

Wisconsin Great Lakes Chronicle 2019



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FOREWORD

Governor Tony Evers

Dear Readers:

Welcome to the 2019 edition of *Wisconsin Great Lakes Chronicle* which highlights important efforts to conserve, protect, and restore our Great Lakes and shorelines across our state.



From drinking water to trade to outdoor recreation, the Great Lakes have played a critically important role for folks in our state and the Great Lakes region at large for generations. The Great Lakes and St. Lawrence River are one of the world's greatest natural resources, accounting for about 20 percent of the world's surface freshwater. These waters unite our states and bordering provinces and are a significant source of our continued prosperity, boasting a \$6 trillion

regional economy. This is among the many reasons why these waters are so important, and why it is one of my top priorities as governor is to protect our natural resources and ensure our water is clean, safe, usable, and enjoyable for generations to come.

This year, I am also honored to be leading the Great Lakes St. Lawrence Governors & Premiers on initiatives to improve the quality of the Great Lakes and enhance our regional economy. We recently adopted resolutions to reduce drinking water contaminants and reaffirmed our commitment to our region's aquatic invasive species collaborative agreement. We are also working to support and expand our region's maritime trade opportunities.

From declaring 2019 the Year of Clean Drinking Water to addressing drinking water contaminants like lead and PFAS, and extending the Knowles-Nelson Stewardship Fund to addressing runoff

into Lake Michigan and Lake Superior, my administration, Lt. Gov. Mandela Barnes and I are working hard to ensure our water resources can continue supporting our economies, sustaining our families, and helping our businesses thrive.

I hope you enjoy this year's edition of *Wisconsin Great Lakes Chronicle* celebrating the good work and dedication of so many folks across our state. Although we are taking significant steps to protect the Great Lakes, we know that there is much work yet to do. Protecting all of our lakes, waterways, and wetlands is a job too big for me or any of us to do alone, and we must continue to work together to ensure we are protecting and conserving natural resources across our state. Thank you for all of your support in this endeavor, and I look forward to continuing the important work of protecting our Great Lakes now and into the future, together.

The binational Great Lakes St. Lawrence Regional Maritime Strategy will double trade and mitigate environmental impacts from water-borne transportation.

REGIONAL MARITIME STRATEGY

Mike Friis

The Conference of Great Lakes and St. Lawrence Governors and Premiers unites the chief executives from Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Ontario, Pennsylvania, Québec and Wisconsin. These Governors and Premiers work as equal partners to grow the region's economy and protect the world's largest system of surface fresh water.

As a group, the Governors and Premiers launched the Great Lakes-St. Lawrence River Maritime Initiative in 2013, including creation of a Maritime Task Force and a call for the Great Lakes-St. Lawrence River maritime transportation system (MTS) to be authorized, managed and funded as a single system. This Initiative will help rejuvenate this critical component of the regional transportation network and is an important step toward improving the region's economic competitiveness.

The MTS supports a \$6 trillion regional economy, more than 220,000 jobs and \$30 billion in business revenue annually. Yet each year, the aging system and its ability to sustain this activity continues to decline. With the launch of this Initiative, the Governors and Premiers are taking an important step to reverse this trend and rejuvenate the MTS.

The MTS includes more than 100 commercial ports spread across eight states and two provinces. More than 40 provincial and interstate highways

and nearly 30 rail lines link the fifteen major ports of the MTS and 50 regional ports with consumers, products and industries throughout North America. These ports serve as a critical connection between the Atlantic Ocean and the Ohio, Illinois and Mississippi River transportation systems, and integrate the region with global supply chains.

The Governors and Premiers support implementation of the 2016 Strategy for the Great Lakes-St. Lawrence River Maritime Transportation System to double maritime trade, shrink the environmental impact of our transportation network, and support the region's industrial core. The strategy recommends actions to maintain and expand the maritime transportation system and establish a Regional Maritime Entity to coordinate state and provincial actions. This group is currently co-chaired by Georges Farrah, Associate Secretary General of Maritime Affairs of Québec, and myself.

Recent highlights of the initiative included the release of a Smart Ships Action Plan in August 2018, a set of policy recommendations for the federal governments, states, provinces and industry. In 2018, "Cruise the Great Lakes" was established as a new regional marketing initiative designed to bring more cruise passengers to the Great Lakes and support this growing industry. In fall 2018, Great Lakes representatives traveled to Europe to explore increased trade opportunities, logistics and governance innovations.



In 2019, Wisconsin Governor Tony Evers assumed the chair of the Conference of Great Lakes and St. Lawrence Governors and Premiers. At the Governors' and Premiers' leadership Summit in Milwaukee on June 14, the Governors and Premiers took steps to boost global connections and trade, grow the region's cruise industry, and showcase cutting-edge technologies. Speaking of the Great Lakes, Governor Evers said, "...we are gathering to protect this natural asset that is the source of our continuing prosperity."

Specific actions included releasing an action plan with the Port of Antwerp, Belgium to double maritime trade with Western Europe. Antwerp is the economic gateway to Europe and the main overseas trading partner of Great Lakes-St. Lawrence ports. This plan aims to diversify and increase trade between our region's ports and Europe. Actions to improve information and

marketing include identifying opportunities to move new types of cargoes, conducting trade missions to Europe to develop new markets, and improving marketing materials. Cost controls and market expansion will be achieved by installing new technologies uniformly throughout the system and exploring and implementing opportunities for governance reform of the Great Lakes-St. Lawrence system.

The strategy will showcase cutting-edge maritime technologies with an autonomous research ship demonstration in Milwaukee harbor. The region's first smart ship test was previously held at the Marine Autonomy Research Site in Houghton, Michigan—the world's first freshwater test site for autonomous technologies. Additionally, the Governors and Premiers endorsed the "Cruise the Great Lakes" brand and marketing campaign to accelerate the growth of

regional cruising. More information is available at www.cruisethegreatlakes.com.

The Strategy also includes a memorandum with the Central Commission for the Navigation of the Rhine (CCNR) focused on governance and best practices. The CCNR is an international organization whose charge is to encourage economic prosperity by managing navigation of the Rhine River and its surrounding areas in Germany, Belgium, France, the Netherlands and Switzerland. The CCNR is the world's oldest international organization and a model for maritime coordination. This relationship will be helpful in learning from the CCNR's well-developed program to track system performance and predict future system demands, regulatory coordination among their member states, and public communications program. Similarly, the CCNR seeks to learn from our processes to develop a regional strategy, improve the management of our maritime system and build international connections.

These strategic actions are designed to help achieve the Governors' and Premiers' goals to double maritime trade, shrink the environmental impact of our transportation network, and support the region's industrial core.

Mike Friis is the Program Manager for the Wisconsin Coastal Management Program. He can be reached at (608) 267-7982 or michael.friis@wisconsin.gov.



Water managers use geographic information systems to inventory and analyze environmental conditions that contribute to water quality.

WATER RESOURCES AND LiDAR IN WISCONSIN

Jim Giglierano

Water resources are important to the citizens of Wisconsin, whether fishing at a favorite pond or stream, using tap water from a private well or municipal water system, or swimming at one of the Great Lakes' many beaches. Wisconsinites expect to have high quality water.

Land and water managers at all levels of government use geographic information systems (GIS) to inventory, analyze and make maps showing the distribution, quality, quantity and environmental conditions that contribute to good water quality. By combining factors such as soils, vegetation, wetlands, streams, wells, concentrated animal feeding operations, underground storage tanks, pipelines and community locations, these managers can analyze existing problem areas such as contaminated wells or algae blooms. They can also model potential wastewater discharge impacts of new construction such as a manufacturing facility or ethanol plant. In many cases, they can identify potential remedial solutions to existing problems or point to smarter alternatives before construction begins.

Use of GIS has become so widespread over the past few decades that there is a constant need to create and improve the baseline data sets that fuel the analysis and maps. Nowhere is that struggle more pertinent than the characterization of the Earth's surface, typically accomplished through the collection of land elevation data. This elevation data is critical to the understanding of the flow

of water across the land's surface—where it starts, what it washes over on the way and where it ultimately ends up.

Originally this mapping was done by survey crews in the field, but after World War I aerial photography was used for topographic mapping of larger and larger areas. Starting around 2000, a new remote-sensing technology emerged that increased vertical accuracy by an order of magnitude—from 10-20 feet to 1-2 feet—and likewise improved the density of elevation data points collected by a single airplane. This new technology is called LiDAR.

LiDAR stands for “light detection and ranging” where, like radar, a burst of laser energy is repeatedly directed at the ground, up to hundreds of thousands of pulses per second. A light sensor records the travel time and converts it to an elevation. The laser sweeps back and forth across the track of the moving aircraft which creates overlapping coverage to make sure nothing on the ground is missed.

LiDAR systems can achieve vertical accuracies of 10 cm (less than one-half foot) over non-vegetated ground, or twice that in vegetated areas. The laser light does not penetrate water or buildings, and returns multiple reflections off vegetation—branches, leaves, tree trunks. All these reflections must be classified and filtered in order to produce a highly accurate representation of the ground surface.

Wisconsin does not have a formal state-run LiDAR program like other states, but instead relies on networks of collaborating partners including local government land information programs, federal agencies within the state and private partners. Local funding for LiDAR acquisition primarily comes from county governments using their Wisconsin Land Information Program (WLIP) funds.

Most county land information programs participate in the Wisconsin Regional Orthophoto Consortium (WROC) which provides a contracting mechanism for mapping services including LiDAR and aerial imagery acquisitions. WROC is led by the North Central Wisconsin Regional Planning Commission (NCWRPC) and a private vendor. The next WROC aerial photography collection cycle aims for statewide coverage in 2020.

Other LiDAR funding comes from the US Geological Survey's 3D Elevation Program (3DEP), a national effort to collect high quality, standardized elevation information through partnerships with other federal, state and local agencies. A major 3DEP goal is to reach 100 percent coverage of the continental US by 2023.

Since 2014, several Wisconsin agencies have submitted yearly project proposals to 3DEP and successfully competed against other states. In addition to 3DEP, LiDAR projects have been completed for specific areas of interest needed



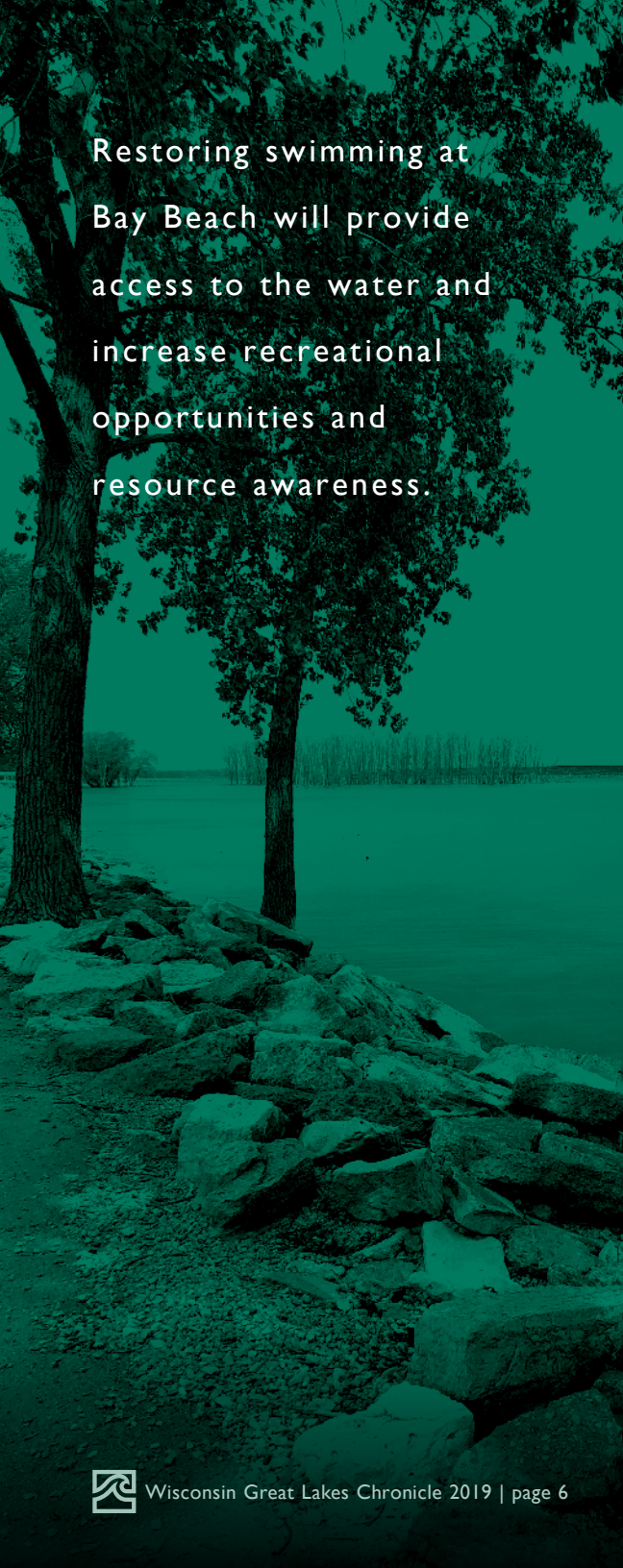
by the Federal Emergency Management Agency (FEMA) related to floodplain and coastal flood inundation studies. Between these two broad efforts, 46 out of 72 counties have been contracted for covering 35,000 square miles, or over 60 percent of the state, with the latest high quality, standardized data. The remaining 26 counties will be surveyed during the next three years to meet the 2023 nationwide goal.

Wisconsin state agencies and university departments also contribute to the overall LiDAR stakeholder network by providing coordination, data distribution and training opportunities to users. The Department of Administration Geographic Information Officer coordinates with 3DEP, FEMA LiDAR programs and Department of Natural Resources GIS technical services.

Additionally, the University of Wisconsin's Wisconsinview Program provides access to free online LiDAR data and viewers and the State Cartographer's Office offers two-day LiDAR training classes during the year.

Research has shown that LiDAR elevation data and derived products usually provide a five-to-one return on investment over the cost of data collection, but only if the data is free and easily accessible to a wide range of users including businesses, government agencies, land owners, tribes and universities. In Wisconsin, LiDAR is fulfilling citizens' demand for high quality water.

Jim Giglierano is the State Geographic Information Officer for the Wisconsin Department of Administration. He can be reached at (608) 267-6902 or jim.giglierano@wisconsin.gov.



Restoring swimming at Bay Beach will provide access to the water and increase recreational opportunities and resource awareness.

BAY BEACH RESTORATION

Dan Ditscheit

Bay Beach Amusement Park is the ninth oldest amusement park in the country and has been a tremendous asset to the community since 1892. Located on the southern tip of the Bay of Green Bay with over 4,000 feet of shoreline, the park is an affordable family attraction. The park—one of only a few municipal-owned amusement parks in the nation—features scenic bay views and classic amusement park rides including a wooden roller coaster, bumper cars, a large Ferris wheel and a carousel.

One hundred years ago, Bay Beach was a popular swimming destination that hosted hundreds of visitors every day during the summer. In the early 1900s, the park consisted of several amusement park rides, a pavilion and dance hall, a bathhouse and a 570-foot-long dock extending out into the bay. However, excessive pollution into the Fox River and the Bay of Green Bay resulted in the closing of the beach in the 1930s—one of the earliest beach closings in the country. The dock was removed shortly after and there has not been another swimming beach near Green Bay since.

In 2007, the City of Green Bay completed the first master plan of Bay Beach Amusement Park and feedback from the community indicated a great desire to improve the shoreline of Bay Beach for public use. Over the years this interest has grown.

In 2012, the Bay Lake Regional Planning Commission received US Environmental Protection Agency (EPA) funding to complete a three-year water quality study at Bay Beach Amusement Park. The results indicated that the water quality is now comparable to other Lake Michigan beaches in Wisconsin and swimming is possible again at this location. This data spurred community interest to initiate a “Bring Back the Beach” campaign.

The City has over the past few years received grant funding from various sources—including the Wisconsin Coastal Management Program, the Packer Stadium District and the Fund for Lake Michigan—to complete the necessary engineering to bring the beach back. Engineering is nearly completed and the Wisconsin Department of Natural Resources (DNR) and US Army Corps of Engineers have granted the appropriate permits necessary to install a swimming beach, a wildlife viewing platform and a shoreline boardwalk. Additional elements in the design are a bathhouse, concession stand, walks leading to the beach, landscaping and additional parking.

Although the water frontage and park are currently open to the public, the shoreline is considered inaccessible due to an existing rip rap flood protection dike along the water’s edge which



creates a physical barrier from the park to the water. The restoration project will feature a 1,000-foot sand swimming beach installed within two feet of the top of the rip rap. Native wetland and dune plantings will aid in creating habitat and ecologically sound practices along the shoreline. ADA-compliant ramps and staircases will be constructed in several locations along the shoreline leading down to the sand. The City will encourage kayak and paddleboard usage along the new sand beach area.

A 450-foot long, sixteen-foot wide wildlife viewing pier/platform will also be installed. ADA accessible fishing railings, fish habitat structures and wildlife viewing opportunities will be created along this platform. The existing asphalt path along the shoreline has reached its lifespan and

will be replaced by a new trail and boardwalk to make this an accessible walk again. Over time the City plans to link this boardwalk with a trail to the City-owned Wildlife Sanctuary to the east and the South Bay Marina to the west. Discussions with the owners of the South Bay Marina have already begun.

Although not part of the beach project, a generous donation from the Friends of Bay Beach helped the City install an iconic 100-foot tall Ferris wheel at the base of the proposed wildlife viewing platform. The placement of this Ferris wheel will ensure that nearly everyone who attends Bay Beach will interact with the new shoreline development. The Ferris wheel opened to the public in summer 2019.


The \$7 million beach reconstruction project is funded through revenues generated at Bay Beach Park, \$1 million in fundraising and \$1 million in various grants. Additionally, a construction grant from the Wisconsin Coastal Management Program will help make this project a reality. Work will begin in fall 2019 and the project will be completed in summer 2020. After completion, the shoreline amenities will be open to the public year-round and free of charge.

Vibrant coastal shorelines are not only valuable natural and community resources, they are also an economic resource for a coastal community. The Greater Green Bay Convention and Visitors Bureau estimates that the amusement park and neighboring City-owned Bay Beach Wildlife Sanctuary contributes \$59 million annually into the local economy. In addition to over 1 million rides sold at Bay Beach Amusement Park each year, the City expects the beach to greatly increase the number of annual visitors and economic impact.

The new beach will provide public access to the water, increase recreational opportunities and resource awareness, and spur future water quality and environmental efforts in the area.

Dan Ditscheit is the Parks, Recreation and Forestry Director for the City of Green Bay. He can be reached at (920) 448-3381 or dandi@greenbaywi.gov.





The Fresh Coast Resource Center helps southeastern Wisconsin improve the health of Lake Michigan through smart use of green infrastructure.

FRESH COAST RESOURCE CENTER

Christopher Schultz and Jacob Fincher

For nearly two decades, the Milwaukee Metropolitan Sewerage District (MMSD) has been a leader in promoting the use of green infrastructure (GI) to manage water where it falls. Beginning in 2000 with the Greenseams® program—an innovative flood management program that permanently protects key lands containing water-absorbing soils—through present-day efforts including funding programs, research, and extensive outreach, MMSD continues to seek new and innovative ways to reach its lofty goal of capturing 740 million gallons using GI by 2035 in every major rainstorm.

The Fresh Coast Resource Center (FCRC), which opened its doors in 2017 under the moniker of the Green Infrastructure Center of Excellence, plays a key role in pushing the region towards the 2035 goal. The FCRC came into being as a result of two significant events: formal adoption of the MMSD 2035 Vision and Strategic Objectives in January 2011 and the subsequent completion of the Regional Green Infrastructure Plan (RGIP) in 2013.

A key goal of the 2035 Vision is to capture the volume equivalent of the first half-inch of rainfall in the MMSD Service Area using GI. The RGIP, in addition to quantifying the half-inch goal to 740 million gallons, provides a roadmap to get there. One of the 48 recommendations in the plan is to “Develop a Regional Green Infrastructure Service Center” to “provide technical assistance” to “reduce duplication of services.” Hence the birth of the FCRC.

Located in the Global Water Center just south of downtown Milwaukee, the Green Infrastructure Center of Excellence opened its doors on March 1, 2017 following strategic planning to provide guidance regarding effective service provision. Later rebranded as the Fresh Coast Resource Center as a key part of a larger initiative to raise awareness of the importance of protecting Lake Michigan, the FCRC aims to empower people, homeowners, businesses, nonprofits and government to take an active role in protecting our most precious natural resource: water. The FCRC does this by providing the inspiration, education and tools needed to manage water where it falls.

The FCRC currently offers GI planning and design services through tools, preliminary plans and specifications, workshops, funding opportunities, grant-writing support, training for workforce development and certification, and other services and advice as needed. Services are geared towards taking an idea and developing it into an implementable project, large or small.

Available GI planning and design services include several online planning tools and a program that offers design services to nonprofit organizations seeking to implement green infrastructure. The Green Infrastructure Sizing Tool helps determine the appropriate size and provides cost estimates for several GI types. A Plant Selection Tool helps identify the best plants to fit project needs. Up to \$15,000 of design services are available to nonprofit organizations submitting requests meeting application criteria.

The FCRC has offered a wide variety of GI workshops to provide education and promote the importance of managing water where it falls, often through collaboration with partners under the FCRC brand. With assistance from a grant provided by the Wisconsin Coastal Management Program, the nonprofits Southeastern Wisconsin Watersheds Trust, Inc. (Sweet Water) and Clean Wisconsin hosted a series of workshops in 2017 and 2018 targeted at audiences ranging from private residents through large-scale commercial developers. Having recently received an additional grant, these nonprofits will continue their efforts in 2019 and 2020. The FCRC offers rain barrel workshops providing attendees the opportunity to learn proper barrel installation and maintenance techniques, how their efforts relate to larger-scale GI practices, and the opportunity to earn a free rain barrel.

Several funding programs available from the FCRC incentivize GI implementation. These range from the MMSD Green Infrastructure Partnership Program—a competitive, reimbursement-based funding program open to public, private and nonprofit organizations—to an annual Rain Garden Workshop and Plant Sale and an education-based Rain Barrel Program.

The FCRC cannot write or submit a grant application for customers, but staff can offer a critical review to grant applicants seeking funding from an external source. With an eye on helping customers develop a successful, implementable



project, the FCRC can also help customers create a project idea, ensure they are considering different aspects of their project, and make connections to other partners.

The FCRC is also the regional host for the Water Environment Federation's National Green Infrastructure Certification Program (NGCIP). The NGCIP certification offers employers a way to identify individuals who have adequate job knowledge, skills and abilities to build, inspect and maintain GI systems.

Now in its third year, the FCRC is in the throes of another round of strategic planning. Building off lessons learned from the first plan, this effort will provide guidance on refinement

of the organization's mission, vision and goals to identify needs, provide location analysis and partnership involvement, offer effective staffing and scheduling, and further market and build the brand including an online presence at www.freshcoastguardians.com.

Currently sitting around the 40-million-gallon mark of rainwater collected, the FCRC hopes to be instrumental in reaching the 740-million-gallon goal! Do you have a question about GI on your site? The FCRC is here to help. Call us at 414-225-2222.

Christopher Schultz is a Senior Project Manager for the Milwaukee Metropolitan Sewerage District. He can be reached at (414) 225-2217 or CSchultz@mmsd.com. Jacob Fincher is the Acting Director for the Southeastern Wisconsin Watersheds Trust, Inc. He can be reached at (262) 716-2211 or jfincher@swtwwater.org.

APOSTLE ISLANDS: PARTNERING FOR ACCESSIBILITY

Mark R. Peterson

“Many hands make a light load,” goes the ancient proverb that has stood the test of time.

Such is the philosophy behind a growing number of 214 local philanthropic organizations across the country that partner with a dedicated national park unit. In the face of declining federal budgets and burgeoning park visitation, these friends-groups marshal additional human and financial capital to rehabilitate historic structures, maintain visitor facilities, enhance educational and recreational opportunities, host special programs and events, mobilize volunteers, and support research and restoration projects.

In Wisconsin, the Friends of the Apostle Islands National Lakeshore is one such organization. A small but park-passionate army of volunteers, the Friends formed in 2001 to help the National Park Service advance its mission of resource protection and visitor enjoyment. The National Lakeshore consists of a 21-island, Lake Superior archipelago in northwestern Wisconsin and several miles of rugged shoreline between Cornucopia and Bayfield. The islands and mainland coast offer visitors an incredible 160 miles of undeveloped shoreline—the longest single area of public coastline in the state—where over 90 percent of the park is the congressionally-designated Gaylord Nelson Wilderness Area.

As one of its legacy projects for the park, the Friends embarked upon a long-term and comprehensive project to enhance park

accessibility for people of all ages and abilities. This need is identified in the park’s management plan but shrinking budgets have put projects out of reach without outside help. Accessibility is a particular challenge for this park largely composed of islands. After visitors face the challenge of crossing Lake Superior with its fickle and treacherous weather, they encounter steep cliffs, rocky trails and sparse infrastructure.

In the belief that many hands make a lighter load, the Friends looked for capable partners to assist with a significant, long-term project to improve accessibility in the Lakeshore. In its search, three complementary partners came forward to join the effort: the Wisconsin Coastal Management Program (WCMP), individual donors and Wilderness Inquiry. The latter is a Minneapolis-based non-profit with a mission to connect people from all walks of life to the natural world. Their hallmark is facilitating opportunities for individuals with disabilities and other nontraditional users of public lands and waterways. The organization’s knowledge niche and networks have proven invaluable.

The Friends and Park Service identified two challenge-prone locations that were popular for able-bodied visitors, but more difficult for others. Meyers Beach on the mainland is a popular jumping off spot to explore spectacular, craggy and cavernous cliffs. In winters when Lake Superior ice conditions are safe, thousands of people embark from this beach on a trek to

A strong partnership
is removing barriers
for people of all
abilities to explore
the Apostle Islands.

the “ice caves” with their frozen stalactites and striking icfall entrances. In summer, the “sea caves” offer a kayaking mecca for paddlers to explore over a mile of dramatic red rock shoreline. In all seasons, the beach portal to these attractions is down a long flight of stairs that tame the steep headlands found here. Whether carrying a kayak and gear in the summer, or walking icy surfaces in the winter, access is a barrier for some.

Another popular but challenging destination is the Stockton Island amphitheater where visitors experience a boreal forest and enjoy programs presented by the island’s interpretive naturalist. The amphitheater is a central focus for park programs and events, including the naturalist’s evening

campfire program. Access here is valuable because Stockton is the only island on a cruise route allowing people with disabilities to depart the boat and explore relatively flat surroundings without the barriers of tall and steep staircases to level ground.

WCMP is helping find a solution to both park portals. At Meyer’s Beach, WCMP is contributing toward a study to identify options for public access while investigating capital and operational costs, environmental impacts and aesthetics of each possibility.

To assist with the Stockton Island amphitheater, WCMP is providing further financial assistance that will allow the Friends to hire architectural


and engineering expertise. They will design drawings for a new amphitheater that is accessible to the dock, trails and campsite providing an opportunity for visitors to explore the natural world while making outdoor spaces accessible to individuals of all ages, backgrounds, and abilities.

But the benefits of both projects go beyond accessibility. All National Lakeshore facilities are along the Lake Superior coast on highly erodible sand or clay. Making shoreline facilities more accessible has the added benefit of selectively hardening access routes and making them less vulnerable to shoreline erosion while reducing wear on adjacent lands. Buried archeological resources will also be better protected at the Stockton Island amphitheater area. Thus it is a win-win of bringing more people of all abilities to experience Wisconsin’s most pristine shorelines while protecting the resource from trampling impacts and random foot trails.

Like the rugged pristine shoreline of the Apostle Islands, a strong partnership among organizations with a common goal is a beautiful thing. People today and future generations will benefit, and the natural treasures found in this special place will continue to inspire.

Mark R. Peterson of Bayfield is a Board Director of the Friends of the Apostle Islands. He can be reached at markpete.mail@gmail.com.





Iterative processes and education are required to establish a standard of care for coastal parks, trails and green spaces.

MANAGING VISITOR USE IN COASTAL PROTECTED AREAS

Lauren Leckwee

You can never have too much of a good thing, especially in northern Wisconsin. A popular destination for residents and tourists alike, northern Wisconsin is a seasonal hotspot lush with forests, wetlands and coastlines. When the weather is warm and the ice is gone, people flock to the north to enjoy all that Wisconsin has to offer. Tourism boosts the local economies and supports the individuals that call the north “home” year-round.

One of the biggest threats to northern Wisconsin’s natural resources is overuse, especially in Ashland and Bayfield Counties where the trails are being loved to death. This sentiment has been expressed by several Wisconsin Coastal Management Program (WCMP) partners including Landmark Conservancy, Bayfield County and the City of Ashland. Fortunately, tools are available to train resource managers how to best deal with issues of overuse or misuse.

The National Oceanic and Atmospheric Administration (NOAA), Office for Coastal Management, offers a workshop titled Managing Visitor Use in Coastal and Marine Protected Areas. The WCMP, recognizing the need for this resource, reached out to NOAA to bring this workshop to northern Wisconsin.

This insightful two-day workshop was held at the Northern Great Lakes Visitor Center in Ashland on September 6-7, 2018. Thirty local resource managers from the Lake Superior counties of

Ashland, Bayfield, Douglas and Iron attended the workshop free of charge. NOAA and the WCMP partnered to provide the best technical support feasible with as little financial requirements for participants as possible.

This unique training featured best practices offered by managers at work on Wisconsin’s Lake Superior coast. For instance, Linda Cadotte, City of Superior, presented on the work happening at Wisconsin Point, why it is needed and what the City is doing to mitigate misuse. Erika Lang of Landmark Conservancy (formally Bayfield Regional Conservancy) spoke on the creation and establishment of social trails and how their conditions tend to deteriorate as more people use them. And Chad Abel, Red Cliff Tribe of Lake Superior Chippewa, talked about visitor management strategies being implemented at Frog Bay Tribal National Park.

During the two-day training, participants were taught to use a framework to help managers identify the root causes to issues and design actions to mitigate the impacts. The framework is not specific to any one region but can be modified to fit each area identified as misused by a resource manager. Participants completed worksheets and had collaborative discussions with other local resource managers and NOAA and WCMP staffs. Iterative processes were encouraged so managers may easily revise and modify their strategies as they test and implement their plans of action.

A common thread in the Lake Superior region is tourism where visitors are vital for the economies of almost every community. However, tourism is also a big stressor on the ecological system. When asked what negative impacts of visitor use the City of Superior deals with most often, Ms. Cadotte, Superior Director of Parks, Recreation & Forestry, said “litter, trash dumping, over-love (overuse) of an area that would cause erosion or degradation to the landscape.” The City of Superior is addressing these threats by renovating several popular visitor destinations to include more trash receptacles, restroom facilities, designated pathways and signage.

Ms. Lang noted the creation and establishment of social trails leads to disturbed land, fragmentation of habitat and plant destruction. These effects get worse as more people use them. Additionally, the spread of invasive plants is, like trash dumping, a form of contamination that alters sensitive habitats.

But placing trash receptacles on trails and removing invasive species are not always enough to mitigate over-use of an area. Many tourists and citizens unfortunately do not feel a personal responsibility to keep natural areas clean and healthy. Each visitor has a different perspective on what is an acceptable use of a resource and changing their behavior and mindset can be very tricky for resource managers.

Education is frequently required to establish a standard of care for parks, trails and green spaces. For some, driving four-wheel-drive trucks on



ski trails is how they have interacted with the outdoors. Others may not understand the impacts of walking off a trail. Changing behaviors, expectations, patterns and the way people interact with the space around them is a constant challenge for resource managers.

The main point of the training is that this framework is an iterative process. It must be redesigned to fit the needs of the community as it is implemented and visitor perspectives and use changes. “There are enough resources for everyone to enjoy. It is just a matter of balancing the use through a variety of approaches that mitigate the impact,” said Ms. Cadotte.

The WCMP funds many large, visible public access projects such as the Ore Dock in Ashland, but the bulk of grant funds is awarded to smaller communities and projects. WCMP encourages every community with a visitor use problem, regardless of size, to consider how Coastal Management grants or technical support can preserve their precious coastal resources.

Lauren Leckwee is Program Coordinator for the Wisconsin Coastal Management Program. She can be reached at (608) 267-2125 or lauren.leckwee@wisconsin.gov.



The Keillor Fellowship supports coastal hazard mitigation strategies through research, policy development and collaboration.

COASTAL PROCESSES MANUAL

Yi Liu

The Great Lakes form an often overlooked fourth coastline of the United States, of which Wisconsin has 820 miles along Lake Superior and Lake Michigan. Lakes as large as the Great Lakes act like oceans in many ways, resulting in hazards such as flooding and erosion along the coast.

This year the water levels throughout all the Great Lakes have approached or exceeded record highs, making flooding and erosion more severe than ever and greatly impacting coastal communities. Because of these increasing coastal hazards, an important question has been brought up more frequently: how do we build resilient communities that can recover from the impact of coastal hazards more quickly? To answer this question, a profound scientific knowledge base of coastal processes and hazards is needed to inform decisions of stakeholders including policy makers, planners, engineers and property owners.

The longtime Wisconsin Sea Grant coastal engineering expert Phil Keillor dedicated over 30 years to building resilience in Wisconsin communities. To celebrate Phil's legacy, Wisconsin Coastal Management Program and Wisconsin Sea Grant partnered to fund the J. Philip Keillor Fellowship. This fellowship places a recent graduate with the Wisconsin Coastal Management Program to work with policy-makers, coastal managers, and researchers from across the state, region and country to improve the science-policy interface regarding coastal hazards.

One important motivation of this fellowship is to update the Coastal Processes Manual, a technical and outreach material developed first by Mr. Keillor and published by Wisconsin Sea Grant, last updated in 1998. This manual primarily intends to inform state, county and local planning, zoning, engineering and other technical staff to make decisions about the development and management of coastal lands. Property owners may also use this manual to inform decisions about investing in and managing their coastal properties.

As a fellow coming from the salt coast of Virginia, I was surprised to see how similar coastal hazards are here on the fresh coasts. While hurricanes barely make their ways to the Great Lakes, locally-formed storms and those coming from the Rocky Mountains are common and cause storm surges and big waves that flood coastal communities.

Additionally, increasing lake levels have similar effects as sea level rise. Historically, lake levels increase and drop over a six-foot range. Why lake levels fluctuate and how to build resilience against the fluctuations are also important topics to which I applied my expertise in the manual update effort. These similarities allow me to bring in my knowledge in hydrodynamic modeling and probabilistic analysis to develop a main chapter in the manual to address coastal flooding issues in Wisconsin and the Great Lakes.

I started my fellowship with two field trips to Lake Michigan's coast. The severe erosion at Kenosha Dunes and other high bluffs where private properties and infrastructures are located caught my attention. These field trips motivated me to get involved in a project to apply innovative nature-based shore protection method to mitigate wave impacts on bluffs and dunes, and another project to develop a beach resilience guidance booklet and factsheet for beach managers and local officials. While these two projects are examples of informing decisions with science, needs from stakeholders also inspired me to contribute to a research team consisting of academics across four states along Lake Michigan to put together

a proposal that addresses sediment transport and erosion issues along Lake Michigan's coastline.

This fellowship provides a unique and great platform for a recent graduate like me to collaborate with experts and engage with stakeholders. Connections I made through the Coastal Hazards Work Group, which is led by Wisconsin Coastal Management Program and includes statewide entities that deal with coastal hazards, provided valuable feedbacks for my manual update effort. I also networked with people at professional conferences such as the NOAA Regional Meeting and Association of State Floodplain Managers annual conference, and incorporated their opinions into updating the manual.

Opinions from stakeholders including coastal planners, engineers and property owners were important to my work. My involvement in the Coastal Actions for Resilience and Economic Security of Southeastern Wisconsin Bluff, Beach and Infrastructure Assets project allows me to engage with stakeholders in various ways including a boat tour along Lake Michigan and community of practice meetings. Through these engaging events I was able to truly learn from stakeholders on their needs, as well as witness how they learn from us and from each other.

Approaching the end of my fellowship and looking back at this past year, I am grateful to have helped develop technical and outreach materials using my expertise, as well as gain new knowledge. I am appreciative of the opportunities and experiences that helped me to build up my professional connections and truly engage me with stakeholders. I believe these mutually beneficial partnerships will result in advancing science to support policy decisions as well as provide valuable training opportunities for new professionals entering the workforce like me. These efforts will undoubtedly form some of the major bricks in building resilient coastal communities in Wisconsin and the Great Lakes.

Yi Liu, a former J. Philip Keillor Fellow, is a Coastal Engineer with Environmental Science Associates. She can be reached at (540) 328-1866 or echoliu@vt.edu.



2019 WISCONSIN COASTAL MANAGEMENT PROGRAM GRANTS

Project Name

Grantee

WCMP Award

Project Description

Contact

Coastwide

River Connection Program

Riveredge Nature Center, Inc.

\$29,250

Educate at least 30 urban Milwaukee classes through the River Connection exchange program using the Milwaukee River as a living laboratory.

Mr. Leif Nordstrom, (262) 375-2715

Cyanobacteria in the Chequamegon Bay

Northland College

\$29,169

Implement Phase I of a two-phase study to identify potential sources of cyanobacteria propagules and risks of cyanobacterial blooms in the Chequamegon Bay region.

Mr. Matt Hudson, (715) 682-1481

Enhancing Access to Coastal Geospatial Content

University of Wisconsin-Madison

\$21,453

Integrate a variety of geospatial data into a single geoportal, creating a unique “coastal geospatial data collection” within GeoData@WI.

Dr. Howard Veregin, (608) 262-6852

WATERshed Program

Hawthorn Hollow Nature Sanctuary and Arboretum
\$19,400

Expand the WATERshed Program into a sustainable, district-wide, inclusive, experiential program for Kenosha 5th grade and Racine 12th grade students.

Ms. Nancy Carlson, (262) 552-8196

Technical Assistance

Northwest Regional Planning Commission

\$20,000

Support coastal management activities and technical assistance to local governments in the Lake Superior region.

Mr. Jason Laumann, (715) 635-2197

Technical Assistance

Bay-Lake Regional Planning Commission

\$20,000

Support coastal management activities and technical assistance to local governments in the Bay-lake region.

Ms. Madison Smith, (920) 448-2820

Technical Assistance

Southeastern Wisconsin Regional Planning Commission

\$20,000

Support coastal management activities and technical assistance to local governments in the Southeast region.

Dr. Thomas Slawski, (262) 547-6721



Ashland County

Ashland Oredock Redevelopment Phase 1: Diamond Access

City of Ashland

\$150,000

Construct an ADA elevated walkway on the 1923 section of the Ashland Oredock to enhance recreation, safety and enjoyment of the dock.

Ms. Sara Hudson, (715) 682-7059

Bayfield County

2020-2030 Red Cliff Comprehensive Plan

Red Cliff Band of Lake Superior Chippewa Indians

\$40,000

Develop a comprehensive ten-year coastal and natural resources management plan for the Red Cliff Tribe.

Mr. Chad Abel, (715) 779-3750

Siskiwit River Estuary Preserve Trail Improvements

Bayfield County Forestry and Parks

\$30,000

Repair and improve existing trails in the Siskiwit River Estuary Preserve damaged by increased usage and interest in the waterfall features of the property.

Mr. Jason Bodine, (715) 373-6114

Big Ravine Preserve

City of Bayfield Parks & Recreation

\$23,400

Establish a unified trail network and provide access to the Big Ravine and other nearby coastal areas.

Ms. Kate Kitchell, (715) 779-5334

Bayfield Area Trail System (BATS) Expansion

City of Bayfield Parks and Recreation

\$6,000

Develop designs, plans, and cost estimates for constructing a stairway between the Bayfield school and the Big Ravine bottom and improve local trails.

Ms. Kate Kitchell, (715) 779-5334

Brown County

Bay Beach Amusement Park Beach, Pier and Boardwalk Construction

City of Green Bay

\$100,000

Improve the shoreline at Bay Beach Amusement Park by constructing a new, ADA-compliant shoreline walk.

Mr. Dan Ditscheit, (920) 448-3381

Baird Creek Watershed Nine Key Element Plan

Brown County

\$29,994

Develop a nine key element watershed plan for the Baird Creek Watershed and create a public interactive online GIS map.

Mr. Devin Yoder, (920) 448-6488

Door County

Dunes Lake Restoration Phase II

Door County Soil & Water Conservation
Department

\$100,000

Hydraulically dredge 18,500 cubic yards of accumulated sediment and associated legacy phosphorus in the 20-acre "inner Lake Basin."

Mr. Greg Coulthurst, (920) 746-2275

Integrated Invasive Species Education and Outreach

Door County Soil & Water Conservation
Department

\$46,742

Develop and implement invasive species messaging using the PlayCleanGo campaign and install two waterless boat cleaning stations at County boat landings.

Ms. Krista Lutzke, (920) 746-2363

Paddling Through the Door

Wisconsin Historical Society

\$15,842

Deliver a training opportunity for avocational archaeologists by conducting a field project to document two nearshore shipwrecks and develop a Door County Shipwreck Paddlers Trail.

Ms. Caitlin Zant, (608) 264-6498

Porte Des Morts Educational Signage

Town of Liberty Grove

\$7,800

Install three informational signs at the Porte des Morts Park to educate park visitors on the Niagara Escarpment.

Mr. Walter Kalms, (920) 854-2934

K-12 Niagara Escarpment Curricula Development

Greater Escarpment Organization of Door County

\$7,500

Develop K-12 STEM-oriented curricula on the Niagara Escarpment and its relationship to the Great Lakes.

Mr. Louis Covotsos, (920) 854-4129

Douglas County

Douglas County Comprehensive Plan Update 2020-2040

Douglas County
\$30,000

Update the County Comprehensive Plan to include a Coastal Resources Element and a Hazard Mitigation Element.

Mr. Zach Devoe, (715) 395-1386

Iron County

Iron County Land and Water Resource Management Plan

Iron County Land and Water Conservation Department
\$12,995

Update the County Land and Water Resource Management Plan and include Coastal Resources as a new element.

Ms. Heather Palmquist, (715) 561-2234

Kewaunee County

Kewaunee County Invasive Species Management Plan

Kewaunee County Land & Water Conservation Department
\$21,597

Develop and adopt an invasive species management plan, collect countywide invasive species GIS data, and conduct public education and outreach.

Ms. Kate Nelson, (920) 845-9747

Kewaunee County Outdoor Recreation Plan Update

Kewaunee County
\$11,879

Update the Kewaunee County Outdoor Recreation Plan.

Mr. David Myers, (920) 388-0444

Manitowoc County

Manitowoc Safe Harbor Dock Facility

City of Manitowoc
\$56,000

Construct an ADA accessible dock adjacent to the Mariners and Riverwalk trails connecting the north and south ends of the city.

Mr. Paul Braun, (920) 686-6930

Hika Park Public Access Planning

Village of Cleveland
\$28,500

Update the Hika Park Master Plan for expanded public access.

Ms. Stacy Grunwald, (920) 693-8181

Marinette County

Stream Connectivity on the North Branch Beaver Creek

Town of Beaver
\$54,500

Install an ecological culvert/crossing on the North Branch Beaver Creek in Marinette County.

Ms. Barb Patz, (920) 619-9598

Milwaukee County

Milwaukee Public Library Green Infrastructure Installation

Milwaukee Public Library
\$96,230

Construct and install green infrastructure practices to treat and manage stormwater runoff at five Milwaukee public library branches.

Ms. Jennifer Meyer-Stearns, (414) 286-3024

Grand Trunk Wetland Public Access Design

Harbor District, Inc.
\$52,702

Complete design and engineering for public access at the Grand Trunk Wetland.

Ms. Lilith Fowler, (414) 643-1266

Drive Increased Use of Green Infrastructure

Clean Wisconsin, Inc
\$49,070

Advance the scale-up of green infrastructure adoption in the Milwaukee area by continuing direct engagement, addressing identified information gaps and barriers and outreach.

Mr. Mark Redsten, (608) 251-7020



Historic Mitchell Street Green Parking Lot

City of Milwaukee

\$45,125

Install green infrastructure practices on a 1.3-acre surface-level parking lot in Milwaukee's Historic Mitchell Street District.

Ms. Danielle Rodriguez, (414) 286-2404

Menomonee River's Edge Assessment

Menomonee Valley Partners

\$30,000

Review and survey shoreline properties within the Menomonee River Valley Riverwalk Overlay Zone and adopt a regulatory design standards agreement.

Ms. Corey Zetts, (414) 221-5506

Emerging Contaminant Pollution Education

Milwaukee Riverkeeper

\$30,000

Develop and launch an educational campaign to inform residents and stakeholders on the results of an emerging contaminants monitoring program.

Ms. Cheryl Nenn, (414) 431-0903

Ozaukee County

Little Menomonee Corridor Ecosystem Restoration

Ozaukee County Planning and Parks Department
\$100,000

Convert a portion of the Little Menomonee River from a straightened channel back to natural channel geometry including constructing several wetlands adjacent to this reach of the river.

Mr. Andrew Struck, (262) 238-8275

Port Exploreum Educational Initiative

Port Washington Historical Society
\$6,500

Acquire and display a Virtual Water Table at the Port Exploreum to enhance the educational experience of students and improve Great Lakes literacy.

Mr. Bill Moren, (262) 573-3130

Racine County

Olsen Prairie Access, Education and Habitat Improvement

City of Racine Public Health Department
\$29,879

Enhance Olsen Prairie through trail enhancement, installation of wayfinding signage, identification and removal of invasive species, and plant native species.

Dr. Julie Kinzelman, (262) 636-9501

Wind Point Lighthouse Public Access Enhancements

Village of Wind Point
\$14,875

Construct a paved pathway to enhance public access from the Wind Point Lighthouse property entrance to the coastline.

Mr. Michael Hawes, (262) 639-3524

Sheboygan County

10-Year Comprehensive Plan Updates and Implementation

Sheboygan County
\$9,610

Include a coastal resources section to the comprehensive plan updates for four towns in Sheboygan County and implement recommendations in a comprehensive plan for another town.

Mr. Kevin Struck, (920) 459-5905





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.

Wisconsin Coastal Management Program

Tony Evers
Governor

Joel Brennan
Secretary, DOA

Dawn Vick
Administrator, DOA Division of Intergovernmental Relations

Mike Friis
Leader, Resource Policy Team and Manager, WCMP

Kathleen Angel
Coastal Natural Hazards and Federal Consistency Coordinator, WCMP

Todd Breiby
Coastal Nonpoint and Education Coordinator, WCMP

Lauren Leckwee
Environmental Compliance Coordinator, WCMP

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James Langdon

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 - 2, Twin Ports, University of Wisconsin Sea Grant
 - 3, Twin Ports, Lake Superior NERR
 - 4, St. Louis River Estuary, Lake Superior NERR
 - 5, Dunes Lake, Door County Soil and Water
Conservation Department
 - 6, Bay Beach, City of Green Bay
 - 7, Bay Beach, City of Green Bay
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Sewerage District
 - 9, Green Infrastructure, Milwaukee Metropolitan
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 - 10, Apostle Islands, National Park Service
 - 11, Apostle Islands, National Park Service
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 - 13, Trail Enhancements, Landmark Conservancy
 - 14, Mount Pleasant, Yi Liu
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 - 16, Bayfield, Bayfield Chamber and Visitor Bureau
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Wisconsin Coastal Management Program

101 East Wilson Street
PO Box 8944
Madison, Wisconsin 53708-8944
(608) 267-7982
<http://coastal.wisconsin.gov>
coastal@wisconsin.gov

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 WISCONSIN COASTAL
MANAGEMENT PROGRAM



