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## FOREWORD

Governor Scott Walker

Dear Friends of the Great Lakes,

Welcome to the 17th year of Wisconsin Great Lakes Chronicle and the fortieth year of the Wisconsin Coastal Management Program. This anniversary year is an appropriate time to recognize and celebrate the many



people dedicated to the stewardship of Wisconsin Great Lakes.

Lake Michigan and Lake Superior are among the most precious of Wisconsin's natural resources. These vast inland seas have for centuries provided, clean water, transportation and economic development for Wisconsin residents.

Wisconsin Great Lakes Chronicle has over the years told the stories of many who have gone beyond the call to ensure the health and prosperity of Wisconsin coasts. For example, in 2015 we

learned about the restoration of the Cat Islands in Green Bay. This important project led by Brown County and the US Army Corps of Engineers used dredge material to restore a chain of islands damaged by waves in the 1970s. The result is a new line of islands that provide wave protection for the bay and habitat for waterfowl, fisheries and other wildlife.

The 2017 Chronicle described work to recover Saxon Harbor on the shores of Lake Superior. This important harbor of refuge was damaged in severe storms and flooding that swept Northern Wisconsin in 2016. Through the leadership of Iron County and other local officials, work is underway to restore Saxon Harbor as an economic, recreational and marine resource for the area.

In 2013, the Chronicle highlighted the work of several communities dedicated to providing clean beaches for residents and visitors. Projects in Racine, Milwaukee and Door County were

acknowledged for implementing best practices to improve and maintain healthy beaches. The article noted that clean beaches attract visitors to coastal counties and have a positive impact on the state's economy.

Wisconsin's ports were featured in a 2011 Chronicle article that underscored the importance of this infrastructure to Wisconsin coastal communities. Ports across our Lake Superior and Lake Michigan coasts support billions of dollars of economic activity and thousands of jobs for Wisconsin families. Local officials and port-related industries are working together to ensure these economic assets continue to serve as Wisconsin's gateways to world markets.

It is my privilege to thank the thousands of women and men who are devoting their time and talents to Wisconsin's Great Lakes ensuring they will continue to be a destination and economic driver for generations to come.

The Ashland Ore Dock represents the heritage of the community that will continue to be experienced and told to others.



## ASHLAND ORE DOCK: REDEVELOPING AN ICON

Sara Hudson

The Ashland Ore Dock—originally the Soo Line Ore Dock named for the railroad company that constructed it—defined Ashland's lakefront for nearly a century. The original 1916 dock structure was 900-feet long, 60-feet wide and 80-feet high with four lanes of railroad track lining its high platform. At the time of its construction, Ashland was a bustling town of 16,000 people and the main port on the southern shores of Lake Superior. While other Ashland docks were built of wood, the Soo Line Ore Dock was unique because of its modern construction including concrete and steel.

A 900-foot addition in 1925 extended the structure to 1,800 feet, the longest ore dock on the shores of Ashland. Over 10,000 virgin timber pilings created the base to support the largest concrete structure of its time. Each side of the dock was lined with 150 ore chutes—or giant funnels—into which rail cars dumped iron ore to waiting ore ships below. Hundreds of ore boats bound for Milwaukee, Cleveland and Detroit loaded with iron ore from Michigan's Upper Peninsula carried their bulk cargoes from the Ashland dock.

The dock's design was revolutionary for its day. Among its most significant and iconic features were 72 diamonds that lined the inside of the 1925 section's base. These hexagonal-shaped openings are found every three feet, and are ten feet wide and 40-feet long. They were constructed for wave attenuation and to help support the load of the dock.

Ultimately, the dock served as an economic asset for the community for less than 50 years. In 1965, the last freighter filled with iron ore pulled away from the dock and since then this immense structure stood vacant and started to become one with nature. Action became necessary to prevent the dock from becoming a hazard and return the site as a community asset.

In 2013, demolition of the superstructure's concrete cathedral-like arches commenced and the Ashland Ore Dock Charitable Trust was created. The Trust was established with money gifted to the City from Canadian National Railroad to restore, develop, maintain and ensure the dock remained open for public use.

When the first 800 feet of the Dock was opened to the public in 2015, 600 people showed up to celebrate, share stories and experience being out on the Ore dock. At this same time, numerous public meetings and design workshops were held by City of Ashland staff, community members and SmithGroupJJR, the City's consultant. These meetings informed the Ashland Ore Dock Concept Design Report, an inspiring document that put into words and pictures the community's bold vision for a three-phase redevelopment project: Diamond Access, Gateway Access, and Upland Redevelopment.

The Ashland Ore Dock Redevelopment project will implement the community's vision of turning the Historical Soo Line Ore Dock and adjacent post-industrial land on Lake Superior's southern

shoreline into a multi-functional, simple and yet authentic destination amenity that all community members and visitors can access. This project will advance a community whose economy was predominantly manufacturing built on the natural resources of the area, to one that leverages the natural resources as a different kind of economic development tool: tourism and nature-based outdoor recreation.

The Ashland Ore Dock Redevelopment Project is a catalyst to create new opportunities for jobs and attract investment and new people to the area. This project is a legacy link—a bridge between

the history of place and those seeking to live and visit the area. It builds on the City's parks system as a resource that few other communities have—a system of green along the waterfront that is nonprivatized and can be used by all regardless of age or economics.

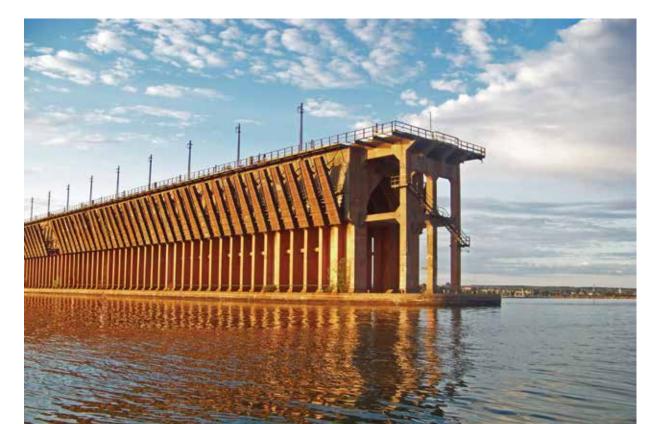
With the help of the Wisconsin Coastal Management Program (WCMP), Ashland has been successful in turning its post-industrialized waterfront into recreational opportunities. In 2017, the WCMP assisted in making the vision of the Ashland Ore Dock Redevelopment a reality by granting the City funds for the final

engineering and construction documents needed for the Diamond Access and Gateway Access projects. WCMP grant monies also helped acquire additional funding for construction of the Diamond Access project.

Upon completion, this park will be a lakefront jewel—a destination that links the community's heritage with current community goals by promoting tourism and catalyzing economic development of formerly industrial properties. It will also offer universal public access for fishing and viewing on a historic piece of maritime infrastructure that extends over 1,800 feet into Lake Superior and gives additional access to approximately five miles of Lake Superior shoreline—an amenity and resource that is a one of a kind opportunity.

The Ashland Ore Dock has been a city icon for over 100 years. Generations of Ashlanders have ties to the dock—relatives worked on them. people fished in the diamonds and teenagers jumped off the end into the frigid waters of the lake. It is part of the City's history—a piece of infrastructure that represents the heritage of a community that should be experienced and told to others. Ashland is the Oredockers.

Sara Hudson is Director of the City of Ashland Parks and Recreation Department. She can be reached at (715) 682-7059 or shudson@coawi.org. More information on the Ashland Ore Dock Redevelopment project is available at www.buildthedock.com.



Dunes Lake dominates
an area of Door County
with inlet and outlet
streams, numerous springs,
and extensive emergent
marshes and fringing fens.



## DUNES LAKE—A FORGOTTEN PARADISE

Mike Grimm and Greg Coulthurst

In 1917, Hjalmar Holland, an early Door County historian, wrote "It is little known and seldom visited ... a beautiful place...this obscure little paradise" about an area that was and still comprises a large unbroken tract of forest, open wetlands and undeveloped wilderness lakes. It is a Great Lakes coastal landscape of small discrete habitats—like dolostone outcrops, springs and marl fens—within a larger forest of cedar swamps and upland conifer hardwood stands.

Dunes Lake is the natural feature that dominates the area with its inlet and outlet streams, numerous springs, and extensive emergent marshes and fringing fens. Approximately five miles northeast of Sturgeon Bay, the lake cannot be seen from any road. Public access is from Haberli Road which then requires a canoe or a kayak for a one-mile paddle down Geisel Creek.

Conservation interest in Dunes Lake and its surrounding wild land began in the late 1980s when a group of field biologists from the University of Wisconsin-Green Bay published a report of their biological inventory of the lake and the surrounding forest and wetlands. They considered the site to represent an outstanding example of Door County's native vegetation and biota and recommended its preservation for the benefit of rare species such as the American black duck, American white pelican, Black-crowned night heron, Caspian tern, Great egret and King rail.

In the early 2000s, staff from the Door County Soil and Water Conservation Department (SWCD) and The Nature Conservancy (TNC) noticed an accumulating number of troubling signs of ecological stress in the waters of Dunes Lake and the waters flowing to and out of the lake. There appeared to be an increase in filamentous algae attached to the cobble of the stream bed. Dark unconsolidated organic muck had accumulated in the lake to the point where canoes got stuck. There was a marked decrease in the native mussels at the outlet of the lake and duckweed nearly covered the entire surface area of the inlet stream. In addition, the stand of cattails around the perimeter of the central basin of the lake had increased rapidly over a few years. All were indicators of an increased rate of eutrophication.

In 2008, the Door County SWCD and numerous other partners started a five-year study of the Dunes Lake Watershed that resulted in the identification of the major nutrient sources that were impacting Dunes and the connecting water bodies. This study resulted in a long term plan titled *Water Quality Evaluation and Planning for the Dunes Lake Watershed, Door County, Wisconsin 2008-2012.* 

The SWCD proceeded to reduce the sources of nutrients that were causing the accelerated rate of eutrophication. The SWCD secured cost share grants to address nonpoint sources of pollution on watershed farmland, and provided numerous educational efforts with residents of a sanitary district in the watershed. The SWCD also

coordinated a study for a passive treatment system which could be added to the existing sanitary treatment system to proactively address future phosphorus discharge limitations.

By 2016 grant funding was secured to conduct a hydraulic dredging pilot project to start addressing legacy phosphorus accumulated in the lake. This project removed approximately 10,000 cubic yards of phosphorus rich sediment over a two-acre area on the northeast end of the inner lake. In 2017, the SWCD in partnership with the Town of Sevastopol installed a public parking area on property owned by the Town to increase public accessibility and secure designated parking for the lake. These strategic efforts enabled the partnership to fine tune estimates for future and complete restoration needs for Dunes Lake through larger and more competitive funding sources.

The partnership is now actively submitting grant applications to complete hydraulic dredging on approximately eighteen acres within Dunes Lake inner basin, continue invasive cattails treatments within the wetland complex and reestablish connectivity for migrating northern pike, suckers and other native Lake Michigan fish species.

The project has over time taken on a variety of partners who have made short- and long-term contributions over the various phases of this extensive and encompassing restoration initiative. Key technical and financial partners at the local level include The Nature Conservancy, the Door



County Soil and Water Conservation Department, Doorland Preserve landowners, the Sevastopol Town Board and the Glidden Drive Association.

State and regional partners include the Wisconsin Coastal Management Program, Ducks Unlimited, the Wisconsin Department of Natural Resources, the Wisconsin Geological and Natural History Survey, UW-Oshkosh, the Fund for Lake Michigan, Partners for Fish and Wildlife, the Great Lakes Protection Fund and the Raibrook Foundation. Federal support has been provided by the National Oceanic and Atmospheric Administration and the US Fish and Wildlife Service.

The truest measure of the project's importance has been citizen involvement. Numerous local individuals have volunteered their time and expertise to the important project. Without their support, the Dunes Lake area might well have remained forgotten and lost its claim to being an unspoiled paradise.

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Wisconsin's coastal communities are special places and we must take necessary actions to both showcase and safeguard them.



## MANAGING COASTAL RESOURCES: A SMALL CITY'S PATH TO SUCCESS

Tom Mlada

As Mayor of the City of Port Washington the past six years, I was privileged to join fellow elected officials, City staff, community leaders and stakeholders in crafting plans and policies for effective management of our precious coastal resources and assets. Truly, Wisconsin's coastal communities are special places and we must take necessary actions to both showcase and safeguard them.

In our coastal community, tourism continues to increase in importance to our economy by powering a resurgence of economic activity within our lakefront business district and inspiring substantial investment. For instance, over the past six years our City invested more than \$10 million in our lakefront to enhance recreational opportunities, community walkability, bikability and public access and connectivity.

Today, we offer four miles of unimpeded public lakefront access and two additional miles of public beach. With the 2013 opening of the national award-winning Coal Dock Park—a 17-acre remediated and reclamated former coal storage area on the lake requiring a nearly \$3 million investment, our City boasts nearly 40 percent of total parkland along the lake. These lakefront parks serve to provide a buffer to development and function as key stormwater management tools.

In order to invest in this way, our City must be good fiscal stewards and identify opportunities for revenue growth. For us, that meant strategic lakefront development to generate resources needed to re-invest back into important asset protection efforts. With all our lakefront development, we have worked diligently to ensure maximum setback, stormwater management, planting of erosion-controlling native vegetation and protection of wildlife habitat.

In providing such extraordinary waterfront access to our residents and visitors, we also embraced the responsibility of doing all we can as a community to help them enjoy it safely. Thankfully, we have been successful in our commitment to a safe waterfront experience.

Working with Great Lakes Surf Rescue Project, we initiated preventative education that provided every student in the Port Washington-Saukville School District with a specially-designed "Water Watcher" card with valuable water safety information courtesy of our local YMCA. We collaborated with the Department of Natural Resources and local Scouting groups to construct life jacket loaner stations for our beaches and marina, and the Port Washington Yacht Club installed life rings and signage on our harbor walk and beaches.

The investment of multiple state and local funding partners has enabled us to enhance the safety of and accessibility to our breakwater. And our City partnered with Professor Chin Wu of the University of Wisconsin-Madison, the Wisconsin Coastal Management Program and University of

Wisconsin Sea Grant to deploy ground-breaking rip current identification technology that people can access via mobile devices. Our collective waterfront safety efforts were celebrated with a keynote speech invitation in April 2017 to the Great Lakes Water Safety Consortium Conference in Sheboygan.

Many of our impactful partnerships began with local volunteers. Our Environmental Planning Committee (EPC) led our city-wide rain barrel initiative and advocated for the City Forestry Department to expand annual tree planting (an outstanding stormwater management tool!) to more than 500 using a City-owned nursery for supply.

These successes and others resulted from EPC collaboration with Green Tier Legacy Communities, Lake Michigan Stakeholders, 1000 Friends of Wisconsin, Ozaukee Washington Land Trust and NOAA. Similarly, our City's Active Community Environments (ACEs) Team championed walkability, bikability and connectivity initiatives focused along our waterfront. Thanks to these partnerships and our generous volunteers, the impact of these efforts on our City budget was zero dollars.

Breakwater and harbor infrastructure safeguard our people and property, yet securing funding for their sustainable upkeep has proved difficult. Nonetheless, we succeeded in mitigating local taxpayer impact by securing over \$4 million

in state and federal funding for breakwater repair and reconstruction while investing only \$500,000 of our own. This is a significant local commitment, but we repaired and improved over 60 percent of the breakwater protecting our harbor and marina.

Lastly, our coastal community is beginning to experience climate change impact that accelerates our need for resilience planning. Bluff integrity poses a serious dilemma creating concern about public safety, loss of parkland and related infrastructure, public access to the beach, and impact to tourism. Moreover, with more dramatic swings in water levels comes a more dramatic pace of beachfront erosion and infrastructure degradation.

Our City is looking to take these challenges head-on through policy-based initiatives. For example, we continue to embrace our standing as Wisconsin's first "Clean Marina" and recently partnered with UW Sea Grant on a Green Infrastructure Code Audit. We collaborated with Clean Wisconsin to institute a city-wide ban on coal-tar based sealants and continue our work with NOAA, the State Historical Society and numerous local and regional stakeholders to advance our National Marine Sanctuary nomination to final designation for local protection of our most precious lakebed treasures.

As Mayor, I was proud of Port Washington's leadership on environmental stewardship and am



confident our City is all the better for it today. The work continues and thankfully so too the partnerships and the people necessary to showcase and safeguard our special places, vital resources and unique assets.

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Providing coastal access for our physically disabled and older neighbors and visitors is a responsibility WCMP takes seriously.



## GREAT LAKES ACCESSIBILITY FOR ALL

Mike Friis

To truly appreciate something, it is important to have exposure to and experiences with it. This is true with music, art, schoolwork and life experiences.

Wisconsin's Great Lakes resources are no exception. They are a source of recreation, commerce and spiritual renewal. The tributaries, rocky shorelines, sandy beaches and high bluffs of Lake Michigan, Green Bay and Superior are our gateway to their waters. Access to and creating opportunities for appreciation of these places is an important mission of the Wisconsin Coastal Management Program (WCMP)

But while many people may think nothing of taking a walk along the shore, getting into a watercraft, wading into the water or fishing from shore, for others it is not so simple. By their nature, some of these special public spaces are remote or difficult to access for persons who lack physical or financial means. According to a 2012 US Census Bureau report, nearly 20 percent of the country's population had a disability. This group does not include the growing number of aging Americans with unreported yet very real physical limitations. Their loss of access to these public treasures and developing an appreciation for our Great Lakes coastal resources is a loss for us all.

Providing coastal access for our physically disabled and older neighbors and visitors is a responsibility WCMP takes seriously. Through grants and with firm support from the Governor's Wisconsin Coastal Management Council, the WCMP supports innovative ways to encourage the enjoyments of our coastal areas by those who may not have thought it possible before.

Accessibility is achieved through partnerships with local governments and nonprofits. Many groups use the WCMP's funding assistance to develop ideas, plans and construction of trails, fishing piers and boat launch sites that can be utilized by people with different physical abilities. In addition, many accessible coastal sites are in population centers where these amenities can be enjoyed and enrich the lives of as many of our fellow Wisconsinites and visitors as possible, regardless of income.

Examples of those innovative projects include the Mobi-Mat at the City of Racine's North Beach. The Mobi-Mat is a roll-out beach access path that provides a safe, stable surface for individuals of all abilities including those with walkers, wheelchairs, parents with strollers and emergency response vehicles.

Families may now bring small children to the water where the next stewards of the natural wonders of the Great Lakes will develop a personal interest, fondness and sense of place. Older residents not otherwise able to traverse the beach are now able to reach the waves at North Beach where the sounds and feeling of the water at their feet can enrich their lives and revive memories that can be shared with loved ones.

At the ribbon cutting for the North Beach mat installation, Dr. Julie Kinzelman of the City of Racine Public Health Department relayed the story of an elderly lifelong Racine resident in a wheelchair who had an emotional first experience ever at his hometown beach because of newfound accessibility. This man's story was poignant and affirming of the effort to bring people of all abilities to the beach.

Another condition that can result in a lack of opportunity and exposure to outdoor recreational experiences is obsolete structures in extensively built environments. In Milwaukee, the WCMP has partnered with the City, County, the Milwaukee Metropolitan Sewerage District and

numerous nonprofits to provide accessibility to coastal assets in old industrial areas including those along the Menomonee River.

The Menomonee River in the heart of Milwaukee was a forgotten place just below the bluffs of working class neighborhoods where access was blocked by railroads, highways and high sheet pile walls along factory property lines. The River provided no public entry points to the thousands of residents who lived within walking distance to it.

Through the WCMP's support of several projects along the Menomonee River, public access has been opened, sheet pile walls have been replaced by natural riverbanks with paths to the river's

edge, and canoe launches and fishing piers have been built. Today the River is visited by anglers, families and even classes of children sampling the river's macroinvertebrates through Urban Ecology Center programs.

"It's shocking today to see the photos of the channelized, inaccessible waterway just 20 years ago", says Corey Zetts, Executive Director of the Menomonee Valley Partners. "Today, along this same stretch of the Menomonee, you can see fish, herons and a diverse cross section of the Milwaukee community walking, fishing or just taking in the view. Through the WCMP's investments, 30,000 people enjoyed the public space along the river last year. There are now vibrant stretches of riverfront which were unavailable to previous generations."

These partnerships and investments from the WCMP are providing thousands of people with new connections to the Great Lakes, its shores and tributaries through trails, boat launches and fishing piers. These amenities enhance quality of life for all people and allow for personal experiences with our Great Lakes resources that create and foster a stewardship ethic that will preserve them.

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## GREAT LAKES COASTAL RESILIENCY STUDY

Alex Hoxsie and David Bucaro

From Hurricane Katrina in 2005 to Hurricanes Harvey, Irma and Maria in 2017, major storm events in recent years have exposed the vulnerability of many of our coastal systems and underscored the need for more comprehensive coastal planning to improve resiliency.

In the aftermath of Superstorm Sandy which caused \$65-70 billion of damage in 2012, funding was appropriated to the US Army Corps of Engineers to conduct a comprehensive study to identify and address the vulnerability of coastal populations, infrastructure and resources at risk throughout the North Atlantic coastal region. This study was designed to help federal, state, and local governments identify areas of high flood risk and implement management strategies to reduce that risk. Similar efforts are proposed for the South Atlantic coast in the wake of the 2017 hurricanes. These recent natural disasters will likely prove to be the costliest storms on record in America.

While the planning strategies that come out of these disasters are incredibly valuable, they are also sadly reactive. If similar planning tools for prioritizing investment in coastal resiliency had existed prior to Katrina, Sandy, Harvey, Irma and Maria, the loss of human life and cost of damage may have been drastically reduced. Rather than repeating history and waiting for a similarly destructive event to impact the Great Lakes coast, there is an opportunity for proactive development of a resilience-based coastal planning strategy to save money, lives and property in the future.

Severe storms on Lake Superior in 2016 and record lake levels on Lake Ontario in 2017 resulted in two declared federal disasters. While these declarations included incentives for hazard mitigation, it perpetuates the pattern of waiting for disaster to strike before taking action and reminds us that the Great Lakes coast is not immune to natural catastrophes.

Scoping the Great Lakes Coastal Resiliency Study (GLCRS) began in 2016 as a regional initiative of the eight Great Lakes States working in collaboration with the US Army Corps of Engineers, National Oceanic and Atmospheric Administration, US Geological Survey, Federal Emergency Management Agency, and US Environmental Protection Agency. Coastal resiliency is the ability of coastal areas to withstand, recover from and adapt to disturbances and underlying stress while maintaining economic, environmental, social and cultural values.

The GLCRS will investigate opportunities to improve resilience within both built and natural coastal environments and result in a plan that identifies vulnerable areas and recommends measures to increase resilience. Without such a plan, we expect increased risk of coastal damage in the future and management strategies that continue to address this problem through a piecemeal approach that is both inefficient and limited in effectiveness.

The study area encompasses over 5,200 miles of shoreline along the five Great Lakes and their connecting channels where approximately 4.2 million people live within two miles of the coasts. Study highlights will include community impacts such as shore protection, public utility infrastructures, major population centers and expansive real estate development throughout the basin. Economic factors will include the Great Lakes' \$17 billion maritime economy, the \$14 billion fishing economy, 60 commercial harbors, recreational boating, and cold-rolled steel production—an industry particularly critical for the automotive sector. Finally, environmental issues such as littoral sediment transport processes, coastal habitats and biodiversity will be studied.

The GLCRS will result in the development of a risk-based vulnerability assessment to create an interagency investment strategy for coastal resilience projects. The study will first look at a range of potential future conditions that take into account climate variability, shoreline development, watershed loadings from agricultural and urban land uses, invasive species, storm damage and other stressors to map coastal vulnerability over the project area.

Second, an array of structural, non-structural, natural, nature-based, institutional and regulatory measures will be evaluated for their ability to improve coastal resilience. Based on the results of a risk-based vulnerability assessment, combinations of these measures will be recommended to address the needs of the Great Lakes coasts.



The study is expected to take 36 months to complete and is spread out over four calendar years. Currently, the US Army Corps of Engineers has requested funding in 2018 to finish developing a detailed scope of work that will serve as a blueprint and roadmap for the rest of the study phases.

In Phase I, the study team will identify problems and inventory existing conditions. This effort will focus on gathering existing coastal data related to resiliency and identifying any gaps. Phase II will be comprised of filling these data gaps. Once the data gaps are filled, the team will run a risk-based vulnerability assessment to determine which coastal areas are most in need of resilience planning. Finally, Phase III will wrap up the study with a reach-specific evaluation of vulnerabilities and a coastal resiliency plan for the Great Lakes.

The final report—developed collaboratively by a diverse group of federal, state and local partners will serve as a unifying plan for coastal management. As we move forward into an uncertain future, this study will encourage a partnership approach to coastal resilience planning, increase the return on investment for coastal projects, and continue to protect the people, infrastructure and resources that define the Great Lakes coasts.

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# VISUALIZING WISCONSIN'S COASTS WITH STORY MAPS

Joe Dwyer

Every Wisconsinite that makes visiting the Great Lakes part of their routine travel itinerary is bound to have their favorite spot (or spots!). It might be strolling through one of the north shore's quiet lakeside parks, or exploring downtown Green Bay on the newly refurbished CityDeck boardwalk, or even a spot in the middle of Lake Michigan where the fishing simply can't be beat, or anywhere in between. Every Wisconsinite has their reason for loving their personal Great Lake spot, and deservedly so. But, how do we get those first-time visitors or out-of-state tourists find their spot?

In the past, this was done with the use of brochure-like guides or gazetteers. These paper guides included maps that expertly laid out images of the coastline and symbolized the access points, parks and attractions adjacent to the Great Lakes. These were invaluable in their time as "on-hand" resources for both the new and veteran traveler. However, with the increasing intersection of technology in our daily lives, visitors are looking to trade the paper for the phone. That's where my Fellowship project comes in.

I landed in Madison, Wisconsin as a NOAA Coastal Management Fellow with the Wisconsin Coastal Management Program and University of Wisconsin-Sea Grant. My two-year Fellowship project goal is stated simply as "to promote vibrant coastal communities by linking a comprehensive inventory of public access sites with geospatial technologies to encourage natural heritage tourism." As I began my Fellowship in August 2016, I viewed this overall goal as having two distinct pieces, the first of which was to create a comprehensive public access inventory.

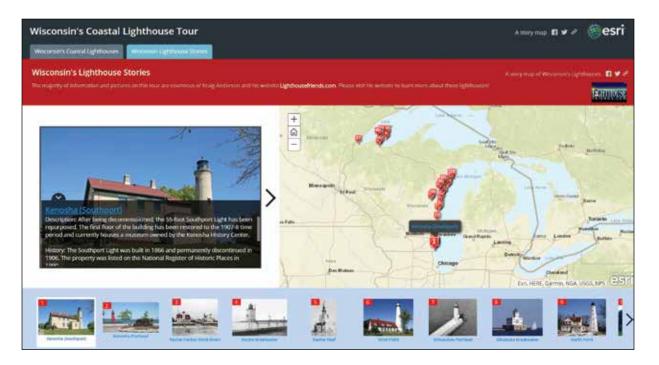
Many of these sites have already been documented over the years in various forms. Organizations such as Wisconsin Regional Planning Commissions have even been digitizing their regional sites for years. My role was to collect and aggregate these separate sources, identify any potential gaps in the data, and organize a detailed list of amenities available at each site.

The final dataset includes 430 coastal sites stretching from the mouth of the St. Louis River to Saxon Harbor, including the Apostle Islands, and from the Menominee River to the tip of Door County and down more than 200 miles of uninterrupted shoreline to the Illinois border. The dataset has been uploaded into an online interactive map viewer (available at bit.ly/2I7WaE0) on desktop or mobile devices to explore every one of these sites and what they offer.

Visitors can now use this resource to find new sites in their favorite areas or discover completely new areas they weren't aware of before. However, this is only the what is there aspect of my project. The next step is to encourage folks on the why you should go there.

This part of my Fellowship is also heavily dependent on innovative and easy to use online apps, but critically, these tools are designed to be engaging as well as informative. One of the tools I have used most often are ArcGIS Story Maps. As the name suggests, these applications are a way for maps to tell a story. Rather than a static, paper map, the digital format allows for the creator to add text, photos and videos to create context and the ability to "walk" the user through their story. However, as exemplified by these story maps, the best way to learn is by using them.

Coastal visitors are encouraged to explore story maps created for some of our partner organizations. For instance, users can travel the coast to learn the history of Wisconsin's lighthouses using the Lighthouses of the Great Lakes Story Map created for the Wisconsin Harbor Towns Association. Another story map, developed with the Wisconsin Historical Society, creates an immerse experience to explore the dozens of shipwrecks located off of the mid-Lake Michigan coastal communities of Port Washington, Sheboygan, Manitowoc and



Two Rivers. Specifically, the Story Map allows individuals to find out more about the ship and follow along as it traveled its final voyage. Additionally, we have added information about the maritime heritage of these communities and modern day "things-to-do" during a visit.

That last piece is a critical one because it is not the intention of these apps to replace a visit to these resources, but rather encourage it. It is hoped that these tools will spur people to think, "Wow I didn't know I could do that!" or "I can dive a shipwreck?"

Getting people to these places is step one—step two is to get them to fall in love and cherish the resource. Luckily, in Wisconsin this is not difficult because the abundant, varied resources of the Great Lakes do that all on their own. With that love comes a passion to protect these resources. Those that value the Great Lakes and its resources will advocate for them, work to defend them and ensure that future generations are able to enjoy them. This is how we create champions and stewards for our natural environment and here in Wisconsin, all you have to do is get them there.

Joe Dwyer is Coastal Management Fellow with the Wisconsin Coastal Management Program and University of Wisconsin Sea Grant Institute. He can be reached at (608) 261-6605 or joe. dwyer@wisconsin.gov.

# A Digital Coast Fellow improves coastal community resilience to flood hazards through an analysis of current federal and state environmental policies and programs. Wisconsin Great Lakes Chronicle 2018 | page 14

# IMPROVING COASTAL RESILIENCE THROUGH DIGITAL COAST

Jake Thickman

The NOAA Digital Coast program is an online collection of data, tools and training for coastal communities and professionals. In addition to housing technical resources, the program coordinates the Digital Coast Partnership, a collection of non-governmental organizations that work to address coastal issues across the country.

As a Digital Coast Fellow, I have worked on a two-year project in collaboration with two partner organizations—the Association of State Floodplain Managers (ASFPM) and the Coastal States Organization (CSO)—based at the ASFPM offices in Madison, Wisconsin. My fellowship project is focused on improving coastal community resilience to flood hazards through an analysis of current federal and state environmental policies and programs, ultimately seeking to help establish a more holistic approach to coastal flood risk management.

A number of policy guidance documents have been produced by organizations representing coastal management professionals—including from ASFPM and CSO—in an effort to update coastal management policies and practices in light of changing threats to productive ecosystems. To this point, however, no framework exists for implementing the progressive policies put forth.

The goal of my project is to fill this gap in knowledge through a review and synthesis of federal and state policies that may potentially influence coastal flood risk, identifying successful policies at the state and federal level, and detailing future policy strategies to support the comprehensive nature of effective coastal flood risk management. Ultimately, I am exploring ways that Digital Coast resources can be used in flood risk management efforts.

My project began with an overview of the coastal management policy objectives and strategies put forth by ASFPM and CSO in order to determine common goals between the organizations and identify specific policy objectives for the project. Five main objectives were ultimately identified: increase state management capacity, promote alternatives to structural flood risk mitigation, incorporate long-term forecasts into mitigation efforts, achieve a balance between disaster recovery and risk mitigation spending, and broaden the scope of coastal flood risk management efforts.

Based on these objectives, I conducted a review of federal and state coastal management policies and practices and compiled all relevant policy documents into a digital library for future reference. As part of this analysis, my work identified the responsibilities, roles and connections between environmental policies and programs, and created links to the previously identified policy objectives. Federal coastal flood risk management policies were reviewed in their entirety, while state analyses consisted of case studies on Wisconsin, New York, Florida and Washington. These states were selected to represent the Great Lakes, East, Gulf and West coasts.

A wide variety of federal and state programs were examined in order to capture the full scope of coastal flood risk issues and management. At the federal level over 30 programs were examined across agencies such as the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration, the US Army Corps of Engineers (USACE) and the US Department of Housing and Urban Development.

State analyses were equally comprehensive and covered topics including state coastal management programs, shoreline zoning, wetlands regulations, floodplain regulations, building codes, erosion management programs and state climate adaptation initiatives. The goal in taking such a broad approach was to emphasize the connections between environmental management policies and

programs. If these connections are not recognized, management efforts can often exist in silos within separate agencies or levels of government, reducing the overall effectiveness of environmental activities including coastal flood risk management.

While preparing state case studies, several Wisconsin Coastal Management Program initiatives stood out in terms of addressing coastal flood risk. In particular, the facilitation of the Wisconsin Coastal Management Council and the Coastal Natural Hazards Work Group coordinate activities involved in coastal issues at multiple levels of government.

During this process I also sought out mechanisms to increase collaboration between state and federal agencies in coastal flood risk management efforts using the USACE Silver Jackets team as a model.

Silver Jackets team leaders were contacted in Wisconsin, New York, Florida and Washington. Efforts were made to examine the coastal element of these teams and how Silver Jackets program resources might be leveraged by coastal states and communities in the future in conjunction with the use of Digital Coast tools where possible.

The final piece of my fellowship project consists of research on moving towards a holistic framework of coastal flood risk management, and investigating the advisability, viability and specific steps needed to implement the five identified coastal management policy recommendations from ASFPM and CSO. Based on the analysis of successful coastal flood risk management policies and programs at the federal and state levels, the report outlines strategies and actions that may be utilized to improve existing flood risk management frameworks or develop new management initiatives as hazards in coastal areas continue to evolve.

Upon completion of my fellowship position all policy documents, summary reports and guidance documents collected and produced throughout the project will be made available through ASFPM's Flood Science Center webpage. We look forward to providing policy leaders with additional tools to provide for the safety of residents and visitors on our coasts.

Jake Thickman is a Digital Coast Fellow at the Association of State Floodplain Managers and Coastal States Organization. He can be reached at (608) 828-6344 or jake@floods.org.





# 2018 WISCONSIN COASTAL MANAGEMENT PROGRAM GRANTS

Project Name Grantee WCMP Award Project Description Contact

#### Coastwide

## Protecting Coastal Waters and Residents from Toxic PAHs

Clean Wisconsin \$49,774

Engage and educate municipal, community, health care and business leaders on the risks posed by polycyclic aromatic hydrocarbons (PAHs) from tar-based pavement sealants.

Mr. Mark Redsten, (608) 251-7020

#### Delivering a Collective Message for a Healthy Lake Michigan

Lakeshore Natural Resource Partnership \$39,400

Develop a collaborative water quality message to raise awareness about stormwater and nonpoint pollution and its impact on local watersheds and Lake Michigan.

Mr. Jim Kettler, (920) 304-1919

#### Wisconsin Coastal Guide Enhancement

The Board of Regents of the University of Wisconsin System

\$29,820

Update and enhance the Wisconsin Coastal Guide, a web mapping site that encourages exploration of coastal heritage tourism attractions along the Great Lakes Circle Tour.

Dr. David Hart, (608) 262-6515

#### Promote Wetland Literacy Across Audiences

Wisconsin Wetlands Association \$29.425

Develop short videos highlighting the importance of wetlands, the consequences of wetland loss and opportunities to protect and restore wetlands to solve problems.

Ms. Katie Beilfuss, (608) 250-9971

### Chequamegon Bay Water Flow Numerical Model Northland College

\$26,821

Develop a numerical model to describe nearshore water movement in Chequamegon Bay and movement between the Bay and Lake Superior. Mr. Matt Hudson, (715) 682-1481

#### Migratory Bird Conservation Along Lake Michigan

Natural Resources Foundation of Wisconsin \$23,920

Develop a comprehensive planning tool featuring conservation profiles for 42 high-priority stopover sites used by more than 100 bird species during migration.

Ms. Caitlin Williamson, (608) 266-1430

# 2017 Lake Michigan Shoreline Oblique Air Photos Analysis

Association of State Floodplain Managers, Inc. \$20,000

Document changes in the number, location and condition of erosion control structures from Door County to the Illinois State Line in 2017 compared to 1976 and 2007.

Dr. David Mickelson, (608) 257-1825

#### Adopt-A-Storm Drain

Southeastern Wisconsin Watersheds Trust, Inc. \$10,000

Develop, expand and deliver an Adopt-A-Storm drain storytelling and public involvement program in southeastern Wisconsin.

Mr. Jacob Fincher, (414) 382-1766

#### **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. Angela Kowalzek-Adrians, (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

Waterfront Development and Comprehensive Outdoor Recreation Plans City of Ashland

\$29,500

Update the City of Ashland's Waterfront Development and Comprehensive Outdoor Recreation Plans.

Ms. Sara Hudson, (715) 685-1644

## **Brown County**

Renard Island End-Use Plan

Brown County Port & Resource Recovery Department

\$44,000

Develop an End-Use Plan for Renard Island, an island in Brown County that was constructed of contaminated dredged sediments between 1978 and 1997.

Mr. Mark Walter, (920) 492-4962

## **Door County**

The Advance of Knowledge: A Foundation for Sharing Wisconsin's Maritime History

Wisconsin Historical Society \$32,084

Conduct a field training school for avocational archaeologists and local diver volunteers in a Phase II archaeological survey of the barge Advance in Door County.

Mr. John Broihahn, (608) 264-6496

Town of Sevastopol Comprehensive Plan Update

Town of Sevastopol

\$7,500

Update the Town of Sevastopol's

Comprehensive Plan.

Ms. Âmy Flok, (920) 746-1230

## Douglas County

Western Douglas County Nine Key Element Plan

City of Superior \$27,350

Develop an EPA Nine Key Element Plan for watersheds in the western Douglas County portion of the Lake Superior Basin through research and stakeholder engagement. Ms. Andrea Crouse, (715) 394-0392

## Iron County

# Saxon Harbor Marina Reconstruction—Beach Access Design

Iron County Forest Department \$10,000

Develop designs for resilient beach access from the marina parking lot.

Mr. Eric Peterson, (715) 561-2697

## Kenosha County

#### Kenosha Harbor/North Pier Bulkhead Reconstruction and Improvements

City of Kenosha \$50,000

Construct a concrete walkway to connect the pier to the west parking lot.

Mr. Brian Cater, (262) 653-4050

#### Kemper Center Shoreline Protection

Kenosha County Division of Parks \$48,592

Complete a coastal engineering study to improve public access to the shore, enhance shoreline protection and prepare construction designs.

Mr. Matthew Collins, (262) 857-1850

## Kewaunee County

#### Ahnapee River Water Trail and Olson Park Master Plan

Bay-Lake Regional Planning Commission \$5,589

Assess public access locations to the Ahnapee River from Lake Michigan to the Forestville Dam, and develop a water trail plan and a master plan for Olson Park in the City of Algoma. Ms. Angela Kowalzek-Adrians, (920) 448-2820

#### Kewaunee Master Harbor Plan

City of Kewaunee \$25,000

Create a Master Harbor Plan addressing public shore and lake access, river dredging, habitat restoration and harbor infrastructure. Mr. Fred Schnook, (920) 388-5000

## Manitowoc County

# Two Rivers South Breakwater Public Access Project

City of Two Rivers \$48,000

Construct a quarter mile paved trail that will enhance public access to the south breakwater via a route that is safe, visible and handicapped accessible.

Mr. Gregory Buckley, (920) 793-5532

#### Manitowoc County Comprehensive Plan Update

Manitowoc County \$15,164 Modernize and update the County Comprehensive Plan. Mr. Tim Ryan, (920) 683-4185

## Marinette County

Peshtigo River Fish Viewing Platform (Phase II) City of Peshtigo \$100,000

Construct an ADA accessible fish viewing platform that will reach 160 feet over the Peshtigo River. Ms. Cathi Malke, (715) 732-3041

## Milwaukee County

# Century City II—Collaborative Stormwater Infrastructure Study

Northwest Side Community Development Corporation \$55,000

Develop planning and engineering design alternatives for a resilient green infrastructure solution to contaminated stormwater on Capitol Drive and the Century City II business park. Ms. Sarah Bregant, (414) 444-8200

## FORB (Fostering Our Riparian Biodiversity)

River Revitalization Foundation \$30,000

Support the volunteer recruitment and education program, Fostering Our Riparian Biodiversity, to engage the community in the Milwaukee River corridor.

Ms. Kimberly Gleffe, (414) 271-8000

#### Lakeshore State Park Visitor and Education Center Design Development

Friends of Lakeshore State Park \$29,500

Complete civil engineering and architectural design activities for the planned Visitor and Education Center and associated amenities at Lakeshore State Park.

Mr. Robert Gosse, (414) 273-1173

#### Watershed Alive—Water Education for Teachers UW-Milwaukee School of Freshwater Sciences \$29,250

Implement the Watershed Alive: Water Education for Teachers program, a professional development program that facilitates integration of watershed education across curricular areas.

Ms. Elizabeth Sutton, (414) 382-1718

## Grand Trunk Green Infrastructure and Habitat Improvements

Harbor District, Inc. \$26,970

Develop design and engineering plans for two green infrastructure practices adjacent to the Grand Trunk Wetland in Milwaukee. Ms. Lindsay Frost, (414) 643-1266

#### Milwaukee Community Map Water History and Coastal Transformation Stories

Reflo, Inc. \$25,000

Support the enhancement of the Milwaukee Community Map with new content and capabilities that highlight the historical transformation of Milwaukee's coastal assets. Mr. Michael Timm, (414) 378-0945

### Neighborhood Environmental Education **Project Water Programming**

Urban Ecology Center \$20,000

Implement Neighborhood Environmental Education Project water-based learning lessons at the Milwaukee River, Menomonee River and Washington Park branches. Ms. Gillian Spence, (404) 964-8505

#### Branch Out Milwaukee

Milwaukee Water Commons \$19,612

Create a plan addressing the extensive loss of tree canopy due to the Emerald Ash Borer. Ms. Ann Brummitt, (414) 763-6199

## Oconto County

#### Oconto River Public Access Project

City of Oconto \$100,000

Transform an abandoned site into a community greenspace and public access point to the Oconto River. Ms. Sara Perrizo, (920) 834-7711

## Ozaukee County

#### **Ecological Prioritization GIS Tool Refinement** and Development

Ozaukee County Planning and Parks Department \$29,978

Refine and develop the Ecological Prioritization Tool used to improve decision-making regarding land protection and restoration and included in the Ozaukee County's Park and Open Space Plan. Mr. Andrew Struck, (262) 238-8275

#### Community Rivers Program

Riveredge Nature Center \$21,908

Expand and implement the Community Rivers Program, an approach to transforming the Upper Milwaukee River Watershed through engaging rural communities in Ozaukee County. Ms. Mandie Zopp, (262) 375-2715

## Sheboygan County

#### Native Orchid Conservation and Restoration

Sheboygan County \$31,500

Identify threats to native orchid species within coastal wetlands with an emphasis on understanding recovery and conservation potential as part of a large-scale collaborative effort. Mr. Aaron Brault, (920) 459-3060



## **ACKNOWLEDGMENTS**

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

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Contents, Schoolhouse Beach, Door County Visitor Bureau

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# Wisconsin Coastal Management Program

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