

# Wisconsin Great Lakes Chronicle 2021

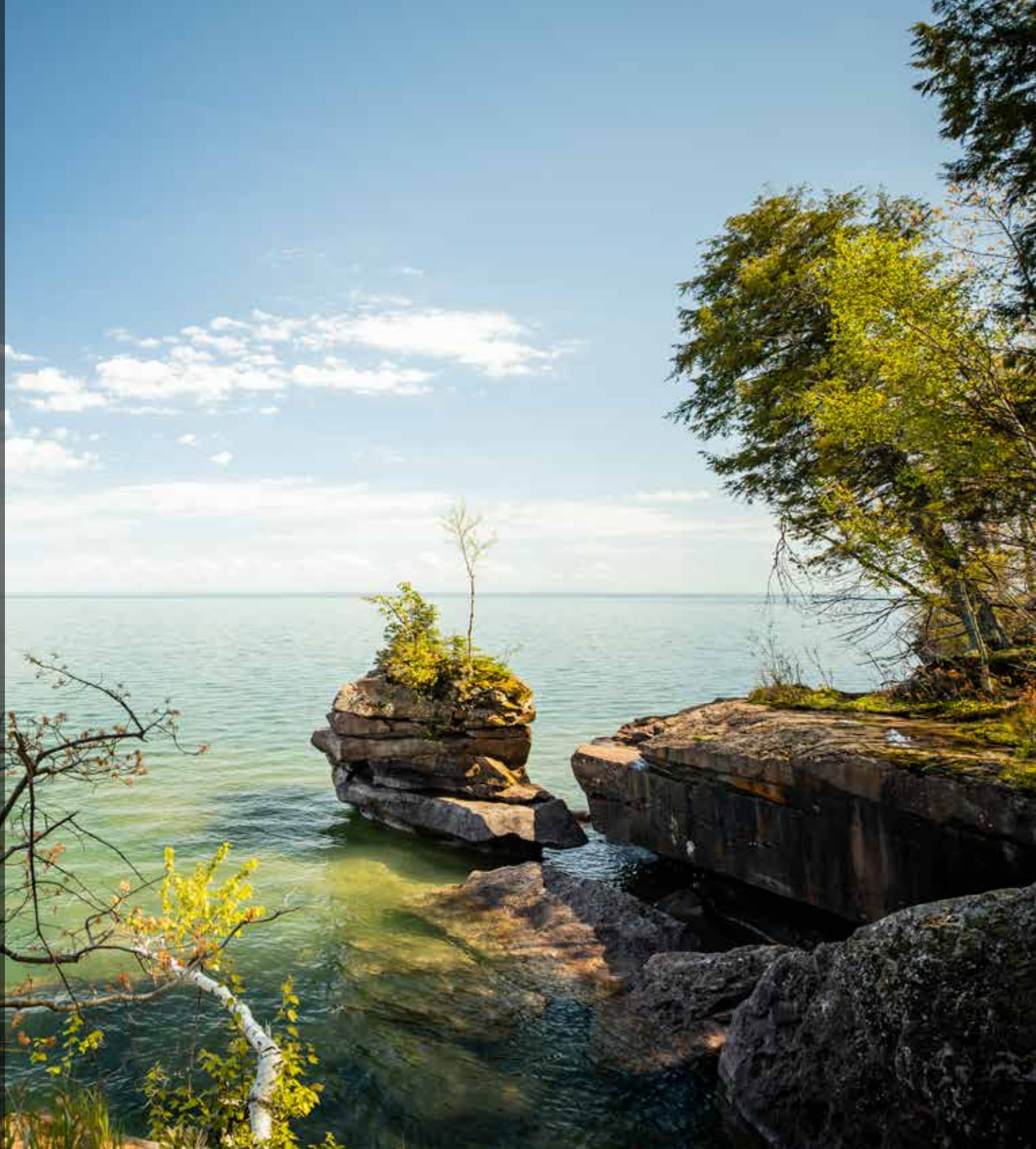


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## On the Cover

Door County Coastline,  
Travel Wisconsin



# FOREWORD

Governor Tony Evers

Dear Friends of Wisconsin's Great Lakes,

I am pleased to share with you the 20th edition of *Wisconsin Great Lakes Chronicle*. Like those that preceded it, this edition features the efforts of dedicated stewards of Wisconsin's Great Lakes who ensure our more than 1,000 miles of coastline are protected.



As a native of Sheboygan County, I know full well that the Great Lakes are fundamental to our identity and way of life as Wisconsinites. Lake Michigan and Lake Superior's natural resources, transportation routes and abundant beauty have enriched our lives for generations. The generations of Wisconsin citizens to follow will continue to rely on the Great Lakes for recreation and as a gateway to the \$6 trillion regional and global economy the Lakes represent.

I have been proud to chair the Conference of Great Lakes and St. Lawrence Governors and Premiers and work with other state and provincial leaders to develop and implement policies to restore and protect the Great Lakes. Together, we established priorities such as growing maritime trade and environmentally sustainable economic growth, creating resilient communities, and taking action to address environmental threats posed by invasive species and pollution.

In March 2019, I petitioned the National Oceanic and Atmospheric Administration (NOAA) to initiate the designation of a National Estuarine Research Reserve (NERR) within the Bay of Green Bay. Since then, NOAA approved the initiative and put the designation approval process in motion. Green Bay is the world's largest freshwater estuary and provides a robust demonstration site for estuary protection, restoration and management.

With the upcoming designation of the Wisconsin Shipwreck Coast National Marine Sanctuary, one of fifteen nationally recognized marine sanctuaries and only the second in the Great Lakes, we have an additional opportunity to spotlight the cultural and historical impact of Lake Michigan. The coastlines of Ozaukee, Sheboygan, Manitowoc and Kewaunee counties in Lake Michigan are home to a significant number of known and yet-to-be discovered shipwrecks and maritime historical artifacts. This designation will expand on our ongoing stewardship of these unique sites and inspire new educational and archaeological discoveries and opportunities for Wisconsin residents, visitors and the nation.

For four decades, the Wisconsin Coastal Management Program in the Department of Administration has worked cooperatively with federal, state, local and tribal governments, universities, non-profit organizations and citizens

to protect the Great Lakes as a natural, commercial and recreational resource. This year, we proudly announced \$1.41 million in grants to support quality of life and foster sustainable economic development for our coastal communities.

There will always be more we can do to protect the environmental, economic and community impact of the Great Lakes with an eye toward promoting outdoor recreation, equitable access and resilience for the future. With ongoing climate change challenges, our Great Lakes are experiencing a period of record-high water levels resulting in grave consequences for coastal ecosystems and economies. The Governor's Task Force on Climate Change Report, which came out in December 2020, outlined some of these challenges and proposed collaborative solutions to address them.

The responsibility falls on all of us, in partnership with our local and federal partners including the National Oceanic and Atmospheric Administration, Wisconsin Harbor Towns Association, Wisconsin Marine Association, University of Wisconsin Sea Grant and Lake Superior National Estuarine Research Reserve, to name a few, to protect our incredible Great Lakes and the people whose lives are inextricably linked to them. I am proud of the work we have accomplished to preserve this vital resource for everyone in Wisconsin as well as the generations to come.

With COVID restricting indoor pastimes, many of us rediscovered the pleasure and fulfilling benefits of outdoor recreation.

## OUTDOOR RECREATION IN THE TIME OF COVID

*Mike Friis*

Our collective lives were upended in March 2020 with the outbreak of COVID 19 pandemic. Precautions put into place across the country reduced the spread and minimized the human cost of the disease. For most of us, we also had fewer or no opportunities for leisure activities such as going out for dinner, music and the theater. With indoor pastimes restricted, we sought alternatives and many of us rediscovered the pleasure and fulfilling benefits of outdoor recreation.

As evidence, shelves in big box and specialty outdoor sporting goods stores were empty by early summer 2020. Water enthusiasts could not find canoes, kayaks and paddleboards and even racks where fishing rods and reels once towered over aisles were empty. Shop owners enjoyed a boom in outdoor recreation equipment sales but had to tell many eager customers products were backordered and available only on a presale basis.

Increased outdoor activity was also noticeable in the field and on the water. In my experience, more boaters used landings on the Madison chain of lakes, more hikers visited the Kickapoo Valley Reserve, more bicyclists rode on the state trails and more people enjoyed our Great Lakes beaches.

These anecdotal observations were substantiated by quantitative measures. One supportive metric is the documented sale of fishing licenses by the

Wisconsin Department of Natural Resources. The DNR saw a dramatic increase in annual fishing license sales in the 2020 fishing season compared to the previous year. They report from March 1 to September 30, 2020, 119,000 more licenses were sold to Wisconsin residents than in 2019. Further analysis showed sales of first-time buyer licenses more than doubled from the previous year. The DNR reported sales of state park passes were up more than 42 percent, while sales of recreational vehicle trail passes grew nearly 33 percent.

According to Julie Van Stappen, Resource Management Chief at the Apostle Islands National Lakeshore, visitation in 2020 was strong despite restricting the area to day-use only for the year. Places like Meyers Beach were busy as area kayak outfitters adapted to renting more day trips. This surge happened despite restrictions on camping, no volunteers to keep track of visitors at places like Devils and Michigan Islands, no concession sales and no shuttle service.

From a local government perspective, Sara Hudson, City of Ashland Director of Parks and Recreation, reported City trails were busy and area beaches were the busiest she had ever seen. The City's Kreher Park RV Campground reached capacity much earlier than expected in 2020 and reservations for 2021 are brisk and indicate the trend will continue.

As a resource manager, I consider how to interpret this trend. We at the Wisconsin Coastal Management Program focus on providing public access to enable people of all abilities and backgrounds to connect with and experience the Great Lakes. Outdoor recreational opportunities enhance our quality of life and allow for a personal experience with our environments that fosters a stewardship ethic that will preserve them. Perhaps more importantly, supporting safe, accessible public places along Wisconsin's Great Lakes creates recreational opportunities that will lead to a healthier, happier population. These valuable objectives should remain at the forefront of our planning.

At the same time, residents and visitors must be mindful that increased interest and participation in outdoor recreation requires funding for facilities, resource protection and restoration efforts. For instance, user fees for boat launches and trails provide direct funding to federal, state and local governments charged with maintaining these resources subject to increased use. Additionally, hunting, fishing and recreational vehicle license revenue will remain important sources of funding to maintain, preserve and protect resources enjoyed by outdoor recreation enthusiasts. At the federal level, indirect funding provided through excise tax dollars associated with purchases of some outdoor sporting equipment and Pittman-Robertson Act funds collected from firearm, archery and ammunition purchases must continue to support environmental restoration activities.



Resource managers must also prepare for the future. For instance, we should be aware that outdoor recreational equipment shortages are likely temporary and we should plan for increased interest in and pressure on public resources like campgrounds, beaches, trails and lakes. Presuming manufacturers and retailers will meet demand for durable recreational equipment that will be used for many years, governments at all levels must prepare for this positive economic impact within communities and plan to increase their supplies of recreational opportunities. If the public sustains their interest in outdoor recreation, we must be ready to increase investments in these opportunities.

Finally, the new users of the outdoors may also need education and information on recreational resources, their location and allowable uses at a site. Crucial to the collective enjoyment of our outdoors is enjoying them appropriately and engaging in ethical behavior such as picking up trash, maintaining vegetation, minimizing adverse wildlife interactions and respecting other users' space.

It will continue to be a priority of the Wisconsin Coastal Management Program to work with our partners in federal, Tribal, state and local governments as well as land trusts to provide these opportunities and support good stewardship of our outdoor recreational resources.

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Cream City Conservation is improving Milwaukee's green infrastructure and changing the face of the environmental industry.

## GENERATION GREEN

*Karina Gonzalez*

Cream City Conservation is a two-prong social enterprise that connects young adults who are primarily people of color and women to paid training experiences on various environmental projects around Southeastern Wisconsin. Simultaneously, the company provides education and organizational assessments to organizations looking to address the diversity crisis within their institutions.

The company was founded by August M. Ball in 2016 just two months after learning the national conservation program she ran in Milwaukee was shutting down operations due to lack of funding. Ms. Ball was determined to keep young people she had worked with over the past eight years engaged in hands-on service to public lands.

It all started with a small contract from River Revitalization Foundation for an invasive species removal project that was only supposed to last one season. Ms. Ball leveraged funds from workforce programs such as the Earn & Learn program and fees collected from the consulting side of her organization to offset the costs of running crews, such as buying work boots and bus passes for teens who could not afford them. These outdoor recreation experiences fostered in her team a love and sense of obligation for protecting public green space for activities like kayaking, birding and camping.

Over the past two years, Cream City Conservation partnered with the Milwaukee Metropolitan Sewerage District to create career exploration experiences while addressing various green infrastructure issues that have gone unmaintained around Milwaukee County due to lack of maintenance funding. In 2019, the public-private duo unveiled the Fresh Coast Ambassadors program designed for teens aged fifteen and older. The crew maintained five green infrastructure sites, installed rain gardens and rain barrels in front of residential houses, and removed acres of invasive species from numerous Milwaukee County Parks.

This year, the partnership in collaboration with Milwaukee County Parks is piloting a construction, wastewater treatment and green infrastructure career preparation employment experience called Fresh Coast, Fresh Start for underemployed adults and returning citizens ages 21 and older. With boots on the ground as of April 2021, the crew has already maintained eleven green infrastructure sites around Milwaukee County, completed OSHA30 certification and is on their way to sit for the National Green Infrastructure Certification. If you are at a local Milwaukee County Park this season, look for crews in blue shirts and say hi!



These young adults will determine the path of hands-on sustainability in Milwaukee which is why career exploration is so important. To bring awareness to the many avenues of conservation and water-related jobs, members of all crews obtain age-appropriate skill certification such as chainsaw safety 1 and 2, forklift, OSHA10, OSHA30, First Aid & CPR and Green Infrastructure certifications.

Personally, I started in the conservation field as a crew member with the original program managed by Ms. Ball. I was thrilled to realize I could make a career out of my love for the environment and everything came full circle for me in March 2019 when I was able to lead the next group of crew members.

The most rewarding part of what I do is seeing the youth's mindset expand. They become more aware of the importance of what they do and most of the time they decide they want to pursue something in the environmental industry. I asked Ismael Casillas, a second-year returner, how his perspective changed since starting the program. He said:

“Before I had a conservation job, I would say that I was somewhat aware about the negative impacts happening to the environment. As I started working for C4 (Cream City Conservation Corps) I realized there was a lot more that I can do to help the environment and it gave me a greater appreciation of nature.” He now plans to pursue a job in land management.

Just as important as career exploration is networking among other conservation groups. For graduation of the 2020 Summer program, C4 paired up with Great Lakes Community Conservation Corps to clear up a portion of Cedar Creek that had previously been clogged up by fallen trees and debris. They were able to meet members their own age and come together on something they are all passionate about. This season, I am proud that two of our graduates, Hanan Ali and Megan Hart, secured employment with our partner agencies, Milwaukee County Parks-Natural Areas and Crossroads at Big Creek in Door County, respectively.

This year we have 45 young Milwaukeeans in the field, I have been promoted to Program Coordinator and we have expanded our small staff with an additional six crew leaders. While the climate crisis is daunting, I wake up every day grateful that I spend my hours doing everything I can to foster the next generation of environmentalists and help change the face of the environmental industry. The past year has been hard on us all and the impacts have affected our communities, but what gives me hope is knowing and trusting that I will see a shift in my lifetime.

The environmental industry *will* resemble the U.S. labor force. The movement is already happening. I hope you will join us!

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Green Bay is addressing recurring flood events that cause major damage and disrupt the lives of its citizens.

## GREEN BAY CLIMATE RESILIENCY

*Melissa Schmitz*

As the climate has changed over the last few decades, the City of Green Bay experienced flooding events that led to neighborhood disruption and community unease. The Fox River, East River and Bay of Green Bay were at record-high levels bringing anxiety with each precipitation event.

In response, the City established a Resiliency Coordinator position to seek grant opportunities that address flood mitigation and climate action. The position pursues funding that will assist residents and businesses in the implementation of low impact, green infrastructure projects, and also develops partnerships with community organizations engaged in watershed resiliency, habitat restoration and water quality improvement.

The Fund for Lake Michigan (FFLM) awarded the City a three-year grant to create the Resiliency Coordinator position that is also funded by the City's Storm Water Utility. As Resiliency Coordinator, my main goals include creating a flood resiliency plan and climate action plan for the City. This is being achieved through interdepartmental coordination of project development, policy change and community engagement. I also support the City Sustainability Commission's mission by engaging elected officials, staff and the community in resiliency and sustainability efforts such as clean energy, climate action planning, waste reduction, water resources management and ecological restoration.

Resiliency planning in areas that experience urban flooding and coastal flooding is underway. The urgent need comes from the impacts of recurring flood events and the damage and disruption they cause to our citizens, infrastructure and environment. Fluctuating lake levels and more extreme weather patterns are increasing urban flood events and our attention to mitigation and adaptation is more important than ever.

A recent example of flooding occurred in March 2019 along the East River. The greater region experienced a rapid winter thaw with temperatures ranging from 36° to 50° Fahrenheit over a seven-day span during which the area also received over an inch of rain. The combination of the above-normal temperatures, above-average rain events that melted a significant amount of snow and still frozen ground caused a tremendous amount of runoff to surge into the East River. Constrained by a frozen river surface, the East River exceeded bank full conditions from its confluence with Baird Creek southward to the southern City limits and inundated over 165 acres of adjacent low-lying area.

The flood damaged public infrastructure including roads, pedestrian paths, bicycle improvements, sewers, and wastewater mains and laterals. Additionally, flood waters impacted public utilities such as telephone, high-speed cable, natural gas and electrical power lines.





Of greatest concern, the flood impacted 102 private properties and damaged residences and accessory structures such as garages and sheds. Fifty-nine households had to be evacuated from their homes. Because water touched the furnace, water heater or electrical systems in many of these structures, the City had to condemn and declare them uninhabitable. Hundreds of residents were forced to seek temporary shelter for several days to weeks while repairs were made to their homes. In a handful of cases, the flooding damaged structural foundations resulting in permanent condemnations.

Motivated by the flood of 2019, a big part of the City's resiliency plan includes incorporating green infrastructure (GI) into public and private properties, street projects and redevelopment projects like the Shipyard District. Green infrastructure refers to those methods of storm water treatment and control that use the natural capacities of soil and vegetation to prevent or reduce stormwater runoff and associated nonpoint source pollution.

Through a Great Lakes Commission grant, we completed an audit of Green Bay's municipal code for barriers that would prevent the inclusion of green infrastructure language and best management practices. This process involved community and staff input from the Public Works, Parks, Recreation and Forestry, Community and Economic Development and Law Departments, and several City committees. The code amendments are in-progress and will encourage GI installation where practical in the City.



In 2022, we anticipate kicking off a residential GI program with a rain barrel and rain garden campaign. Later in 2022, a GI incentive program will be introduced for Green Bay's commercial and industrial businesses. It is our goal to get as much GI into the community as possible. Distributed strategically across a drainage area, these practices can have an impact on reducing storm water flow volumes, velocities and pollution loads. Other benefits of GI include reduced heat island effect, improved air quality and neighborhood revitalization.

Another leg of the resiliency plan is flood mitigation through property acquisition. The long-term project will acquire structures in the

floodway and one-hundred-year floodplain of the East River watershed, demolish them and restore the area to natural, vegetated conditions. These structures were constructed during the 1930s through the 1950s prior to City-wide adoption of floodplain regulations, and nearly all of them are and will remain susceptible to flooding events.

Flood events are unpredictable yet can be expected to occur more frequently. The City of Green Bay is committed to providing a safe, protected environment for our citizens and business to live and prosper.

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Work on Bayfield's Big Ravine is reducing erosion and improving hiking opportunities for residents and visitors.

## BAYFIELD'S BIG RAVINE

*Kate Kirchell*

The City of Bayfield's intimate connection with Lake Superior draws visitors and residents who relish its natural beauty and diverse outdoor experiences on land and water. A central natural feature connecting Bayfield Hill with the Lake is the Big Ravine and the creek that runs through it.

In July 1942, heavy rains caused unprecedented flooding through the Big Ravine and inundated the City with water, mud, rocks and debris. The lessons learned from that event led to a long-standing commitment to protecting the Big Ravine's watershed and natural habitats.

Encompassing 300 forested acres, the Big Ravine offers hiking along the creek, waterfalls and hemlock and mixed deciduous forests on the benches. Unfortunately, trails developed incrementally over many years were not connected and led people to pioneer social trails on the steep sensitive slopes causing erosion and sedimentation. The lack of connectivity and limited access points also constrained options for longer walking routes to experience the full diversity of this special place.

Additionally, students have for decades run roughshod up and down the Ravine's steep slopes to the Bayfield school located on its western edge. The lack of safe and sustainable access created safety risks, soil compaction, vegetation loss and erosion, and prevented students and teachers from taking full advantage of the Big Ravine's outdoor education and recreation potential.

Finally, concerns over runoff and erosion in the Big Ravine are not limited to local use. They are magnified because Bayfield, like many other communities, is experiencing more extreme weather events and stormwater runoff associated with climate change.

Recognizing environmental concerns and the need for enhanced hiking opportunities, the City of Bayfield Parks and Recreation Committee launched efforts to develop a cohesive trail and restoration plan. The City of Bayfield, Town of Bayfield, Bayfield Chamber and Visitor Bureau, Bayfield School, Bayfield Community Education Foundation, Duluth-Superior Area Community Foundation, Landmark Conservancy, Bayfield County, Bird City Wisconsin, and over fifty volunteers contributed funds and more than 1,500 hours of labor to implement the new plan and vision.

Two Wisconsin Coastal Management Program grants supported the City's work. The first grant funded the Big Ravine Trails Design Report authored by Will Krift of Trails Anonymous. The Report included designs and specifications for eight new sustainable trail segments connecting the Gil Larsen Trail in the Ravine bottom and the east and west side trail systems.

The Report helped secure grants from the Apostle Islands Community Fund and the Wisconsin Department of Natural Resources to construct five trail segments and a network of loop and extended hiking options over five miles of trails and three

miles of country road. These trails now provide the opportunity to walk from the City's lakefront up to the Bayfield Hill's orchards crossing a variety of terrain and degrees of difficulty.

The first grant also funded a plan by Bay Area Environmental Consulting to restore areas damaged by unmanaged social trailing. While most of the plan has been implemented, the greatest restoration challenge, the slope behind the school, awaited construction of a sustainable school trail connection. With the completion of this trail in August 2021, final slope restoration will occur when grant funding is secured.

The second Coastal Management grant supported several public information and access efforts that dovetail with the new trails and restoration activities. Most notably, the gateway to the

Big Ravine Preserve located at the Gil Larsen Trailhead on Washington Ave. got a facelift. This included reconstructing the deteriorated steps and access trail, installing a pollinator plant garden, and planting new trees with Bayfield's fourth graders. The icing on the cake at this trailhead is the addition of four interpretive signs about the Big Ravine's natural and cultural history and responsible recreation.

To bookend the Gil Larsen Trailhead, a new access was developed at the Ravine's upper end called the North Ravine Trailhead. At a smaller scale, the West Rim, Hilltop, and North Ravine Trailheads have been spruced up with new kiosks that display trail maps, trail etiquette and information about cultural and natural features. Additionally, Bayfield school students will develop interpretive signs about the Ojibwe language interpretation of trail names.

In the process, the Bayfield Area Trails Committee ([www.bayfieldareatrails.com](http://www.bayfieldareatrails.com)) was born to build and steward a sustainable trail network. County, city and town government, the Red Cliff Band of Lake Superior Chippewa, Landmark Conservancy, the Ashwabay Outdoor Educational Foundation and the Apostle Islands National Lakeshore have united with a goal to develop an interconnected trails network in the Bayfield area serving local and visiting trail enthusiasts.

These public information and access efforts were also supported by a 2020 WCMP-funded project focused on launching a Bayfield Green Infrastructure program. Through this project, a City flow path has been produced and provides detailed information on how and where water flows across the City's landscape toward the Lake. This map will aid efforts toward managing and capturing stormwater runoff, including future trails planning and restoration in the Big Ravine.

Bayfield City Councilor Matt Carrier sums it up: Thanks to WCMP's support, 2020 was an incredible year for the Big Ravine and the people who love it. The trails and public information will enhance the quality of life for our residents and provide wonderful experiences for visitors for many years to come.

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The Integrated Nowcast/  
Forecast Operation  
System (INFOS) alerts  
the public to dangerous  
rip current conditions at  
Port Washington beaches.

## PORT WASHINGTON RIP CURRENT ALERT SYSTEM

*Dr. Chin Wu and Todd Breiby*

Dangerous currents are common in the Great Lakes and can form due to waves, wind, water temperature, lake bottom bathymetry, coastal infrastructure, river outlets and channels between islands. These hazards pose a significant risk to people recreating in coastal nearshore waters and are a catalyst for coastal communities to find solutions to address these hazards and improve water safety. Oftentimes the public is unaware that dangerous currents can form in the Great Lakes.

Rip currents are strong, localized channels of water that move rapidly away from the shore toward open water. According to the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service Great Lakes Current Incident Database, there have been hundreds of fatalities and rescues due to dangerous currents since 2002. Common in all five of the Great Lakes, many incidents occur each year in Lake Michigan.

Port Washington, situated along Wisconsin's Lake Michigan coast, was significantly impacted in recent years by two drownings due to dangerous currents and wave conditions. After a tragedy in 2012, Port Washington officials began discussions with university and agency partners on how to address the hazards, better understand rip currents along its coast and find solutions to improve water safety. This collaborative partnership developed what became a road map to meet these objectives.

In 2014, with funding from the NOAA Coastal Storms Program, a project team was formed that included the University of Wisconsin-Madison Department of Civil and Environmental Engineering, Wisconsin Coastal Management Program, Minnesota and Wisconsin Sea Grants, and local partners such as the City of Port Washington. The goal was to improve rip current observation, forecasting and warnings at three beaches in Lake Michigan and Lake Superior.

North Beach in Port Washington was selected to be one of study beaches due to NOAA's National Weather Service incident records and because its topography features are prone to the formation of flash rips and structural rip currents. Specifically, the project aimed to develop a real-time observation and forecasting system to provide rip current information to the public so individuals could make an informed decision on when conditions were safe to enter the water.

Critical to the project was technological innovation that could bring together real-time data with predictive modeling. In 2015, an Integrated Nowcast (real-time) Observation and Forecast (future) Operation System (INFOS) for rip currents was developed and launched for the study site at Port Washington. An INFOS website (<http://infosportwashington.cee.wisc.edu>) aimed to serve as a platform for integrating and sharing real-time rip current information with the public.

Through the INFOS website, users can check real-time wave conditions, water temperatures, weather conditions, and live beach views. This data is collected by a nearshore wave sensor, a weather station and a dual-view camera installed near North Beach. Forecasts of waves and currents in the next twelve hours are made available by an integrated atmospheric-hydrodynamic model. An advisory for the risk of rip currents is posted using real-time wave conditions and provides a three-tier classification system of high-moderate-low (red-yellow-green) risk.

In 2017, with funding support from Wisconsin Coastal Management Program, WE Energies and local businesses, the project was extended to include Port Washington's South Beach. The decision to expand monitoring and forecasting was based on data showing the presence of rip currents at the site, as well as an increasing need from residents and the City. A second goal was to develop rip current warning kiosks at North and South Beaches to deliver timely, dynamic, in-situ risk warnings to the public. Not only could the public access the INFOS website to obtain current and forecasted conditions on their mobile devices, but beach users would now be able to access the same information at both beaches.

In 2019, a first of its kind kiosk system was developed and installed at the entrance of North Beach. The kiosk is equipped with a display screen to show real-time observation and modeling rip current information. On top of the kiosk, a tricolor



(red, yellow, green) beacon light system was added to provide a dynamic color display of the rip current risk level. The color of the light is automatically updated based on the corresponding risk level.

The beacon light system aims to provide real-time information about condition changes to beach users from a distance. The kiosk has greatly promoted warnings for rip current danger and fostered increased awareness about the beach hazard. Following the success in North Beach, in 2020, a second kiosk and a new lake-view panoramic camera were installed at South Beach providing the same real-time and forecasted data and tri-color beacon light system.

Over the years, the engagement and commitment of project partners facilitated the advancement of the technology, identification of new

opportunities, and the critically important component of education and outreach. To ensure Port Washington INFOS is sustainable far into the future, the City of Port Washington, UW-Madison Department of Civil and Environmental Engineering, Wisconsin Coastal Management Program and UW Sea Grant are entering into a Memorandum of Understanding that will enable the information, technology and products developed through the project to continue serving the local community.

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Reliable, accessible  
culvert data remain one  
of the best defenses  
against the impacts of  
future flooding events.

# WISCONSIN COASTAL MANAGEMENT DATA INFRASTRUCTURE PROJECT

*Melanie Kohls and Jim Giglierano*

Established in 2018, the Wisconsin Coastal Management Data Infrastructure (WICDI) Project ([www.wicdi.org](http://www.wicdi.org)) aims to bring together a coastal Community of Practice through tools, training and collaborative efforts around culvert mapping. Anyone who lives in or near the Lake Superior coastal region, and many who live elsewhere, will recall the devastating rains and flooding there in 2012, 2016 and 2018. Record-breaking rainfalls led to millions of dollars' worth of infrastructure damage, much of it at road-stream crossings where flooded streams engulfed and washed out huge stretches of highway.

These weather events called new attention to the effects of climate change on the region, but also to the effects of scattered or “siloed” management of road crossings, and especially culverts. There is no shortage of culvert data in the area—on the contrary, the volume and depth of data makes it difficult to sift through, and many organizations have their own data housed separately in their agency’s data portal. With no aggregated system for tracking maintenance and no single location for accessing culvert data, keeping track of aging and outdated culverts becomes challenging and will lead to a higher likelihood of culvert failures and extreme washouts in future weather events.

This challenge is exacerbated for many northern towns and counties who may lack access to consistent high-speed internet and the funding to support GIS technology and a full team of GIS

staff. It is not uncommon for one town official to wear many hats and a comprehensive culvert inventory of their township is simply not high on the priority list.

The WICDI project team is bridging these need gaps by developing needed tools, training and data. The Wisconsin Coastal Management Program (WCMP) and the UW-Madison State Cartographer’s Office work together to lead WICDI with funds from a NOAA Project of Special Merit Grant. Three main components make up the WICDI project: a Community of Practice (CoP), a Collaborative Support Environment (CSE), and a case study of culverts.

Over 100 individuals and agencies from the local, state and federal levels make up the CoP. Most of these members live or work in one of the four coastal counties hit hardest by flooding: Ashland, Iron, Douglas and Bayfield. This community is the guiding force behind all of WICDI’s actions. WICDI project staff work to ascertain community needs through in-person and virtual workshops and one-on-one meetings. These meetings led to the ideas for and development of an aggregated culvert database that is easily accessible in the cloud.

This culvert database is one component of the CSE. Another component is a cloud-based program called AppStream which allows users to log into an account and work on a remote desktop or view and edit projects in ArcGIS Pro, all without limitations from the computing power or licenses

available on their local devices. Finally, content management system GeoNode provides a place for community members to discover data without having to navigate multiple portals or silos.

Both of these concepts—CoP and CSE—converge around WICDI's final component: culvert mapping. WICDI staff have collaborated and exchanged ideas with other significant culvert mapping efforts in the region such as the Great Lakes Stream Crossing Inventory (GLSCI) from the Michigan DNR, Wisconsin DNR and U.S. Forest Service, and a Natural Flood Management project in the Marengo watershed sponsored by Wisconsin Wetlands with numerous other partners.

These mapping and data gathering endeavors are a positive step forward toward a better understanding of the hydrology and culvert status of the area. However, they tend to support longer-term solutions requiring both a depth and breadth of work that many smaller local stakeholders cannot budget for immediately.

WICDI fills in these gaps by offering tools and data such as the CSE and culvert database that allow users to discover, view and edit data as easily and efficiently as possible. WICDI staff receive and import data into the aggregated culvert database that therefore remove that burden from data collectors. No culvert dataset is too small, too

old or too sparse to be included. And when culvert managers or road crews want to expand on what they collect, they have WICDI's comprehensive database schema to use as a template.

In 2021, WICDI was awarded a second NOAA Project of Special Merit grant. What does this exciting news mean for the project? WICDI is currently putting plans in the works to grow its Lake Superior community and reach out to Wisconsin's Lake Michigan coastal partners. Project staff are also developing data collection tools such as surveys that will help future contributors generate new data for the WICDI database. Finally, sustainability is a major focus. WICDI staff are working with its Community of Practice to generate policies and committees to ensure that the project's database and other assets remain available and useful long after its initial funding comes to a close.

With these future-oriented goals and a strong sense of purpose in the present, WICDI will continue providing an invaluable infrastructure to support culvert mapping in coastal Wisconsin communities. Reliable, accessible data remain one of the best defenses against the impacts of future flooding events.

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University of Wisconsin  
students and faculty  
are at the forefront  
of protecting and  
preserving Wisconsin's  
Great Lakes.

# UNIVERSITY OF WISCONSIN AND THE GREAT LAKES

*Tommy Thompson*

The Wisconsin Idea is alive and well at the University of Wisconsin where our thirteen research and comprehensive universities work each day to solve problems and improve the lives of Wisconsin citizens. Nowhere is this commitment to service more evident than at UW campuses along Lakes Michigan and Superior. I am proud to present a sample of important initiatives at our Great Lakes universities.

**UW-Green Bay.** Green Bay as a body of water is unique among all the Great Lakes and in the world. The Bay is bounded by the Niagara Escarpment to the east and an extensive wetland to the west. Green Bay and its Fox River tributary furnish unmatched habitat for local and migratory birds and nearshore and deep-water fish.

The University of Wisconsin-Green Bay recognizes its opportunity and obligation to study and preserve Green Bay and the Fox River. The university has in recent years studied the reintroduction of wild rice in the Bay's shallow waters. Additionally, UW-GB partnered with local groups to restore the Cat Islands, a chain of barrier islands that protect shoreland and support habitat.

Today the university pursues federal designation of the Green Bay National Estuarine Research Reserve (NERR). A NERR supports research, education and management of estuaries along the nation's ocean and Great Lakes coasts. A Green Bay NERR would attract federal funding and research partners and enhance UW-Green Bay's ability to protect the world's largest freshwater estuary.

**UW-Milwaukee.** Wisconsin's largest city has a complicated history along Lake Michigan. Originally a Native American community, European settlers transformed the area to one of the most productive industrial centers in the world. The University of Wisconsin-Milwaukee today uses its research power to restore the lakeshore and tributaries to a healthy, dynamic asset for the modern city.

UW-M's work is evident along Milwaukee's lakefront. Runoff, *E. coli* and pollution from former industrial sites seriously threaten the health of beaches used to provide recreation and economic opportunity. UW-M School of Freshwater Sciences research supports urban planners, engineers and environmental groups to ensure places like Bradford and South Shore Beaches offer healthy settings for city residents and visitors.

UW-Milwaukee also works at inland locations to clean water before it reaches the lake. Bacteria pollution caused by leaking pipes and urban runoff threatens the city's water resources. UW-M research is helping to clean water at its source. Milwaukee depends on its water resources, and UW-Milwaukee water research is vital in securing the city's vibrant future.

**UW-Parkside.** Wisconsin's southernmost Lake Michigan shoreline presents both opportunities and challenges. Bluffs, beaches and wetlands demonstrate the region's ecologic diverse and abundant resources. However, urban density and coastal erosion present unique problems



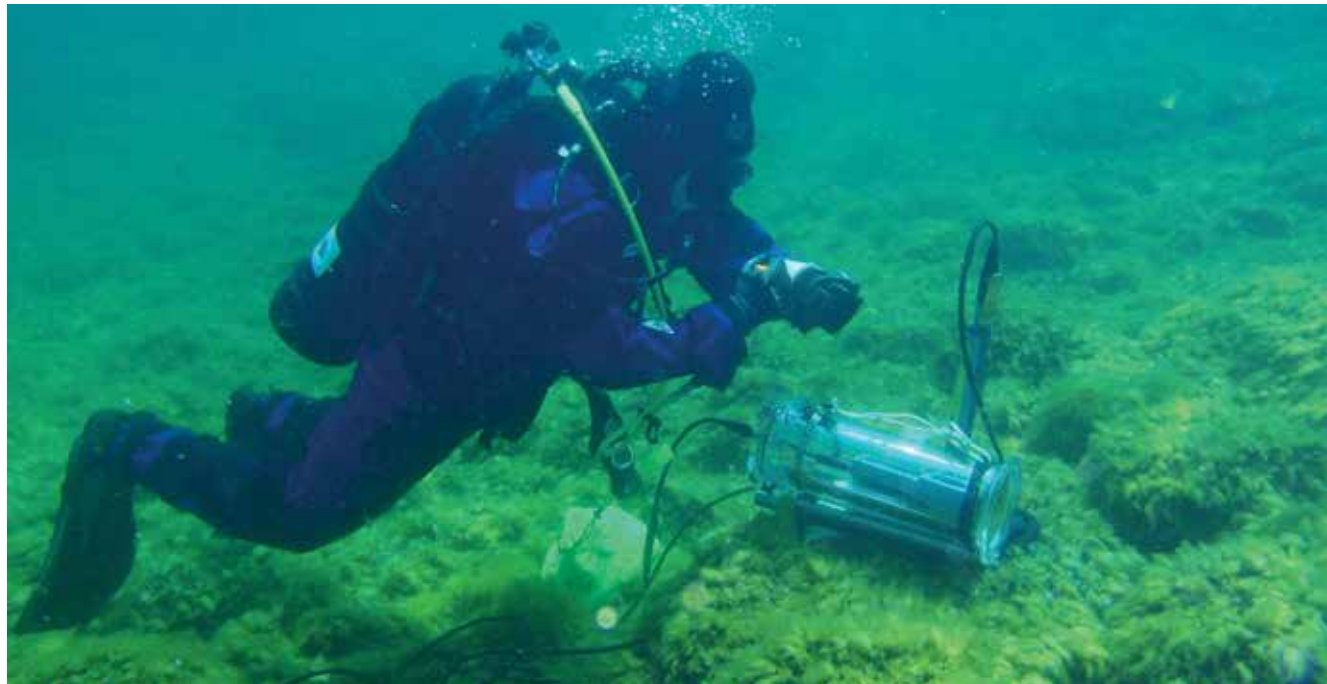


for Racine and Kenosha County communities. Thankfully, University of Wisconsin-Parkside is up to these challenges.

UW-Parkside students and faculty are actively engaged in issues that matter to southeastern and all of Wisconsin. For instance, undergraduate students are monitoring and improving water and habitat quality at wetlands, beaches and along the Pike and Root Rivers. Their research is documenting problems and offering solutions to improve the condition of coastal resources enjoyed by thousands of residents and visitors annually.

The Great Lakes have experienced exceptionally low and high water levels over the past decade, and UW-Parkside students and researchers are working to solve shoreline erosion projects at important places like Kenosha Dunes. Thanks to Parkside, communities will better manage coastal resources during times of extreme water conditions. Southeastern Wisconsin benefits from a healthy, safe Lake Michigan shoreline, and UW-Parkside is a critical partner in the region's success.

**UW-Superior.** Wisconsin's Lake Superior coast is one of the hardest working, hardest playing places in the state. The Port of Superior-Duluth moves more bulk material than any port on the Great Lakes and ranks in the top seven nationally. Additionally, Wisconsin's shoreline from Superior to Saxon Harbor offers unmatched recreational opportunities including sailing, kayaking and fishing. The University of Wisconsin-Superior is at the forefront of supporting this unique region.



UW-Superior is a major partner in the Lake Superior NERR, a federally funded collaborative dedicated to the health of Lake Superior and the St. Louis River estuary. Research, monitoring and training conducted by UW-Superior faculty and staff benefits communities throughout the Great Lakes faced with water quality, wildlife and socioeconomic challenges.

UW-S researchers are studying the impacts of ice cover on maritime transportation. Seasonal ice on Lake Superior limits commercial activity throughout the Great Lakes, and research conducted today will shape shipping strategies in the decades ahead. From transportation policy to water quality to invasive species control, UW-Superior is leading the way for Wisconsin and the Great Lakes region.

These four University of Wisconsin campuses are not alone in working for the benefit of Wisconsin's coasts. Each UW institution offers environmental, economics and other programs that address critical issues on our Great Lakes today and educate our next generation of coastal leaders who will solve new problems tomorrow.

When Wisconsin communities have a problem, the University of Wisconsin stands ready to serve. I am grateful to all of our universities for their work to preserve and protect Lake Superior and Lake Michigan.

*Tommy Thompson is Interim President of the University of Wisconsin System. He can be reached at [president@uwsa.edu](mailto:president@uwsa.edu).*

# 2021 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 focused on tackling science and policy challenges related to increasing coastal community resilience across the Great Lakes region.

Ms. Jennifer Hauxwell, (608) 263-4756

### Wisconsin Master Naturalist-Hybrid Training

University of Wisconsin-Madison Division  
of Extension

\$35,979

Adapt the Wisconsin Master Naturalist program to a twelve-module online platform that can be completed asynchronously by individuals over six weeks.

Ms. Becky Sapper, (715) 685-2352

### Coastal Hydrography Geospatial Data

Wisconsin Department of Natural Resources

\$19,000

Develop updated rivers, lakes and streams hydrography geospatial data for Kewaunee and Manitowoc Counties to support nonpoint pollution planning.

Ms. Ruth Person, (608) 264-8964

### Lake Superior Projects Database

Board of Regents of the University of  
Wisconsin System

\$16,850

Assess recent natural resource projects completed in the Lake Superior basin and create a comprehensive and easy-to-navigate web-based projects database.

Dr. Erin Burkett, (715) 209-1014

### Door Peninsula Trash Identification and Mitigation

University of Wisconsin-Oshkosh

\$13,418

Conduct a comprehensive survey of shoreline litter and debris on the Door County peninsula and install and monitor trash receptacles.

Dr. Gregory Kleinheinz, (920) 424-1100

### Regional Environmental Corridors Public Portal

Bay-Lake Regional Planning Commission

\$12,500

Update a Bay-Lake regional environmental corridor dataset and present the data in an online public portal.

Ms. Nicole Barbiaux, (920) 448-2820

### 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, (920) 448-2820



### **Technical Assistance**

Northwest Regional Planning Commission  
\$20,000

Provide technical assistance to local government and citizens in Ashland, Bayfield, Douglas and Iron Counties.

Mr. Jason Laumann, (715) 635-2197

### **Technical Assistance**

Southeastern Wisconsin Regional  
Planning Commission  
\$20,000

Provide technical assistance to local government and citizens in Kenosha, Milwaukee, Ozaukee and Racine Counties.

Dr. Thomas Slawski, (262) 547-6721

### **Great Lakes Inquiry: Engaging in Place-Based Education**

Wisconsin Wildlife Federation dba  
FIELD Adventures  
\$10,000

Provide environmental education in K-12 schools within four coastal communities along Lakes Michigan and Superior to close an ever-widening opportunity gap in Great Lakes education.

Ms. Ruth Ann Lee, (608) 635-0600

## **Ashland County**

### **Microbial Source Tracking**

Northland College  
\$28,058

Conduct microbial source tracking to investigate the presence of DNA markers such as human, avian, canine and ruminant at four City of Ashland public beaches and nearby stormwater outfalls.

Mr. Matt Hudson, (715) 682-1481

### **Marengo River Watershed Management Plan**

Superior Rivers Watershed Association  
\$17,229

Revise the Marengo River Nine Key Element Watershed Plan and re-evaluate several watershed plan elements.

Mr. Kevin Brewster, (715) 682-2003

## **Bayfield County**

### **Waterfront Walk Renovation**

City of Bayfield  
\$25,000

Renovate the existing City Harbor walk to include repaving, widening, safety and accessibility improvements, new connections and signage.

Ms. Kate Kitchell, (541) 452-3079

### **Blue Wing Bay Sanitary Sewer Collection System Expansion**

Pikes Bay Sanitary District  
\$10,550

Complete a feasibility study for the expansion of a sanitary sewer collection system to the Blue Wing Bay area between Highway 13 and Lake Superior.

Mr. Rex Dollinger, (715) 779-9866

### **Brownstone Trail Restoration Planning**

Landmark Conservancy  
\$10,500

Develop a long-term restoration and protection plan to provide slope stability, trail access and other visitor infrastructure on the Brownstone Trail in Bayfield.

Ms. Erika Lang, (715) 235-8850

## **Brown County**

### **Ashwaubomay River Trail Bridge**

Village of Ashwaubenon  
\$100,000

Construct an ADA-accessible bike and pedestrian bridge with a fishing bump-out to connect the Ashwaubomay River Trail south across Ashwaubenon Creek to Ashwaubomay Park.

Mr. Aaron Schuette, (920) 593-4405

### **Green Stormwater Infrastructure Education**

Clean Wisconsin, Inc.  
\$56,041

Educate Green Bay audiences on addressing flooding challenges and water quality impacts generated by stormwater runoff.

Mr. Mark Redsten, (608) 251-7020

### **Green Bay NERR Site Nomination and Selection**

Board of Regents of the University of Wisconsin System  
\$49,788

Address federal public outreach and mapping requirements for a new reserve within the National Estuarine Research Reserve System (NERR).

Ms. Emily Tyner, (920) 465-2586

### **Brown County Land Division and Subdivision Ordinance Update**

Brown County  
\$17,100

Align the ordinance with best management practices for environmentally sensitive areas, shoreland and wetland zoning, floodplain zoning and stormwater management.

Mr. Devin Yoder, (920) 448-6488

## Door County

### **Wetland Preserve Bridge Restoration**

Village of Ephraim

\$26,560

Reconstruct 360 feet of boardwalk bridges in the Village Wetland Preserve to provide ADA compliant public access.

Mr. Brent Bristol, (920) 854-5501

### **Invasive Species Prevention**

Door County Soil & Water

Conservation Department

\$23,055

Address the spread of invasive species through prevention, communication, monitoring and management.

Ms. Samantha Koyen, (920) 746-2363

### **Meridian County Park Light Acquisition**

Door County Facilities & Parks Department

\$12,000

Acquire a 4.0 acres wooded parcel adjacent to an existing County Park including an easement leading to Lake Michigan's sandy shores.

Mr. Burke Pinney, (920) 746-7132

### **Comprehensive Plan Update**

Town of Gardner

\$6,250

Update the Town's comprehensive plan including a 20-30 page brochure with updated data and recommendations.

Mr. Mark Stevenson, (920) 825-1137

## Douglas County

### **Woodstock Bay Public Access Project: Phase 1**

City of Superior

\$150,000

Convert an undeveloped parcel of land along the Woodstock Bay waterfront into a rustic public access point using low-impact design techniques.

Ms. Linda Cadotte, (318) 348-7315

## Kenosha County

### **Petrifying Springs Park Restoration: Phase II**

Kenosha County Parks

\$100,000

Complete restoration and engineering designs, site assessments and permitting for a stretch of the Pike River at Petrifying Springs Park.

Mr. Matthew Collins, (262) 857-1850

## Kewaunee County

### **Groundwater Education and Well**

#### **Testing Program**

Kewaunee County Land and Water

Conservation Department

\$27,000

Provide groundwater education, monitoring and protection as recognized in national and local plans.

Ms. Davina Bonness, (920) 845-9700

## Manitowoc County

### **Green Infrastructure and Outdoor Education**

#### **Master Plan**

Mishicot School District

\$39,900

Develop a plan to improve stormwater runoff pollution into the East Twin River and provide environmental education and planning.

Ms. Jamie Propson, (920) 755-3300

## Milwaukee County

### **Honey Creek Headwaters – Stream Restoration and Access Improvements**

City of Greenfield

\$48,000

Complete design and approvals needed for restoring six acres of the Honey Creek headwaters.

Mr. Jeff Katz, (414) 939-8322

### **Milwaukee River Greenway Coalition at 15**

River Revitalization Foundation

\$40,000

Commemorate fifteen years of the Milwaukee River Greenway Coalition by hosting programs and activities for public education and community engagement.

Ms. Kimberly Gleffe, (414) 271-8000

### **Kinnickinnic River Public Access Design**

Harbor District, Inc.

\$29,000

Design public access across 500 feet of Kinnickinnic River frontage and connect to an adjacent public park.

Mr. Aaron Zeleske, (414) 643-1266

### **Water Quality Outreach Initiatives in**

#### **Underrepresented Communities**

City of Milwaukee

\$28,583

Develop a replicable framework that will lead to the development of strategic neighborhood outreach plans for three coastal neighborhoods.

Mr. Nader Jaber, PE, (414) 286-0514

**Paddle Forward, the Future of the Milwaukee Urban Water Trail**

Milwaukee Riverkeeper  
\$25,000

Create an online map/website and expand outreach to kayak companies, outdoor retailers, waterfront businesses, condos, tourism partners and underrepresented groups.

Ms. Cheryl Nenn, (414) 378-3043

**River Loop Area Assessment and Planning Project**

Redevelopment Authority of the City of Milwaukee  
\$20,000

Evaluate trail conditions, determine regulatory requirements and explore alternative designs for the River Loop area on the south bank of the Menomonee River.

Mr. Mat Reimer, (414) 286-5693

**Lakeshore State Park Water and Sewer Design**

Friends of Lakeshore State Park  
\$10,900

Evaluate the feasibility of extending nearby water and sanitary infrastructure to the Park peninsula to support existing boat docks and the proposed Visitor and Education Center.

Ms. Susan Frautschi, (414) 247-4281

**Ozaukee County**

**Clay Bluffs Cedar Gorge Nature Preserve Acquisition**

Ozaukee County Planning and Parks Department  
\$125,000

Acquire 10.5 acres along Lake Michigan at Clay Bluffs Cedar Gorge Nature Preserve.

Mr. Andrew Struck, (262) 284-8257

**Mee-Kwon County Park**

Ozaukee County Planning and Parks Department  
\$38,000

Remove a portion of asphalt in the City of Mequon and install two stormwater treatment wetlands to improve water quality within the Pigeon Creek and Milwaukee River watersheds.

Mr. Andrew Struck, (262) 284-8257

**Downtown Port Washington Master Plan**

City of Port Washington  
\$36,000

Create a downtown master plan to address land use, site and building design, parking, stormwater runoff, lakefront access improvements and future marina improvements.

Mr. Robert Harris, (262) 284-2600

**Building Climate Resiliency**

Ozaukee Washington Land Trust  
\$10,834

Develop a Climate Resiliency Evaluation of Ozaukee Washington Land Trust's preserves.

Mr. Tom Stolp, (715) 225-3344

**Sheboygan County**

**Sheboygan River 9KE Watershed Planning: Phase 1**

Lakeshore Natural Resources Partnership  
\$30,000

Develop a Nine Key Element Watershed Plan for a prioritized 10-digit Hydrologic Unit (HUC) sub-watershed in the Sheboygan River Watershed.

Mr. Tom Mlada, (262) 573-8736

**Comprehensive Outdoor Recreation Plan**

City of Sheboygan  
\$25,000

Develop a Comprehensive Outdoor Recreation Plan for the City of Sheboygan.

Mr. Joe Kerlin, (920) 459-3459

**Shoreline Restoration Plan**

City of Sheboygan  
\$25,000

Develop a Shoreline Restoration Plan to implement restoration objectives and guide improvements along the City's Lake Michigan shoreline.

Mr. David Biebel, (920) 459-3366



# 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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## Editor

Jim Langdon

## Photographs

### *Page, Image, Source*

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Door County  
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Sea Grant  
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16, Woodland Dunes Nature Center, Mike Roemer  
20, Eagle Bluff Lighthouse, Destination  
Door County  
21, Bay of Green Bay, Greater Green Bay  
Convention and Visitors Bureau

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**WISCONSIN COASTAL  
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