Wisconsin Great Lakes Chronicle

2022

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On the Cover

The schooner *Abbey Road* sails the Apostle Islands National Lakeshore, photo by Mark Weller.

FOREWORD

Governor Tony Evers

Dear Friends of Wisconsin's Great Lakes,

With the Mississippi River to our west, Lake Michigan to the east, Lake Superior to the north, and thousands of lakes and rivers in between, no state compares to Wisconsin. Our abundant waters define us as a place of history, community, industry, transportation and recreation. I have made it a priority to support initiatives to preserve and protect our waterways, and this 21st edition of Wisconsin Great Lakes Chronicle tells a few of the many stories about our two largest lakes.

My administration's work is statewide, local and international. In 2020, my Governor's Task Force on Climate change issued a report calling for actions to protect our environment while sustaining economic and community development. In 2022, the Office of Sustainability and Clean Energy released the state's first ever Clean Energy Plan identifying strategies to promote energy independence and reduce costs, create tens of thousands of energy-related jobs, and invest in innovative industries and technologies. These reports set a blueprint for future policy choices and investments that will make Wisconsin a cleaner, more affordable place to live.

My Wisconsin Blue Ribbon Panel on Rural Prosperity recommended a web-based mapping tool to address environmental and public health challenges facing underserved and under-resourced Wisconsinites. Four state agencies are developing the Wisconsin Environmental Equity Tool (WEET) to help Wisconsin communities, and especially those on the Great Lakes, become healthier places for all our citizens.

I led the initiative to designate the Wisconsin Shipwreck Coast National Marine Sanctuary along the Ozaukee, Sheboygan, Manitowoc and Kewaunee county coasts. This federal designation, one of fifteen nationally and the second in the Great Lakes, will preserve and protect cultural and historical assets lying beneath the surface of Lake Michigan. We will honor the memory of those who sailed on these lost ships by being good stewards of the sites and creating educational and research opportunities to tell their stories for future generations.

The designation of a National Estuarine Research Reserve (NERR) within the Bay of Green Bay will bring new opportunities for education, research, and the future of our fishing industry. The National Oceanic and Atmospheric Administration (NOAA) is now considering our petition, and my administration continues to work with federal and local stakeholders to make this designation a reality. When approved, Green Bay will not only be known for having the world's finest football franchise, but also the world's largest freshwater estuary.

I continue to chair the Conference of Great Lakes and St. Lawrence Governors and Premiers and partner with these regional leaders to restore and safeguard the Great Lakes. Together, we are finding solutions to grow maritime transportation, protect and restore water and coastal resources, fight aquatic invasive species, promote international trade and tourism, and manage our shared waters.

The Wisconsin Coastal Management Program in the Department of Administration continues to work with partners across Wisconsin's coasts to preserve and protect our Great Lakes. In 2022, I announced 41 Coastal Management grants totaling $1.4 million that will enhance sustainability and resilience, and support local economies, jobs, and recreational and educational opportunities on our freshwater coasts.

Water is life in Wisconsin, and citizens, nonprofits, educators, communities and government are taking action every day to protect our Great Lakes. I hope you enjoy this year's *Wisconsin Great Lakes Chronicle* and are inspired to join our important work.

WEET will help Wisconsin Great Lakes communities become healthier and fairer for all.

WISCONSIN ENVIRONMENTAL EQUITY TOOL

Maggie Thelen and Dominic Holt

Wisconsin's Great Lakes system is one of our state's greatest assets. They represent an important natural resource, a culturally significant body of water for Tribal Nations and others, a tourist and recreation destination, and an avenue for trade and commerce. As the climate changes, stakeholders are looking for ways to better understand and address environmental and public health challenges in the region. Among these priorities is assessing and addressing the environmental and public health challenges disproportionately experienced by underserved and under-resourced Wisconsinites.

Recommendations from the Wisconsin Blue Ribbon Panel on Rural Prosperity pointed to developing a web-based mapping tool that could help Wisconsin do just that. To this end, the Wisconsin Department of Health Services, Department of Natural Resources, Department of Administration, and Wisconsin Economic Development Corporation (WEDC) are developing the Wisconsin Environmental Equity Tool (WEET). With this project, Wisconsin is joining a growing number of states—at least 17 so far—and the federal government in leveraging geospatial technologies and techniques to help tackle these challenges.

Often groups that are typically most impacted by a changing climate, air and water pollution, disinvestment, and other environmental and public health hazards are our most vulnerable neighbors. People with low incomes, people of color, Tribal Nations and other indigenous peoples, migrant workers and people with disabilities or chronic health conditions also often lack the resources to prepare for, avoid or recover from climate crises. These populations' health can also be significantly affected by the changing climate.

We know that environmental concerns directly impact the health of those who live in affected communities. For instance, air pollution impacts persons with respiratory health issues. People with lower incomes disproportionately live in areas with higher levels of pollution or unsafe drinking water. Lead pollution affects children's cognitive functions and recreational water pollution causes increase in microbes.

Wisconsin state agencies understand the importance of centering communities' experience and expertise to make sure WEET is as relevant and applicable as possible. Community engagement is crucial to fill knowledge gaps and identify emerging trends. Staff are thus employing a community engagement strategy to help shape the tool and its dissemination. Partnering agencies and engaged stakeholders will collaborate with a firm to build and launch WEET's technical components.

During fall 2021, agencies convened three public listening sessions that focused on obtaining insights on environmental equity, climate change and healthy communities. Because of the pandemic, the sessions were virtual and included

a toll-free phone-in option. Approximately 300 individuals participated in these sessions to share their knowledge and lived experiences. Overall, themes of accessibility, water and air pollution, knowledge of and access to information, disparities and inequities, economic impacts of climate and pollution, and mental health emerged from the listening sessions.

Similar themes arose from a separate survey focusing on public sector employees in Wisconsin who will likely be heavy users of the tool. Respondents cited water pollution, extreme weather and natural disasters as the types of environmental impacts that most burden the populations they serve.

Additional stakeholder engagement will involve establishing an ad hoc advisory group comprising local organizations and statewide subject matter experts. This engagement will help center the tool's development around concerns of underserved and under-resourced communities and provide more insight into how potential users will best interact with WEET.

A wide range of stakeholders—including community members, government officials, elected officials, public health professionals and nonprofits—will be able to use WEET for a variety of purposes. Some examples include strengthening community development efforts, building community awareness and education campaigns, informing policy and program planning, prioritizing funding for investment and interventions, conducting community health assessments, and writing data-driven grant proposals.

WEET will include an Environmental Equity Index, interactive stories and an online mapping interface showing the levels of environmental equity impacts among census tracts. The tool will be based on best practices gleaned from similar tools in California, the State of Washington, Maryland, Michigan and the federal government. For instance, California uses its environmental justice mapping tool to assist in making informed decisions for grant writing and informational outreach.

Some of the most notable national-level tools include the U.S. Environmental Protection Agency's EJScreen and the draft Climate and Economic Justice Screening Tool under development by the White House Council on Environmental Quality. However, state-focused tools have access to more detailed local and state data than national-level tools and therefore are better able to characterize local conditions. WEET will provide users with a unique opportunity to look at local Wisconsin data at a greater spatial resolution then available with EJScreen.

Wisconsin is a state abundant in natural resources. Lake Superior is the largest freshwater lake on Earth, while Lake Michigan is the sixth largest lake in the world and more than 900 feet deep. Both lakes are ecologically and culturally important to

the people of Wisconsin and far beyond. We will work to maintain these treasures for generations to come, and Wisconsin will soon have a tool to help communities along the Great Lakes and elsewhere become healthier and fairer for all.

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WICCI helps decisionmakers adapt to and lessen the impacts of climate change in Wisconsin.

WISCONSIN INITIATIVE ON CLIMATE CHANGE IMPACTS

Dea Larsen Converse

Since 2007, groups of scientists and practitioners in Wisconsin have explored the impacts of climate change in Wisconsin. These experts, all volunteers associated with the Wisconsin Initiative on Climate Change Impacts (WICCI), recently published the 2021 WICCI Assessment Report with the latest research and solutions for Wisconsin's changing climate.

Place-based narratives and an effort to identify and integrate environmental and climate justice into climate assessments and solutions are unique features of the report. The initiative, coordinated by scientists and staff associated with the Nelson Institute for Environmental Studies and the Wisconsin Department of Natural Resources, is part of WICCI's mission to help Wisconsin decisionmakers adapt to and lessen the impacts of climate change in Wisconsin.

WICCI experts report that the last two decades have been the warmest on record in Wisconsin and the past decade has been the wettest. The changing climate is increasing the frequency of extreme precipitation events and warming waters in lakes. These changes impact the amount and cycling of nutrients and contaminants in the nearshore lake environment leading to more microbial contamination on beaches and increasing the risk of potentially toxic blue-green algal blooms, including near drinking water intakes on the Great Lakes. For example, extreme storm events in 2018 elevated nutrient levels along the South Shore of Lake Superior for months and fueled major algal blooms along the shoreline. While Green Bay has experienced algal blooms for decades, it is a concerning new phenomenon in Lake Superior.

WICCI experts also find that coastal communities and businesses will need to adapt to more volatile lake level fluctuations. All of Wisconsin's Lake Michigan and Lake Superior coasts experienced extreme lake level fluctuations in the past decade. Along Lake Michigan, near record high water levels in 2020 followed record low water levels in 2013. At low water levels, coastal-dependent industries are at risk due to insufficient water depths for navigation in ports, harbors and marinas.

At high water levels, concerns include increased erosion, flooding, bluff failure and infrastructure damage from high water combined with waves and storm surges. In some coastal communities, the areas with the highest risk of coastal flooding are also home to low income and other vulnerable populations. WICCI experts anticipate these extreme highs and lows will become more frequent as the climate continues to warm.

Findings also show that ice cover on the Great Lakes is declining as air temperatures rise. Nine of the top ten lowest ice cover years have occurred since 2002. Projections show that ice cover duration on Lake Superior will decrease by one to two months by the end of the century as the climate continues to warm. Loss of ice cover can increase erosion because ice helps prevent damage to shorelines in the winter. Less ice cover

also directly impacts fish spawning because ice protects fall and winter spawning beds. Finally, loss of ice cover can lead to warmer spring water temperatures and create a feedback loop of ever-increasing water temperatures. The impact of this warming may cause ecological cascades that could affect economically and culturally significant fisheries and water-quality based recreation like swimming and kayaking.

WICCI experts also report that climate change is further stressing Great Lakes ecology already impacted by dams, hardened shorelines and invasive species. For example, rapid changes in Great Lakes water levels are increasing flooding along coastal shorelines, eroding beaches and displacing native plant communities. The Great Lakes basin is home to hundreds of species of fish and wildlife and provides drinking water, recreation and livelihood to more than 34 million people. Restoration and protection of coastal wetlands and coastal shorelines will improve habitat for fish, wildlife and wild rice that support Great Lakes communities and provide protection from storms and floods.

Finally, WICCI emphasizes that, while everyone is affected by climate change, not everyone is impacted equally. For example, runoff into the Great Lakes from extreme storm events bring contaminants that have the potential to move through the food web into fish that are an important part of the diet for subsistence fishers from Tribal Nations, Hmong populations living in Sheboygan, Green Bay and Milwaukee, and others who rely on Great Lakes fish for their food supply.

To adapt to a changing coast, WICCI experts recommend that coastal communities explore approaches to build resilience and seek to incorporate nature-based solutions that protect coastal wetlands, increase water storage capacity in Great Lakes watersheds, and reduce nutrient and sediment runoff. Coastal communities should also conduct assessments to identify buildings and critical infrastructure that are vulnerable to climate impacts.

The WICCI Coastal Resilience Working Group webpage (https://wicci.wisc.edu/coastal-resilience-working-group/) has resources to help coastal city planners, property owners, marinas, local officials and coastal resource managers. The WICCI Great Lakes Working Group site (https://wicci.wisc.edu/great-lakes-workinggroup/) has resources to build resilience for coastal ecosystems.

There is hope for the future but it is up to us. Access the 2021 WICCI Assessment Report for ways to make Wisconsin's coastal region more climate-resilient at https://wicci.wisc.edu/2021-assessment-report/.

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The Anishinaabemowin language is a map of communication, human evolution and social healing.

GREAT LAKES ANISHINAABE PLACE NAMES

Dr. Margaret Noodin and James Langdon

In Anishinaabemowin, one of the languages indigenous to the Great Lakes region, the word for city is *oodena*, which implies a site of confluence and exchange rather than something built. It is not surprising, from an Anishinaabe perspective, that many of the most diverse urban centers today are located in bays, along shorelines or at the confluence of lakes and rivers. Over time these places have changed, yet many of them remain.

Identifying some of the oldest Great Lakes cities before and after the 300-year period known as a time of disruption, *zhigwaa-wanishkwemiwin,* reveals a spectrum of ideas related to the experience of loss, *wanitoon,* and the act of reclaiming and remembering, *mikan.* These cities are interconnected points marking urban civilizations to be much older than the traders, explorers, missionaries and settlers who came to claim them. By learning the names underneath colonial maps, we are reminded of the connections that shaped ancestral practices, contemporary realities and future possibilities for reconciliation.

Oodena (city) reminds us that our place on earth has been shaped by the flow of water and cities are sites of change and confluence. Embedded in *oodena* is *ode,* meaning heart, and both are similar to *odis,* the word for a placenta or umbilical cord. These connections preserve critical frameworks and are forged of powerful semiotics representing a place where liquid carries life.

Mounds, crooked trees, pictographs and petroglyphs record how time and space align in the Great Lakes region. The earliest navigational charts of the Anishinaabeg were stories told to echo equations visible on the land and in the sky. Moving from one city to another depended on knowledge of the north star, *giiwedin anang,* a star with the verb *giiwe* (to go home) built into its name. Knowledge of the sky could chart a course for travel, help predict the weather or lead to decisions about where to gather and build shelter.

Circling the Great Lakes, including Wisconsin and nearby communities, we find many examples of names based on knowledge of relationships between land, water and beings. As the Anishinaabe people traveled west, natural bays, intersections and stopping points became home and served as locations where ceremony, trade, celebration, work and rest could happen.

For instance, *Zhigaagong,* now known as Chicago, was named for the skunk cabbage, *zhigaagawanzh* or *zhigaagobag,* that grew in the region and its strong smell common with the skunk, or *zhigaag. Minowakii,* changed to Milwaukee by territorial governors in the 1800s, is still known by many as "the good land," which is the literal meaning in the prefix "mino-" and the word "aki." *Boojwiikwedong,* now called Green Bay, had long been the home of Menominee and Ho-Chunk people when it was given its Anishinaabe name for the way the land extended into the lake from the mouth of the Fox River.

Onigamiinsing, the place of portaging, was renamed Duluth in the late 1600s for French explorer Daniel Greysolon, Sieur du Lhut. Close to *Onigamiinsing* are two islands where people often stayed, *Mooniingwanekaaning-minis* (Madeline Island) and *Miinoong* (Isle Royale). *Mooniingwanekaaning-minis* is named for the yellow-shafted northern flicker, a type of woodpecker indigenous to the region. The island is also an important stopping place in the Anishinaabe migration story. *Miinoong* is simply named island, like many other places and perhaps all of them were known as good places to spend the winter, slightly offshore, taking advantage of the lake's ability to keep the lower atmosphere slightly warmer than the upper currents during times of extremely cold temperature.

Viewing the region from an Anishinaabe perspective, these *oodenawan* (cities) of the freshwater coast share a single identity connected to *Michigami*. However, the continental narrative was simplified and nearly all tribal diversity was erased as American maps supported the myth of Manifest Destiny after the War of 1812. The cities along the shores of the Great Lakes were imagined to be the product of military victory and the names merely romantic gestures to a colorful past. This was a time of disruption, *zhigwaa-wanishkwemiwin,* a time of great loss.

Anishinaabemowin is a language of options so diverse and extreme that the act of seeking a center becomes the focus. The language itself is a map of

communication and human evolution. It can be used to trace the genealogy of urban centers and also to reveal the process by which the colonial landscape was constructed. By foregrounding Anishinaabe ontologies, cartographies, history and poetics, we can map reparation and social healing.

We understand our relationships when we speak our languages to each other on the land. As we are faced with extinction or evolution it is important to use Anishinaabe language and philosophy if we are going to get through these times, to survive future challenges and continue to care for the universe and one another. Our resistance becomes the way we correct, heal and repair one another.

Editor's Note: This article is a collaborative adaptation of the essay "Wanitoon ani Mikan Odenang: Anishinaabe Urban Loss and Reclamation," Margaret Noodin, 2021, University of Toronto Press.

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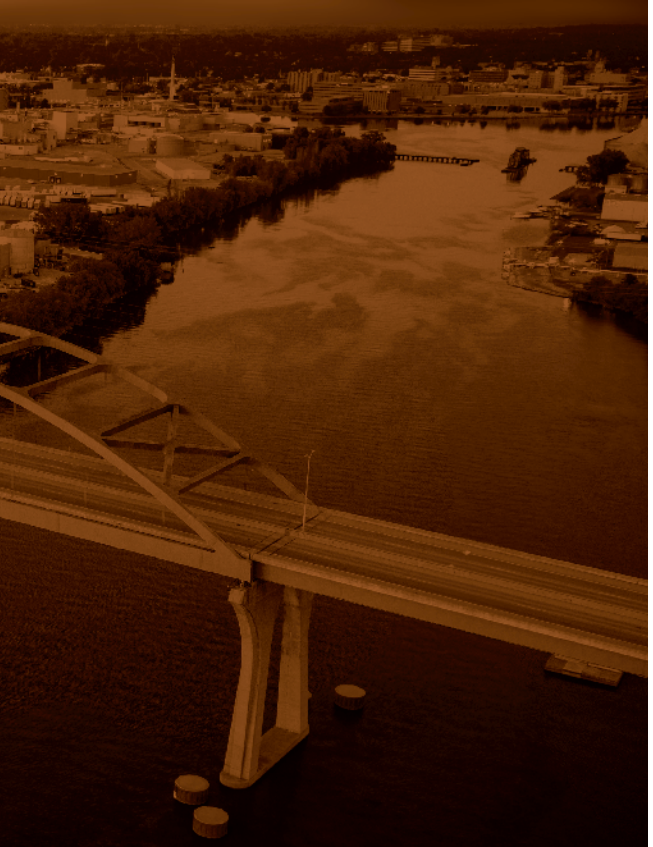
The Green Bay NERR will focus on science and celebrate the ways water touches our lives and communities.



GREEN BAY NATIONAL ESTUARINE RESEARCH RESERVE

Emily Tyner

Excitement is building in northeast Wisconsin over the prospect of a new National Estuarine Research Reserve (NERR) on the Bay of Green Bay. Green Bay is the world's largest freshwater estuary and the concept of locating a NERR in the Bay has been discussed for years. The University of Wisconsin-Green Bay is leading the designation, which was first explored with a grant from the Wisconsin Coastal Management Program (WCMP) in 2016. Three years of building local support culminated in a letter of interest from Governor Tony Evers to the National Oceanic and Atmospheric Administration (NOAA) in 2019. NOAA's positive response kicked off the designation process and momentum has grown since.

The mission of the NERR System is to "practice and promote stewardship of coasts and estuaries through innovative research, education, and training using a place-based system of protected areas." Joining the NERR system would integrate Green Bay into a national network of 30 sites, including two on the Great Lakes, to study, sustain and connect communities with estuaries and their coastal ecosystems.

Established through the Coastal Zone Management Act, reserves represent a partnership between NOAA and the coastal states. NOAA provides funding and national guidance with each site managed by a lead state agency or university with input from local partners. The Green Bay NERR will offer a coordinating force to manage, restore and celebrate the Green Bay Estuary and watershed with a programmatic focus on research, education, stewardship and training.

Upon designation, the Green Bay NERR would be the second reserve in Wisconsin, following the Lake Superior NERR designation in 2010. Located within the Wisconsin waters of the Green Bay Estuary, the reserve will have a large programmatic footprint covering the Lake Michigan-Lake Huron biogeographic region. The Green Bay NERR will provide a platform for collaborative research, educational programming and coastal trainings with communities along the shorelines of Lakes Huron and Michigan.

UW-Green Bay has adopted a vision for the NERR that offers holistic programming with a focus on science of the Great Lakes and a celebration of the many ways water touches our lives and communities. The NERR will tell our shared history of life around the bay beginning with Indigenous and First Nations communities. It will explore the artistic and storytelling connections we have with the waters of Green Bay and recognize the economic importance of water in the past and future. The NERR will appreciate all the recreational offerings provided by the shoreline and open waters of Green Bay and the Great Lakes.

We have a goal to make the Green Bay NERR the most technologically advanced reserve in the system, with applications in research, visitor interactions and educational opportunities for students. We have already started on this

vision through collaborations across the region. Current projects include the creation of a Green Bay Estuary surround-sound exhibit capturing stories and sounds from above and below water with funding provided by the Wisconsin Sea Grant Program. A collaborative project between UW-Green Bay and the Wisconsin Department of Natural Resources, made possible by a WCMP grant, will create a Green Bay Estuary Digital Archives to provide a digital home for historical maps, aerial photographs, oral histories, home videos and data sets related to the Green Bay watershed.

The Green Bay NERR will also be an organizing force for research and conservation. There has been tremendous investment in recent decades to restore and conserve the Green Bay Estuary and Watershed. Projects have included the $1.5 billion cleanup of the Fox River, the delisting of the Menominee River Area of Concern and significant progress towards delisting the Green Bay Area of Concern. There remains a need for post-clean-up planning and coordination to better engage our communities with these restored resources, and the Green Bay NERR is well-positioned to lead this effort.

The designation is currently in step two of a six-step process. We hope to select the natural areas of the NERR by the end of 2022, identify a location for the visitor and education center in 2023 and obtain designation by the end of 2024. The work of designation is being led by three committees representing a range of regional interests and professional expertise, including Tribal and state government, K-12 administrators and the northeastern Wisconsin business community.

As we build support and plan for the NERR, we are dreaming big about its impact and are in conversation with artists, museum directors and tourism officials to explore possibilities for the built infrastructure. We envision the facilities of the NERR as a regional hub for outdoor recreation, cultural education and a celebration of water. Visitors could learn about the best places to bird watch or hike, be connected to an on-site kayak outfitter or meet with a fishing guide, all while enjoying an artistic collection of wooden duck decoys and interacting with a digital visualization of bird migration across the bay.

The potential partnerships around tourism, outdoor recreation, experiential education and more—and the visibility the Green Bay NERR will bring to northeast Wisconsin—are exciting. To learn more or join the designation effort, please explore uwgb.edu/nerr.

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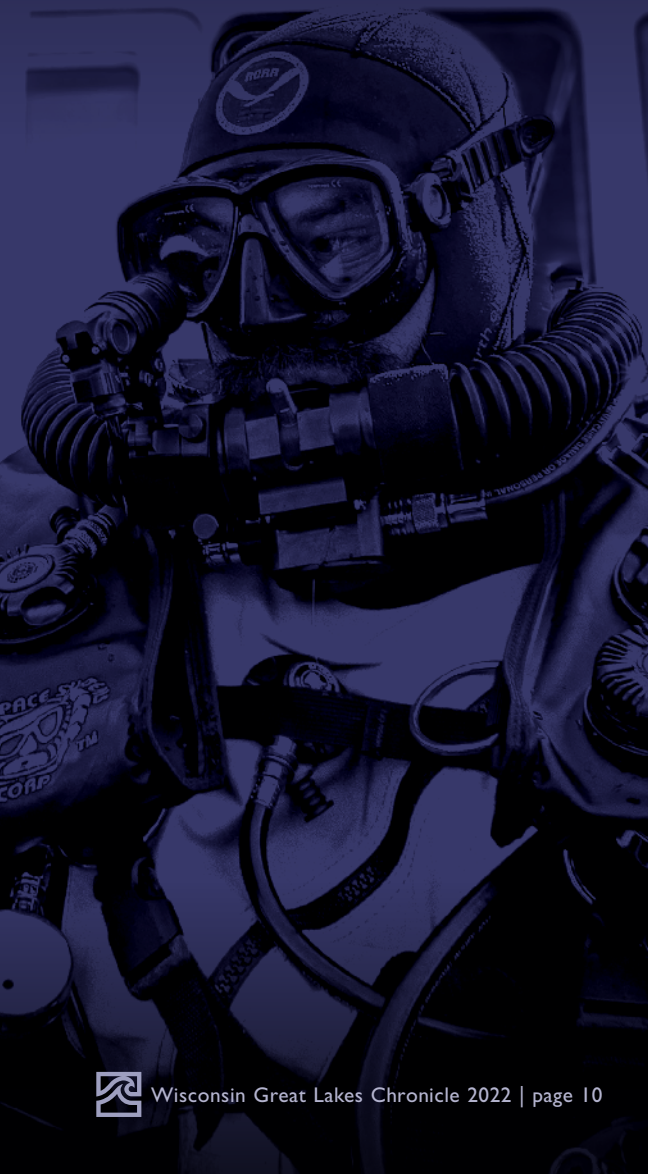
The Wisconsin Shipwreck Coast National Marine Sanctuary is an investment in our past and future.



WISCONSIN SHIPWRECK COAST NATIONAL MARINE SANCTUARY

Russ Green and Mike Friis

In August 2021, the National Oceanic and Atmospheric Administration (NOAA) designated the Wisconsin Shipwreck Coast National Marine Sanctuary (WSCNMS) along the mid-Lake Michigan coast as the nation's fifteenth maritime sanctuary. It joins the diverse National Marine Sanctuary System protecting iconic natural and cultural resources in 620,000 square miles of marine and Great Lakes waters from the State of Washington to the Florida Keys, and Lake Michigan to American Samoa.

Co-managed with the State of Wisconsin, the sanctuary provides stewardship for our nation's maritime heritage in Lake Michigan and expands on the State's 30-year management of these sites by bringing new opportunities for research, education and community engagement. The sanctuary also provides a national stage for promoting recreation and heritage tourism in partnership with local communities and supports research more broadly benefiting Lake Michigan conservation.

Two Rivers, Manitowoc, Sheboygan and Port Washington and the State of Wisconsin nominated the sanctuary in 2014. The designation process included public comments and coordination with the Wisconsin Coastal Management Program (WCMP), Wisconsin Historical Society (WHS) and Wisconsin Department of Natural Resources (WDNR). WCMP played an essential role from the beginning by recommending and funding an analysis of maritime heritage in Wisconsin's Great Lakes waters. WHS conducted the analysis and recommended the mid-Lake Michigan region for a sanctuary.

Central to the sanctuary are 36 shipwreck sites that represent vessels critical in building the nation between the 1830s and 1930s. These ships and their people drove the transformation of the Great Lakes from a maritime frontier into an economic engine for the United States. Yet sanctuary waters are also ancient with cultural significance extending thousands of years into the past. Native Americans were the first people to settle its shores and this cultural imprint is inherent to sanctuary waters.

Well-preserved by Lake Michigan's cold, fresh water, several of the known shipwrecks in the sanctuary are essentially intact and look much like they did when they sank. The incredible states of preservation, coupled with the sites located in a variety of depths, presents unique research and recreational opportunities. Thanks to WHS, 27 of these nationally significant sites are listed on the National Register of Historic Places. Research suggests another 60 shipwrecks may yet be discovered.

Research in the sanctuary is already underway. In 2021, a NOAA Office of Ocean Exploration grant funded a team of NOAA and WHS Maritime Heritage and Preservation Program archaeologists and Universities of Delaware and Miami researchers to search for shipwrecks off historically treacherous Rawley Point. Marine Magnetics and Ocean Infinity, leaders in marine technology, contributed in-kind resources to test new equipment. Bringing diverse partners together to accomplish its mission is a true hallmark of national marine sanctuaries.

The sanctuary also expands NOAA's mission of science, service and stewardship in Wisconsin. In 2022, NOAA's Office of Coast Survey awarded a contract to map much of the sanctuary's 962-square-mile lakebed. This precise, sonar-based high-resolution mapping ensures the Great Lakes shipping industry has updated charts to operate safely. In partnership with programs like the National Centers for Coastal Ocean Science (NCCOS), the sanctuary will add lakebed ground truthing to produce detailed habitat maps that will contribute to our scientific understanding of Lake Michigan. A successful pilot project already produced detailed lakebed characterization maps for about 50 sq. miles of the sanctuary that are available via the sanctuary's website.

In addition to on-water research, the sanctuary supports educational programing, community engagement and recreation and tourism. We know people will protect what they value and our conservation message will reach the public in a variety of ways. In 2022, for example, WCMP, the sanctuary and the Lakeshore Natural Resource Partnership co-funded a sanctuary-branded recreation and tourism podcast and digital short. Produced by Discover Wisconsin Media, the pieces entice travelers to explore the heritage of mid-Lake Michigan's coastal communities.

To help the public explore Lake Michigan safely, the sanctuary in 2021 installed three real-time "smart moorings" off Two Rivers, Sheboygan and Port Washington. The moorings transmit wind, water

temperature and wave data that help boaters plan for a safe day and anglers better locate fish. A Great Lakes Observing System grant brought WSCNMS, the Great Lakes Environmental Research Lab and the Cooperative Institute for Great Lakes Research together to make this project possible.

Turning landward, a 15-seat Sanctuary Advisory Council brings local community members together to advise NOAA on sanctuary management and build strong connections with communities and stakeholders. A future NOAA facility along the lakeshore now being studied may someday support sanctuary programs and promote recreation, tourism and education.

The sanctuary is also inspiring future generations to protect our Great Lakes. The Rawley Point field project partnered with University of Wisconsin Sea Grant and the Wisconsin Maritime Museum to create a hands-on learning experience for 20 teachers. Educators from the Two Rivers/Manitowoc area, Milwaukee and Green Bay explored new avenues for bringing marine tech and archaeology into their classrooms. More programs supporting educators are on the way.

The Wisconsin Shipwreck Coast National Marine Sanctuary honors and preserves Wisconsin's rich maritime heritage and supports our coastal communities and economies. The sanctuary will long serve as an investment in our past and future.

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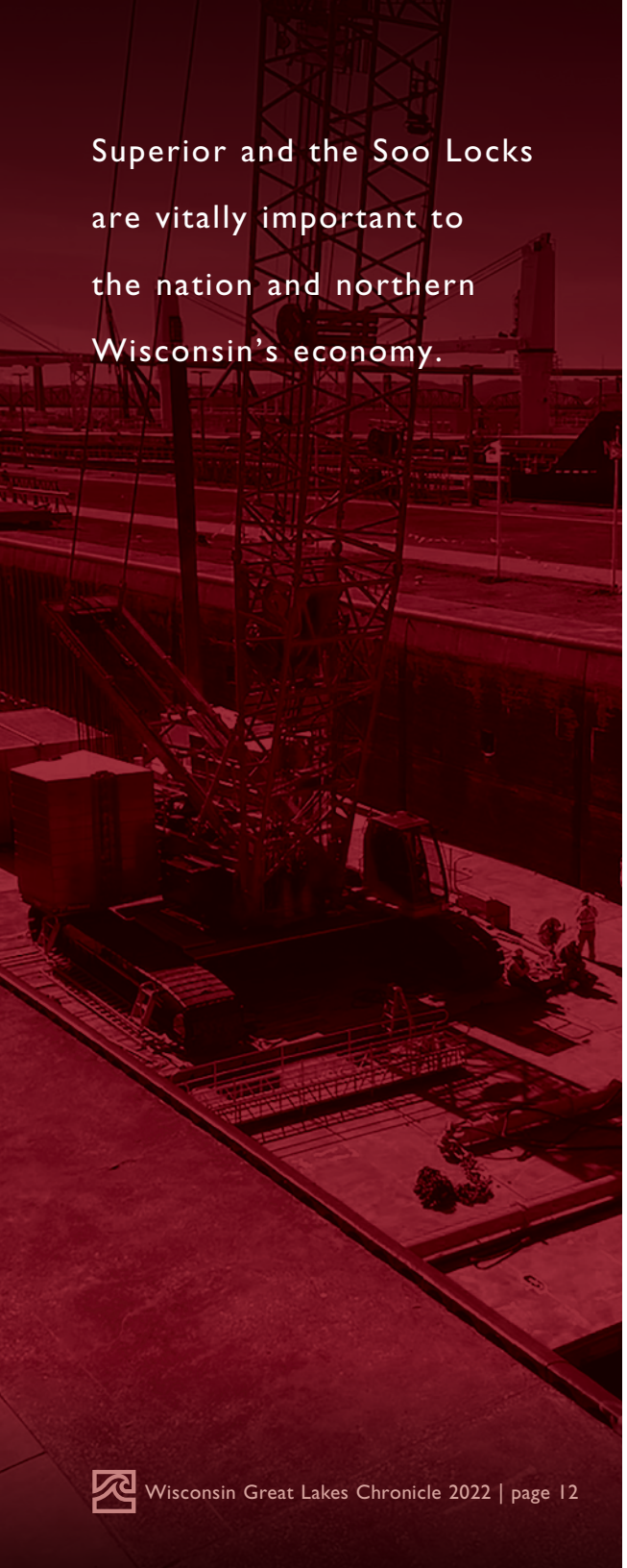


Superior and the Soo Locks are vitally important to the nation and northern Wisconsin's economy.

SOO LOCKS EXPANSION WILL BENEFIT SUPERIOR

James Langdon

Over 6,000 miles from Wisconsin, the 1,312-foot container ship *Ever Given* took a hard right in the 800-feet wide Suez Canal and buried its bow deep in the east bank. Backhoe operators, engineers and tugboat captains worked for six days in March 2021 to dislodge the catawampus ship until the perigean Moon raised the tide just enough to lift the 200,000-ton vessel from the bottom. Tugs did the rest as they pulled the *Ever Given's* stern into the channel to send it on its way.

The canal blockage disrupted global trade with nearly 300 ships at anchor waiting for the *Ever Given* to be freed. Syria rationed fuel in anticipation of delayed oil deliveries and European gas prices shot up. More concerning, at least 20 ships carrying livestock risked running out of water and food putting thousands of sheep and cattle at risk. Economists estimated the blockage cost $9 billion per day.

Fortunately, the Suez Canal has an (or is the) alternative. It was built in the 1800s to provide ships a shortcut between Europe and Asia through the Mediterranean and Red Seas rather than the long voyage around Africa. Instead of waiting for the *Ever Given* to be freed, some ships diverted to the much longer Cape of Good Hope route, even at the risk of being raided by Somali pirates off the east coast of Africa.

A similar maritime threat lurks only hundreds of miles from Wisconsin at Sault Ste. Marie, Michigan where the Soo Locks raise and lower ships 21 feet between the levels of Lake Superior and Lake Huron. The Locks, first built in 1855 and operated by the U.S. Army Corps of Engineers, make possible navigation around the St. Mary's Rapids that for centuries provided a shallow-water source of whitefish for Ojibwe peoples. Today, eighty million tons of cargo pass through the Soo Locks each year.

Wisconsin's Port of Superior depends on the Soo Locks for ships to navigate to and from the lower Great Lakes and world markets. Superior is Wisconsin's most active port and among the busiest on the Great Lakes. A July 2018 report (Martin and Associates) estimated 22 million short tons of cargo shipped annually from the Twin Ports to domestic and international markets. Additionally, the port supported more than 4,300 jobs in the Duluth-Superior area. While the Soo Locks sit in Michigan, they are vitally important to northern Wisconsin's economy.

Only one lock in the Soo complex, the 1,200-foot Poe Lock (named for U.S. Army Brig. Gen. Orlando Poe), is large enough to accommodate 1,000-foot lake freighters that transport Mesabi Range iron ore and western coal to lower lake ports for steel production and power. The Soo Locks' other operating lock, the 800-foot MacArthur, can only handle ocean vessels limited in size by the Welland Canal and small lake freighters that carry less than half the tonnage of the 1,000-footers.

Like a ship stuck in the Suez Canal, failure of the Soo Locks would have devastating economic impacts on northern Wisconsin and the nation. The U.S. Department of Homeland Security in 2018 predicted 100% of North American auto production would halt within weeks of a shutdown. Worse, 11 million jobs would be lost if the Locks were down for six months. Worst, the annual gross domestic product would lose $1.3 trillion due to a long-term closure.

If the Poe fails, attention may turn to moving bulk cargoes from Superior across Wisconsin to lower lake steel mills via rail and truck. In context, a 2009 Corps report noted 3,000 semi-trucks would be required to transport the tonnage carried by one 1,000-foot freighter. Nonetheless, industry warns rail and truck capacity does not exist to carry cargoes shipped by the thirteen 1,000-footers each making dozens of round trips to Superior per year.

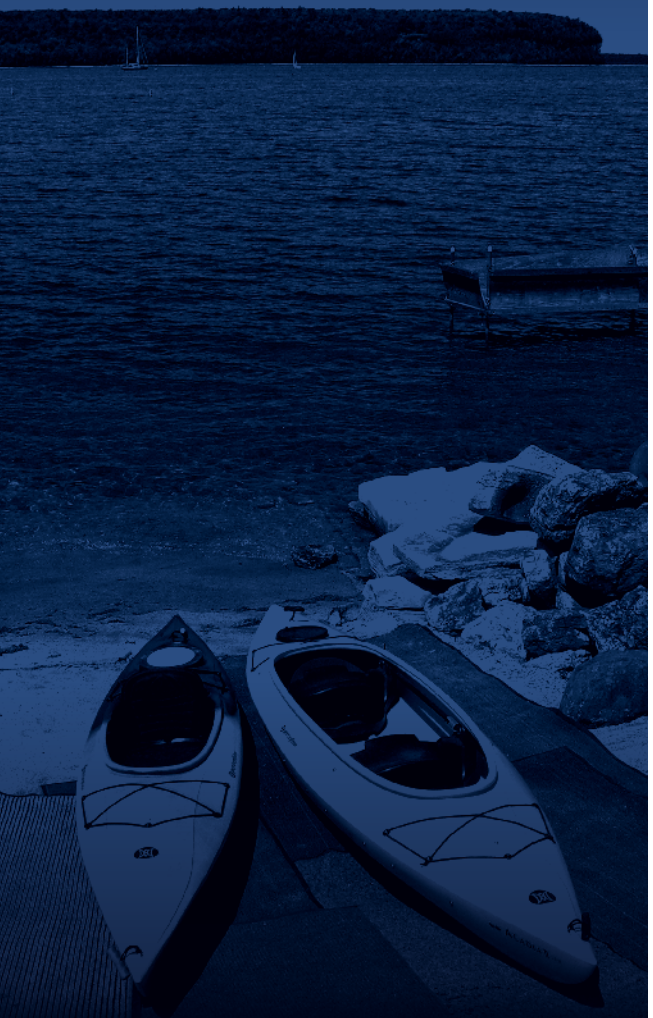
The environment would also suffer if shipments shifted to ground transportation. The 2009 Corps report estimated a Great Lakes freighter travels 607 miles on one gallon of fuel per ton of cargo, or ten times farther than a semi-truck and three times farther than a freight train. A long-term closure of the Poe would increase truck and rail traffic across Wisconsin consequently causing the release of excessive pollutants into our air. Further complicating the situation, nearly all of the steel mills served by the Locks are only capable of receiving raw materials by water.

Congress originally authorized a second Poe-sized lock in 1986 and earmarks kept the project on life support until President Trump stated his support for Soo Lock expansion during a Michigan speech. President Biden and Congress later included funding in the Infrastructure Investment and Jobs Act to build the new lock where the obsolete Davis and Sabin Locks now sit idle.

Construction on the $1.3 billion project is underway with completion scheduled for 2030. Until then we can only hope the 54-year-old Poe Lock avoids catastrophic failure or damage. If that day comes, 1,000-foot freighters will be indefinitely stuck on one end of the lakes or the other and millions of jobs will be lost. And there won't be a thing the Moon can do about it.

James Langdon is editor of Wisconsin Great Lakes Chronicle *and a Sault Ste. Marie Tribe of Chippewa Indians member. He may be reached at makwa@charter.net.*

Wisconsin has been a coastal management leader since the 1970s.



50 YEARS OF COASTAL ZONE MANAGEMENT

Donna McCaskill

The late sixties and early seventies represent a watershed moment for the nation, a time when the public and Congress recognized the need to engage the government for the purpose of protecting the nation's environment. In 1972 alone, Congress enacted four important pieces of environmental legislation focused on the coast: the Coastal Zone Management Act, the National Marine Sanctuaries Act, the Marine Mammals Protection Act and the Clean Water Act.

This article covers the Coastal Zone Management Act, the legislation that provides for the management of the nation's coastal resources, including the Great Lakes, with a goal to "preserve, protect, develop, and where possible, to restore or enhance the resources of the nation's coastal zone." Participation is voluntary with 34 of the 35 eligible states and territories currently participating. Wisconsin, an early adopter and first in the Great Lakes, started the Wisconsin Coastal Management Program in 1978.

The Coastal Zone Management Act is unusual in that the program is a 100 percent partnership effort between the states and the federal government. It is this partnership, and the inherent flexibility found in this approach, that has allowed this legislation to continue to be as relevant today as it was fifty years ago.

The Birth of the Legislation. With the end of World War II in 1945, Americans turned their attention to raising families and enjoying the expanding leisure time available to the growing middle class. Many chose to spend their vacations along the nation's 95,000 miles of coast.

A 1955 National Park Service report, *Our Vanishing Shoreline,* issued a warning to the country: "Almost every attractive seashore area on our Atlantic and Gulf coasts has been preempted for commercial or private development. Only a fraction of our long seacoast is left for public use, and much of this small portion is rapidly disappearing before our eyes."

There was intense pressure to develop the nation's shores for a plethora of potentially conflicting uses, including industrial, residential, recreational and tourism, amid fears that without some kind of legal framework, the nation's wild beaches and the public's ability to access the seashore would be lost. But Congress took action and passed the Coastal Zone Management Act in 1972.

People who work in the field of coastal resource management usually point to three important features of the legislation that keep it relevant and effective, even 50 years later.

The Partnership Approach. State participation is voluntary, but the Coastal Zone Management Act provides basic principles and policy requirements states must meet to qualify. The National Oceanic and Atmospheric Administration (NOAA) administers the program at the national level and funds 50 percent of a partner state's or territory's operating costs.

Flexibility. While there are mandates, a generous amount of flexibility is provided which allows the state to develop its program in a way that works the best for its communities and citizens. No two state programs look exactly alike, and yet each works to address local and national needs in unison.

Dual Environment and Economic Focus. This legislation is not about the environment alone—economic considerations play an important role. Each project and policy strives to reach solutions that are good for both and hundreds of economic development projects have flourished with assistance from the Act. A wide range of issues are addressed through these programs, including development, water quality, public access, habitat protection, energy facility siting, ocean governance and planning, coastal hazards and climate change.

The state programs benefit from the federal consistency provision because of their inclusion in the national program. This means any federal activities that take place in the coastal zone, or may impact this jurisdictional area, must abide by state policies. Examples include dredging, beach nourishment and highway construction. The states have veto power in a process that otherwise would have been unavailable to them.

Another important element is the Coastal Zone Enhancement Program giving states incentives to improve their states in nine key areas: wetlands, coastal hazards, public access, marine debris, cumulative and secondary impacts, special area management planning, ocean and Great Lakes resources, energy and government facility siting, and aquaculture. The Coastal Nonpoint Pollution Control Program is also important and gives states the regulatory tools needed to address polluted runoff.

The Wisconsin Example. Wisconsin's coastal management program addresses many important coastal issues including wetlands protection, habitat restoration, public access, land acquisition, nonpoint source pollution control, land use and community planning, natural hazards, and Great Lakes education. The program also supports ongoing coastal planning, public outreach, restoration and technical assistance to local governments with an average of 30 annual projects funded in recent years. Resource protection is balanced with efforts to promote sustainable development. Preserving and enhancing public access is another priority.

"Wisconsin has been a coastal management leader since day one," says Kim Penn, acting director of the National Coastal Zone Management Program. "With the strength of the Coastal Zone Management Act, and Wisconsin's commitment to the effort, there's no reason to believe this legislation won't carry us into the next 50 years as well."

Donna McCaskill is the Communications Director at the NOAA Office for Coastal Management. She may be reached at donna.mccaskill@noaa.gov.

2022 WISCONSIN COASTAL MANAGEMENT PROGRAM GRANTS

Project Name
Grantee
WCMP Award
Project Description
Contact

Coastwide

Coastal Hazards Fellowship
University of Wisconsin Sea Grant Institute
$52,330
Sponsor a one-year fellowship tackling science and policy challenges to increase coastal community resilience across the Great Lakes region.
Dr. Jennifer Hauxwell, jennifer.hauxwell@aqua.wisc.edu

Woodland Understory Invaders Education Campaign
University of Wisconsin-Madison
$52,150
Establish a multi-faceted education program focused on the terrestrial invasive plants of Wisconsin's coastal forests and forested wetlands.
Dr. Mark Renz, mrenz@wisc.edu

2021 WICCI Assessment Report Education and Outreach
Natural Resources Foundation
$45,000
Implement an outreach and communications strategy to reach decision-makers with actionable and practical ways to become more climate resilient.
Ms. Caitlin Williamson, caitlin.williamson@wisconservation.org

Green Bay Coastal and Riverine Inundation Forecasting
University of Wisconsin-Madison
$29,966
Develop a three-day coastal and riverine inundation map forecast for the Wisconsin coast of Green Bay for public preparedness in the case of a flooding emergency.
Dr. Chin Wu, chin.wu@wisc.edu

Gauging Spill Prevention Preparedness
Southeastern Wisconsin Watershed Trust, Inc.
$25,825
Conduct a business sector assessment to gauge knowledge gaps on best management practices and water quality in Milwaukee and Ozaukee Counties.
Mr. Jacob Fincher, fincher@swwtwater.org

Waterfront Planning Toolkit: Catalyzing Change
Bay-Lake Regional Planning Commission
$24,977
Create a toolkit to help waterfront communities plan and manage coastal resources.
Mr. Brandon Robinson, brobinson@baylakerpc.org

Peatlands Bryophyte Community Assessment Protocols
University of Wisconsin-Green Bay
$24,957
Implement a pilot initiative in Door, Marinette and Oconto Counties to develop protocols for assessing wetland quality using mosses, liverworts and hornworts.
Dr. Keir Wefferling, wefferlk@uwgb.edu

Virtual Beach Training Resources
The Board of Regents of the University of Wisconsin System
$20,645
Update the Virtual Beach training curriculum and materials for beach managers to reflect updates to the model.
Dr. Natalie Chin, nchin5@aqua.wisc.edu

Coastal Hydrography Data in Brown and Door Counties
Wisconsin Department of Natural Resources
$19,000
Develop updated rivers, lakes and streams hydrography geospatial data to support nonpoint pollution planning.
Ms. Ruth Person, ruth.person@wisconsin.gov

Climate Science and Great Lakes Literacies
Wisconsin Wildlife Federation FIELD Edventures
$10,000
Support 60 K-12 teachers with a plan integrating climate science and Great Lakes instruction into existing curriculum and the support of a FIELD coach.
Ms. Sandra Benton, sandy@fieldedventures.org

Technical Assistance
Bay-Lake Regional Planning Commission
$20,000
Provide technical assistance to local government and citizens in Brown, Door, Kewaunee, Manitowoc, Marinette, Oconto and Sheboygan Counties.
Mr. Brandon Robinson, brobinson@baylakerpc.org

Technical Assistance
Northwest Regional Planning Commission
$20,000
Provide technical assistance, analysis and program coordination for coastal programs and issues occurring in Northwest Wisconsin.
Mr. Jason Laumann, jlaumann@nwrpc.com

Technical Assistance
Southeastern Wisconsin Regional Planning Commission
$20,000
Provide technical assistance, regional analysis and public outreach services to coastal communities.
Dr. Thomas Slawski, tslawski@sewrpc.org

Ashland County

Ashland Rails to Trails System: Waterfront Trail Repair
City of Ashland
$51,375
Reconstruct 1,200 feet of the Ashland Rails to Trails System (ARTS) along the Lake Superior shoreline.
Ms. Sara Hudson, shudson@coawi.org

High-Resolution Flood Exposure/Vulnerability Mapping
Wisconsin State Cartographer's Office
$49,045
Build a Geographic Information System database for northern Ashland County that will focus on flood exposure and vulnerability.
Dr. Howard Veregin, veregin@wisc.edu

Ashland Rails to Trails System: Waterfront Trail Design
City of Ashland
$10,520
Create engineering and construction plans to repair 1,200 feet of the Ashland Rails to Trails System along the Lake Superior shoreline.
Ms. Sara Hudson, shudson@coawi.org

Bayfield County

Bayfield County Comprehensive Plan Update
County of Bayfield
$29,500
Update the Bayfield County 2022-2042 Comprehensive Plan.
Mr. Mark Abeles-Allison, mark.abeles-allison@bayfieldcounty.wi.gov

Lakeshore Habitat and Recreation Improvements
City of Washburn
$22,5000
Improve native habitat, raise public awareness and enhance public access along the City of Washburn's Lakeshore Parkway.
Mr. Tony Janisch, asstadmin@cityofwashburn.org

Big Ravine Preserve Headwaters Wetlands
Town of Bayfield
$22,045
Purchase a 10-acre parcel at the Big Ravine Preserve headwaters wetlands.
Ms. Kate Kitchell, katepkitchell@gmail.com

Big Bay Town Park Accessibility Improvements
Town of La Pointe
$15,000
Develop engineering designs to remove barriers and improve access to Lake Superior, the beach and Big Bay Lagoon while preserving historic vistas.
Mr. Michael Kuchta, administrator@townoflapointewi.gov

Comprehensive Plan and Future Land Use Map
Town of Clover
$8,936
Update the Town of Clover 2023-2043 Comprehensive Plan.
Mr. Keith Koenning, keith.koenning@gmail.com

Brown County

Green Bay Estuary Archives Collection
University of Wisconsin-Green Bay
$50,959
Expand accessibility of and digitize Green Bay Estuary-related materials and collect new materials through community outreach.
Ms. Emily Tyner, tynere@uwgb.edu

Woods Greenway Acquisition
City of Green Bay
$35,500
Acquire 12.1 acres of land in Green Bay.
Mr. Dan Ditscheit, dan.ditscheit@greenbaywi.gov

Door County

Door County Outreach Translation
Door County Soil & Water Conservation Department
$24,597
Update and translate nine brochures/pamphlets on invasive species and water resources from English to Hmong and Spanish.
Mr. Greg Coulthurst, gcoulthurst@co.door.wi.us

Town of Gibraltar Long-Range Planning
Town of Gibraltar
$23,000
Update the Town of Gibraltar Comprehensive Plan.
Mr. Travis Thyssen, tthyssen@townofgibraltar.us

Niagara Escarpment Informational Signage
Door County Facilities & Park Department
$12,525
Develop and install informational signs about geological, cultural and historical significance of the Niagara Escarpment at the Door Bluff Headlands County Park.
Mr. Burke Pinney, bpinney@co.door.wi.us

Town of Jacksonport Future Plan Elements
Town of Jacksonport
$9,000
Update the Town of Jacksonport Comprehensive Plan.
Mr. Randy Halstead, jtownclerk@jportfd.com

Douglas County

St. Louis River Estuary Drowning Hotspots
University of Wisconsin-Madison
$29,917
Coordinate integrated efforts to characterize, forecast and enhance risk communication for drowning hotspots in the St. Louis River.
Dr. Chin Wu, chin.wu@wisc.edu

Kenosha County

Prairie Shores Park Wave Tripper Engineering
Village of Pleasant Prairie
$24,500
Complete engineering designs of "wave trippers" to be placed along the shoreline of Prairie Shores Park.
Mr. Tom Hupp, thupp@pleasantprairiewi.gov

Kewaunee County

Groundwater Education and Well Testing Program
Kewaunee County Land & Water Conservation Department
$30,000
Implement well testing for 600 wells in Kewaunee County.
Ms. Davina Bonness, bonness.davina@kewauneeco.org

Olson Park Green Infrastructure
City of Algoma
$30,000
Develop green infrastructure designs to support conservation, recreation and sustainability at Olson Park.
Mr. Matt Murphy, matt.murphy@algomacity.org

Hickory Dickery Dock
Wisconsin Historical Society
$16,851
Study submerged cultural resources associated with historic lumber piers in Kewaunee County and associated submerged cultural remains.
Ms. Amy Rosebrough, amy.rosebrough@wisconsinhistory.org

Manitowoc County

Water Trail Signage and Access
City of Manitowoc
$85,200
Improve access through an ADA kayak launch at the newly developed River Point District in downtown Manitowoc.
Mr. Brock Wetenkamp, bwetenkamp@gmail.com

Hika Bay Wave Study
Village of Cleveland
$46,380
Conduct a feasibility study on marine conditions to influence shoreline safety, construction and specifications for future shoreline improvements.
Ms. Stacy Grunwald, sgrunwald@clevelandwi.gov

Coastal Wetland Aviary Design Plan
Lincoln Park Zoological Society
$25,000
Develop plans to restore unused Manitowoc Lincoln Park Zoo exhibit space into an aviary to house coastal and wetland birds.
Mr. Andy Janicki, lpzscoordinator@gmail.com

Manitowoc County Park and Open Space
Manitowoc County
$19,440
Update the Manitowoc County Open Space Plan.
Mr. Tim Ryan, timryan@manitowoccountywi.gov

Milwaukee County

The Node in Milwaukee's Harbor District
City of Milwaukee Redevelopment Authority
$128,000
Provide public access to over 4,300 linear feet of waterfrontage in Milwaukee.
Ms. Alyssa Remington, alyssa.remington@milwaukee.gov

30th Street Industrial Corridor Green Infrastructure
Clean Wisconsin
$44,066
Support implementation of green infrastructure goals in two City of Milwaukee neighborhoods adjacent to the 30th Street Industrial Corridor.
Mr. David Tipson, dtipson@cleanwisconsin.org

Milwaukee Waters Investigations
Keep Greater Milwaukee Beautiful (KGMB)
$38,075
Support one year of water-focused projects through the Learn Deep Fellows Program.
Ms. Zoe Jump, zoe@kgmb.org

Ozaukee County

Virmond County Park Stormwater Wetland Restoration
Ozaukee County Planning and Parks Department
$96,000
Investigate groundwater and improve stormwater drainage at Virmond County Park.
Mr. Andrew Struck, astruck@co.ozaukee.wi.us

Historic North Breakwater Lighthouse Preservation
City of Port Washington
$40,000
Create engineered plans and specifications to restore the Historic North Breakwater Lighthouse structure to its original condition.
Mr. Robert Vanden Noven, rvandennoven@cpwwi.org

Racine County

Racine Zoo Path Beach Public Access
City of Racine
$75,000
Create a new public access point from the Lake Michigan Pathway (Zoo Beach Path) to the Zoo Beach.
Mr. Matt Koepnick, matthew.koepnick@cityofracine.org

ACKNOWLEDGMENTS

The Wisconsin Coastal Management Program was established in the Department of Administration (DOA) in 1978 under the Federal Coastal Zone Management Act. The program and its partners work to achieve balance between natural resource preservation and economic development along Wisconsin's Great Lakes coasts. The program thanks its principal federal partner, the National Oceanic and Atmospheric Administration, Office for Coastal Management, for the technical and financial support it provides on behalf of Wisconsin's coastal communities.

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Contents, Kewaunee Pierhead Lighthouse, Travel Wisconsin

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2, North Beach, Racine, UW Aquatic Science Center

3, Milwaukee Harbor, Harbor District, Inc.

4, Kenosha Paddler, Visit Kenosha

5, Lake Superior, WICDI

6, Ojibwa Man at Bad River Indian Reservation, Wisconsin Historical Society

7, Chippewa Woman with Child, Wisconsin Historical Society

8, Lower Fox River, NEW Water

9, Green Bay, UW-Green Bay

10, Diver, NOAA/WSCNMS

11, Sanctuary Shipwreck, WHS/Tamara Thomsen

12, Soo Locks, Anna Langdon

13, Soo Locks, Jim Langdon

14, Eagle Harbor Kayaks, Destination Door County

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16, Coal Dock Park, Port Washington, Port Washington Tourism Council

20, Frog Bay, Grandon Harris

21, Death's Door, Destination Door County

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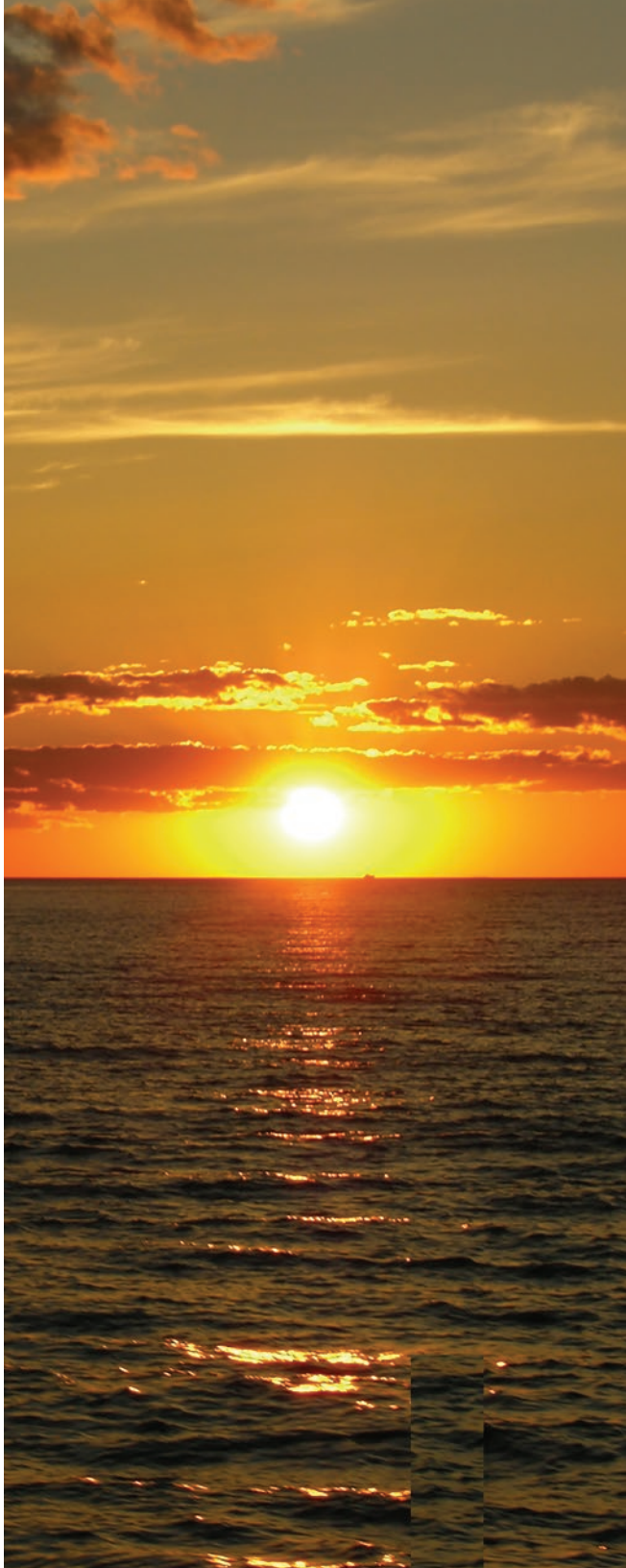
WISCONSIN COASTAL MANAGEMENT PROGRAM

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