

Wisconsin Great Lakes Chronicle
2004



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Lion's Den Gorge Natural Area provides public access to 3/4 miles of Lake Michigan shoreline. Ozaukee County purchased the property with support from the Wisconsin Coastal Management Program.

FOREWORD

Governor Jim Doyle

Dear Friend of Wisconsin's Great Lakes:

The Great Lakes are one of America's greatest resources. The lakes are used in manufacturing, transportation and energy, and draw thousands of tourists to their shores. They provide drinking water for millions and habitat for animals as diverse as the piping plover and the coaster brook trout. Wisconsinites understand the need to preserve and protect the Great Lakes – the largest body of fresh water in the world.



My administration has done much to improve the quality of the Great Lakes and their coasts. Over the past year, we have accomplished several objectives.

- I requested that the federal government site a National Estuarine Research Reserve (NERR) on the shores of Lake Superior, the first on the western Great Lakes. A Wisconsin NERR would improve coastal decision making, increase awareness of coastal resources and promote stewardship of estuarine natural areas.

- I signed into law a bill that expands the state's Harbor Assistance Program (HAP) to privately owned ports and docks, facilitating economic development by allowing private businesses to improve their port facilities. Additionally, I signed a bill that requires HAP-supported facilities to be held open for public use for at least ten years after the improvements are made.
- The Wisconsin Coastal Management Program awarded \$1.55 million in grants to preserve and enhance Wisconsin's Great Lakes coasts. Nonprofit organizations, universities, and various levels of governments will support 39 projects totaling \$4.2 million.
- We took an important step towards educating our youth about the importance of our Great Lakes by distributing *Paddle-to-the-Sea*, a classic children's book, to every elementary school and public library in Wisconsin.
- All state agencies have been directed to work towards the protection and restoration of the Great Lakes.

Looking ahead, Wisconsin is poised to do even more for the benefit of our Great Lakes. As Chair of the Council of Great Lakes Governors, I have invited the other members of the Council to Wisconsin to discuss Great Lakes diversion requests and consumptive use of Great Lakes water within the basin. The Council must act to prevent the diversion of Great Lakes waters to far away places like Las Vegas and Phoenix.

I will join with the federal government, port authorities and the shipping industry in identifying and implementing creative approaches to prevent the discharge of ballast water from ocean going vessels. Together, we will limit the entry of new invasive species to our Great Lakes and help prevent further invasions of inland waters.

Finally, I am pleased that Lake Michigan will form the backdrop for the 86th PGA Championship at Whistling Straits. Through this event, the world will discover the beauty of Wisconsin's Great Lakes.

The investments we make now to protect and restore Lakes Michigan and Superior will benefit future generations. I ask all Wisconsinites to join me in working toward a healthier Great Lakes system.



While the catch of a solitary fish does not necessarily indicate the imminent return of healthy populations, it does offer a glimmer of hope that it is indeed possible.

COASTER BROOK TROUT REHABILITATION

Laura Hewitt

The brook trout fishing about Bayfield can scarcely be equaled in all respects in any part of the world. There are not less than fifty trout streams of easy access from Bayfield for both ladies and gentlemen; and the "rock fishing" for brook trout all along the shore, which is shielded by the Islands, affords the grandest sport that the disciples of Walton can find... The size of the brook trout caught about Bayfield run from one half pound to four pounds.

– *The Ashland Press, May 12, 1877*

A palpable buzz among anglers and fishery biologists followed the confirmed March 2004 catch of a nine-pound coaster brook trout in Lake Superior off the Bayfield Peninsula. Coaster brook trout, a variant of the small stream dwelling brook trout, migrate from streams to grow large and glorious in the big waters of Lake Superior. Historical newspaper accounts talked of area streams that "seem to possess exhaustless numbers of brook trout."

Sadly, by the early 1900s the limits of the brook trout fishery were all too evident. Over zealous fishing was the first major blow. Widespread logging, mining, agriculture and road building subsequently took a heavy toll on the condition of streams and ultimately decimated the fishery.

Repeated attempts since the 1930s to reintroduce coasters have met with little success. Since the mid-1990s, renewed undertakings to rehabilitate coasters in the Lake Superior basin have been bolstered by improved scientific understanding of this unique fish and the partnership of 26 public and private organizations in the United States and Canada.

The appearance of a large brook trout in these waters, bearing no discernible fin clips that indicate a hatchery origin, is tantalizing. While the catch of a solitary fish does not necessarily indicate the imminent return of healthy populations, it does offer a glimmer of hope that it is indeed possible. Today, a basinwide effort to rehabilitate the coaster focuses on the steep sandy land of the Bayfield Peninsula and its neighboring waters.

The Habitat Connection

In some ways, coaster brook trout could be viewed as the animate link between Lake Superior and her tributaries. In a cycle that resembles that of salmon, most coasters return to the streams to spawn over groundwater upwellings. The young



IN LAKE SUPERIOR

mature in the streams and then migrate out to the lake where they grow large. While the conditions of habitat in the streams and the lake are important, the streams have borne the brunt of environmental damage over the past century.

In response to the growing recognition that habitat may play a critical role in coaster rehabilitation efforts, partner organizations sponsored a comprehensive watershed assessment of five streams around the Bayfield Peninsula. The assessment documented the current state of stability in the watersheds, identified problem areas and recommended watershed rehabilitation management strategies.

The study – funded through a grant from the Wisconsin Coastal Management Program – was conducted as a cooperative effort among Trout Unlimited, Bayfield County, the Wisconsin Department of Natural Resources, Inter-Fluve, Inc., the United States Geological Survey, the United States Fish and Wildlife Service, the Red Cliff Band of Lake Superior Chippewas, Northland College and Windway Capital Corp. The report made recommendations that address land use and forestry management to reduce nonpoint pollution and runoff, and specific remedies to improve instream habitat. Partners are now actively working to implement those recommendations.

Conservation Stocks and Reintroductions

One aspect of the overall rehabilitation strategy involves strategic reintroductions of brook trout that are known to exhibit the coaster migratory life history. The USFWS Iron River hatchery and the Red Cliff hatchery are the only sites within the basin that rear conservation brood stock from Lake Superior remnant populations. These fish are used in multiple sites across the lake for reintroduction experiments.

In late 2003, several partners initiated a reintroduction experiment at Whittlesey Creek National Wildlife Refuge. Over the next few years, brook trout from two coaster strains will be reintroduced at varying times and stages, from eggs to fry and fingerlings. Partners will closely monitor the response of the populations to determine which strategies hold the most promise. The Wisconsin Department of Natural Resources has also strengthened fishing regulations for brook trout on Whittlesey Creek, other streams and Lake Superior to help protect these sensitive fish from over harvest during this critical period.

Learning and Building Support

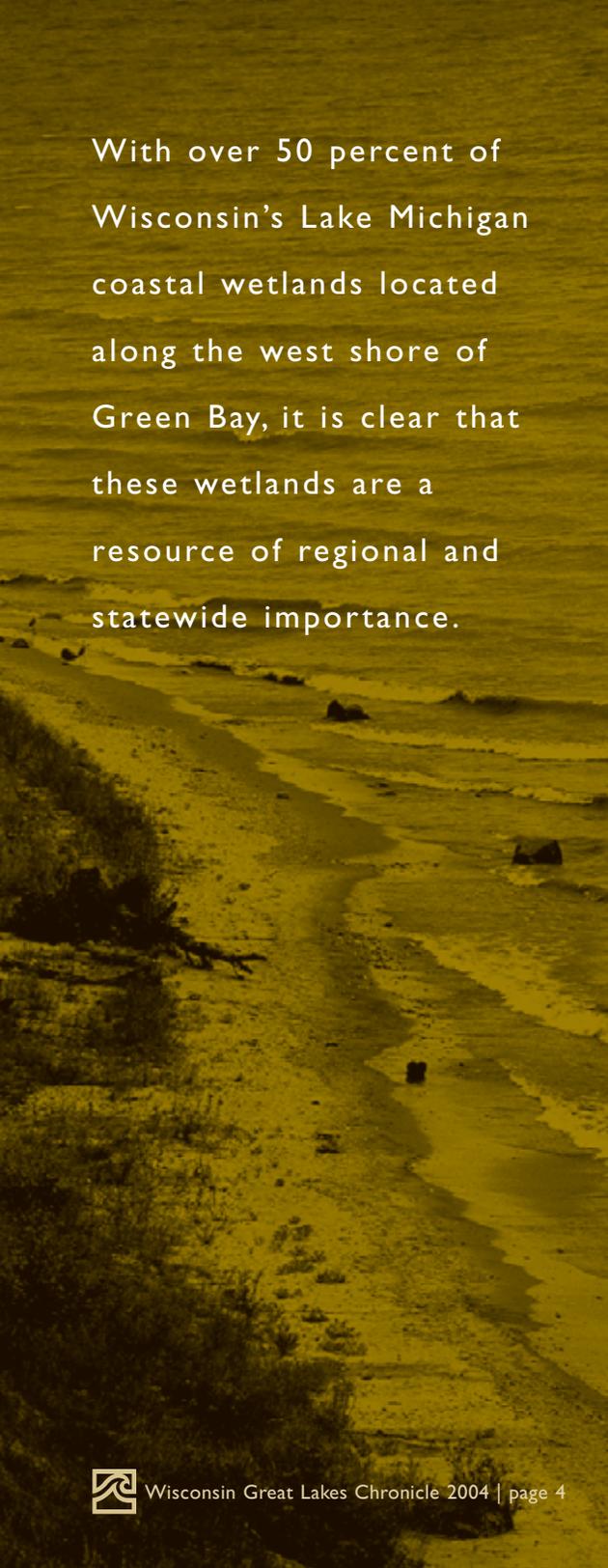
Coaster brook trout rehabilitation efforts will not succeed in the absence of broad public awareness and support. The partners are collaborating on a



basinwide education and outreach campaign that includes newsletters, brochures, a web site and regional meetings. They will host a Coaster Brook Trout Symposium at the August 2004 American Fisheries Society Annual Meeting in Madison, Wisconsin, to communicate the lessons learned from the numerous research and management experiments occurring across Lake Superior.

The journey to return self-sustaining populations of coaster brook trout to at least a portion of their historic home waters will take many years. It will be possible only through the coordinated efforts of a committed group of partners and public support for this unique fish.

Laura Hewitt is Upper Midwest Conservation Director at Trout Unlimited. She can be reached at (608) 250-3534 or lhewitt@tu.org.



With over 50 percent of Wisconsin's Lake Michigan coastal wetlands located along the west shore of Green Bay, it is clear that these wetlands are a resource of regional and statewide importance.

RESTORING THE WEST SHORE OF GREEN BAY

Kendra Axness

The west shore of Green Bay is home to some of the finest remaining coastal wetlands in the Great Lakes system. Along with the valuable wetland functions of shoreline protection and nutrient cycling, these wetlands provide exceptional breeding, nesting and feeding habitat for birds and spawning habitat for fish.

However, they are threatened by hydrologic changes that have resulted from increased development of the watershed, invasion by exotic species and greater recreational use of waterways and undeveloped lands. To counter these threats, agencies, non-profit organizations and interested individuals are partnering and working across traditional jurisdictional boundaries to ensure that this resource will be available for future generations to enjoy.

A Unique Natural History

Over the last two million years, glaciers advanced and retreated, eroding the relatively soft sedimentary bedrock underlying the west shore coastal zone. The process left behind lowlands that are fundamentally influenced by the ebb and flow of water. In pulses that mimic a slow and life-giving heartbeat, the springtime landscape fills with water, cycling nutrients and providing fish with passageways to marshes for spawning.

During late spring and summer, the water retreats to the bay. This seasonal fluctuation is superimposed over short-term changes resulting from seiches and storms and long-term cycles related to climate trends. These constantly changing water levels fuel dynamic wetland ecosystems that are home to, among many other species, the state-endangered Forster's tern and common tern. The hydraulic connection to the bay enables important game fish species, such as northern pike, to move inland for spawning and feeding.

A Tradition of Conservation

Coastal wetlands have long been recognized as critical to supporting migratory bird, waterfowl and fish populations. Louis Henry Barkhausen, a Green Bay area businessman and co-founder of Ducks Unlimited, established the Barkhausen Waterfowl Preserve in 1926. In 1936, a federal waterfowl refuge was designated on Long Tail Point. State of Wisconsin activity on the west shore began with the acquisition of the Sensiba Wildlife Area in 1948.

Leroy Lintereur, a state wildlife manager, developed the Green Bay West Shore Project in the 1970s. The project defined boundaries within which the Wisconsin Department of Natural Resources (DNR) could acquire land and establish



management of state-owned lands on the west shore for wildlife protection, wildlife-based recreation and habitat preservation. UW-Green Bay Professor Hallet J. (Bud) Harris began sponsoring research studies of west shore ecology in the 1970s. Through their participation in the US Environmental Protection Agency-funded Great Lakes Environmental Indicators Project, UW-Green Bay faculty continue to lead west shore research projects that have national significance for understanding wetland ecology.

Growing Recognition of West Shore Importance

While state and federal agencies have managed project areas, guided restoration and protection efforts, and conducted research during the past decades, other individuals and organizations are beginning to turn their attention to the west shore wetlands. The Lake Michigan Shorelands Alliance – a coalition of land trusts working in the Lake Michigan basin – has identified three priority conservation areas on the west shore that together cover nearly all the shoreline between Green Bay and Marinette. The Nature Conservancy, an organization with an international presence, identifies the west shore as a priority and is beginning to apply its site conservation planning process to the area.

New Opportunities for Protection, Planning and Restoration

The role of headwater streams in protecting west shore wetlands habitat and water quality has become more apparent as uplands in the watersheds are developed. Consequently, a broader watershed approach to conservation has been promoted and is taking shape.

In 2002-2003, the DNR protected some of these important headwaters and coastal areas through their scattered fish habitat project, funded by a Wisconsin Coastal Management Program grant. Bay-Lake Regional Planning Commission defined environmental corridors for Marinette, Oconto and Brown Counties with local citizen input. By providing a regional view of natural resources, these corridors foster watershed-level thinking in local communities as they develop comprehensive plans. The west shore area is eligible for funds through the Fox River PCB Natural Resource Damage Assessment. These funds present a unique and significant opportunity for area resource managers to implement restoration projects that benefit the health of the Green Bay watershed.

Partnering for Conservation

The agencies, organizations and individuals involved in west shore projects have recently initiated efforts to strengthen existing and develop new partnerships to ensure efficient and collaborative use of resources along the west shore. These partners recognize the need for a strategic approach to conservation that includes not only continued research and land acquisition, but also participation in comprehensive planning, outreach and education, land protection through easements, and cooperation with private landowners to implement management practices. Projects that build on these partnerships include an educational water trail at the mouth of the Peshtigo River and low-order stream mapping in Oconto County to enhance understanding of local watersheds.

With over 50 percent of Wisconsin's Lake Michigan coastal wetlands located along the west shore of Green Bay, it is clear that these wetlands are a resource of regional and statewide importance. The sustained and coordinated efforts of partners to protect the coastal wetlands of the west shore have been and will continue to be critical to maintaining them into the future.

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Reducing the amounts and sources of phosphorus entering the lakes is clearly the best means available of controlling the growth of *Cladophora* and other algae.

SIGNS OF STRESS: LAKE MICHIGAN ALGAE

Victoria A. Harris and John Karl

During the past four summers, heaps of rotting algae have piled up on some beaches of Lake Michigan. The powerful stench turns otherwise inviting beaches into repulsive wastelands where walking is difficult, swimming is unthinkable and breathing turns the stomach. Similar conditions have been reported along the shores of Lakes Ontario and Erie.

The offending plant is known as *Cladophora*. It is a filamentous green alga common in the Great Lakes and many other fresh waters. Growing on submerged rocks, it looks like long, green hair waving in the water.

Cladophora is an important component of freshwater ecosystems, providing food and shelter for invertebrates and small fish. The recent excessive blooms in the Great Lakes, however, may be the response of a dynamic ecosystem to natural changes and human impacts.

Decaying *Cladophora* is more than an annoyance to people strolling on the beach. It may lower property values and has been linked to taste and odor problems in drinking water. In addition, it may exacerbate levels of *E. coli* and enterococci bacteria in swimming waters, raising questions about beach safety.

E. coli is an indicator of fecal contamination, and high numbers prompt managers to close beaches. Recent research shows *Cladophora* mats may

nourish the growth of bacteria that come from gull droppings, sewage overflows or runoff from urban and agricultural areas.

Problems with *Cladophora* date back to the mid-1950s when nutrient levels, particularly phosphorus, were higher throughout the Great Lakes. Following the 1972 Amendments to the Clean Water Act, wastewater discharges of phosphorus were limited. Phosphorus levels in the lakes declined and nuisance algae blooms in Lake Michigan largely subsided.

Conditions Favoring *Cladophora's* Growth

The most important factors governing growth of *Cladophora* are substrate (the material it grows on), temperature, light and nutrients.

Substrate – *Cladophora* generally grows attached to rocky substrates or other hard surfaces like piers, breakwalls or woody debris. *Cladophora* requires high levels of calcium and thus grows well on the dolomite (limestone) bedrocks of the west shore of Lake Michigan.

Temperature – Optimal water temperature for *Cladophora* is 15-25°C (59-77°F). It does not grow well in the cold waters of Lake Superior, but is commonly found in the other Great Lakes. Abundance generally peaks in the spring and again in the fall. Die-offs occur in mid-summer,



possibly due to higher water temperatures. Then, filaments break free from their substrate, and waves and currents carry the dead algae ashore.

Light – *Cladophora* thrives in shallow and clear waters where light easily penetrates to the lake bottom.

Nutrients – In freshwater ecosystems, phosphorus is usually the essential plant nutrient in shortest supply. Therefore, additions of phosphorus will usually stimulate *Cladophora* growth.

Possible Reasons for Excessive Growth

The causes of the *Cladophora* resurgence in the Great Lakes are not known for certain, but experts increasingly agree they probably include changes involving zebra mussels, lower water levels and possibly rising phosphorus inputs.

Zebra mussels – During the past decade, water clarity in the Great Lakes has increased substantially because zebra mussels filter suspended particles from the water as they feed. Light now penetrates to much greater depths, expanding the areas of well-lit, hard substrates where *Cladophora* can grow.

Zebra mussels also may be increasing phosphorus concentrations in nearshore waters. As the mussels feed, they filter algae and other phosphorus-

containing particles out of the water and excrete them onto the lake bottom – fertilizing the habitat they share with *Cladophora*.

Finally, the vast beds of zebra mussels now found in the Great Lakes also provide *Cladophora* with new substrate to grow on. *Cladophora* grows directly on the hard shells of the mussels and may draw upon the rich nutrients the mussels deposit.

Lower water levels – Lower lake levels may have expanded the areas of suitable substrate that receive sufficient light for *Cladophora* growth.

Possible increased phosphorus – Although inadequate funding seriously hinders water quality monitoring, there is limited evidence that phosphorus inputs may have increased in recent years from some streams that flow into Lake Michigan. Runoff is known to be the largest source of phosphorus to the Great Lakes. While phosphorus concentrations in the open waters of Lake Michigan remain low, levels in the nearshore waters may be much higher due to inputs from fertilizers, livestock manure, soil erosion or urban storm water.



What Can Be Done?

In the short term, mechanically removing *Cladophora* from beaches and composting it may mitigate the offending conditions. However, zebra mussels are unfortunately here to stay, and little can be done to control water levels in the Great Lakes. Reducing the amounts and sources of phosphorus entering the lakes is clearly the best means available of controlling the growth of *Cladophora* and other algae.

New regulations are helping curb runoff pollution in Wisconsin. Smart Growth guidelines promote low-impact development that minimizes urban pollution. Farms near streams and lakes must meet new agricultural performance standards, and urban stormwater management programs are required for larger communities. Some municipalities also prohibit the sale of phosphorus-containing lawn fertilizers.

Nuisance *Cladophora* blooms indicate an ecosystem under stress. They remind us of the vulnerability of Great Lakes ecosystems to disturbances from urban and agricultural runoff, introductions of exotic species and changes in weather and climate.

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This project was the first to build a comprehensive library of images covering the entire stretch of Bayfield County shoreline.

BAYFIELD COUNTY SHOREVIEWER

David Lee

Bayfield County's Lake Superior shoreline is a treasured resource with a valued natural heritage. Unfortunately, through forces of nature and consequences of man, we find this vulnerable resource increasingly threatened. However, confluence of advanced scientific understanding of the shoreline and a resurgence of land use planning allowed Bayfield County to take proactive measures to address issues of coastal hazards.

In recent decades, many studies have been conducted – and a great deal of information generated – on the characteristics and dynamics of Lake Superior coastal hazards, particularly coastal erosion. Excellent and relevant information has been developed by numerous local, state and federal agencies, and academic institutions.

A concern that these messages were not reaching coastal landowners and other stakeholders prompted the Bayfield County government to initiate a community outreach project focused on coastal hazards. The project, funded in part by the Wisconsin Coastal Management Program (WCMP), allowed Bayfield County to develop innovative data products and outreach materials that were integrated into a series of informative, live presentations on coastal erosion and shoreline recession.

Representatives from the WCMP, the University of Wisconsin-Madison, the University of Wisconsin Sea Grant Institute, the Wisconsin Department of Natural Resources and others presented current research on shoreline dynamics to help coastal stakeholders understand the processes causing erosion and learn more about specific ways to protect and manage their shoreline. The information generated through the outreach sessions, as well as much of the coastal research itself, has been incorporated into the Bayfield County website as a permanent reference for the public.

A particularly interesting component of the much larger outreach project is *Bayfield County ShoreViewer*, a series of oblique aerial photographs documenting the current condition of Bayfield County's Lake Superior shoreline. Although images depicting the Lake Superior shoreline abound, this project was the first to build a comprehensive library of images covering the entire stretch of Bayfield County shoreline.

Inspired in part by the California Coastal Records Project and Washington State's shoreline aerial photos, Bayfield County saw this as a means for providing a visual baseline for observing shoreline changes over time, whether



from natural forces such as erosion, or from development. This visual shoreline archive also provides a ready source of imagery that can be useful for land use planning efforts, educational displays, public meetings and a multitude of other shoreline-related issues and events.

Bayfield County ShoreViewer was created to meet several objectives. It sought to capture close-range, oblique aerial images of the entire Bayfield County Lake Superior shoreline of approximately 87 miles in length. *ShoreViewer* would obtain high-resolution images and maximize shoreline visibility by taking photos during “leaf-off” conditions.

Bayfield County also sought to create a system to record the geographic position of the camera when each image was taken for use in an Internet application to permit site visitors to view and download shoreline images. Where possible, the County placed a premium on minimized costs and the use of local expertise. Finally, *ShoreViewer* was expected to include recent shoreline research and educational information on factors of Lake Superior shoreline erosion.

Bayfield County ShoreViewer met these objectives and more. Using a Cessna 1726 flown at approximately 500 feet above Lake Superior and

about 1,200 feet parallel to the shoreline, 513 overlapping oblique photos were taken extending from Fish Creek to the Brule River. A Nikon D100 digital camera captured the high-resolution (3008 x 2000 pixel) images in November 2002. GPS recorded the flight path and GPS-Photo-Link software assigned a geographic coordinate value to the position of the aircraft when each photo was taken.

Flight costs were significantly reduced by collaborating with the Bad River Band of Lake Superior Chippewas Natural Resources Department. The skills of pilot and biologist Tom Doolittle and GIS Specialist Matt Eitrem are showcased by the aerial images they captured. This fortuitous partnership not only provided Bayfield County excellent photography, but also allowed the Bad River Natural Resources Department to hone technical skills directly applicable to other natural resources projects on which they are working.

A web-based map interface was developed to provide instant access to the shoreline images. The architect of this application, consultant



Mark Miller, created *ShoreViewer* to permit site visitors to explore the Lake Superior shoreline using the oblique aerial photographs. Users employ locator maps to navigate to the particular reach of shoreline they wish to examine, or simply click to advance photos incrementally and literally *walk* along the shoreline. If greater detail is desired, all photos are downloadable; while file sizes are large, the high-resolution images are rich in detail.

Shoreline bluff profile and erosion information from UW-Madison researchers David Mickelson, Lindsay Anderson, et. al., can be accessed from *ShoreViewer*. The Lake Superior shoreline portion of the Bayfield County Land Records Department web site, <http://www.bayfieldcounty.org/landrecords>, also contains extensive information, resources and publications on coastal processes.

Bayfield County is dedicated to protecting its Lake Superior shoreline. The Wisconsin Coastal Management Program continues to further our shared goal to provide objective scientific information to our community so that, together, we may chart the best future for this valued resource.

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Wisconsin's fifteen coastal counties are projected to increase by 14.9 percent in population through 2030.

PROJECTED POPULATION CHANGE IN

David Egan-Robertson

The Wisconsin Demographic Services Center in 2004 completed a set of long-range projections for Wisconsin including the state's fifteen coastal counties. These projections, from 2000-2030, help public officials and others anticipate and plan for future growth and decline.

As a group, Wisconsin's fifteen coastal counties are projected to increase by 14.9 percent in population through 2030. This change is less than projected statewide growth of 19.6 percent. Numerically, the coastal counties' population is projected to increase by 296,000 persons, from 1.99 million in 2000 to 2.29 million in 2030.

Lake Superior Counties: Modest Growth

Overall, the four counties bordering Lake Superior – Ashland, Bayfield, Douglas and Iron – are projected to increase in population by 7.5 percent, from 82,000 in 2000 to 88,200 in 2030. Of particular note, Iron County is forecast to decline by approximately -4.5 percent while Ashland, Bayfield and Douglas are each expected to grow (8.9 percent, 8.0 percent and 8.7 percent, respectively). Bayfield County's population is projected to peak at 2025 and then decline thereafter.

The primary reasons for this relatively slow growth and decline are 1) the aging population of the area over the next 30 years and 2) minimal net in-migration. At the 2000 Census, Iron County had the second-highest median age (45.0) of all Wisconsin counties; Bayfield, the seventh highest (42.1). In the 1990s, both of these counties experienced natural *decrease* (more deaths than births). For instance, in Iron County deaths exceeded births by nearly 400 from 1990-2000.

By 2020-2030, this difference increases to more than 500, and the predicted net in-migration will be inadequate to offset it. Furthermore, net in-migration across all four counties is expected to be modest: In-migration across the 30-year period is expected to be 5,800 residents, increasing the base population by roughly seven percent.

Bay-Lake Counties: Fast and Moderate Growth

Overall, the seven Bay-Lake counties on Lake Michigan – Brown, Door, Kewaunee, Manitowoc, Marinette, Oconto and Sheboygan – are projected to increase in population by 19.9 percent, from 549,400 in 2000 to 658,700 in 2030.

Growth in these counties will be bifurcated based on proximity to the city of Green Bay. Following



WISCONSIN COASTAL COUNTIES

Census 2000, the Green Bay Metropolitan Statistical Area – formerly consisting of Brown County only – was expanded to incorporate Kewaunee and Oconto Counties. Together, these three counties will contain the bulk of this region's growth.

Brown County is projected to grow by 28.8 percent, Oconto County by 27.0 percent and Kewaunee County by 15.3 percent. Their growth is expected to occur in both natural increase (18 percent) and net in-migration (10 percent). Manitowoc and Sheboygan Counties are also anticipated to demonstrate solid growth of 10.2 percent and 18.1 percent, respectively.

On the contrary, Door and Marinette Counties will display population change similar to Bayfield County: moderate growth until 2020, and then gradual decline with net gains over the 30-year period of five and three percent, respectively. At 2000, Door County had the fifth highest median age (42.9) and Marinette County had the fifteenth (40.5).

Door County, which experienced natural decrease of about –300 in the 1990s, is likely to see this negative value soar to –2,600 in the 2020-30 period. Marinette County, with a natural decrease of –400 last decade, will probably see this negative

value rise to –1,800. While net in-migration is still expected to be strong in these counties through 2030 – adding 22 percent to the year 2000 population in Door County and 11 percent in Marinette County – by the last decade of the projection period, it will not overcome the imbalance between births and deaths.

Southeastern Wisconsin Counties: Solid Gains

Overall, the four southeastern counties on Lake Michigan – Kenosha, Milwaukee, Ozaukee and Racine – are projected to increase in population by 13.3 percent, from 1,360,900 in 2000 to 1,541,500 in 2030.

Again, it is instructive to view these counties in sub-groupings. Due to their relatively young populations, Milwaukee and Racine Counties are projected to gain population on the basis of strong natural increase, adding 19 percent to the base population in Milwaukee and 15 percent in Racine. However, Milwaukee and Racine Counties are also predicted to experience out-migration during the 30-year period, resulting in net population gains of 9.6 percent and 13.8 percent, respectively.

Kenosha and Ozaukee Counties are expected to gain in both natural increase and net migration through 2030. Kenosha County, as the northernmost county in the Chicago metropolitan area, is predicted to increase its 2000 population by 23 percent through natural increase and 10 percent through migration (32.5 percent overall). Ozaukee County is expected to show a more modest increase of 18.6 percent.

Regional Population Distribution

The fifteen coastal counties will lose a portion of its share of Wisconsin's overall population to other areas of the state. In 2000, the coastal counties comprised 37.1 percent of the state's population; in 2030, their share will fall to 35.7 percent. The Lake Superior counties' share will fall nominally from 1.5 percent to 1.4 percent in 2030, and the Bay-Lake region's portion will grow slightly from 10.2 percent to 10.3 percent. However, the Southeastern Wisconsin coastal counties' proportion will drop from 25.4 percent to 24.0 percent. As was the case in past decades, the southeastern region remains the most significant driver of population trends in Wisconsin's coastal counties.

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Wisconsin's economic, industrial and cultural development has been influenced substantially by its proximity to water.

WISCONSIN'S MARITIME TRAILS

Russ and Cathy Green

Wisconsin has by any standard a rich maritime history. Bordered on the east, west and north by some of America's most important navigable waterways, the Badger State sits at the maritime crossroads of Middle America. The state's economic, industrial and cultural development has been influenced substantially by its proximity to water. Evidence of Wisconsin's maritime legacy is found in the unique stories of its people, its towns, on the state flag, and in a large and well-preserved collection of marine archaeological sites.

Shipwrecks and other submerged sites offer a fascinating way to learn about Wisconsin's past. Kept extremely well preserved by the Great Lakes' cold, freshwater, shipwrecks are virtual underwater museums. Historic documents indicate that over 700 shipwrecks sites may exist in Wisconsin's Lake Michigan and Superior waters alone.

To encourage preservation and visitation of these unique sites and foster wider public appreciation for Wisconsin's maritime cultural resources, the Wisconsin Historical Society (WHS) began the Wisconsin's Maritime Trails initiative in July 2001. Winding above and below the waves, the Maritime Trails encompass four stretches of Wisconsin coastline linking shipwrecks, lighthouses, historic waterfronts, historic vessels,

museums and shore-side historical markers and attractions. When viewed as a metaphorical "trail," these resources vividly illustrate the state's diverse maritime history.

Under the Maritime Trails initiative, the state is divided into four regional trails. From the waterfront remains of the logging industry in Washburn to the dramatic wreckage of the steamer *Sevona* in the Apostle Islands, the *Lake Superior Maritime Trail* celebrates the harsh realities that characterized this northern-most region of the state. The *Door County Trail* highlights this vacation peninsula's unique maritime heritage, from its once thriving stone industry to the cargo schooners that sailed this busy shipping corridor.

Upper Lake Michigan Trail attractions include the Wisconsin Maritime Museum and historic Port Washington where the story of the sinking of the steamer *Niagara*, one of the most tragic passenger ship disasters in the Great Lakes, is told along the city's waterfront. Finally, the *Lower Lake Michigan Trail* relays the story of the vibrant ports of Milwaukee, Kenosha and Racine and the histories of immigrants traveling to and the products of industry traveling out of the area via the Great Lakes transportation network.



Some of the Wisconsin's Maritime Trails' major elements include:

Archaeological Research. The documentation of Wisconsin's submerged cultural resources, primarily historic shipwrecks, is the foundation of the Maritime Trails initiative. Beyond academic and resource management applications, the results of this research form the basis of most interpretive and outreach projects.

Shipwreck Moorings and Dive Guides.

With volunteer assistance, the WHS maintains permanent moorings on 18 historic shipwrecks. The moorings facilitate recreational access to the sites, offer a means of interpreting the wreck to visitors, provide a safe point of descent for divers and eliminate damage to the site from recreational boat anchors. Rugged waterproof dive guides supply divers with maps, and unique ship construction and dive site details.

Public Presentations. Given at a variety of venues, public presentations provide a direct, personal connection between the WHS and the public. WHS underwater archaeologists and volunteers have reached over 14,700 people via public presentations since the Wisconsin's Maritime Trails inception.

Interpretive Signage and Kiosks. By summer 2004, the WHS will have installed 15 shore side informational markers for historic shipwrecks and waterfronts. All of the signs utilize an identical template unifying them as attractions and information points within the statewide Maritime Trails program. In addition, interactive computer kiosks highlighting Wisconsin's historic shipwrecks will be installed at the Wisconsin Maritime Museum, the Kenosha Public Museum and at WHS headquarters in Madison.

Web Sites. Three sites dedicated to Wisconsin's historic shipwrecks, underwater archaeology, and maritime history provide access to timely and useful information.

- Wisconsin's Maritime Trails at <http://www.maritimetrails.org>
- Notes from the Field at <http://www.maritimetrails.org/participate>
- Wisconsin's Great Lakes Shipwrecks at <http://www.wisconsinshipwrecks.org>



Partnerships. The Wisconsin's Maritime Trails program collaborates with federal, state and local agencies, chambers of commerce, private businesses, non-profits and individuals. Funding partners include the Wisconsin Coastal Management Program, UW Sea Grant Institute and the Wisconsin Department of Transportation.

Dozens of volunteer groups such as the Wisconsin Underwater Archaeological Association and the Great Lakes Shipwreck Research Foundation, as well as a growing list of project specific partners and individuals, ensures that all of those with a stake in Wisconsin's maritime cultural resources share in their management and interpretation.

Russ and Cathy Green served as Underwater Archaeologists at the Wisconsin Historical Society until 2004. The State Underwater Archaeology Program at the Wisconsin Historical Society can be reached at (608) 264-6500 or underwater@whs.wisc.edu.



Sustainable tourism is an excellent way for people to learn to appreciate and value our shoreline's environmental assets.

WISCONSIN HARBOR TOWNS: PROMOTING COASTAL COMMUNITIES

Tom Lyons

Dotted along 1,100 magnificent miles of scenic coastline, Wisconsin's harbor towns have welcomed visitors to our shores for more than 150 years. From sophisticated cities to quaint fishing villages, Wisconsin's harbor towns feature outdoor recreation, museums, shopping, arts, dining, relaxing scenery and hospitality.

The Wisconsin Harbor Towns Association – a non-profit organization with membership from communities on Lake Michigan, Green Bay and Lake Superior – formed in 2000 to promote the beauty and attractions found along Wisconsin's coastline under a single brand image. The scope of the organization has evolved from its original focus of attracting cruise ships to include recreational boating, sailing and land-based tourism in coastal towns.

Assisted by a \$26,000 grant from the Wisconsin Coastal Management Program, the group in 2003 produced a full-color guide to the Wisconsin harbor towns. The guide beautifully showcases each of the member communities with pictures, marina maps, attractions and special events, and information for boaters, sailors and land-based tourists. Visitors took more than 20,000 copies of the guide in its first six months.

Wisconsin Harbor Towns has since launched online promotional efforts at <http://www.WisconsinHarborTowns.org>. The site includes much of the information and images in

the printed guide as well as interactive features. Additionally, the group received a crucial \$40,000 grant from the Wisconsin Department of Tourism to promote coastal communities in key markets through advertising and public relations. Wisconsin Harbor Towns will also host members of the Midwest Travel Writers Association on a weeklong guided tour along our eastern seaboard in 2004.

The Wisconsin Harbor Towns Association believes that sustainable tourism is an excellent way for people to learn to appreciate and value our shoreline's environmental assets through enjoyment of the many activities they offer. People tend to protect what they value and they value what has personal meaning to them.

Tourism promotion is only the start for Wisconsin Harbor Towns Association. Future efforts under discussion include ways to share information and strategies for dealing with issues such as beach water quality and homeland safety as it applies to our major ports.

With the continued support of our members and strategic partners, the Wisconsin Harbor Towns Association will be a force for positive and sustainable economic growth in the state's shoreline communities.

Tom Lyons served as President of the Wisconsin Harbor Towns Association. The WHTA may be reached at <http://www.WisconsinHarborTowns.org>.



RECREATIONAL BOATING FACILITIES PROGRAM

Larry Freidig

It's a beautiful summer evening. There is just a whimsy of breeze from the west and the sun is beginning its final descent. You stand in a park overlooking the boat basin, the melody of wind in the sailboat rigging filling the area. The sun reflects off the masts and hulls of the moored boats and catches the shimmer of an incoming boat, the last sport-fisher of the day....

For over 25 years, a small but effective grant program has made this image a reality for Wisconsin coastal communities. More than creating just an image, the state's Recreational Boating Facilities Program has made a substantial contribution to the safety and convenience of boaters using our state's water resources.

This grant program was patterned in 1978 after Michigan's highly successful boating facility program, but with a significant difference. Rather than rely on a state agency for investigation, planning, design and construction of boating facilities, Wisconsin's program offered financial assistance to local communities to undertake these activities.



Funds for this state cost-sharing program started as general purpose revenue and bonding. The Legislature in 1985 changed the source to a formula transfer of gasoline excise tax attributed to recreational boating use.

The original legislation also created the Wisconsin Waterways Commission to supervise the program. Each of the five Commissioners represents a particular water "geographical" area: Lake Michigan, Lake Superior, the Mississippi River, the Lake Winnebago watershed and the state's inland waters.

The Commission supervises the Recreational Boating Facilities Program by assessing the need and feasibility of recreational boating projects either through its own study activities or financial assistance to local sponsors. It then provides financial assistance to local sponsors for the construction or rehabilitation of eligible facilities.

On coastal waters, these recreational facilities have largely been harbors of refuge, often including multiple lane launch ramps and associated car/trailer parking areas. Prohibited by law from participating in the construction of marinas, the Commission has directed its financial assistance at creating large boat basins protected by breakwater structures to provide flatter water conditions for non-trailerable watercraft during periods of stormy weather.

These harbors also provide for protected launching and retrieving launch lanes for trailerable boats. One only needs to observe the retrieving of sport-fishing boats during a storm event to understand the value of this protection for boater safety.

As coastal communities have recognized the value of once dormant waterfront properties for public recreation and downtown development, the construction of these protected boating facilities have become the catalyst for a variety of urban renewal activities. Public and private development spurred by the construction of harbors in Racine, Kenosha, Port Washington and Sheboygan highlight how important the provision of safe boating facilities has been in community redevelopment.

Larry Freidig is the Recreational Boating Facilities Program Administrator in the Wisconsin Department of Natural Resources. He can be reached at (608) 266-5897 or larry.freidig@dnr.state.wi.us.

The real proof of the project's impact will come years from now when today's children have grown to adults who are more aware and protective of their Great Lakes.

PADDLE-TO-THE-SEA

James M. Langdon

The Great Lakes are as impressive and vast as any natural feature in Wisconsin. Their physical enormity notwithstanding, they may also be the most overlooked geographical contributors to our state's history, culture and economy.

The Wisconsin Coastal Management Program (WCMP) has launched numerous initiatives to educate the public about Lakes Michigan and Superior and their shores. In fact, *Wisconsin Great Lakes Chronicle* – first published in 2002 – was created to enlighten the citizenry in matters concerning their Great Lakes. More recently, however, the WCMP strove to reach a new audience with its Great Lake education campaign: Wisconsin's children.

The WCMP celebrated its 25th anniversary in 2003 with a gift to the youth of Wisconsin. It distributed to every elementary school and public library in Wisconsin *Paddle-to-the-Sea*, a classic children's book that illustrates the history, character and importance of the Great Lakes.

Paddle-to-the-Sea, written by Holling Clancy Holling in 1941, follows a wooden Indian and canoe as it travels from the headwaters of Lake Superior through the Great Lakes and into the Atlantic Ocean. Although *Paddle-to-the-Sea* won a Caldecott Medal in 1942 – presented annually to the most distinguished American picture book for children – its images and story hold up well for today's youth.

The WCMP anniversary edition of *Paddle* includes a classroom activity drawn from *Working with Water: Wisconsin's Waterways*, by Bobbie Malone, Jefferson J. Gray and Anika Fajardo. Guided by the activity, elementary students learn about the ecological and geographical features of the Great Lakes. In addition, children study how the Great Lakes and St. Lawrence River connect the producers of Wisconsin commodities to world markets.

The real strengths of *Paddle-to-the-Sea*, however, are Holling's well-crafted story and engaging illustrations. Children – and adults – learn about the character of the Great Lakes from the water-level perspective of a child's toy. They develop a sense of scale and direction by tracking the path of the toy as it travels throughout the Lakes and into the Atlantic Ocean. Holling leaves the reader aware that the Great Lakes are a special place deserving of care and protection.

Teachers, librarians and students from as far away as Italy have expressed interest in the WCMP's *Paddle-to-the-Sea* project. However, the real proof of the project's impact will come years from now when today's children have grown to adults who are more aware and protective of their Great Lakes.

James M. Langdon is a Director in the Wisconsin Department of Administration. He can be reached at (608) 261-7520 or james.langdon@doa.state.wi.us. The WCMP thanks Cathy Techtmann, Bobbie Malone, Houghton Mifflin Company and others for assisting in the development of this project.



2004 WISCONSIN COASTAL MANAGEMENT GRANTS

Project Name

Grantee

WCMP Award

Project Description

Coastwide

Prioritizing Cladophora Management Areas on Lake Michigan's Western Shore

UW- Milwaukee

\$138,126

Identify the factors leading to the increase in the filamentous green alga *Cladophora*, evaluate whether this exacerbates an *E. coli* problem and identify management strategies.

Natural Heritage Inventory Web-based Access for Communities

Wisconsin Department of Natural Resources

\$43,500

Develop a web portal for local governments and nonprofit organizations to access Natural Heritage Inventory data for comprehensive and restoration planning projects.

Connecting the Coasts...Lake Superior Stewardship Service Learning on the Web

UW-Extension, Northern Great Lakes

Visitor Center Office

\$36,697

Educate students and teachers about Lake Superior coastal resources and Lake Superior Binational Program research and recommendations.

Leaders Explore Natural Areas (LENA) Program

Natural Resources Foundation of Wisconsin

\$25,200

Target community leaders with presentations and guided field trips to eight local State Natural Areas. Facilitate formation of "Friends" groups at four coastal SNAs.

View From the Lake: Water Resource Issues in Your Community

Lake Superior Research Institute

\$20,612

Provide Lake Superior citizens an on-the-water view of their communities and information about key water resource issues.

Shipwrecks Article

Wisconsin Department of Natural Resources

\$18,753

Develop and publish an eight-page color supplement and poster insert to *Wisconsin Natural Resources* magazine about the history, preservation and travel opportunities associated with Great Lakes shipwrecks.

Lake Superior Coastkeeper

Inland Sea Society

\$17,000

Expand existing WCMP-funded citizen volunteer monitoring at Bayview Beach in Chequamegon Bay to nine other coastal sites in Ashland and Bayfield Counties.

Restoration of Coastal Wetlands – Invasive Species Removal

Wisconsin Department of Natural Resources

\$15,000

Restore 125 acres of wetlands at eleven coastal State Natural Areas in three coastal counties.

Road-End and Public Access Inventory, Green Bay West Shore

Bay Lake Regional Planning Commission

\$14,762

Inventory and assess access points to Green Bay along the west shore of the bay from Marinette to the village of Howard.

Wetland Restoration Workshops for Coastal Landowners

Wisconsin Wetlands Association

\$13,900

Develop four, two-day wetland restoration workshops to be held in four coastal counties. Workshops will be based on the *Wetland Restoration Handbook for Wisconsin Landowners* that received WCMP funding.

Technical Assistance to Local Units of Government

Wisconsin Department of Natural Resources

\$354,842

Enhance the local role in wetland protection by supporting implementation and enforcement of waterway and shoreland-wetland regulations.

Coastal Wisconsin Wetland Inventory

Wisconsin Department of Natural Resources

\$80,198

Continue updates and enhancements to the Wisconsin Wetland Inventory in the coastal counties.

Bay-Lake Technical Assistance

Bay Lake Regional Planning Commission

\$20,000

Support local governments and the WCMP in coastal management activities.



NWRPC Technical Assistance

Northwest Regional Planning Commission
\$20,000

Support local governments and the WCMP in coastal management activities.

SEWRPC Technical Assistance

Southeastern Wisconsin Regional Planning Commission
\$20,000

Support local governments and the WCMP in coastal management activities.

Ashland County

Lake Superior Leadership School

Sigurd Olson Environmental Institute/Northland College
\$49,388

144 high school youth will participate in one-week sessions at Northland College to learn about coastal management issues and develop leadership skills and an action plan for future community outreach.

Bayfield County

Lake Protection, Phase II

County of Bayfield
\$23,408

Refine Bayfield County's shoreland ordinance to incorporate Lake Superior shore erosion updated information, develop a pilot compliance monitoring program and launch an educational campaign.

GIS Integrated Resources Management Planning

Red Cliff Band of Lake Superior Chippewa
\$22,985

Establish a Geographic Information System (GIS) for use in the development and implementation of an Integrated Resource Management Plan for the Red Cliff Reservation.

Historic Halvor Reiten Boatyard Park (Dock "L"): Purchase & Restoration

City of Bayfield
\$24,500

Acquire and stabilize a historic dock.

Wisconsin's Maritime Trails 2004:

Apostle Islands

Wisconsin Historical Society
\$36,187

Expand the Wisconsin Maritime Trail to the Apostle Islands with further development of web-based information and virtual shipwreck tours.

Brown County

East River Greenway Monroe to Jackson

Green Bay Park, Recreation and Forestry Department
\$60,058

Provide a linkage between public greenways with 560' of trail development.

Linking Land Use to Water Quality – Green Bay Project NEMO

Fox-Wolf Watershed Alliance
\$19,000

Improve understanding by City of Green Bay staff, elected officials and community leaders of the link between land use decisions and water quality.

Door County

Coastal Resource Identification for the Door Peninsula and the Bay-Lake Region

Bay Lake Regional Planning Commission
\$21,524

Delineate coastal environmental and cultural resources for the Door Peninsula as part of a region-wide environmental corridor planning/mapping process.

Douglas County

SS *Meteor* Historic Structure Report

City of Superior
\$30,800

Develop a report to guide restoration efforts of the historic whaleback SS *Meteor*.

Iron County

Interpretive/Classroom Center, Saxon Harbor

Iron County Forestry and Parks Department
\$31,880

Develop a 24' x 48' interpretive center/classroom as part of a larger harbor improvement project.

Boat Ramp and Launch Pier, Saxon Harbor

Iron County Forestry and Parks Department
\$20,451

Construct a two lane boat ramp and pier at Saxon Harbor.



Kenosha County

Chiwaukee Prairie Habitat Restoration

Wisconsin Department of Natural Resources
\$33,904

Restore 200 acres of wetlands at Chiwaukee Natural Area.

Kenosha Lighthouse Keeper's Dwelling Restoration Project

City of Kenosha
\$39,068

Implement an accessible restoration plan for the facility.

Kewaunee County

Harbor Park Expansion Acquisition Project

City of Kewaunee
\$35,000

Acquire two parcels totaling 1.3 acres for the expansion of Harbor Park.

Manitowoc County

Michigan Shores Land Acquisition

Village of Cleveland
\$207,500

Acquire approximately 3.5 acres that includes about 535 feet of Lake Michigan shoreline (includes WCMP Restoration funding).

Manitowoc County GIS Wetland Restoration Inventory

Manitowoc County Land & Water Conservation Department
\$21,335

Inventory, assess and monitor small wetland restorations in Manitowoc County.

Marinette County

City and Town of Peshtigo Comprehensive Plan

City and Town of Peshtigo
\$21,716

A multi-jurisdictional planning effort between the Town of Peshtigo and City of Peshtigo to strengthen the natural resources, land use and implementation elements of the comprehensive plan.

Peshtigo Harbor Environmental Education Trail Project (PHEET)

Marinette County Land and Water Conservation
\$14,970

Provide water and land based trail development and signage, and support the Teaching Outdoor Awareness and Discovery (TOAD) program.

Milwaukee County

Planning for Public Access to the Milwaukee River in Riverside Park

Urban Ecology Center
\$16,850

Produce a site-specific plan for public access to an urban park on the Milwaukee River. The Urban Ecology Center brings about 16,000 visitors annually to the Riverside Park.

SHIPSHAPE: Preservation of the Great Lakes Marine Vessel Files

Milwaukee Public Library
\$50,000

Preserve the information in 7,200 paper archival vessel files through conversion to an electronic database, and consolidate with existing Wisconsin Marine Historical Society databases.

Stimulating Interest in the Kinnickinnic River

Sixteenth Street Community Health Center
\$17,703

Develop an outreach campaign to community residents and organizations of the Kinnickinnic River corridor in Milwaukee. Develop a strategic action plan for implementing recommendations of the Milwaukee Estuary Remedial Action Plan.

Milwaukee Urban Water Trail

Friends of Milwaukee's Rivers
\$53,797

Inventory existing access points within the three rivers of the Milwaukee estuary. Includes GIS information of present access points and a map featuring the trail.

Ozaukee County

Comprehensive Plan – Natural and Coastal Resources Inventory

Ozaukee County – Planning, Resources and Land Management Dept.
\$25,000

Develop the natural and coastal resources inventory as a first step for Ozaukee County's comprehensive plan.

Sheboygan County

Sheboygan County Wetland Restoration Inventory

Sheboygan County Land & Water Conservation Department
\$20,000

Inventory, assess and monitor small wetland restorations in Sheboygan County.



ACKNOWLEDGEMENTS

The Wisconsin Coastal Management Program (WCMP) in the Wisconsin Department of Administration (DOA) publishes *Wisconsin Great Lakes Chronicle*. It welcomes but is not responsible for the opinions expressed by contributing authors.

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Contents, Apostle Islands, Robert Queen

1, Gov. Jim Doyle, Governor's Press Office

2, Great Lakes Stream, Robert Queen

2, Coaster Brook Trout Release, Trout Unlimited

3, Coaster Brook Trout, US Fish and
Wildlife Service

4, Lake Michigan Shore, Robert Queen

6, Cleveland, Jim Langdon

7, Lake Michigan Algae, Princely Nesadurai

8, Great Lake Bluffs, Robert Queen

10, Milwaukee Lakefront, Robert Queen

12-13, Steamer *Frank O'Connor*,
Wisconsin Historical Society

14, Washburn Marina, Wisconsin Harbor
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16, Wequiock Falls, Mike Friis

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Financial assistance for this project was provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, pursuant to Grant #NA03NOS4190106 and the Wisconsin Coastal Management Program.

The Wisconsin Coastal Management Program, part of the Wisconsin Department of Administration, was established in 1978 to preserve, protect and manage the resources of the Lake Michigan and Lake Superior coastline for this and future generations.



**WISCONSIN COASTAL
MANAGEMENT PROGRAM**



