

# **Wisconsin's Lake Michigan Islands Plant Survey-II**

**1998 and 1999**

**PUB ER-801-01**

September 1999  
*(reprinted in April 2001)*

**Dr. Emmet Judziewicz  
David Kopitzke**

Wisconsin Department of Natural Resources  
Bureau of Endangered Resources  
Madison, Wisconsin DNR

**Funding Provided by:**  
Wisconsin Coastal Management Program  
Division of Energy and Intergovernmental Relations  
Department of Administration  
State of Wisconsin

## ACKNOWLEDGMENTS

We would like to acknowledge the Wisconsin Coastal Management Program, Wisconsin Department of Administration for their funding and support. In particular, thanks are due to Oscar Herrera, Mary Frazier, Gerri Parrish, and Diana Toledo.

Many thanks are extended to two people who were of particular help with this project: Eric J. Epstein, Wisconsin Heritage Ecologist, WI Department of Natural Resources (WDNR); and Paul E. Berry, Director of the Wisconsin State Herbarium.

In addition, we also give great thanks to: all of the private landowners who gave their permissions for this survey; Betty Les (Section Chief, Bureau of Endangered Resources, WDNR) for her constant support; Andrew Galvin and Julie Bleser for report preparation; Michael R. Penskar (Heritage Botanist, Michigan Natural Features Inventory) for his help in funding surveys of the Michigan islands; and David L. Sperling (Editor, Wisconsin Natural Resources Magazine) for his help with the magazine article. Other biologists who generously helped with this project include Theodore H. Cochrane, June M. Dobberpuhl, Gary Fewless, Robert W. Freckmann, Mike Grimm, Phyllis Higman, Neil Luebke, Carl W. Taylor, Donald Ugent, and Edward G. Voss. We also thank the many individuals who provided logistical support for the visits to the various islands including John Huff, Mike Vitt, Mike Cherff, the Diocese of Green Bay, Joel and Mary Ann Blahnik, Carolyn and John Farwell, US Fish and Wildlife personnel Ken Stromberg and Joel A. Trick, the US Coast Guard, the Detroit Island Landowners Association, Andrew Galvin, Jim and Marilyn Gau, Mark Eggleston, Rock Island park personnel, and Pat Ranguette. Darryl Beers is thanked for his pictures that were included in the Wisconsin Natural Resources Magazine article.

### **FUNDED IN PART BY THE WISCONSIN COASTAL MANAGEMENT PROGRAM.**

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 #NA870Z0255 and the WISCONSIN COASTAL MANAGEMENT PROGRAM.

THE WISCONSIN COASTAL MANAGEMENT PROGRAM, part of the Wisconsin Department of Administration, and overseen by the WISCONSIN COASTAL MANAGEMENT COUNCIL, was established in 1978 to preserve, protect and manage the resources of the Lake Michigan and Lake Superior coastline for this future generations.

# TABLE OF CONTENTS

<b>Introduction.....</b>	<b>3</b>
<b>Status of Rare Vascular Plant Species .....</b>	<b>5</b>
<b>Protection and Management Considerations .....</b>	<b>11</b>
<b>Ranking of the Significance of Wetlands .....</b>	<b>14</b>

## **APPENDIX 1**

Submission Letter to the Michigan Botanist

## **APPENDIX 2**

“Flora and Vegetation of the Grand Traverse Islands, Wisconsin and Michigan,” submitted to the Michigan Botanist on September 30, 1999

## **APPENDIX 3**

“Green Treasures in a Sea of Blue,” Wisconsin Natural Resources Magazine, October 1999 issue

## Introduction

This report is a collection of the various final products for a grant provided to the Bureau of Endangered Resources (BER), Wisconsin Department of Natural Resources from the Wisconsin Coastal Management Program (WCMP), Department of Administration. The grant, entitled the Wisconsin Lake Michigan Island Plant Survey II (grant # 88014 – 901.9) extended from May through September of 1999.

The primary objective of this grant was to publish the inventory results of a Door County Islands Vegetative Survey that was completed in 1998 through another WCMP grant. Articles were submitted for publication to *The Michigan Botanist*, a technical journal renowned throughout the United States as a leading botanical journal, and the *Wisconsin Natural Resources Magazine*, a popular magazine distributed throughout the State of Wisconsin. In addition to the articles, some limited field inventory work was completed to supplement the earlier work completed in 1998; the status of element occurrence records for rare vascular plants and communities surveyed within the project area was developed; general protection and management considerations were developed; and significant wetlands were ranked.

## Publications

A scientific paper entitled “**Flora and Vegetation of the Grand Traverse Islands (Lake Michigan), Door and Marinette Counties, Wisconsin and Delta County, Michigan**” was written by Dr. Emmet Judziewicz, Senior Conservation Biologist at BER. The paper was submitted on September 30, 1999 for publication in *The Michigan Botanist*, the most important botanical journal in the Midwest (Appendix 1). The paper is expected to appear in print sometime in the year 2000. The draft manuscript is included in Appendix 2.

This paper includes the results of a rare plant, floristic, and plant community survey of the Grand Traverse Islands archipelago. The paper is a compilation of past field surveys, historic botanical information, and the more recent surveys completed by Dr. Judziewicz. Included are descriptions of plant communities, floristics and biogeography, island-by-island summaries and a checklist of vascular plants. The paper also includes habitat assessments of Door County islands sites and summaries of rare plant and community assessments.

Since the manuscript was recently submitted, it has yet to undergo the rigorous review process necessary for publication in *The Michigan Botanist*. We are relying on the Journal's review process to provide the technical review that we would normally require before submitting to the Coastal Management Program as part of a final grant report. Thus, it is important to note that if this paper is reproduced or distributed in anyway, it should be considered as a draft until final publication. Five copies of the final printing will be forwarded to WCMP upon publication.

A galley proof copy of “**Green Treasures in a Sea of Blue**,” written by David Kopitzke, will be published in the October 1999 issue of the *Wisconsin Natural Resources Magazine*. The article is a narrative of the work completed by Emmet and David, including the dreaded and almost fatal tree fall of 1998. The galley proof copy is included in Appendix 3 and five copies of the final magazine will be forwarded to WCMP upon release of the issue.

## Other Final Products

In addition to the two articles described above, a number of other work products were completed as part of this grant. They include:

- **Habitat assessment of Door County islands sites:** The habitat assessment of the Door County Islands is included within the technical publication submitted to Michigan Botanist.
- **Data entry into the NHI database:** All of the rare plant and community data gathered during this study (approximately 100 new records and updates for rare plants, and 25 new records and updates for communities) have been entered into the Natural Heritage Inventory (NHI) Biological Conservation Database (BCD). NHI Ecologist Eric J. Epstein assigned quality rankings to the communities. The rare plants await assignment of ranks by Heritage Botanist June M. Dobberpuhl, who is on medical leave.
- **Data sharing with regional conservation efforts:** The final report completed from this grant, including the two articles, will be shared with a variety of interested parties within and around the Door County area. Data will be shared through standard licensing agreements and other standard methods for sharing NHI data.
- **Build a network of private landowners:** David Kopitzke continued his landowner contact work through this grant. He initiated contacts with several private landowners on Washington and Chambers Islands during a May 1999 trip to Door County. He obtained permission to survey two potentially important wetland complexes on Washington Island: Big Marsh and Little Marsh. He also visited Chambers Island on 7 August 1999 and addressed the Chambers Island Landowners Association.
- **Status of all rare plant species on the Door County Islands:** discussed below.
- **Protection and Management Considerations:** discussed below.
- **Ranking of the significance of the wetlands on a greater regional basis:** discussed below.

## Status of Rare Vascular Plant Species

Lake Michigan Islands, Wisconsin and Michigan

*Acer pensylvanicum* (striped maple); no status yet in Wisconsin; none in Michigan. This small tree is common in a mixed conifer-hardwood forest understory in northeastern Summer Island, Michigan, and was recently found (1997) on the Door County mainland in Newport State Park. It was not found on any of the Wisconsin Lake Michigan islands.

*Adlumia fungosa* (climbing fumitory); SPECIAL CONCERN (WI and MI). This biennial herbaceous vine is found in upland woods, usually with dolomite or dolomite bedrock or gravel at or near the surface. The seeds remain in the seedbank for many years and populations may appear suddenly after burning or excavation. It was found on several small islands: Little Strawberry (rare), Horseshoe (locally common). A population from Pilot Island was not relocated. It is occasional in coastal cliff-top white cedar forests on Plum Island; rare on a dolomite escarpment on Detroit Island; uncommon on Washington Island, where it was found on Lobdells Point and along the east and north coasts; and fairly common at the base of dolomite escarpments on Rock Island.

On the Michigan islands, climbing fumitory has been reported from Summer, Gull, and Little Gull Islands; it was not relocated on Summer Island, and the Gull Islands were not visited. Large new populations were located on Little Summer Island, where they covered a graded, gravelly forest lane.

*Asplenium rhizophyllum* (walking fern); THREATENED (MI). Walking fern is rare but locally common on large, mossy dolomite boulders on the interior escarpments of Rock Island. It was not been found on the Michigan islands.

*Asplenium trichomanes* (maidenhair spleenwort); SPECIAL CONCERN (WI). Small populations were discovered on shaded dolomite bluffs along Old Mill Road on Washington Island. There are no other island reports.

*Asplenium trichomanes-ramosum* (*A. viride*) (green spleenwort); ENDANGERED (WI). A population has long been known, and still exists, on north-facing shaded dolomite cliffs at Mountain Tower Park on Washington Island.

*Cakile edentula* (American sea-rocket); SPECIAL CONCERN (WI). First recorded on Chambers Island in 1961, large populations were found in 1998 on lake beaches at Sand Point and on the south tip of the island. On Washington Island it is known from the Michigan Road beaches and from Jackson Harbor.

*Calamagrostis stricta* (slim-stemmed reedgrass); SPECIAL CONCERN (WI). This species is known from several populations on Great Lakes alkaline rockshore communities on Washington, Plum and Summer Islands. It was also found in a marly bulrush wetland at Big Marsh on Washington Island.

*Calamintha arkansana* (low calamint); SPECIAL CONCERN (WI). Significant populations occur on Great Lakes alkaline rockshore communities on Detroit Island (south end) and Washington Island (southeast coast and Jackson Harbor Ridges). In Michigan the species is common in similar habitats on Poverty, Summer, and Little Summer Islands, mostly on eastern coast alvar communities.

*Calypso bulbosa* (calypso orchid); THREATENED (WI and MI). There were several records for Washington Island in the 1920's and 1930's, with Fuller (1927) calling it "locally abundant" there. It was not seen in the present survey and there have been no sightings for several decades. Deer herbivory is possibly responsible for its decline. There is also a 1926 record from St. Martin Island, Michigan.

Cardamine pratensis (cuckoo flower); SPECIAL CONCERN (WI). There is a 1916 record from "wet open places" on Washington Island, where it was recorded as "rare". It has not been relocated since in the GRAND TRAVERSE ISLANDS ARCHIPELAGO.

Carex backii (Rocky Mountain sedge); SPECIAL CONCERN (WI). Recent records from a hardwood forest on Boyer Bluff, Washington Island, were not relocated (but not intensively looked for).

Carex capillaris (hairlike sedge); SPECIAL CONCERN (WI). Although not known from the Wisconsin islands, there is a recent record from coastal alvar on Poverty Island, Michigan. It was not seen there in 1998.

Carex concinna (beautiful sedge); THREATENED (WI). This sedge was recently discovered on forested ridges and swales on Washington Island (Jackson Harbor Ridges) by Gary Fewless. In Michigan, this species is uncommon on alvar communities on Summer Island (mostly on the east coast).

Carex crawei (Crawe's sedge); SPECIAL CONCERN (WI). This sedge is fairly widespread in coastal alvar and Great Lakes alkaline rockshore communities. It is found on Detroit Island (south end), Washington Island (several places near ferry dock; southeast coast; Jackson Harbor), and Rock Island (borrow pit) and is frequent on the Michigan Islands (Poverty, Summer and Little Summer). It is weedy and thrives in mowed lawns near Lake Michigan.

Carex garberi (Garber's sedge); SPECIAL CONCERN (WI). This sedge is fairly widespread in coastal alvar and Great Lakes alkaline rockshore communities. It is found on Detroit Island (south end), Washington Island (several places near ferry dock; southeast coast; Jackson Harbor), and Rock Island (borrow pit) and is frequent on the Michigan Islands (Poverty, Summer, and Little Summer). There is a historical site from Jack Island.

Carex gynocrates (northern bog sedge); SPECIAL CONCERN (WI). A large colony of this species was found in a cedar swamp near Big Marsh on Washington Island in 1999. Here it was locally the dominant groundcover and all plants were female.

Carex livida (livid sedge); SPECIAL CONCERN (WI). Livid sedge was newly discovered and is fairly common in two boreal fen communities on Washington Island (Coffee Swamp and Big Marsh).

Carex platyphylla (flat-leaved sedge); SPECIAL CONCERN (WI), THREATENED (MI). This eastern disjunct is found in small to large, dense colonies in old-growth to second-growth beech-sugar maple forests, often on tip-up mounds or where dolomite is near the surface. All ten GRAND TRAVERSE ISLANDS ARCHIPELAGO sites were discovered during this inventory. On Washington Island it occurs in Mountain Tower Park and several private woodlots in the interior of the island. There are also several colonies on Rock Island, the largest with over 1,000 plants. It is not known from the Michigan islands or anywhere in the Upper Peninsula, but is to be expected on the Garden Peninsula.

Carex prasina (drooping sedge); THREATENED (WI), no status (MI). This eastern woodland species was newly discovered in an interior seep in an old-growth beech-sugar maple forest on Rock Island. It is not known from the Michigan islands or elsewhere in the Upper Peninsula.

Carex richardsonii (Richardson's sedge); SPECIAL CONCERN (WI and MI). This prairie-barrens-alvar species is not known from Door County, but is occasional in coastal alvar communities on Poverty and Summer Islands, Michigan.

Cirsium pitcheri (Pitcher's thistle); THREATENED (WI and MI). FEDERALLY LISTED. This Great Lakes dune species has been adversely affected by development and vehicular and foot traffic. It was seen in the GRAND TRAVERSE ISLANDS ARCHIPELAGO in 1998-1999 only at South Dunes Park on Washington Island, where only a few plants remain. There is purportedly also a record for Summer Island, Michigan, but it was not seen there in 1998.

Cryptogramma stelleri (slender cliffbrake); no status (WI), SPECIAL CONCERN (MI). In 1998, this fern of shaded dolomite cliffs was rare on Washington (Mountain Tower Park) and Rock (interior escarpment near the lighthouse) Islands in Wisconsin and on an interior escarpment on Summer Island, Michigan. There is also a historical site from St. Martin Island, Michigan.

Cypripedium parviflorum (small yellow lady's-slipper); SPECIAL CONCERN (MI), no status (MI). This conifer swamp species is known from a 1931 collection from Washington Island, probably from Jackson Harbor Ridges. There is also a historical collection from St. Martin Island, Michigan. It was not relocated in 1998-1999, although its larger cousin C. pubescens is thriving on many parts of Washington Island.

Cypripedium reginae (showy lady's-slipper); SPECIAL CONCERN (MI), no status (MI). This conifer swamp species is known from a 1926 collection from Washington Island, probably from Coffee Swamp. There is also a 1989 collection from St. Martin Island, Michigan. It was not relocated in 1998-1999 and may be declining because of deer herbivory.

Cystopteris laurentiana (Laurentian fragile fern); no status (WI), SPECIAL CONCERN (MI). This is a fern of shaded dolomite cliffs. There are reported sites on St. Martin and Summer Islands that require verification. It was not seen in 1998.

Deschampsia cespitosa (tufted hairgrass); SPECIAL CONCERN (WI). Locally abundant on Great Lakes alkaline rockshore and alvar communities on Detroit Island (south end), Washington Island (southeast coast and Jackson Harbor), Cana Island and Poverty and Summer Islands, Michigan.

Deschampsia flexuosa (crinkled hairgrass); SPECIAL CONCERN (WI). Local on stabilized wooded dunes with pine and oak on Chambers Island (near Mud Lake) and Rock Island (near the south coast).

Draba arabisans (rock whitlow-grass); SPECIAL CONCERN (WI), THREATENED (MI). Locally abundant in white cedar forests on coastal cliffs on Washington Island (Boyer Bluff and several miles south) and Rock Island (along all but the south coast); rare on Detroit Island. Not known from the Michigan Islands.

Draba lanceolata (lanceolate whitlow-grass); ENDANGERED (WI), THREATENED (MI). There are recent records (1989-1990) from dolomite bluffs on the west coast of St. Martin Island, Michigan.

Dryopteris expansa (spreading woodfern); SPECIAL CONCERN (WI). A possible specimen was collected in 1997 at the base of a forested dolomite escarpment on Rock Island.

Eleocharis quinqueflora (few-flowered spikerush); SPECIAL CONCERN (WI). There are records from Great Lakes alkaline rockshore communities from Washington Island (Jackson Harbor Ridges) and from alvar communities on Summer Island, Michigan.

Elymus lanceolatus subsp. psammophilus (thickspike wheatgrass); THREATENED (WI). This dune grass is found (1998) on Washington (South Dunes Park) and Rock Island (south beach). In both places it is threatened by heavy foot traffic.

Epilobium strictum (downy willow-herb); SPECIAL CONCERN (WI). There is a 1926 Fuller collection from Little Lake (presumably from the fen on the north side of the lake), Washington Island. It was not seen in 1998.

Equisetum palustre (marsh horsetail); SPECIAL CONCERN (WI). There is an old record from an interior swamp on Washington Island. The species was not seen in the GRAND TRAVERSE ISLANDS ARCHIPELAGO in 1998.

Equisetum variegatum (variegated horsetail); SPECIAL CONCERN (WI). This species is scattered but never common on Great Lakes alkaline rockshore/alvar/wet sand. It is found on Chambers Island (Sand Point swale), Detroit Island (south end), Washington Island (Jackson Harbor Ridges, also on a roadside near Big Marsh), Rock Island (borrow pit), and on alvar communities on Poverty and Summer Islands, Michigan.

Euphorbia polygonifolia (seaside spurge); SPECIAL CONCERN (WI). This beach species appears to be declining because of development and increasing human disturbance. It is locally common on Chambers Island (Sand Point, east coast dock, and south point), and rare and barely persisting on Washington (South Dunes Park) and Rock (south beach) Islands.

Festuca occidentalis (western fescue); THREATENED (WI). There are old to recent records from Plum, Washington and Summer Islands. It was not relocated from any of these islands in 1998-1999.

Gentianopsis procera (lesser fringed gentian); SPECIAL CONCERN (WI). This gentian is occasional but never abundant in Great Lakes alkaline rockshore and/or alvar on Detroit Island (south end), Washington Island (east coast and Jackson Harbor), and Summer Island, Michigan.

Geocaulon lividum (northern comandra); ENDANGERED (WI). Found only in boreal forest patches at Jackson Harbor Ridges, Washington Island.

Goodyera oblongifolia (giant rattlesnake-plantain); SPECIAL CONCERN (WI). First collected in the GRAND TRAVERSE ISLANDS ARCHIPELAGO in 1998, from a coniferous forest on Summer Island, Michigan.

Iris lacustris (dwarf lake iris); THREATENED (WI and MI). FEDERALLY LISTED. Locally common in white-cedar- dominated swales near coasts: Plum Island (north coast), Detroit (west coast), Washington (southeast coast; abundant at Jackson Harbor), St. Martin (reported from near the lighthouse on the northeast coast by Fuller [1927]); Poverty and Summer Islands (common on east and south coasts), and Little Summer Island (rare, east coast).

Juglans cinerea (butternut); "TRACKED" (WI). Listed as common on Washington Island by Fuller (1927), it is now uncommon to rare on that island, found mostly in the Little Lake, Mountain Tower and Washington Harbor areas. Only one mature tree was seen, and it was diseased.

Malaxis brachypoda (white adder's-mouth); SPECIAL CONCERN (WI). Rare, first located in 1998 in a cedar swamp in the Big Marsh area of Washington Island.

Medeola virginiana (Indian cucumber-root); SPECIAL CONCERN (WI). Collected from somewhere on Washington Island in 1931, and not seen since. This species may be adversely affected by deer herbivory. There are no recent records from any of the Wisconsin Counties bordering Lake Michigan proper.

Minuartia dawsonensis (rock stitchwort); SPECIAL CONCERN (WI). Found in 1998 on dunes on Washington Island at Jackson Harbor and at Percy Johnson Park on the east coast.

Orobanche uniflora (one-flowered broomrape); SPECIAL CONCERN (WI). Locally common in white cedar forest on dolomite clifftops on Plum Island in 1998; rare in similar habitats on Washington, Rock, and Summer Islands (historic).

Osmorhiza chilensis (Chilean sweet-cicely); SPECIAL CONCERN (WI). Rare, collected once in a white cedar forest on Rock Island in 1972 by Ted Cochrane, and not relocated in 1998.

Parnassia parviflora (small-flowered grass-of-Parnassus); ENDANGERED (WI), no status (MI). In the GRAND TRAVERSE ISLANDS ARCHIPELAGO, it is known only from a 1926 collection from St. Martin Island, Michigan. It was not seen in 1998-1999, and may be extirpated in Wisconsin (James Meeker, pers. comm.).

Platanthera dilatata (leafy white orchis); SPECIAL CONCERN (WI). Known in the GRAND TRAVERSE ISLANDS ARCHIPELAGO only from a 1926 collection from somewhere on Washington Island. This is a species of fens and open minerotrophic conifer swamps, and most likely was found at Little Lake or Coffee Swamp. It was not relocated in 1998.

Platanthera orbiculata (large roundleaf orchid); SPECIAL CONCERN (WI). There is a 1975 sight record by Bill Tans from Jackson Harbor Ridges, Washington Island, and also a 1968 Summer Island, Michigan collection. This orchid of cool woods was not relocated in 1998-1999.

Primula mistassinica (bird's-eye primrose); SPECIAL CONCERN (WI). Bird's-eye primrose is one of the most characteristic species of Great Lakes alkaline rockshore, forested ridge and swale, and alvar communities. It was locally common on Detroit (south end) and Washington (southeast coast and Jackson Harbor Ridges) Islands in Wisconsin, and on Poverty and Summer Islands in Michigan. It is also reported from St. Martin Island, Michigan by Fuller (1927).

Ribes hudsonianum (northern black currant); SPECIAL CONCERN (WI). This handsome shrub was found in a cedar swamp near Big Marsh on Washington Island in 1999.

Salix cordata (sand dune willow); ENDANGERED (WI). This Great Lakes dunes willow has recently discovered at Jackson Harbor Ridges, Washington Island by Gary Fewless, with the population still extant in 1998. The identification needs to be verified.

Scirpus cespitosus (tufted clubrush); THREATENED (WI). The only GRAND TRAVERSE ISLANDS ARCHIPELAGO occurrence is at Coffee Swamp on Washington Island, where the species is locally common in a boreal fen mat along with Carex livida, Rhamnus alnifolius, Phragmites australis, and Pentaphylloides floribunda among scattered cedars.

Senecio congestus (marsh ragwort); SPECIAL CONCERN (WI), EXTIRPATED (MI). There is a 1935 collection from Jack Island in Green Bay; this site was searched unsuccessfully on 8 June 1998. Marsh ragwort may be extirpated in both Wisconsin and Michigan (Judziewicz 1999).

Solidago ohioensis (Ohio goldenrod); SPECIAL CONCERN (WI). This is another characteristic species of Great Lakes alkaline rockshore, alvar, and forested ridge and swale communities. It is locally common on Washington Island (southeast coast and Jackson Harbor Ridges), rare on Rock Island, and common on the east coasts of Poverty and Summer Islands, Michigan. Its close relative, the regionally endemic S. houghtonii (Houghton's goldenrod), was searched for unsuccessfully in the GRAND TRAVERSE

ISLANDS ARCHIPELAGO in 1998; its closest station is near Thompson, Michigan, just northeast of the Garden Peninsula.

Solidago simplex var. gillmanii (sticky goldenrod); THREATENED (WI). Another Great Lakes alkaline rockshore/alvar/lake dune species, populations are known from Detroit (rare, west coast), Washington (southeast coast and Jackson Harbor Ridges), Plum (locally common on the Light Station grounds) and Rock (south beach) Islands, and from the eastern coasts of Poverty and Summer Islands, Michigan.

Tanacetum huronense (Lake Huron tansy); ENDANGERED (WI), THREATENED (MI). This regional lake dune endemic appears to be declining because of increased development and vehicular and foot traffic. The Rock Island (south beach) station was last noted in 1982, and not relocated in 1997-1998. There was also a site on the Summer Harbor dunes on Summer Island, Michigan (1968 and 1972 collections) site that was not relocated in 1998.

Taxus canadensis (Canada yew); "TRACKED" (WI). Dense colonies occur only on Green and Adventure Islands in Wisconsin, and on Poverty and St. Martin (Thaddeus Grudzien, pers. comm.) Islands, Michigan. Fuller (1927) reported it as very abundant on the latter island in 1926. Other large islands have remnant populations, mostly on dolomite cliffs that deer cannot reach.

Tofieldia glutinosa (sticky false-asphodel); THREATENED (WI). False-asphodels prefer fens, the swales in forested ridge and swale communities, and creviced dolomite shorelines. This species was abundant in 1998 at long-known sites on Washington Island (Coffee Swamp and Jackson Harbor); a small new population was also found on southeastern coast Great Lakes alkaline rockshore. It is also present on east coast alvar communities on Poverty and Summer Islands, Michigan.

Triglochin maritimum (common bog-arrow grass); SPECIAL CONCERN (WI). Apparently the first site for the GRAND TRAVERSE ISLANDS ARCHIPELAGO was found in 1998 on Washington Island at Big Marsh, where it is frequent in an emergent bulrush community at the margin of a shallow marly pond.

Triglochin palustre (slender bog-arrow grass); SPECIAL CONCERN (WI). This arrow-grass is found in the swales of "forested ridge and swale" communities (Jackson Harbor Ridges, Washington Island), and also in shallow pools in shoreline dolomite communities (historical site from Summer Island, Michigan).

Trisetum melicoides (purple false oats); ENDANGERED (WI), no status (MI). This rare eastern grass is usually found in cold coniferous or mixed woods. There are no records for the Wisconsin islands, but there is a 1968 collection from Summer Island, Michigan. It was not relocated in 1998.

Utricularia geminiscapa (hidden-fruited bladderwort); SPECIAL CONCERN (WI). There is a 1972 sight record by Ted Cochrane from an ephemeral dune pond on Carlin Point, Jackson Harbor Ridges, Washington Island. It has not been relocated since.

Viola rostrata (long-spurred violet); SPECIAL CONCERN (WI). This violet of beech-sugar maple woods is known only from Washington Island, where it was collected from an unspecified locality in 1916. It was recorded in 1998 from a mesic forest east of Coffee Swamp.

## Protection and Management Considerations

Lake Michigan Islands, Wisconsin

Rare plant species and natural communities on the Lake Michigan Islands face a number of challenges that may affect their long-term sustainability. Important challenges include habitat loss due to human development; timber management practices; white-tailed deer herbivory, which impacts groundlayer flora composition and forest tree regeneration; foot and vehicular destruction of dune and beach vegetation; and invasion by exotic plants (principally garlic mustard, *Alliaria petiolata*), which can be inadvertently facilitated by hiking and camping traffic and logging activities.

The following is a general discussion of management considerations for each of the Lake Michigan islands based on the surveys conducted through this project. We emphasize that these are general in nature and advocate additional work be conducted to develop more detailed management recommendations for specific islands, plant species, and natural communities.

**Green Island** is small, privately owned, and disturbed by past human activities. The natural communities are not ecologically significant, but there is a black-crowned night heron rookery on the west end of the island in a remnant boreal forest. Future development and management actions of the island should consider the protection of this rookery.

**Chambers Island** is privately owned except for a 40 acre Town of Gibraltar Park at the lighthouse and a few tiny state-owned islands in Mackaysee Lake. The forests on the island are excellent, extensive, second-growth mixed beech, hemlock, sugar maple, and red oak. The town roads are low-specification “tunnels” in the woods. This helps to discourage the invasion of the forest by cowbirds, blue jays, two parasitic and predatory birds. Deer have been absent for approximately ten years, allowing for a flush of tree regeneration.

The natural communities and plant species of this island would benefit from continued cooperation between the WDNR and the Chambers Island Landowners Association (CILA). Issues of concern include continuing responsible forestry practices (currently, there are select cuts for sawtimber every 15 years); maintaining “low-spec” town roads; and assuring that logging equipment is free of garlic mustard seeds (the logging company works out of Kewaunee County where garlic mustard is already common in the woods). WDNR should provide information to the CILA about the uniqueness of the Great Lakes pine barrens on the north bay of island and cooperatively explore ways to manage this very rare community through controlled burning. To maintain this unique barrens community, the establishment of pine plantations should be strongly discouraged.

The smaller “**bird**” islands in Green Bay and Lake Michigan (Hat, Adventure, Little Strawberry, Jack, Sister, Spider, Gravel, Pilot, Hog, and Fish) are now utilized primarily by colonial waterbirds and have no known value for rare plants and communities.

**Plum Island** is currently owned by the US Coast Guard. However, they are attempting to sell the island and have interested buyers including private parties and public agencies. Currently, the natural communities on the island – northern mesic forest and northern wet-mesic forest – have been severely impacted by logging and deer herbivory. If deer were removed and the forests left alone, some recovery could occur given 50 years or so. Given that there are better examples of both communities on other islands, it does not appear that WDNR involvement in purchasing/managing this island should be a high priority. Of perhaps greatest interest on Plum Island is a small wetland (known locally at Carp Lake) on

the northwest tip of the island, which has some unique physiographic features (it is recurrently connected to and separated from Lake Michigan), and one federally listed plant, dwarf lake iris (*Iris lacustris*).

**Detroit Island** is a linear island that is primarily privately owned. The forests are heavily managed and there is a large deer population - most of the caveats applied to Plum Island apply here. However, there is one high quality natural community, Great Lakes alkaline rockshore on the south tip of the island, with numerous rare plant species present. It is also frequented by waterbirds during migration. Fortunately, the entire south half of the island is owned by one private owner, with one infrequently used seasonal cabin. From a BER standpoint, this site appears to be of State Natural Area ecological quality and designation should be strongly considered.

**Washington Island** faces all of the challenges typical of the Lake Michigan islands. Development pressure is strong throughout the island, including sensitive areas such as the high dolomite cliffs at Boyer Bluff. Numerous, small private lots and their houses coexist along the southeastern shore of the island with excellent occurrences of Great Lakes alkaline rockshore communities. A number of owners have signed Protective Agreements to safeguard this community and the plants that grow in it, including the federally listed dwarf lake iris. Similar protection efforts would benefit other priority sites on the Island.

The island has two State Natural Areas: Coffee Swamp (boreal rich fen, northern wet-mesic forest, northern hardwood swamp, and northern sedge meadow) and Jackson Harbor Ridges (Forested ridges and swales, with associated Great Lakes dunes and beaches and interdunal ponds). The Jackson Harbor Ridges SNA includes the majority of the site with one private inholding existing on the beach. The landowner of the inholding has recently signed a voluntary Protective Agreement.

Expanding the Coffee Swamp SNA to include all of the wetland complex north to and including part of the shoreline of Lake Michigan would increase the protection of this ecologically important site. A single private landowner owns the land to the north and east of the SNA. A more limited expansion to the south of the current SNA would also increase the protection of this site. Deer herbivory is a very serious problem in this complex, as is incipient invasion by the shrub glossy buckthorn (*Rhamnus frangula*).

One other wetland complex on Washington Island, little known until this survey, should receive strong consideration for ecological protection and management. Big Marsh is a complex of boreal rich fen, relatively high quality northern wet-mesic forest, and an unusual emergent aquatic community with large expanses of seasonally dry marl and dolomite gravel pavement. It exists within a number of privately owned 20 and 40 acre tracts. From a BER standpoint, this site appears to be of State Natural Area ecological quality and designation should be strongly considered.

All the mesic forests of Washington Island appear to be impacted by past logging. However, there is one site, Mountain Tower Park in the center of the island, that stands out for its relatively large size and relatively good condition. Only a few acres are currently protected as a Town Park, including a very valuable and unique Moist Cliff with a rare fern species. However, there are good second-growth beech and sugar maple forests totaling over 100 acres that occur on private lands extending to the south and west of the Park. Voluntary Protective Agreements and other protection efforts should be considered here.

Finally, there are two extensive (at least 1 km long) dunescapes on Washington Island in addition to Jackson Harbor: 1 km east from Dunes park on the south shore, and 1 km north from Percy Johnson County Park on the north shore. Both dunescapes are developed with seasonal and permanent houses, but the dunes themselves retain much more natural integrity than those in the adjoining tiny parks that have been seriously degraded by beachgoers. These sites might be potential places where federally and regionally rare dune species such as Pitcher's thistle (*Cirsium pitcheri*) and Lake Huron tansy (*Tanacetum*

*huronense*) might be re-introduced in the future. Voluntary Protective Agreements and other protection efforts should be considered here.

**Rock Island** already has some protective status as a Wisconsin State Park. It has outstanding, state significant rare species and plant communities, particularly southern mesic forest, forested seep, moist cliff, and dry cliff. The majority of the island north of the developed campgrounds and the former Thordarson estate appear, from a BER standpoint, to be of SNA ecological quality and designation should be strongly considered. Towards that end, Mark Martin of BER visited the island in the spring of 1999 in the company of the Park Superintendent.

The principal threats to this island are deer herbivory (there is only beech, no sugar maple regeneration in the old growth forest), and invasion by garlic mustard (first noted in 1997, and now under active management to eradicate it). Higher harvests of deer for Rock Island would reduce herbivory. These harvests will need to occur indefinitely, because replacement animals can easily wade and swim to the island from nearby Washington Island. There should be educational signs and ranger briefings of all campers and dayhikers who visit the island, asking them to clean boots and camping equipment thoroughly so that the tiny seeds of garlic mustard are not brought to Rock Island. This, too, will need to be an ongoing project since garlic mustard is so widespread in parks and campgrounds to the south – common destinations for campers before their visit to Rock Island. The dunes and beach on the south shore of Rock Island have been so seriously degraded by beachgoers over the last few decades that the remnant dune and beach communities there are probably no longer viable.

# Ranking of the Significance of Wetlands

Lake Michigan Islands, Wisconsin

The Wisconsin Natural Heritage Inventory (NHI) program is part of an international network of NHI programs. The defining characteristic of this network, and the feature that unites the programs, is the use of a standard methodology for collecting, processing, and managing data on the occurrences of natural biological diversity. NHI programs focus on rare species, natural communities, and other rare elements of nature. The NHI methods have been widely accepted by conservation biologists as the norm for site evaluation and ranking. These methods, discussed briefly below, were followed throughout this project.

**Data Consolidation:** Existing information on the plants and communities of the Lake Michigan islands were gathered, including NHI databases, herbaria, UW-Green Bay, records of experts, and institutions (including Milwaukee Public Museum and the UM-herbaria). Air photo interpretation and database queries were evaluated prior to field visits. Target species lists were compiled.

**Landowner Contact:** Once inventory sites are identified, private landowners were contacted and visited and permission to access their property was requested.

**Field Inventory:** Following data consolidation and landowner contact, NHI scientists surveyed appropriate habitat, focusing on target species and communities. Element occurrences (EOs) were documented, sometimes collected, and mapped.

**Database Development and GIS Integration:** EO records were transcribed onto NHI forms for standardization. They were entered into the Biological Conservation Database (BCD) and mapped on 7.5' USGS topographic quadrangle maps. All point occurrence data were transferred into a Geographic Information system (GIS). All community (polygonal) data is digitized in a GIS.

During the Database Development and GIS Integration phase, EOs were described and mapped for approximately 25 natural communities in the Lake Michigan Islands. NHI Ecologist Eric J. Epstein then assigned a Rank for each EO. These ranks represent a comparative evaluation summarizing the occurrence quality, condition, viability and defensibility relative to other occurrences of that same element. The codes, in which one to three may be entered, are:

A = excellent	D = poor
B = good	H = historical
C = marginal	X = exterminated

The ranks for the highest quality wetland sites surveyed on the Lake Michigan islands are presented below. Sites in brackets are non-wetlands. A single asterisk indicates that the EO is on public land and two asterisks indicate that the EO is protected within a State Natural Area.

## “A” Ranked Sites

- Forested Seep, Rock Island\*
- Interdunal Wetland, Jackson Harbor Ridges, Washington Island\*\*
- Beach, Jackson Harbor Ridges, Washington Island\*\*
- [Moist Cliff, Rock Island\*]
- [Southern Mesic Forest, Rock Island\*]

### **“AB” Ranked Sites**

- Great Lakes Alkaline Rockshore, Detroit Island
- Boreal Rich Fen, Coffee Swamp, Washington Island\*\*
- Boreal Rich Fen, Big Marsh, Washington Island

### **“B” Ranked Sites**

- Great Lakes Alkaline Rockshore, Southeast Coast, Washington Island
- Northern Wet-Mesic Forest, Rock Island\*
- Northern Wet-Mesic Forest, Big Marsh, Washington Island
- [Northern Mesic Forest, Chambers Island]
- [Northern Dry-Mesic Forest, Chambers Island]

### **“BC” Ranked Sites**

- Great Lakes Alkaline Rockshore, “Carp Lake”, Plum Island
- Northern Wet-Mesic Forest, Coffee Swamp, Rock Island\*
- Northern Wet-Mesic Forest, Plum Island
- [Northern Dry-Mesic Forest, Rock Island\*]

## **APPENDIX 1**

### **Submission Letter to the Michigan Botanist**

The memo sent to Barbara J. Madsen, Editor of the Michigan Botanist, to submit the manuscript by Dr. Emmet Judziewicz for publication.



**State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES**

**Tommy G. Thompson, Governor**  
**George E. Meyer, Secretary**

**101 S. Webster St.**  
**Box 7921**  
**Madison, Wisconsin 53707-7921**  
**Telephone 608-266-2621**  
**FAX 608-267-3579**  
**TDD 608-267-6897**

September 30, 1999  
ER/4

Barbara J. Madsen, Editor  
The Michigan Botanist  
The University of Michigan Herbarium  
North University Building  
Ann Arbor, MI 48109-1057

Dear Barbara,

Enclosed is the manuscript and two copies of my article "Flora and Vegetation of the Grand Traverse Islands (Lake Michigan), Wisconsin and Michigan", which I am submitting for publication in the Michigan Botanist.

As reviewers I would suggest Gary Fewless of the University of Wisconsin-Green Bay; he and his students have done extensive collecting on the islands and know their flora well; good old Mike Penskar of MNFI (again), and Bob Freckmann, University of Wisconsin-Stevens Point, who has also collected on the islands.

Several weeks ago, you should have received a check for \$ 4,820.00 from our office as advance payment for page charges and reprints, as we discussed at our meeting in Ann Arbor in August.

A few of the maps (such as Fig. 1) will be redone in the next few weeks to make them look more polished for the finished publication. Also, a few of the photos have scratches which I will remove using Adobe Photoshop.

I sent samples of scanned photos to Vivian Bradbury of Sans Serif Typesetters, and she received them and reported that they will do just fine for publication. I am really excited about the quality of the images, and look forward to working with you and Vivian to make sure that they look real good in print.

Right now I am just sending you the manuscript (in Word) and tables (in Excel) on diskettes. The photo files are large – 1-2 MB each – and I could send them to you either on ZIP disk(s), or, (much cheaper since we have access to a CD burner!) CD-ROM.

Sincerely,

Emmet J. Judziewicz  
Senior Conservation Biologist  
Bureau of Endangered Resources  
Wisconsin Department of Natural Resources  
P.O. Box 7921  
Madison, WI 53707-7921  
judzie@dnr.state.wi.us

## **APPENDIX 2**

### **“Flora and Vegetation of the Grand Traverse Islands, Wisconsin and Michigan,” submitted to the Michigan Botanist on September 30, 1999**

A scientific paper by Dr. Emmet Judziewicz submitted to The Michigan Botanist on September 30, 1999.

**(June 2002) NOTE: This paper was in press as of this writing and should be accessed directly. The full citation will be placed here when it becomes available.**

### **APPENDIX 3**

**“Green Treasures in a Sea of Blue,” Wisconsin Natural Resources Magazine,  
October 1999 issue**

**(June 2002) NOTE: This article is now available online at**

<http://www.wnrmag.com/stories/1999/oct99/island.htm>