layer of local and state-mandated codes that create a 'no-development' zone. These include:

- Location within the Lower Green Bay and Fox River Area of Concern, which provides federal oversight to restoration efforts. The Village cannot unilaterally approve projects that would degrade the Beneficial Use Impairments concerning wildlife habitat or water quality.
- Wisconsin Administrative Code NR117[4], shoreland-wetland protection standards:
    - Chapter 45, Shoreland-Wetland Zoning:
        - Protects wetlands greater than 5 acres. Explicitly permits research and educational activities; limits vegetation removal within 35 feet of the waterline.
    - Village of Howard Code of Ordinances Chapter 45 Shoreland-Wetland District[5]:
        - Sections 5 and 6, Shoreland-Wetland Overlay. Acts as the primary protection for the corridor; strictly prohibits permanent structures, filling, or dredging in wetlands (Sec 45-6). Permitted passive developments (e.g. boardwalks, observation docks) require a land use/zoning permit (Sec. 45-5(3)).
        - Chapter 50, Section 50-451 (District R-5), Conservancy Standard (Floodplain/R-5). Pairs with the R-5 Rural Estate zone to limit land to open space, forestry, and agricultural uses. It effectively prohibits standard residential subdivisions and

[4] See Administrative Code NR 117 Wisconsin's City and Village Shoreland-Wetland Protection Program

[5] See Village of Howard Code of Ordinances, Chapter 45.

commercial developments to preserve the corridor's ecological integrity.

- *Point au Sable Natural Area (University of Wisconsin–Green Bay*) is a freshwater estuarine spit located along the east shore of the bay. Managed by UW–Green Bay, the site features walking trails, a lagoon, wetlands, and remnant dune ecosystems that support migratory bird populations and native plant communities. Access is primarily limited to foot travel, with hunting permitted only by permission. UW–Green Bay uses the site for ecological research, restoration projects, and student field training. Public visitation is allowed on designated trails, while group access can be coordinated through UW–Green Bay staff. Point au Sable is a documented archaeological site with early 1800s surveyor notes referencing Menominee, Ho-Chunk, and Potawatomi. The area is of significant cultural and historical importance as the ancestral and ceded territories of the Menominee Nation. An ongoing collaboration between Menominee Indian High School students, Consulting Archaeologist David Overstreet, and UW-Green Bay Cofrin Center for Biodiversity staff are conducting archaeological digs at both Point au Sable and Wequiock Creek[6].
- *Wequiock Creek Natural Area (Northeast Wisconsin Land Trust)* is a collaborative conservation site co-managed by the Northeast Wisconsin Land Trust, the University of Wisconsin–Green Bay, and the Town of Scott. The site includes wetlands, restored prairies, and stream habitat along Wequiock Creek. UW–Green Bay staff lead restoration activities aimed at converting former agricultural fields into native grassland and wetland communities. Public access is limited but may expand as restoration progresses. The area supports research and education on stream ecology, watershed health, and land-water interactions. The area is within the original homelands of the Menominee Indian Tribe of Wisconsin, Ho-Chunk Nation, and Potawatomi Nation. Future restoration or development should consider potential cultural resource surveys (Northeast Wisconsin Land Trust; Bureau of Indian Affairs Great Lakes Region; WHS Predictive Modeling Map). Just north of Wequiock Creek and Point au Sable is the Red Banks area. While outside the boundaries of the Green Bay NERR, oral history explains that Red Banks is the first Ho-Chunk Village and the ancestral homelands extended around the mouth of the Fox River in lower Green Bay.

  The mission of the Northeast Wisconsin Land Trust is to preserve lands that protect our waters, landscapes, and natural habitats for this and future generations.

[6] See a story highlighting this effort from Wisconsin Sea Grant: Reconnecting Menominee students with their roots in the bay of Green Bay.

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Northeast Wisconsin Land Trust is a non-profit organization that permanently protects conservation land for natural, recreational, and agricultural value through ownership and easements. The land within the Green Bay NERR boundary was purchased for permanent protection and is owned by Northeast Wisconsin Land Trust. Included within the Articles of Incorporation of Northeast Wisconsin Land Trust are purposes and powers that speak to the land protection mandate, they include:[7]

> *The corporation is organized exclusively for charitable, educational, and scientific purposes, and, more specifically within these purposes:*
>
> *(1) To preserve, maintain and enhance the historic cultural features and ecological integrity of the lands and waters of Northeastern Wisconsin, including Lake Michigan, Green Bay, Lake Winnebago, numerous inland lakes, the Fox, Wolf, Menominee, Oconto and Peshtigo Rivers, their tributaries and drainage basins in a manner consistent with productive forestry, agriculture, recreation and human habitation.*
>
> *(2) To protect agricultural and wooded lands, environmental corridors, wildlife habitat, including habitat of rare, threatened and endangered species, and open space areas in Northeastern Wisconsin to maintain a diversity of land uses in the region which support its ecological integrity and economic diversity.*
>
> *(3) To acquire, by gift, purchase or otherwise, real or personal property of any kind whatsoever, including partial real property interests and conservation easements, to protect against sedimentation and pollution of lakes, bays, rivers, streams and other water resources of Northeastern Wisconsin and to protect wildlife habitat, wetlands, wooded lands, natural and scenic areas (including the Niagara Escarpment) and other conservation features for public benefit, including the acquisition of property for conservation purposes pursuant to Sections 23.0955 and 23.096 of the Wisconsin Statutes.*

Restoration Activities in the Lower Bay Component

Most areas within the Lower Bay Component are part of current or planned restoration efforts that may influence habitat conditions and site management priorities in the future. Restoration projects are coordinated by multiple partners and include wetland enhancement, shoreline stabilization, and fish habitat improvements. For information and updates to the long-term planning of these areas see these published plans:

- Lower Fox River & Green Bay AOC Management Action List (DNR)

[7] Language excerpted from Articles of Incorporation of Northeast Wisconsin Land Trust.

- City of Green Bay – Ken Euers Nature Area
- Brown County – Barkhausen Waterfowl Preserve

STURGEON BAY COMPONENT

The Sturgeon Bay Component includes a variety of conservation lands and public access sites managed by the Wisconsin Department of Natural Resources, Crossroads at Big Creek, and the Door County Land Trust. These sites offer opportunities for non-motorized recreation, environmental education, and habitat protection consistent with the goals of the Green Bay NERR. The management authorities for each site are listed in parentheses.

- *Big Creek Preserve and Cove Preserve (Crossroads at Big Creek)*. *Big Creek Preserve* is a nature preserve that permits non-motorized recreation, research, and educational access. Trails are open 24 hours a day, 7 days a week, and dogs must remain leashed. Hunting, camping, and off-trail use are not permitted without prior approval. The site also includes indoor learning spaces and a small lab for visiting researchers. *Cove Preserve* is a nature preserve that permits non-motorized recreation, research, and educational access. Trails are open 24 hours 7 days a week. Hunting, camping, dog walking, and off-trail use are not permitted without prior approval. Both Big Creek Preserve and Cove Preserve are within property owned and managed by Crossroads at Big Creek. Crossroads holds full ownership of both the Big Creek Preserve and the Cove Preserve. The Cove property is owned outright by Crossroads and has no deed restrictions or easements. The Crossroads main campus is subject to several deed restrictions held by the Sturgeon Bay School District. These include:
    - A restriction against subdivision
    - Lighting restrictions requiring that exterior light fixtures not exceed 20 feet in height and that all lighting be directed downward
    - Impervious surface limitations, allowing only walkways and parking lots
    - Use restrictions requiring that the property be used solely for purposes compatible with the adjoining property dedicated to education, conservation, and preservation
    - A right of first refusal granted to the Sturgeon Bay School District should the property ever be offered for sale
- *Big Creek State Habitat Area (DNR)* supports fish and wildlife conservation goals and is open to the public for hunting, trapping, and wildlife viewing in accordance with DNR regulations. Infrastructure is limited, and public access is primarily through walk-in routes. Within the area there is a fishing pier and kayak launch that are maintained by Crossroads at Big Creek.

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- *Strawberry Creek Chinook Facility (DNR)* is a seasonal facility focused on Chinook salmon egg collection during the fall spawning run. The site is open to the public when the DNR is processing fish, typically on Mondays and Thursdays during the first three weeks of October. The facility may be used for rearing fingerling Chinook salmon for six weeks in April and May. Fishing and hunting are not allowed. Further information on the facility is found on the Wisconsin DNR's website: Wisconsin DNR Strawberry Creek Chinook Facility

- *Strawberry Creek State Habitat Area (DNR),* adjacent to the hatchery, is open for public access and hunting, which requires a permit. Hunters should follow up with either municipal or landowner representatives on allowable activities and timing[8].

- *Sturgeon Bay Ship Canal Nature Preserve (Door County Land Trust)* includes ecologically significant coastal forest and wetland habitats. The preserve is part of the Cave Point–Clay Banks State Natural Area, co-managed with The Nature Conservancy and DNR. The Preserve contains federally threatened Pitcher's Dune Thistle and Dwarf Lake Iris, as well as several other state-listed species. Public access is permitted on 2.5 miles of rustic hiking trails. There are two public parking areas, a boardwalk to the beach designed to protect sensitive dune thistle habitat, scenic overlooks, and educational kiosks. Visitors must stay on marked trails, leash pets, and avoid disturbing or collecting natural or cultural features. Public uses include birdwatching, nature study, cross-country skiing, snowshoeing, and regulated hunting (white-tailed deer and turkey). Motorized vehicles, camping, fires, and bicycles are prohibited in the Preserve. Hunting and fishing may be permitted under DNR specific seasonal conditions and adhering to gun restrictions within the city limits of Sturgeon Bay. Scientific research is welcomed with coordination and appropriate permitting. Adjacent to the Preserve is a seawall along the Sturgeon Bay Shipping Canal. This is a pre-existing use with no intent to expand or alter the structure. This property is all fee-title with no conservation easements within the footprint. Additionally, the Door County Land Trust maintains a national accreditation status with the Land Trust Alliance which is a rigorous set of standards and practices for maintaining conservation permanence. They have been accredited since 2016 and are undergoing their third renewal. The Door County Land Trust has a designated endowment, the Stewardship Endowment Trust Polity. With every fee land acquisition, Door County Land Trust follows an accreditation standard to calculate a contribution to be made into this endowment. A standard deposit is also made into a separate fund for Legal Defense for every property. These two elements enable Door County Land Trust to use the word "forever" in their mission statement. Each year they take a standard draw from the endowment that is specifically utilized for land stewardship activities listed in the land management plans.

[8] For more information see Sturgeon Bay Ordinance 9.04 Hunting Permit

PERMIT REQUIREMENTS

Scientific research and species collection on DNR-managed lands require a scientific collector permit or scientific research license[9] from the Wisconsin DNR. Additional permits are required for working with threatened or endangered species. Permit requirements vary by activity type and landowner, and applicants are encouraged to consult directly with the Wisconsin DNR prior to conducting research. All permit applications and conditions are available via the DNR website.

Research on non-DNR managed lands should be designed in conversation with the landowning partner and plans shared with the Reserve's Research Coordinator.

SURVEILLANCE AND ENFORCEMENT

Enforcement authority remains with the individual landowning agencies, DNR Conservation Wardens, and municipal enforcement as applicable. Surveillance activities vary by property but may include routine patrols, signage, seasonal access restrictions, and staff presence during high-use periods. Municipal regulations and ordinances may apply, in addition to agency and organization restrictions. For further information on DNR enforcement, contact the general line: 1-888-DNR-INFO (1-888-936-7463) or the Violation Hotline: Hotline 1-800-TIP-WDNR, 1-800-847-9367.

The Reserve's water areas are protected under the Wisconsin Public Trust Doctrine and are subject to the jurisdiction of state and local boating and fishing regulations.

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[9] For more information see the Wisconsin DNR Species Collection and Research Permits and Licenses website.

PUBLIC ACCESS AND VISITOR USE PLAN

CURRENT PUBLIC ACCESS

The lands and waters of the Green Bay NERR are managed by ten land-holding partners: the Wisconsin Department of Natural Resources, Brown County, Northeast Wisconsin Land Trust, Village of Howard, City of Green Bay, University of Wisconsin System, Town of Scott, Crossroads at Big Creek, Door County Land Trust, and the Sturgeon Bay School District.

Each of these landowners has issued guidelines on public access, including allowable activities. In general, the following activities may be permitted on the land and waters within the Reserve boundaries through consultation with the landowning partner,

- Field research
- Off-trail access for low-impact purposes such as hiking, art, and photography
- Watercraft use
- Fishing

Within the Green Bay NERR boundary approximately 1,584 acres (14% of the total Reserve land area) were acquired through the Knowles-Nelson Stewardship Program. This includes land owned by the Wisconsin DNR, Northeast Wisconsin Land Trust, Brown County, Village of Howard, and the Door County Land Trust.

Under Wisconsin state law these lands must be open to the public for nature-based outdoor activities, including hunting, fishing, trapping, hiking, and cross-country skiing. Exceptions to these activities may only be granted if the Natural Resources Board determines that specific prohibitions are necessary, as outlined in Wisconsin Statute s. 23.0916(1)(b). Additional information about Stewardship terms and conditions is available through the DNR: Wisconsin DNR Knowles-Nelson Stewardship Program.

Maps below show public access points for the entire Reserve (Figure 19) and highlighted for each component area (Figure 20, 21, and 22).

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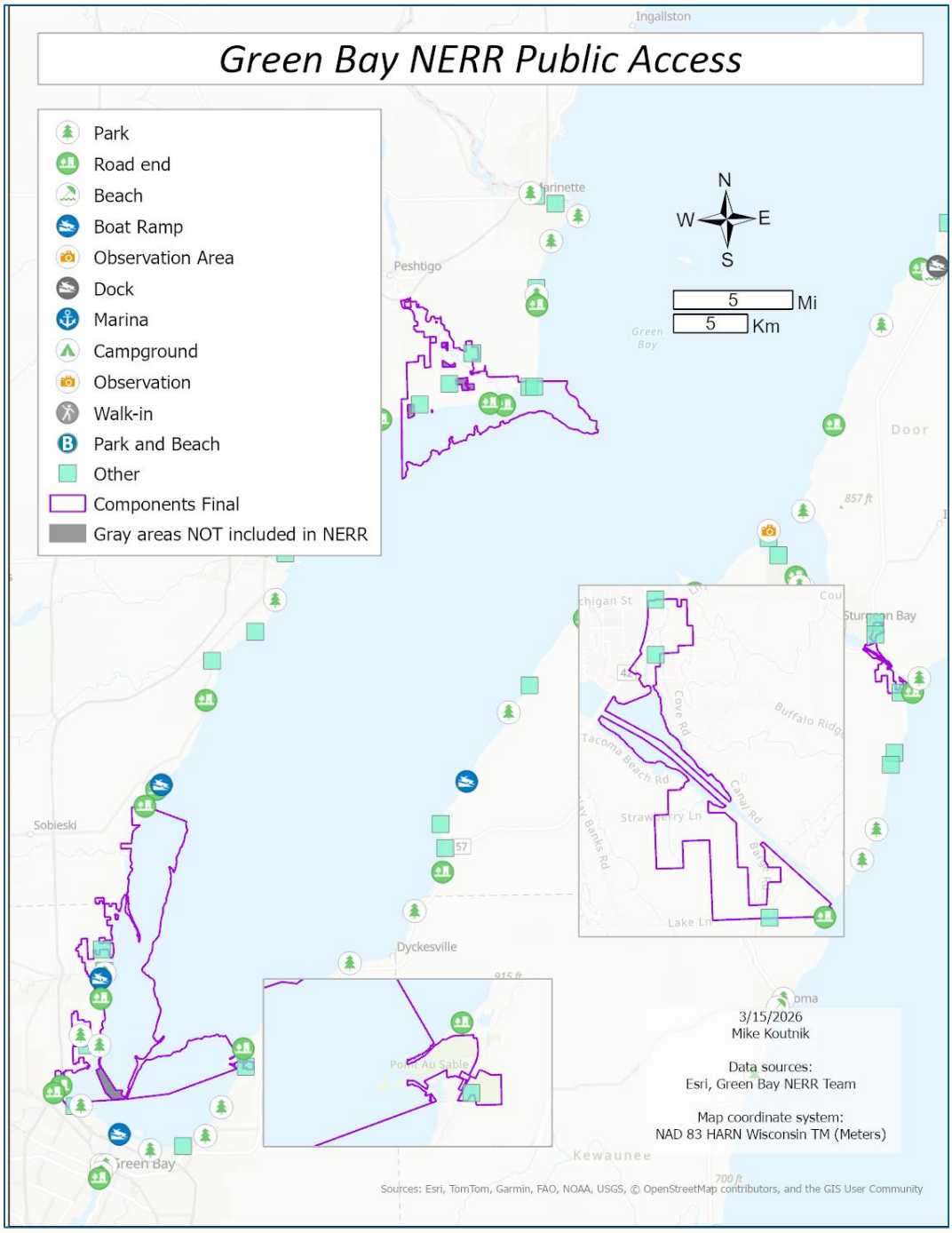


Figure 19: Public access sites within the Green Bay Estuary

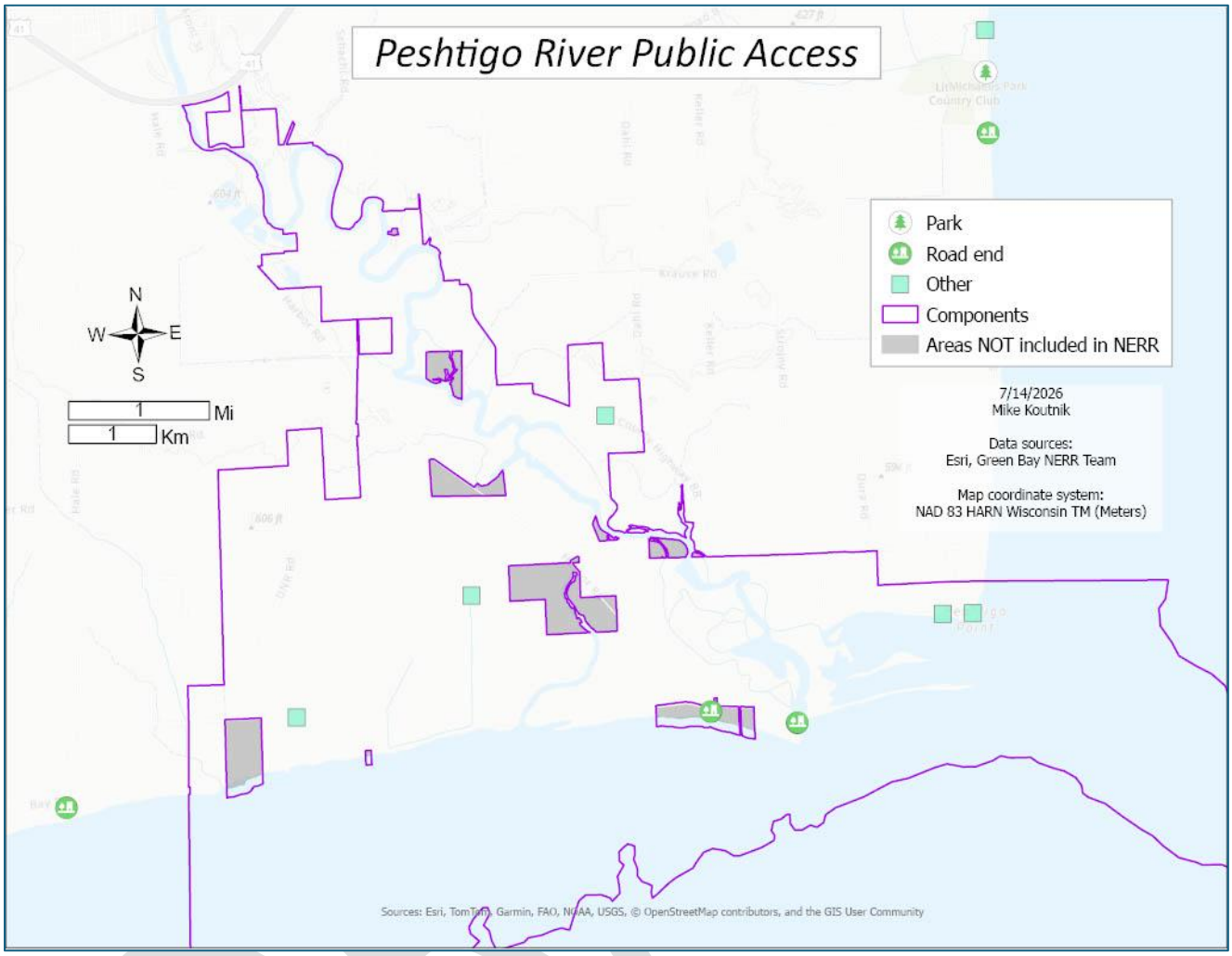


Figure 20: Public access sites within the Peshtigo River Component

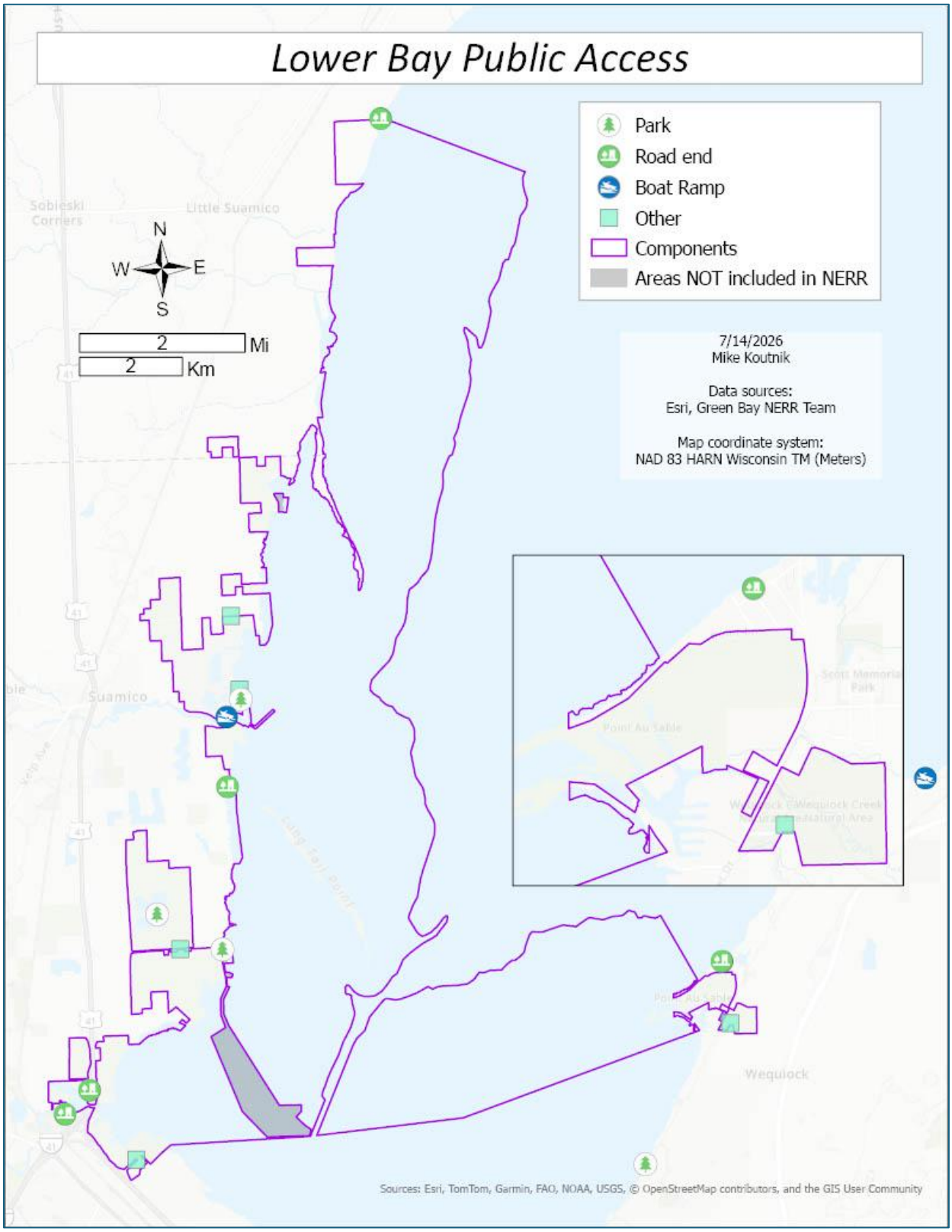


Figure 21: Public access sites within the Lower Bay Component

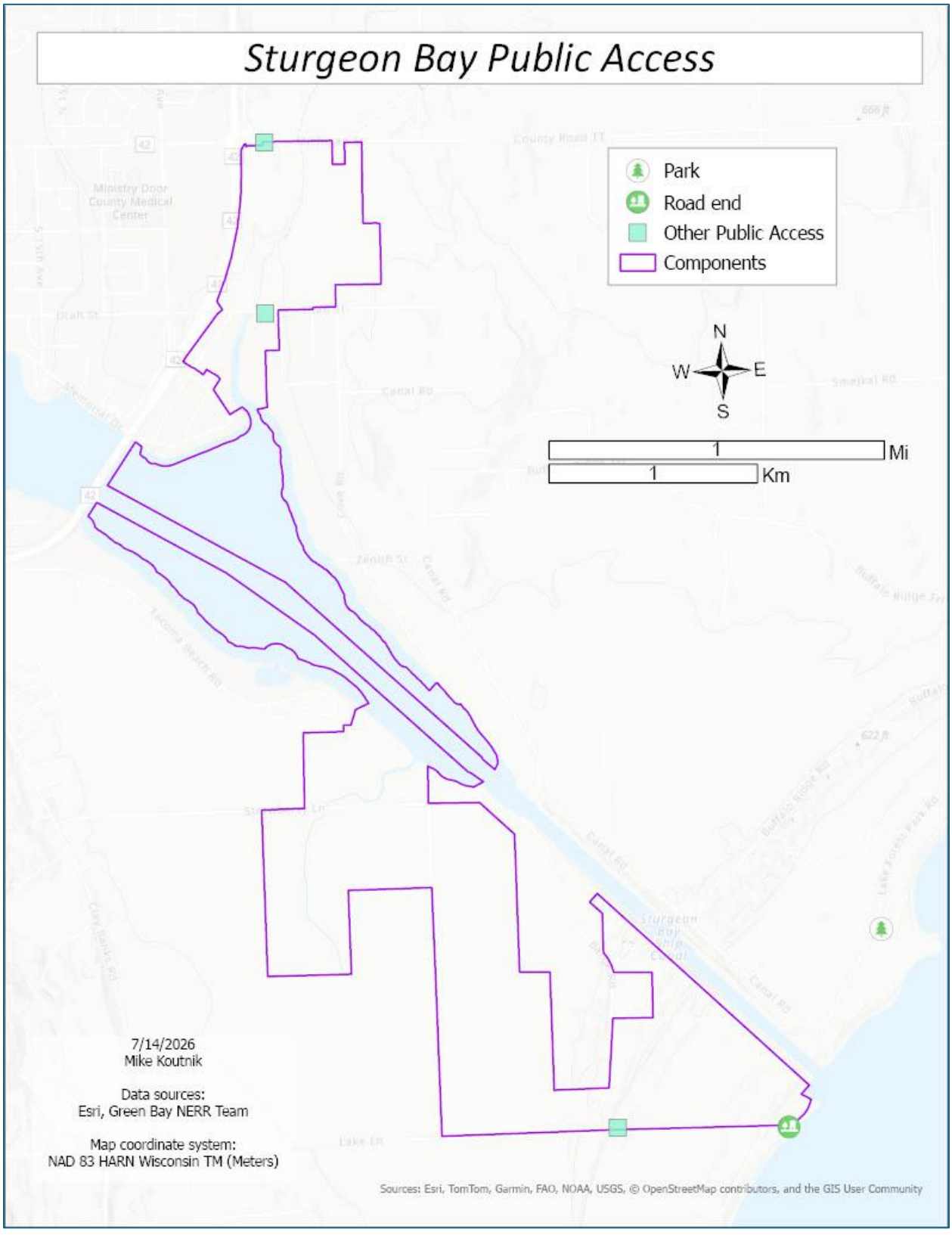


Figure 22: Public access sites within the Sturgeon Bay Component

PUBLIC ACCESS CHALLENGES

Public access to the Bay of Green Bay is limited by a range of environmental, infrastructure, and social challenges. Despite the bay's proximity to numerous communities, only a modest number of access points exist, and many are difficult to find or not well marked. Several road ends along the shoreline offer potential access but are often unsigned and vulnerable to encroachment by adjacent landowners. Other access points lack basic amenities such as restrooms, trash disposal, or safe parking areas, which limits their usability and comfort for visitors.

For water users, certain boat launches, such as Metro Boat Launch at the Fox River mouth, may pose hazards for inexperienced boaters due to rough wave conditions. In addition, seasonal ice cover and unpredictable winter conditions may limit safe public use in colder months. Two nearby large marinas (South Bay and Yacht Club) can act as safe harbors under rough conditions that limit safe use of the public boat launch.

Some shoreline sites lack the infrastructure necessary to support education programs and group activities. Challenges include insufficient parking or turn-around spots for school busses, absence of sheltered spaces for inclement weather, lack of restrooms and handwashing stations, and minimal accessibility accommodation. Physical access is also limited for people with mobility concerns, from young children to older adults, due to steep or uneven terrain, inaccessible docks, or lack of ADA-compliant facilities. While sites such as Barkhausen Waterfowl Preserve include accessible sensory trails, most locations around the estuary have limited ADA-accessible infrastructure.

Visitor impacts on rare and sensitive habitats are also a concern. At sites with known populations of species such as Pitcher's Dune Thistle and Dwarf Lake Iris, even low levels of off-trail foot traffic can degrade habitat. Despite signage and trail design efforts, visitor trampling remains a concern. In some cases, these impacts have been mitigated by installing barriers and elevated boardwalks.

For some sites around the bay, accessibility gaps extend to digital access and wayfinding, with not enough signage, lack of digital maps or QR-based guides, and limited public awareness of where and how to visit shoreline properties. These barriers can be especially challenging for first-time visitors, non-local tourists, or residents unfamiliar with lesser-known public sites. Across the estuary there are opportunities to evaluate and respond to public access needs.

PUBLIC ACCESS OPPORTUNITIES

The Reserve can play a key role in improving public access infrastructure and programming throughout the estuary, with opportunities to highlight both ecological richness and local restoration success stories. Working collaboratively with partners, the Reserve will focus on strategies to enhance access via land and water. Estuary-wide, the DNR provides

helpful maps of Lake Michigan Tributary Access points, many of which are along the shores of the estuary and within the Peshtigo River, Lower Bay, and Sturgeon Bay Components.

LOWER BAY

In the lower bay, several public access points offer valuable connections to the estuary but may benefit from targeted infrastructure investments. Within the Reserve, the Sensiba Unit within the Green Bay West Shores Wildlife Area, Ken Euers Nature Area, and Barkhausen Waterfowl Preserve provide critical habitat and recreational access for walking, birdwatching, and environmental education. Outside the Reserve, Communiversity Park, Joliet Park, and Bay Shore Park allow public access on the east side of the bay, which is a popular spot to watch sunsets. Outside the Reserve's boundaries, boaters, paddlers, and anglers can access the bay at Eagles Nest Boat Launch, South Bay Marina, Metro Boat Launch, Wietor Wharf, and Deerfield Docks. As Brown County continues to develop Renard Island, additional opportunities for shoreline recreation, educational interpretation, and community gathering spaces are anticipated.

While these sites collectively represent some of the most accessible points in the lower bay, some areas lack amenities that would enhance public experience and safety. Opportunities exist to add coastal boardwalks, elevated viewing platforms, interpretive signage, accessible parking, and public restrooms. Improving these amenities will support field-based education, expand opportunities for people with varying mobility levels, and help residents and visitors connect with the bay's natural areas.

MARINETTE

In the city of Marinette, opportunities include expanded signage and storytelling along the Menekaunee Harbor Park trail, connecting visitors to the Menominee River's legacy of industrial impact, and ecological recovery. Enhancing trailhead access and integrating QR-coded signs can share the science of fish ladder installations, "fish sticks" habitat structures placed by the DNR, and the collaborative efforts behind wild rice restoration.

Sites like the city-owned Red Arrow Park remain under-leveraged for public use. Trails exist or are planned, but amenities such as interpretive signage that reflect the Menominee Nation's enduring connection to the waterway, boat launches, and viewing platforms are needed to fulfill their potential.

At the county level, Marinette's identity as the Waterfall Capital of Wisconsin offers an entry point for visitor exploration. Within Marinette County is the Peshtigo River, one of the last remaining braided estuaries in Lake Michigan.

DOOR COUNTY

In Sturgeon Bay and Door County, which attract an estimated 2.5 million visitors annually, partnerships with organizations such as Crossroads at Big Creek, The Ridges Sanctuary, and the Door County Land Trust present opportunities to expand eco-tourism that

integrates conservation and education. The Door County Land Trust hosts 'Explore the Door' hikes, school field trips, and community events that promote environmental education and nature-based recreation. These programs, combined with infrastructure already in place, create rich opportunities for the Reserve to partner in expanding land-based experiences across the peninsula. Additionally, the region's Ramsar-designated wetlands, diverse coastal habitats, and well-established tourism infrastructure provide a strong foundation for visitor engagement.

Collaborative programming could engage visitors with the distinct ecological features of Lake Michigan's shoreline and the estuary of Green Bay, while highlighting public lands, water trails, and family-focused outdoor experiences. These efforts would not only elevate environmental literacy but also support sustainable tourism across Door County.

In addition to public access and eco-tourism, Sturgeon Bay presents a unique opportunity to position the region as a hub for collaborative freshwater research in the Great Lakes. With initiatives led by institutions such as UW–Green Bay, UW–Milwaukee, UW–Oshkosh, the Smithsonian, Shedd Aquarium, and others, the Reserve can help amplify these efforts. The area's diverse habitat includes beaches, dunes, and ridge-and-swale upland, which support rare species and make it an ideal site for long-term ecological study. Future investment in lab space, short-term housing for visiting researchers, and public-facing facilities to showcase research will further strengthen Sturgeon Bay's role as a center for applied freshwater science.

ESTUARY-WIDE PUBLIC ACCESS OPPORTUNITIES

Estuary-wide opportunities identified by partners include:

Improved infrastructure at existing bay access sites, such as accessible kayak launches, restrooms, trash collection, and shaded seating or benches along the water.

Expanded signage and mapping, including clear site expectations, as well as stories that reflect the region's human and ecological history.

Accessibility solutions, such as providing motorized beach chairs and trailers for kayaking and canoe exploration of wetland habitats.

Kayak and boat rentals, coastal locations to rent a kayak, canoe, and related equipment.

Creation of outdoor classroom spaces near the Green Bay estuary that include safety features, drinking water, and resources like kid-sized boots, waterproof notebooks, and observation guides.

Seasonal and sensory programming, such as cross-country skiing routes, audio-guided nature tours, and docent-led walks.

Public transportation support for school groups and community organizations, potentially including event shuttles or budget lines for bus rentals and teachers.

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On-water access for educational use, such as collaborating with existing Fox River tour operators or pursuing shared-vessel use for Reserve programming.

Interpretive experiences that tie together past and present, highlighting Indigenous connections, early settlers, industrial legacies, and contemporary restoration efforts through signage, programs, and storytelling.

In all efforts the Reserve will aim to elevate partner-led work, foster stewardship through interpretation, and create welcoming spaces where people can meaningfully connect with the waters and lands of Green Bay.

TARGET AUDIENCES AND WIDESPREAD BENEFITS

The Green Bay NERR will make its programs and visitor experiences inclusive, accessible, and relevant to a diverse range of audiences. Youth engagement will be a priority, with partnerships formed with local schools, after-school programs, and youth organizations such as Scouts, 4-H, and FFA to foster early connections to the estuary through hands-on, place-based learning. The Reserve will work closely with educators and schools to reduce barriers to visiting the bay, such as transportation and equipment needs.

Relationships with Tribal nations, including the Menominee and Oneida, will be built on mutual respect and reciprocity. The Reserve will support cultural interpretation and practices, such as water ceremonies and seasonal storytelling, that honor the historical and contemporary connections between communities and the watershed.

Organizations like Ducks Unlimited and the Izaak Walton League will be engaged through recreation-based stewardship opportunities. Lifelong learners, including university students, writers, artists, and ecotourists, will find access to educational events, guided experiences, and interpretation that links research to public understanding.

Across all programming and through collaborative partnerships, the Reserve will prioritize physical, cultural, and informational access to foster a welcoming environment where visitors feel a sense of belonging and opportunity.

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BOUNDARY EXPANSION PLAN

BOUNDARY EXPANSION CONTEXT

The Green Bay NERR consists of lands already in public ownership. Potential additions to the Reserve boundaries may be considered if they provide an opportunity to conserve coastal habitats, enhance ecological connectivity, or increase public access to the bay. Any boundary additions must directly support the mission of the Reserve and meet NOAA's requirements outlined in the federal regulations (15 CFR § 921.31). As stated in 15 CFR § 921.33, boundaries of a Reserve may also be adjusted to remove areas previously approved that no longer meet the needs or requirements of the Reserve.

Because the University of Wisconsin–Green Bay did not enter into agreements to purchase land for conservation or stewardship as part of the designation of the Reserve, direct acquisition or purchase of ecologically important land or water areas by the University of Wisconsin-Green Bay is not part of the Reserve's strategic plan, now or in the future. Rather than the University pursuing land ownership, Reserve staff will work collaboratively with landowning partners and conservation organizations whose acquisition efforts are guided by existing state, local, or nonprofit authorities.

The goal of the Boundary Expansion Plan is not to expand holdings for their own sake, but to remain responsive to opportunities that align with partner priorities and the Reserve's mission. When partner acquisitions advance shared goals, such as protecting estuarine habitats, improving connectivity among conservation lands, or enhancing research and education opportunities, the Reserve may explore boundary expansion in coordination with NOAA. This collaborative, strategic, and adaptive approach ensures that future land protection complements existing conservation initiatives while supporting the long-term ecological, educational, and community values of the Green Bay NERR.

PRIORITY VALUES

The Green Bay NERR will incorporate additional land and water through acquisitions made by its landowning partners. The process for including new areas, or excluding existing areas, within the Reserve boundary will follow federal regulations, and landowning partners will modify the MOU between their organization and the Green Bay NERR. The inclusion of new lands within the NERR boundaries will be evaluated based on the research, education, stewardship, and training priorities of the Reserve.

Any future area identified for inclusion in the Green Bay NERR will adhere to the values and criteria outlined below for Core and Buffer areas.

CRITERIA FOR CORE AREAS

- Coastal or estuarine property.

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- Has features aligned with the research and education goals of the Reserve.
- Publicly owned or land trust-owned property with public accessibility.
- Connects to the estuary in a significant way, there is direct linkage with the waters of the bay, and the water-connection has bidirectional flow.
- Maintains a sufficient level of control to ensure the long-term viability of the Green Bay NERR for research and natural processes.
- Encompasses resources representative of the total estuary system.
- Adds lands that are not well represented but are ecologically beneficial (e.g. sedge meadow).
- 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 bay.

CRITERIA FOR BUFFER AREAS

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

PRIORITY AREAS

Possible areas for future boundary expansion may include publicly owned lands of important ecological value that are adjacent to areas already included in the Reserve. This may include:

- New acquisitions within the project area for the DNR's Green Bay West Shore Wildlife Area, including future acquisitions within the Long Tail Unit
- Lands that are placed in public ownership near the Point au Sable/Wequiock Creek areas within the Lower Bay Component
- Expansion of land-trust held properties within the Sturgeon Bay Component.

Other areas that may be considered in future boundary expansion are public lands that were explored in the Site Nomination Process as Candidate Site Areas but not included in the boundaries. Those properties are listed below, and many are included in the DNR's Green Bay West Shore Wildlife Area.

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Chambers Island Nature Preserve: The largest area managed by the Door County Land Trust at 830 acres. The location is at an inflection point within the bay for both estuary and open water research. Relatively intact areas as compared to other parts of the bay. Contributes a different geology compared to the larger west shore rivers. Access to Chambers Island requires a boat.

Marinette Complex: Includes Wisconsin Department of Natural Resources owned Seagull Bar State Natural Area. Lands and waters include some unique natural communities, clear seiche influence, and an interesting site for Bay-related research (wild rice, bird migration). Unique lagoon-type habitat behind Seagull Bar.

Oconto Complex: Combination of DNR owned lands, and land owned by the Oconto Sportsmen's Club. Self-sustaining wild rice marsh, multiple sites for research opportunities along with Oconto River.

Pensaukee Complex: DNR owned large land area with significant existing research and monitoring. The mouth of the Pensaukee River is a key estuarine feature but not in public ownership.

Door County Island Complex: These include DNR and federal lands alongside private ownership. There are a high number of natural and unique communities present and several unique geomorphic features. Important bird migration area. Access is seasonally limited and requires a boat.

PRIORITY EXPANSION STRATEGY

The next iteration of the Green Bay NERR Management Plan will follow the NOAA Reserve System program guidance on developing a boundary expansion plan, including detailed descriptions of the criteria used to prioritize areas, the prioritization process, and any additional factors that influence the selection of areas. Future boundary expansion strategies will be aligned with the priorities of landowning partners acquisition of new coastal properties. What follows are general strategic parameters that can serve as a foundation to be built upon.

PARCEL EXPANSION STRATEGY

Parcels considered for inclusion in boundary expansion should be under adequate state or local governmental control and chosen such that the appropriate uses would be consistent with the goals and objectives of the Green Bay NERR and meet the boundary expansion values detailed above. The level of restoration needs and existing resource manipulation activities within the potential properties, and the results from ecosystem-based management assessments will be considered when evaluating potential boundary expansion areas.

Incorporating existing publicly owned land or land owned by land trusts would require extensive discussions with the University of Wisconsin–Green Bay administration and the

Reserve Advisory Board. The Green Bay NERR would work with NOAA's Office for Coastal Management to request the designation of a new component or a boundary modification.

The Green Bay NERR may collaborate with partners to conserve targeted properties by entering into a collaborative agreement with a land trust to articulate management responsibilities and achieve compatible conservation goals. The Green Bay NERR may help its landowning partners to undertake pre-acquisition due diligence activities for purchases that will be included within the Reserve boundaries and may provide resources for acquisition.

According to the Reserve System federal regulations, a Reserve must establish adequate state control over new areas acquired for inclusion in the boundary. The Green Bay NERR will meet this requirement through MOUs and the adoption of a shared, high-level management plan. Additional approaches taken by other Reserves have included conservation easements, property acquisition or donation, or a combination of these approaches. The Green Bay NERR will work with partners to develop management plans to protect or enhance the natural resources on property purchased by landowning partners. Lands included in boundary expansion would need to allow for public access, long-term research, and monitoring.

CLIMATE AND NON-CLIMATE STRESSORS

Future boundary expansion will include assessing anthropogenic and natural stressors to help inform other aspects of prioritization and selection of lands for inclusion. Types of stressors that will be considered include the level of on-site development, threat of adjacent or proximal development, invasive species, pollution / contaminant presence and levels, and land zoning.

In 2010, NOAA developed a framework for considering climate change impacts in planning and decision-making for coastal investments in restoration, facilities development, and land acquisition (NOAA Coastal Strategy, 2010). That framework states that new or updated acquisition plans that are part of a management plan must integrate climate considerations. Climate stressors pertinent to boundary expansion include changes in precipitation patterns, and the combined impacts of storms and precipitation on naturally fluctuating Great Lakes water levels which can impact shoreline erosion, flooding, and infrastructure.

FAIR MARKET VALUE ESTIMATES

The Green Bay NERR does not anticipate purchasing new land for inclusion in the boundaries. Any incision of new areas or boundary expansion would be from lands purchased by landowning partners. Inclusion of these lands in the Green Bay NERR boundaries would be considered after consultation with NOAA's Office for Coastal Management and adhering to the regulations for NERR System boundary expansion.

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ESTIMATED TIMELINE

During the timeframe of this management plan, the first for the Green Bay NERR, the Reserve will not seek to expand boundaries or acquire new property. Therefore, no timeline is provided.

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RESOURCE MANIPULATION PLAN

OVERVIEW

Resource manipulation refers to long-term human activities that alter natural systems primarily for human benefit, rather than for ecological restoration or scientific research. These activities are often necessary to support navigation, erosion control, flood mitigation, or habitat management and are generally compatible with the Green Bay NERR's mission and goals. This chapter describes existing and anticipated resource manipulations within the Reserve boundary, assesses potential impacts, and summarizes regulatory considerations and partner roles.

Within the Green Bay NERR boundaries, various manipulations occur across coastal wetlands, embayments, nearshore areas, and managed impoundments. These activities reflect long-standing infrastructure investments, shoreline protections, and habitat management practices that support both human and ecological needs. While not initiated by the Reserve, these manipulations occur on land and waters managed by Reserve partners and are likely to continue under established authorities. Overhead utility infrastructure is not included as a resource manipulation because utility lines exist throughout the boundaries and impacts are minimal and limited to planned mowing around utility infrastructure. Descriptions of long and short-term resource manipulation activities are listed below.

This chapter complements the Resource Protection Plan, which outlines allowable and prohibited uses, by focusing specifically on physical and hydrologic alterations that may influence the Reserve's ecological character and operational objectives.

LONGSTANDING RESOURCE MANIPULATIONS

DOCKS AND RAMPS

Docks and ramps are structures that allow access and use of waterbodies. Within the Reserve boundaries this includes floating and fixed docks, and ramps. All docks and ramps are within buffer areas and the impact of docks and ramps is limited and local. This may include short-term disturbances during construction and repair of dock structures. Additionally, there may be limited use-impact disturbances associated with recreational navigation and dredging.

FISHERIES MANAGEMENT

The Strawberry Creek Chinook Facility is within the buffer area of the Sturgeon Bay Component. The facility is owned and managed by the Wisconsin DNR. This hatchery is Wisconsin's primary source of Chinook salmon eggs for stocking in Lake Michigan. Chinook salmon return to Strawberry Creek from Lake Michigan to spawn. Salmon eggs are

collected, cleaned and prepared for transport to hatchery. In late September (the peak of the salmon spawning run), DNR staff collect eggs two times per week. The rustic hatchery facility is open to the public from late September through early November when DNR personnel are present. The salmon stocking program began in the spring of 1969 with 65,000 fingerlings stocked in Strawberry Creek. In recent years, about 120,000 Chinook salmon fingerlings are released annually at the facility. Stocking provides a diverse sport fishery for Lake Michigan. The footprint and activities of the facility are minimal and pose no conflict with the activities and operation of the NERR. Further information on the Strawberry Creek Hatchery can be found in an online brochure.

At the facility there are two seasonal mechanisms for water control. The first is an above-ground pipe that provides supplemental water flow from the Sturgeon Bay Ship Canal to the facility in the fall during spawning operations. The pipe exists all year and the pump is installed and used seasonally from late September to late October. The second mechanism is a seasonal bypass of some water from upstream Strawberry Creek, through the facility, and back into Strawberry Creek as it flows towards the Sturgeon Bay Ship Canal. This occurs for approximately six weeks from the end of April to late May to support salmon rearing.

SHORT-TERM RESOURCE MANIPULATIONS

NAVIGATION AND CHANNEL DREDGING

Maintenance dredging supports navigation and restoration projects and is managed primarily by the U.S. Army Corps of Engineers in partnership with local sponsors. There are no plans for dredging within the Reserve boundaries.

Navigational channels in Lower Green Bay, the Suamico River, and the Sturgeon Bay Ship Canal are not included in the boundaries of the Reserve. Short-term impacts of dredging include disturbance to the benthic community and temporary water quality degradation. Long-term impacts are generally mitigated through planning, permitting, and use of clean material for beneficial reuse. Positive long-term impacts from the use of clean dredge material can support new wetland and nearshore habitats.

HABITAT ENHANCEMENT ACTIVITIES

Habitat restoration activities in the Lower Bay Component include actions to stabilize the streambank, restore habitat, and other natural resource actions. Restoration activities are detailed in the Restoration Plan within this document.

WATER-LEVEL CONTROL STRUCTURES

Water-level control is used in several areas of the Reserve to manage wetland health, suppress invasive species, support fish and wildlife habitat, support management of natural communities, and prevent adjacent road flooding. Within the Reserve, water-level

control mechanisms allow for water level management to support habitat functions and control invasive species. Mechanisms include pumps, levees, and culverts, typically operated as needed.

Key sites with active water-level control include Sensiba State Wildlife Area (managed by the WDNR), Ken Euers Nature Area (owned by the City of Green Bay, with technical support from Ducks Unlimited and UW–Green Bay), and Point au Sable Natural Area (UW–Green Bay managed).

REGULATORY CONTEXT AND PERMITTING

Resource manipulation activities in Wisconsin are regulated under state and federal law. Key, relevant statutes and regulations include,

Wisconsin Statues Chapter 30, Navigable Waters, Harbors, and Navigation: Governs alterations to waterways, including dredging, structures, and shoreline modifications.

Wisconsin Statues Chapter 31, Regulation of Dams and Bridges Affection Navigable Waters: Applies to dams, none of which are located within the Reserve boundaries.

Wisconsin Administrative Code NR 15, Runoff Management Wisconsin: Provides performance standards and prohibitions for nonpoint source pollution in agricultural and urban areas.

Wisconsin DNR Waterways General Permits and Individual Permits: Required for dredging, grading, or construction below the ordinary high-water mark.

Federal Clean Water Act Section 401: Requires water quality certification for discharges, including dredge and fill operations.

National Environmental Policy Act and Wisconsin Environmental Policy Act: Requires Federal and state agencies to analyze, consider, and disclose the anticipated environmental impacts of certain proposed actions.

Endangered Species Review and Cultural Resource Assessments: Required as part of project planning and permitting.

The Wisconsin DNR requires permits for shoreline erosion control structures (Wisconsin DNR Shoreline Erosion Control Structures Permitting) and for dredging and grading projects Wisconsin DNR Dredging and Grading Project Permitting). Resource manipulation activity above the ordinary high watermark may be subject to local regulations. Project proponents may also be subject to stormwater management ordinances or municipal zoning rules for upland components.

PARTNERS AND IMPLEMENTATION

The following organizations play critical roles in planning, funding, executing, or permitting resource manipulations within or adjacent to the Reserve,

- Wisconsin Department of Natural Resources
- U.S. Army Corps of Engineers
- City of Green Bay
- Marinette Land & Water Conservation Department
- Oconto County Land & Water Conservation Department
- Brown County Land & Water Conservation Department
- Brown County Port and Resource Recovery Department
- Cofrin Center for Biodiversity, UW–Green Bay
- Ducks Unlimited
- Wisconsin Coastal Management Program
- U.S. Fish and Wildlife Service
- Northeast Wisconsin Land Trust

These partners bring technical, financial, and operational expertise, ensuring resource manipulations are consistent with best practices and aligned with conservation goals.

CLIMATE AND NON-CLIMATE CONSIDERATIONS

Lake Michigan and Green Bay water levels fluctuate naturally, while recent patterns of increased precipitation, more intense storms, and rapid spring runoff events have resulted in shoreline erosion, flooding, and habitat degradation. In response, Reserve partners may wish to expand resource manipulation activities to enhance resilience. These could include constructing living shorelines, enhancing stormwater management systems, or modifying water-control structures. Coordination with state agencies and partners will guide these actions to ensure they remain adaptive and evidence based. Climate adaptation plans from partner agencies and resources networks will be helpful references for Reserve staff. Examples of Great Lakes digital climate adaptations and resources include,

- Wisconsin DNR Climate Action Response
- NOAA Great Lakes Climate Adaptation Network (GLCAN)
- Wisconsin Initiative on Climate Change Impacts
- US Department of Agriculture Strategies for Adapting Great Lakes Coastal Ecosystems to Climate Change

RESERVE ROLE AND OVERSIGHT

The Green Bay NERR does not directly implement or regulate resource manipulation activities; however, it may engage with permitting agencies as appropriate to support informed decision-making. All Reserve engagement will operate within and respect existing federal, state, and local laws and authorities.

In alignment with the priorities and management responsibilities of landowning partners, the Reserve may contribute by monitoring and assessing the impacts of resource manipulation activities on Reserve programs and by supporting research and monitoring efforts that evaluate ecological outcomes. The Reserve will also develop outreach and education materials that highlight nature-based solutions and best management practices, while promoting the integration of stakeholder perspectives into decision-making processes.

Through its coordinated stewardship and science programs, the Reserve will help ensure that lessons learned from resource manipulation activities are translated into applied research, education, and training efforts, strengthening regional understanding and informing future management approach.

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RESTORATION PLAN

CONTEXT FOR RESTORATION IN THE RESERVE

The Bay of Green Bay, particularly the lower bay, has undergone significant habitat restoration that will continue through the period of the Reserve's first Management Plan. Future restoration activities within the Reserve's boundaries will improve ecological integrity and support habitat for native species. As a member of the National Estuarine Research Reserve System, the Green Bay NERR can contribute to NOAA Management Plan guidance for Reserve's in the following ways.

- Play a national role in developing innovative technology and methods of evaluating restoration performance.
- Serve as a reference site for restoration in large freshwater estuaries.
- Translate and transfer restoration science to local and regional practitioners.
- Provide scientific and technical advice to support science information decisions-making.
- Build support for regional science coordination.

While most restoration activities are being led by partner groups, Reserve staff will support these and other efforts by contributing staff time, technical expertise, education, and capacity-building.

RESTORATION ACTIVITIES WITHIN THE AREA OF CONCERN

Many active restoration areas with the Reserve's boundaries overlap with the Lower Green Bay and Fox River Area of Concern. The *Lower Green Bay & Fox River Area of Concern Fish and Wildlife Habitat and Populations Management Action Plan* (DNR, 2024) identifies twelve management action locations across the AOC. Detailed priority habitat descriptions are available in the Wisconsin DNR's Lower Green Bay & Fox River Area of Concern Fish and Wildlife Habitat and Populations Management Action Plan (2024). Four of these priority projects overlap the Reserve and are described below.

- *Ken Euers Nature Area*: Active restoration was completed in 2021 (tree removal, berm regarding, installation of water control structure, prairie plantings, wild rice seeding, in-water woody structure installation) to enhance trail access, views of the bay, and improved habitat for waterfowl. Work includes invasive species management, and the monitoring of anurans and marsh breeding birds.
- *UW–Green Bay Complex (Wequiock Creek Natural Area and Point au Sable)*: Improving berm and shoreline resiliency for long-term stability. Management of

aquatic invasives species. The addition of woody habitats and substrate, and aquatic habitat enhancements.

- *Longtail Point Beach Restoration and Reefs*: Close collaboration with the U.S. Army Corps of Engineers to complete beach nourishment using beneficially dredged sand from nearby harbors, enhancing Great Lakes Beach habitat and coastal resiliency along Longtail Point. Following the completion of beach nourishment, Ducks Unlimited will lead restoration activities along Longtail Point and the leeward Deadhorse Bay coastal wetland to restore forest, grassland, wet meadow, and coastal emergent and submergent marsh habitat. Several fisheries habitat structures will also be placed throughout the project area as part of the restoration design, targeting yellow perch, northern pike, musky, and sunfish. Along the beach there is seasonal habitat restoration to benefit Piping Plovers.
- *Duck Creek Delta Wetland Complex:* Restoration of several hundred acres of coastal emergent and submergent marsh by implementing fetch control structures such as woody breakwaters and habitat groins that will reduce wind, wave, and ice scour impacts to aquatic vegetation, and serve as habitat features for an array of fish and wildlife. Additional invasive species management and native species restoration will occur in nearshore and upland areas surrounding the Duck Creke Delta. Substrate improvements will be made in Duck Creek to support several fish and native mussel species.

  In 2025 Ducks Unlimited was awarded a NOAA Fish Habitat Restoration Partnership grant agreement supported by the Great Lakes Restoration Initiative to deliver habitat restoration at the Duck Creek Delta and Longtail Point. While both locations have been significantly degraded by invasive species encroachment, poor water quality, altered sediment dynamics, and other anthropogenic issues, they remain important coastal wetlands and Great Lakes beach habitat in lower Green Bay. Ducks Unlimited will work with many agency, technical, and community partners to design plans and specifications for restoration actions at both sites.

RESTORATION ACTIVITIES OUTSIDE THE AREA OF CONCERN

Other restoration activities within the Reserve boundaries include projects at the Wisconsin DNR's Sensiba Unit within the Green Bay West Shores Wildlife Area and the Peshtigo Harbor State Wildlife Area.

- *Sensiba Unit*: The DNR partnered with Ducks Unlimited on a project to create a new dike bisecting a former leaking impoundment. This included two new water control structures, restoring wetland management functions through a variety of techniques to cover 225 acres. In addition to the primary function of habitat management, restoration will improve recreation and flood protection in the surrounding area.

- *Peshtigo Harbor State Wildlife Area*: The DNR partnered with Marinette County and the City of Peshtigo to repair erosion and enhance fish habitat on 1,600 linear feet of the Peshtigo River beneath the first upstream dam. The project incorporated removing old rubble from the riverbank and replacing it with root wads and rock spines that will benefit small mouth bass, sturgeon, walleye, and other fish species.

Through collaborative efforts, the Wisconsin Department of Natural Resources (DNR) is actively working to combat invasive species and advance restoration across lands within the Reserve boundaries. These efforts include the removal and control of species such as buckthorn, European frog-bit, and phragmites, alongside research to improve management effectiveness. Additional work is underway to mitigate the impacts of emerald ash borer through the release of parasitic wasps, establishment of ash underplanting, and implementation of multi-trial study plots designed to inform long-term forest resilience strategies.

Several additional restoration initiatives and research projects are of interest to the Reserve and reflect the breadth of partner-led efforts across the estuary. Recent research on the rusty-patched bumble bee, conducted by multiple universities, is expected to inform future local restoration actions once agency guidance is finalized. In 2026, research on muskellunge spawning began in several Green Bay tributaries, with findings anticipated to improve understanding of reproductive dynamics and inform habitat restoration strategies. These efforts build on past tributary restoration work that has already enhanced habitat for Northern Pike, lake sturgeon, and other aquatic species. Wild rice restoration continues as a multi-partner initiative to seed hundreds of acres across the bay, with monitoring led by UW–Green Bay scientists. Complementary efforts include culvert replacements in tributaries to improve fish passage and access to spawning habitat.

At specific Reserve sites, restoration activities demonstrate the integration of habitat management and long-term stewardship. At Barkhausen Waterfowl Preserve there is management of invasive species, mowing to maintain prairie and wet meadow habitats, native plantings, and repairs to berms surrounding wetland complexes. At the Sturgeon Bay Ship Canal Nature Preserve, Door County Land Trust staff control invasive species within coastal dune habitats, including management of Scots pine, purple loosestrife, European marsh thistle, and other species. These efforts are paired with monitoring for threatened and endangered species, as well as inventory and treatment of invasive woody species as funding allows. Together, these projects highlight the role of coordinated, site-based restoration in advancing broader estuarine recovery goals.

RESERVE PRIORITY RESTORATION ACTIONS

During the first management plan cycle Reserve staff will not lead large-scale restoration projects. Instead, Reserve efforts will focus on supporting projects led by partners across the estuary. A key need identified by partners is the ability to strengthen monitoring and evaluation to better understand restoration outcomes and inform future actions.

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To meet this need, the Reserve will support the Green Bay Restoration Team by building and maintaining partnerships among both traditional partners, such as natural resource agencies and conservation organizations, and non-traditional partners, including the business community, to advance short- and long-term restoration goals. The Reserve will extend monitoring beyond the typical 5-year window supported through Area of Concern funding to generate longer-term datasets that capture restoration trajectories over time. This work will include conducting high-resolution, seasonal monitoring of oxygen, nutrients, and other environmental indicators, as well as designing studies that examine short-term shifts in vegetation, water quality, and habitat response under changing environmental conditions. These studies will aim to better understand patterns of extent and colonization across space and time.

The Reserve will also pilot new technologies, such as sensors capable of operating during winter and spring transition periods, to improve understanding of year-round estuarine conditions. Targeted research will investigate sediment dynamics, including the use of dye tracer studies in the Duck Creek Delta and Cat Island Chain to better understand deposition, circulation, and sediment transport processes. Additional efforts will examine the effects of legacy and emerging contaminants on fish, wildlife, and vegetation communities, contributing to a more comprehensive understanding of barriers to ecosystem recovery.

In collaboration with partners, the Reserve will assess how resiliency is being incorporated into restoration design and long-term stewardship forecasting, identifying the tools and information currently in use and evaluating gaps that may inform best management practices for dynamic Great Lakes systems such as the Green Bay estuary. Finally, the Reserve will help develop educational materials and interpretive signage for key restoration projects, including the woody breakwater at Ken Euers Nature Area and the causeway entrance to the Cat Island Chain, helping connect the public to restoration science, outcomes, and stewardship programs.

EDUCATION, TRAINING, AND ENGAGEMENT

Restoration in the bay can serve as a living classroom for students, professionals, and community members. In collaboration with partners, Reserve staff may deliver workshops and field training courses that highlight best practices in design, monitoring, and adaptive management.

The Reserve's KEEP and TOTE programs will integrate restoration as a core theme. K–12 initiatives such as the Lower Fox River Watershed Monitoring Program already brings restoration science into classrooms and field trip opportunities for students to experience on-the-ground projects. Existing partnerships with the College of Menominee Nation and Menominee Indian High School will connect students to field tours and restoration workdays, building knowledge and stewardship skills. Interpretive programming, signage, and the future Visitor and Education Center will highlight restoration as part of the bay's ecological identity.

LOOKING AHEAD

This initial Restoration Plan provides context, priorities, and actions for the Green Bay NERR's first five years of operation. During the next management plan cycle, Reserve staff will work closely with partners and land managers to identify priority habitats and geographic areas across the Reserve's boundaries for targeted restoration activities. This will include integrating partner-led monitoring and adaptive management strategies, establishing shared regional restoration goals and measurable targets, and incorporating Indigenous knowledge and perspectives into restoration design and implementation.

The Reserve will also seek to strengthen connections between restoration, community resilience, and regional economic vitality, recognizing the role that healthy estuarine systems play in supporting local communities and livelihoods. By focusing on monitoring, evaluation, and shared learning, the Reserve will enhance restoration outcomes and contribute new insights to the broader community of restoration practitioners across the Great Lakes.

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APPENDIX A: NOAA & UWGB MOU

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Memorandum of Understanding

Between the

National Oceanic and Atmospheric Administration and

The Board of Regents of the University of Wisconsin System d.b.a. UW-Green Bay

Detailing the State-Federal Roles in the Management of the

Bay of Green Bay National Estuarine Research Reserve

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I. PARTIES AND PURPOSE

This Memorandum of Understanding (MOU or agreement) establishes the framework for the cooperative management of Bay of Green Bay National Estuarine Research Reserve (GBNERR) in the State of Wisconsin, between the National Oceanic and Atmospheric Administration (NOAA), Office for Coastal Management and the Board of Regents (BOR) of the University of Wisconsin System d.b.a. UW-Green Bay (UWGB).

II. AUTHORITY

The authority for this agreement is the Coastal Zone Management Act of 1972, as amended (CZMA, 16 U.S.C. §§ 1451-65), and its implementing regulations at 15 C.F.R. Parts 921, 923.

III. BACKGROUND

A. The State of Wisconsin has determined the waters and related coastal habitats of GBNERR provide unique opportunities for the study of natural and human processes to contribute to the science of estuarine ecosystem processes, enhance environmental education opportunities and public understanding of estuarine areas, and provide a stable environment for research through the long-term protection of reserve resources.

B. The State of Wisconsin has determined that the resources of the GBNERR and the values they represent to the citizens of Wisconsin and the United States will benefit from the management of these resources as part of the National Estuarine Research Reserve (NERR) System.

C. The BOR, as the agency designated by the Governor of Wisconsin, is responsible for maintaining, operating and managing the GBNERR in accordance with Section 315 of the CZMA, 16 U.S.C. § 1461, and acknowledges the value of state-federal cooperation for the long-term management and protection of the GBNERR in a manner consistent with the purpose of its designation.

D. NOAA finds that the State of Wisconsin has satisfied the legal and procedural requirements for designation and, pursuant to its authority under Section 315 of the CZMA, 16 U.S.C. § 1461, and in accordance with implementing regulations at 15 C.F.R. Part 921, designated the GBNERR.

E. The GBNERR management plan approved by NOAA describes the goals, objectives, strategies/actions, administrative structure, and institutional arrangements for the GBNERR, including this agreement and others. In consideration of the mutual agreements herein, NOAA and BOR agree to the roles indicated in Section IV of this agreement.

IV. STATE-FEDERAL ROLES IN RESERVE MANAGEMENT

A. The BOR role in GBNERR Management

The BOR shall:

1. be responsible for compliance with all applicable federal laws and regulations, and ensure that the GBNERR management plan is consistent with the provisions of the CZMA and implementing regulations;

2. support and coordinate, within BOR's legal authority and in cooperation with agencies and entities having jurisdiction, the protection of the natural and cultural resources of the GBNERR, and coordinate with appropriate governmental authorities regarding the enforcement of the provisions of state law and regulations aimed at protecting the GBNERR;

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3. ensure adequate, long-term protection and management of lands and waters included within the GBNERR boundary to the extent within BOR's legal authority and control, and in coordination with landowners and governmental entities having jurisdiction over such lands and waters;

4. cooperate with NOAA to apply for and manage funds to support the GBNERR in accordance with applicable federal and state laws, the GBNERR management plan, annual funding guidance from NOAA, and any other NOAA directives pertaining to GBNERR operations, research and monitoring, education and stewardship, and, as necessary, land acquisition and GBNERR facility construction;

5. conduct and coordinate research and monitoring programs that encourage scientists from a variety of institutions to work together to understand the ecology of the GBNERR ecosystem to improve coastal management;

6. conduct and maintain programs that disseminate research results via materials, activities, workshops, and conferences to resource users, state and local agencies, school systems, the general public, and other interested parties;

7. provide staff and endeavor to secure state funding for the manager, education coordinator, and research coordinator;

8. secure facilities and equipment required to implement the provisions within the GBNERR management plan, subject to available funding, applicable law, necessary approvals, and BOR's legal authority;

9. ensure adequate support for facilities operation and maintenance for facilities under BOR/UWGB's control, subject to available funding, applicable law, necessary approvals, and the terms of any applicable financial assistance award;

10. maintain effective liaison with local, regional, state, and federal policy makers, regulators, and the general public;

11. serve as principal contact for issues involving proposed boundary changes and/or amendments to the GBNERR management plan; and

12. cooperate with NOAA regarding review of performance pursuant to Sections 312 and 315 of the CZMA, 16 U.S.C. §§ 1458 and 1461, 15 C.F.R. § 921.40, and ongoing management plan approvals.

B. Federal Role in GBNERR Management

NOAA's Office for Coastal Management shall:

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1. administer the provisions of the Sections 312 and 315 of the CZMA, 16 U.S.C. § 1458 and 16 U.S.C. § 1461, respectively, to ensure that the GBNERR operates in accordance with goals of the NERR System and the GBNERR management plan;

2. review and process applications for financial assistance from the BOR, consistent with 15 C.F.R. Part 921, for management and operation of the GBNERR, and, as appropriate, land acquisition and facility construction;

3. advise BOR of existing and emerging national and regional issues that have bearing on the GBNERR and NERR System;

4. maintain an information exchange network among reserves, including available research and monitoring data and educational materials developed within the NERR System; and

5. to the extent possible, facilitate the allocation of NOAA resources and capabilities in support of GBNERR goals and programs.

C. General Provisions

1. Nothing in this agreement shall obligate either party in the expenditure of funds, or for future payments of money. Each party bears its own costs to implement this agreement. Any obligations involving the expenditure of funds are subject to available appropriations, applicable law, and all required approvals. NOAA may provide Federal funding in accordance with the CZMA and any requirements of the U.S. Department of Commerce through financial assistance awards that are separate from this agreement.

2. A free exchange of research and assessment data between the parties is encouraged and is necessary to ensure success of cooperative studies.

D. Other Provisions

1. Nothing in this agreement diminishes the independent authority or coordination responsibility of either party in administering its respective statutory obligations. Nothing in this agreement is intended to conflict with current written directives or policies, applicable law, or applicable governing authority of either party. If the terms of this agreement are inconsistent with existing written directives or policies, applicable law, or applicable governing authority of either party entering this agreement, then those portions of this agreement that are determined to be inconsistent with such written directives or policies, applicable law, or applicable governing authority shall be invalid; but the remaining terms

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not affected by the inconsistency shall remain in full force and effect. In the event of the discovery of such inconsistency, and at the first opportunity for revision of this agreement, the parties shall seek to amend or terminate this agreement in accordance with the provisions of section VI of this agreement.

2. Any disagreement on the interpretation of a provision, amendment, or other matter related to this agreement shall be resolved informally at the lowest operating level of each party's respective organization. If such disagreement cannot be resolved, then the area(s) of disagreement shall be stated in writing and presented to the other party for further consideration. If agreement is not reached within thirty (30) days of presentation, then the parties shall forward the written presentation of the disagreement to their respective higher official for appropriate resolution.

V. PROGRAM EVALUATION

In accordance with sections 312 and 315 of the CZMA, 16 U.S.C. §§ 1458 and 1461, and 15 C.F.R. § 921.40, NOAA's Office for Coastal Management will schedule periodic evaluations of BOR performance in meeting the terms of this agreement and the GBNERR management plan. Where findings of deficiency occur, NOAA may initiate action in accordance with the interim sanctions or withdrawal of designation procedures established by the CZMA and applicable regulations at 15 C.F.R. Part 921, Subpart E.

VI. EFFECTIVE DATE, REVIEW, AMENDMENT, AND TERMINATION

A. This agreement is effective on the date of the last signature on this agreement and shall be in effect until terminated by either party.

B. This agreement will be reviewed periodically by both parties and may only be amended by the mutual written consent of both parties.

C. This agreement may be terminated by mutual consent of both parties or by unilateral termination by either party. Termination of this agreement may provide grounds for NOAA (at its discretion) to withdraw designation of the GBNERR from the NERR System, pursuant to applicable provisions of the CZMA and its implementing regulations as described under 15 C.F.R. Parts 921 (Subpart E) and 923 (Subpart L). Section 315 of the CZMA, 16 U.S.C. § 1461, provides that NOAA may withdraw designation of a NERR if: 1) NOAA finds that any of the criteria for establishing the reserve no

longer exist; or 2) a substantial portion of the research conducted within the reserve fails to meet NERR System guidelines. In making any decision to withdraw designation, NOAA will take into consideration factors set forth in 15 C.F.R. § 921.40.

D. If any clause, sentence, or other portion of this agreement shall become illegal, null, or void for any reason, the remaining portions of this MOU shall remain in full force and effect.

E. No waiver of right by either party of any provision of this agreement shall be binding unless expressly confirmed in writing by the party giving the waiver.

IN WITNESS THEREOF, the parties have caused this agreement to be executed.

Name	Name
Director	Director
Office for Coastal Management National Ocean Service	State Agency Department
National Oceanic and Atmospheric Administration	
U.S. Department of Commerce	
Date	Date

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APPENDIX B: MULTIPARTY MOU

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MEMORANDUM OF UNDERSTANDING BETWEEN

UNIVERSITY OF WISCONSIN-GREEN BAY, BROWN COUNTY,

WISCONSIN DEPARTMENT OF NATURAL RESOURCES,

CITY OF GREEN BAY, NORTHEAST WISCONSIN LAND TRUST, DOOR COUNTY LAND TRUST, VILLAGE OF HOWARD,

TOWN OF SCOTT, CROSSROADS AT BIG CREEK, AND STURGEON BAY SCHOOL DISTRIC

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU) serves to establish the contractual framework for coordination, cooperation, collaboration, and communication regarding the Bay of Green Bay National Estuarine Research Reserve (Reserve) among the following parties (parties-in-interest): The University of Wisconsin-Green Bay (UWGB), a state institution of higher education and a component of the University of Wisconsin System serving as the state lead entity; Brown County; Wisconsin Department of Natural Resources; City of Green Bay; Northeast Wisconsin Land Trust; Door County Land Trust; Village of Howard; Town of Scott; Crossroads at Big Creek, and Sturgeon Bay School District. Subject to the MOU's below-conditions, this MOU is a binding contract that is entered into by the parties-in-interest.

WHEREAS, the University of Wisconsin-Green Bay) has received a grant (Grant) from the United States Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA) for the development and operation of the Bay

of Green Bay National Estuarine Research Reserve (Reserve), which includes portions of the Bay of Green Bay Freshwater Estuary and adjacent lands, and

WHEREAS, the purpose of the DOC grant is to create new opportunities for coordinated coastal resource management, research, monitoring, stewardship, and public education (Program), and

WHEREAS, such Program has wide public support, as evidenced by the documented public support throughout the Reserve feasibility study, site selection process, site nomination,
and designation process, and

WHEREAS, the parties-in-interest have evidenced support for such a Program through their approval of the **XXXX** Site Nomination Proposal for the Reserve,

NOW THEREFORE, in consideration of the mutual covenants and agreements contained in this MOU as well as the mutual benefits to be derived from implementing this Program, the parties-in-interest agree to the following:

1. The lands described in Appendix C (attached to this MOU and incorporated into this MOU by this reference) are designated as sites participating in the Reserve for purposes of the Reserve designation and management plan, subject to the terms of this MOU and applicable NOAA requirements.

   Participation in the Reserve and inclusion of lands described in Appendix C shall not alter ownership, management authority, jurisdiction, regulatory authority, public access rights, or any other property rights associated with such lands. Each party-in-interest retains full authority and discretion over the management and use of lands under its ownership or control, subject to applicable laws, regulations, and existing agreements.

2. There is a program Management Plan (Plan; this document) for the Reserve that provides a framework for conducting a specified Program on Reserve sites. Revisions of the Plan shall be developed by the Reserve staff and reviewed by the Green Bay NERR Reserve Advisory Board (Board). The Plan shall be reviewed every five (5) years and revised in consultation with the Board and NOAA.

3. Parties-in-interest agree to exert their reasonable best efforts to support the implementation of the Plan. The Green Bay NERR Reserve Advisory Board serves in an advisory capacity only and shall not possess authority over the ownership, management,

operation, regulatory authority, or property rights of any Reserve site or party-in-interest.

Nothing in this MOU diminishes the independent authority or coordination responsibility of any party-in-interest in administering its respective statutory and legal obligations. Nothing in this MOU is intended to conflict with current written directives or policies, applicable law, applicable governing authority, or grant obligations of any party-in-interest. If the terms of this MOU are inconsistent with existing written directives or policies, applicable law, applicable governing authority, or grant obligations of any party-in-interest entering into this MOU, then those portions of the MOU that are determined to be inconsistent with such written directives and policies, applicable law, applicable governing authority, or grant obligations shall be invalid; but the remaining terms not affected by the inconsistency shall remain in full force and effect. At the first opportunity for revision of this MOU, all necessary changes will be made by either an amendment to this MOU or by entering into a new superseding MOU, whichever is deemed expedient to the interest of all parties. Issues that arise that may be contrary to the terms or intent of the Plan will be brought to the Board for discussion and resolution by consensus or majority vote of its members. Nothing in this MOU shall be construed as granting the Advisory Board authority over the management, ownership, regulatory authority, or operational decisions of any Reserve site. Should disagreement arise on decisions of the Board or in the interpretation of the provisions of this MOU, or amendments and/or revisions to the MOU, that cannot be resolved by negotiations at the operating level of each party-in-interest, the area(s) of disagreement shall be stated in writing by each party-in-interest and promptly presented to a unanimously approved mediator for non-binding mediation. If the parties-in-interest cannot agree on the choice of a mediator or if the mediation does not resolve the dispute to the unanimous approval of the parties-in-interest, the parties-in-interest are free to pursue any other legal remedies that are available or to terminate their participation in this MOU.

4. Multiple uses of Reserve lands are encouraged to the extent that such uses are compatible with the Program and its purpose as expressed in the Plan. The parties-in-interest having jurisdiction over the Reserve site (or sites) will exert their reasonable best efforts to ensure uses or levels of use are consistent with the goals of the Plan.

5. No projects shall be carried out on Reserve lands without the prior written approval of the agency/entity having jurisdiction over such lands.

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6. The Reserve staff, Board, and appropriate advisory participants, if any, shall confer regularly to ensure coordination between the Reserve Program and the broader goals and mandates of regional coastal management programs that affect the Reserve.

7. This MOU shall not be construed to preclude additional transfers of property among the parties-in-interest, or to preclude additions or subtractions of appropriate lands to Reserve sites.

8. This MOU shall continue on an on-going basis so long as the Reserve Program is funded and remains viable. This MOU may be amended or terminated by the parties-in-interest at any time by written consent of affected parties. Nothing in this MOU shall preclude the partial or unilateral withdrawal of any of the parties-in-interest. In such an eventuality, it is understood that the lands of the withdrawing party-in-interest would be de-designated from the Reserve, and it is further understood that, should the withdrawing party-in-interest have received federal awards related to the Reserve Program, it will notify such federal agencies as required with respect to modification or termination of current or pending grants. A party-in-interest may withdraw upon 90 days written notice.

9. All parties-in-interest agree to exert their reasonable best efforts to cooperate with the Reserve Program so that it can achieve its mission to serve as a regionally-scaled scientific and educational resource to help promote and recover the ecological health of the Bay of Green Bay Freshwater Estuary and to foster continued support and expansion of regional Great Lakes freshwater estuary research, education, and stewardship.

10. The parties-in-interest understand that UWGB's primary mission is education and ensuring that all Wisconsin people can access university resources and research and engage in lifelong learning, wherever they live and work. Consequently, UWGB's activities under this MOU are designed to carry out that mission.

11. The manner of performance of UWGB's activities under this MOU shall be determined by UWGB. UWGB does not guarantee specific results. UWGB is free to continue similar research and educational activities on other projects. UWGB may discuss its activities under this MOU with other entities and individuals.

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12. UWGB shall have the right to use, publish, and disclose data, information, or writings generated by UWGB activities under the Program.

13. Participation in this MOU does not create any obligation for a party-in-interest to provide funding, staffing, matching funds, or in-kind services unless separately agreed to in writing.

14. The parties-in-interest agree to comply with all applicable federal, state, and local laws regulating ethical conduct of public officers and employees.

15. Each party-in-interest will comply with all applicable laws, regulations, and executive orders relative to Equal Employment Opportunity.

16. Each party-in-interest will comply with all applicable laws, regulations, and executive orders relative to Indian Tribal governments, their sovereignty, and their treaty rights.

17. Upon termination of this MOU, any equipment purchased by a party-in-interest for activities initiated in furtherance of this MOU will be retained by the respective party-in-interest, as permitted under applicable law, grant terms, third-party funding requirements, and the terms of any agreement or award that funded the purchase.

18. A free exchange of data and information among the parties-in-interest is encouraged and is necessary to ensure the success of these cooperative activities.

19. This MOU is subject to availability of appropriated funds.

20. The parties-in-interest shall not be liable for any incidental, indirect, special or consequential damages arising out of or related to this MOU.

21. The parties-in-interest are not making any express or implied warranties of merchantability, fitness for a particular purpose, freedom of infringement, or any other warranties of any kind or nature.

22. This MOU shall be binding on the successors and/or assigns of the parties-in-interest.

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23. This MOU shall be construed and enforced in accordance with the laws of the State of Wisconsin, exclusive of its choice of law provisions, as well as any applicable United States federal laws and regulations.

24. If any clause, sentence or other portion of this MOU shall become illegal, null or void for any reason, the remaining portions of this MOU shall remain in full force and effect.

25. No waiver of right by any party-in-interest of any provision of this MOU shall be binding unless expressly confirmed in writing by the party-in-interest giving the waiver.

26. No party-in-interest shall be liable for delays in performing the MOU due to factors beyond the reasonable control of such party-in-interest.

27. Those provisions of this MOU which by their nature extend beyond termination or expiration of this MOU shall survive such termination or expiration.

28. This MOU may be executed in two or more counterparts, all of which together shall constitute one and the same document.

UNDERSTOOD AND AGREED

University of Wisconsin-Green Bay

By: _____

Name: _____

Title: _____

Date: _____

Brown County

DRAFT

By: _____

Name: _____

Title: _____

Date: _____

Wisconsin Department of Natural Resources

By: _____

Name: _____

Title: _____

Date: _____

City of Green Bay

By: _____

Name: _____

Title: _____

Date: _____

Northeast Wisconsin Land Trust

By: _____

Name: _____

DRAFT

Title: _____

Date: _____

Door County Land Trust

By: _____

Name: _____

Title: _____

Date: _____

Village of Howard

By: _____

Name: _____

Title: _____

Date: _____

Town of Scott

By: _____

Name: _____

Title: _____

Date: _____

DRAFT

Crossroads at Big Creek

By: _____

Name: _____

Title: _____

Date: _____

Sturgeon Bay School District

By: _____

Name: _____

Title: _____

Date: _____

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APPENDIX C: SUMMARY OF GREEN BAY NERR LANDS

Attachement to the Multiparty MOU:

Summary of lands included in the Green Bay National Estuarine Research Reserve

This document identifies the lands included within the proposed Green Bay National Estuarine Research Reserve and provides a summary of existing ownership, management, and significant ecological features. It is intended for reference purposes only. Nothing in this attachment modifies ownership, management authority, jurisdiction, public access, or applicable laws, regulations, or land management responsibilities of any participating landowner.

SUMMARY: RESERVE BOUNDARIES

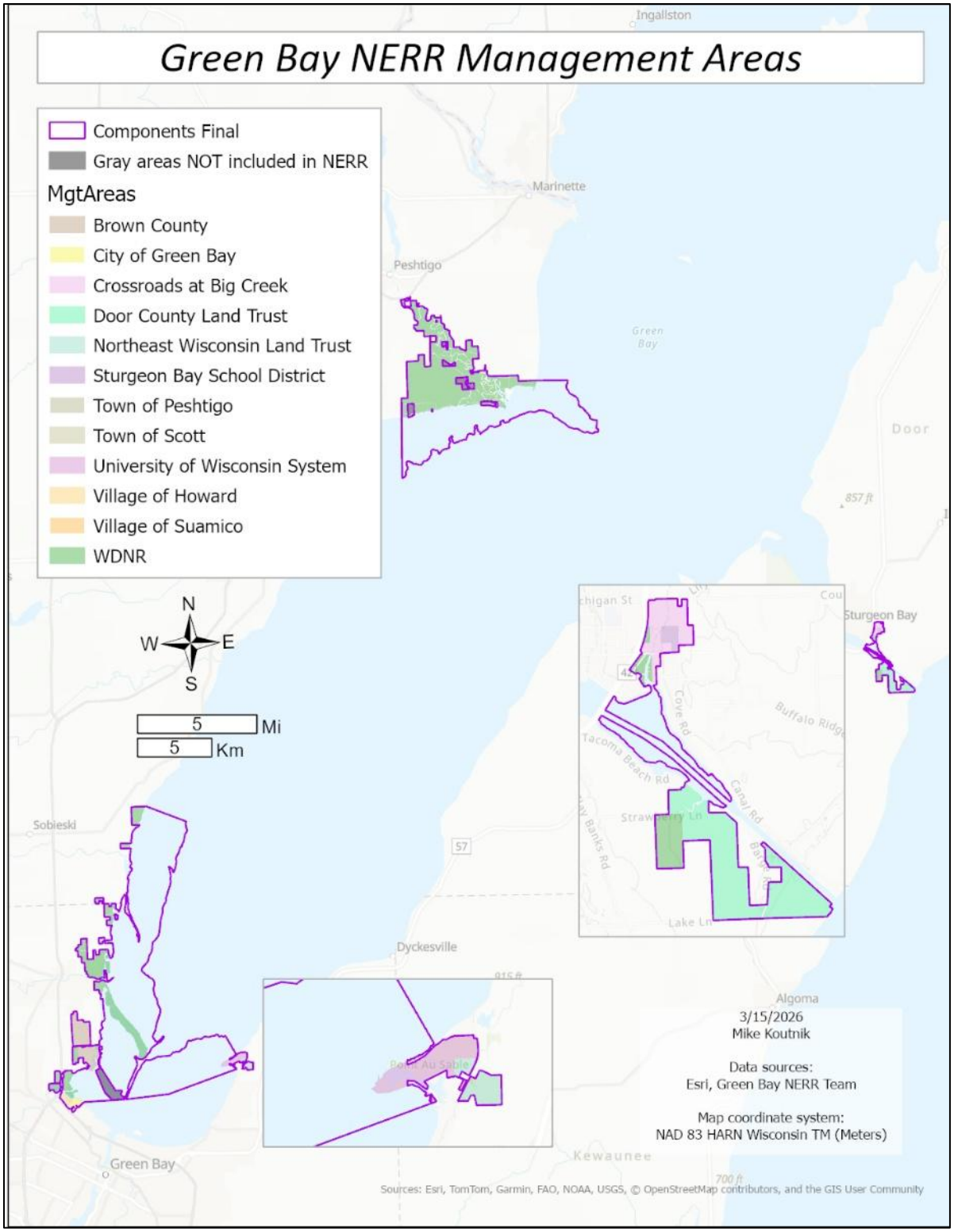
The Green Bay estuary is defined by two important gradients: 1) a disturbance gradient from minimally impacted habitats in the northern portion of the Bay to areas restored in Lower Green Bay, and 2) the south-to-north gradient capturing the nutrient-rich waters of the Fox-Wolf watershed entering Green Bay at the mouth of the Fox River, meeting the nutrient-poor waters entering the Bay from Lake Michigan and flowing in a counter-clockwise pattern around Green Bay. The lands and waters selected for inclusion in the Green Bay NERR were chosen with consideration of these gradients. The boundary for the Reserve comprises land and water area totaling 36,502 acres, comprising 11,428 acres of uplands and wetlands and 25,074 acres of open water within the Bay of Green Bay. Of the total area, 25,694 acres (70% of the total area) are core, and 10,808 (30%) are buffer.

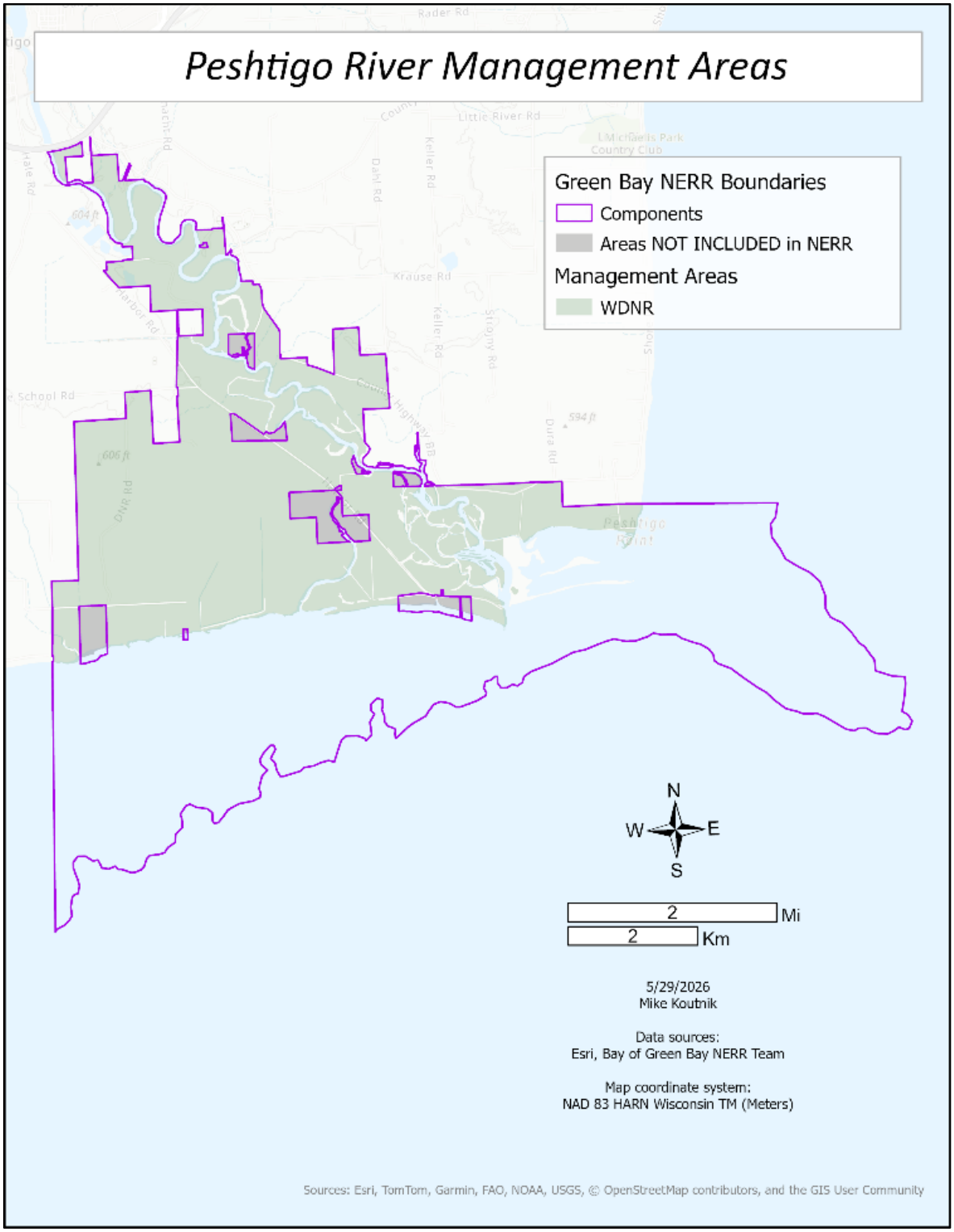
The Green Bay NERR is organized into three component areas by geography: the **Peshtigo River Component, Lower Bay Component,** and **Sturgeon Bay Component**. The size of each component area is:

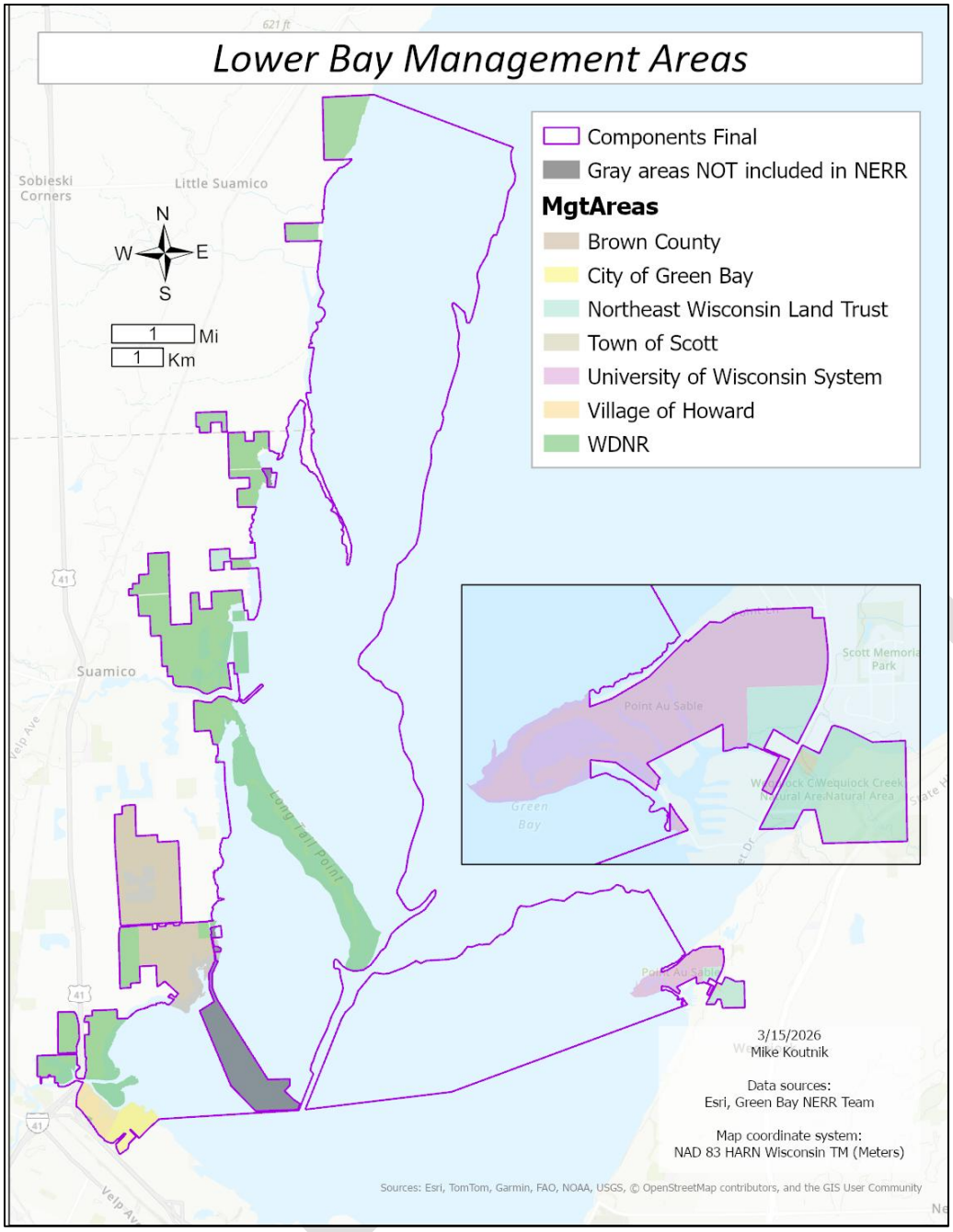
- **Peshtigo River Component** - 13,403 acres (6,560 land/wetland; 6,843 open water in the Bay)
- **Lower Bay Component** – 22,247 acres (4,210 land/wetland; 18,037 open water in the Bay)
- **Sturgeon Bay Component** - 852 acres (658 land/wetland; 194 open water in the Bay)

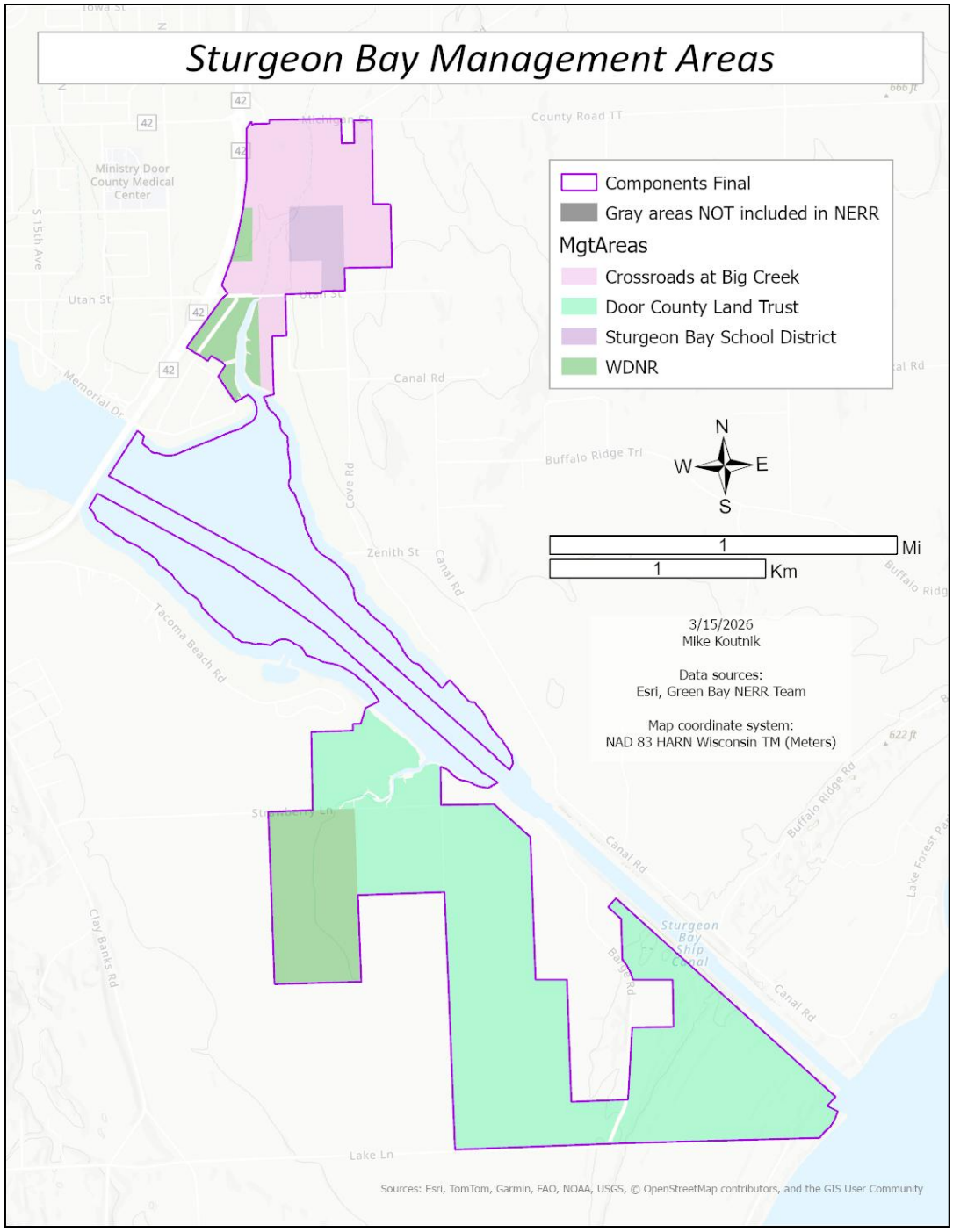
The Reserve is located entirely within the boundaries of Wisconsin and no federal land holdings are included within the designation. The boundaries were selected to include upland, transitional and aquatic habitats in proportions reflective of the Green Bay estuary and approximating an ecological unit characteristic of a Great Lakes freshwater estuary. The Lower Green Bay and Fox River Area of Concern (AOC) overlap most of the Lower Bay Component.

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Green Bay NERR Management Areas
Components Final
Gray areas NOT included in NERR
MgtAreas
Brown County
City of Green Bay
Crossroads at Big Creek
Door County Land Trust
Northeast Wisconsin Land Trust
Sturgeon Bay School District
Town of Peshtigo
Town of Scott
University of Wisconsin System
Village of Howard
Village of Suamico
WDNR
N
W
E
S
5 Mi
5 Km
Ingallston
Marinette
Peshtigo
Green Bay
Door
Sturgeon Bay
Sobieski
Dyckesville
Algoma
Kewaunee
Green Bay
3/15/2026
Mike Koutnik
Data sources:
Esri, Green Bay NERR Team
Map coordinate system:
NAD 83 HARN Wisconsin TM (Meters)
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Peshtigo River Management Areas
Green Bay NERR Boundaries
Components
Areas NOT INCLUDED in NERR
Management Areas
WDNR
N
W
E
S
2
Mi
2
Km
5/29/2026
Mike Koutnik
Data sources:
Esri, Bay of Green Bay NERR Team
Map coordinate system:
NAD 83 HARN Wisconsin TM (Meters)
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Lower Bay Management Areas
Components Final
Gray areas NOT included in NERR
MgtAreas
Brown County
City of Green Bay
Northeast Wisconsin Land Trust
Town of Scott
University of Wisconsin System
Village of Howard
WDNR
Sobieski Corners
Little Suamico
Suamico
N
W
E
S
1 Mi
1 Km
Point Au Sable
Scott Memorial Park
Green Bay
Long Tail Point
3/15/2026
Mike Koutnik
Data sources:
Esri, Green Bay NERR Team
Map coordinate system:
NAD 83 HARN Wisconsin TM (Meters)
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community


Sturgeon Bay Management Areas
Components Final
Gray areas NOT included in NERR
MgtAreas
Crossroads at Big Creek
Door County Land Trust
Sturgeon Bay School District
WDNR
N
W
E
S
1 Mi
1 Km
3/15/2026
Mike Koutnik
Data sources:
Esri, Green Bay NERR Team
Map coordinate system:
NAD 83 HARN Wisconsin TM (Meters)
Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

SUMMARY: DESCRIPTION OF LANDS

PESHTIGO RIVER COMPONENT

The Peshtigo River Component encompasses the DNR-owned and managed Peshtigo Harbor Unit, which contains several designated State Natural Areas (SNAs) and a Special Management Area.

These areas represent estuarine and riparian habitats in Northeastern Wisconsin protected for their ecological, cultural, and research values.

- *Bloch Oxbow State Natural Area* features a meander cutoff and floodplain forest that supports rare and sensitive species. It provides wildlife habitat and offers an example of a dynamic riverine wetland system. This site is a *dedicated* State Natural Area.
- *Peshtigo Harbor Lacustrine Forest State Natural Area* contains northern hardwood forest transitioning into Great Lakes coastal wetlands.
- *Peshtigo River Delta Marshes State Natural Area* protects the vast, emergent wetland complex at the river mouth, serving as a migratory bird stopover and fish nursery.
- *Badger Gift Lands* include the Peshtigo Shooting Range, which is designated as a Special Management Area. The Peshtigo Shooting Range is excluded from the Reserve boundaries.

LOWER BAY COMPONENT

DNR-managed units in the Lower Bay Component include Tibbet-Suamico, Sensiba, Long Tail, and Peats Lake. These areas are protected for wetland conservation, fish spawning, waterfowl habitat, and invasive species control. These units are open to the public for compatible recreational activities in accordance with DNR regulations.

- *The Sensiba Unit* includes managed impoundments that provide stopover habitat for migratory birds.
- *The Long Tail Unit* contains the ruins of a historic lighthouse of interest for heritage interpretation and restoration.
- *The Peats Lake Unit* and adjacent areas are largely undeveloped, emphasizing wetland preservation and fish spawning.

The Lower Bay Component also includes components managed by entities other than the DNR. These areas are listed below with the management authority in parentheses.

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- *Ken Euers Nature Area (City of Green Bay)* encompasses restored coastal wetlands. Restoration efforts have included the removal of invasive species such as common buckthorn, installation of woody breakwaters to protect shorelines, and seeding of wild rice to enhance waterfowl habitat.
- *Barkhausen Waterfowl Preserve and Fort Howard Paper Foundation Wildlife Area (Brown County)* includes forest, meadows, and wetlands along the west shore of Green Bay. The preserve is home to the West Shores Interpretive Center, which provides educational programs and hands-on exhibits about the local ecosystem.
- *Duck Creek Conservation Corridor (Village of Howard)* includes restored wetlands, riparian woodlands, and grassland buffers along the lower reaches of Duck Creek. The corridor connects to the broader Green Bay West Shores Wildlife Area and includes public trails, boardwalks, and interpretive signage.
- *Point au Sable Natural Area (University of Wisconsin–Green Bay*) is a freshwater estuarine spit located along the east shore of the bay. Managed by UW–Green Bay, the site features walking trails, a lagoon, wetlands, and remnant dune ecosystems that support migratory bird populations and native plant communities. The site is used for ecological research, restoration projects, and student field training.
- *Wequiock Creek Natural Area (Northeast Wisconsin Land Trust)* is a collaborative conservation site co-managed by the Northeast Wisconsin Land Trust, the University of Wisconsin–Green Bay, and the Town of Scott. The site includes wetlands, restored prairies, and stream habitat along Wequiock Creek.

STURGEON BAY COMPONENT

The Sturgeon Bay Component includes a variety of conservation lands and public access sites managed by the Wisconsin Department of Natural Resources, nonprofit organizations, and local partners. These sites offer opportunities for non-motorized recreation, environmental education, and habitat protection. The management authorities are listed in parentheses.

- *Big Creek Preserve and Cove Preserve (Crossroads at Big Creek).* Big Creek Preserve and Cove Preserve include publicly accessible trails, indoor learning spaces, habitat restoration, and a small lab for visiting researchers.
- *Big Creek State Habitat Area (DNR)* is open to the public for hunting, trapping, and wildlife viewing in accordance with DNR regulations. Infrastructure is limited, and public access is primarily through walk-in routes. Within the area, there is a fishing pier and kayak launch that are maintained by Crossroads at Big Creek.
- *Strawberry Creek Chinook Facility (DNR)* is a seasonal facility focused on Chinook salmon egg collection during the fall spawning run. The site is open to the public when the DNR are processing fish, typically on Mondays and Thursdays during the

first three weeks of October. The facility may be used for rearing fingerling Chinook salmon for six weeks in April and May.

- *Strawberry Creek State Habitat Area (DNR),* adjacent to the hatchery, is open for public access and hunting.
- *Sturgeon Bay Ship Canal Nature Preserve (Door County Land Trust)* includes coastal forest and wetland habitats. The preserve is part of the Cave Point–Clay Banks State Natural Area, co-managed with The Nature Conservancy and DNR. The Preserve contains federally threatened Pitcher's Dune Thistle and Dwarf Lake Iris.

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