

# Rare and Invasive Plant Surveys of Great Lakes Islands in Michigan Islands National Wildlife Refuge (Lake Michigan)



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**Cover Photo:** Common trillium (*Trillium grandiflorum*) in mesic northern forest on Gull Island, with Canada yew (*Taxus canadensis*) in background. Photo by Tyler J. Bassett. All pictures by Tyler J. Bassett unless otherwise noted.

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Hat Island. *Foreground:* Ruderal plant community typical of “bird islands.” *Background:* Boat captains Bill Parsons and Kevin Haynes of the Little Traverse Bay Bands of Odawa Indians Natural Resources Department.

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## Introduction

Great Lakes islands provide critical habitat for native biodiversity and support rare and endemic natural communities. A diverse assemblage of more than 32,000 islands occurs across the Great Lakes plus the connecting channels (Henson et al. 2010). The United States Fish and Wildlife Service (USFWS) National Wildlife Refuge (NWR) system includes thirty-six islands across the Great Lakes. These islands are managed to maintain the existing natural communities to support the needs of priority and migratory bird species, threatened and endangered species, and resident wildlife and provide valuable stopover habitat for birds and pollinators migrating across the Great Lakes.

Many of the islands within the Great Lakes that are part of the NWR system are remote, difficult to access, and challenging to survey. Despite limited access, these islands still face a variety of anthropogenic pressures including the establishment and spread of invasive plant and animal species and the impacts of climate change. Unfortunately, most biodiversity data are limited or outdated, which hinders effective management and decision-making.

To address this critical information gap, the USFWS contracted Michigan Natural Features Inventory (MNFI) to conduct botanical surveys, including rare and invasive plant species mapping and floristic surveys of natural communities; and ecological surveys, including qualitative natural community surveys and quantitative forest sampling. In 2021, botanical and ecological surveys were conducted in Michigan Islands NWR in Lake Huron (Bassett et al. 2022a, Cohen et al. 2022a) and Gravel Island and Green Bay NWRs in Lake Michigan (Bassett et al. 2022b, Cohen et al. 2022b). In 2022, botanical and ecological surveys were conducted in Huron NWR in Lake Superior (Bassett et al. 2023a, Cohen et al. 2023a), Harbor Island NWR in Lake Huron (Bassett et al. 2023b, Cohen et al. 2023b), Michigan Islands NWR in Lake Michigan (*this report*, Cohen et al. 2023c), and West Sister Island NWR in Lake Erie (Bassett et al. 2023c, Cohen et al. 2023d). Botanical surveys were also conducted in 2022 in Detroit River International Wildlife Refuge (Bassett et al. 2023d). This report focuses on the botanical surveys conducted in 2022 on Gull, Hat, Shoe, and Pismire Islands.



Round-leaved orchid (*Platanthera orbiculata*) in boreal forest (*left*) and rock cress (*Boechera grahamii*) in limestone cobble shore (*right*) on Gull Island.



were tracked in the Michigan Natural Heritage Database at the time of these surveys (MNFI 2023). This included species listed at the state- and federal-levels as threatened and endangered that are legally protected. Species of special concern are also tracked and include species that are considered at risk of declining but are not legally protected. Managing populations of these species and their habitat is a high conservation priority. These species are frequently associated with high-quality ecosystems, or natural communities, that further warrant prioritized management.

A critical goal of this project was to collect updated and new data for rare plant species occurrences to provide natural resource managers and planners with accurate, detailed, standardized baseline information on the viability and extent of rare plant species populations and the condition of their habitat on these islands.

An equally critical goal of this project was to collect updated and new data for invasive plant species that potentially threaten the viability of rare plant species and high-quality natural communities on these islands. This baseline information facilitates site-level decisions about biodiversity stewardship; prioritizing protection, management and restoration decisions; monitoring the success of management and restoration; and informing landscape-level biodiversity planning efforts. Data on the location and extent of rare plant species and natural communities enables invasive plant species management to better protect these targets of high conservation value. This report summarizes the findings of MNFI’s rare and invasive plant surveys on Gull, Hat, Shoe, and Pismire Islands in Michigan Islands National Wildlife Refuge of the Seney National Wildlife Refuge Complex.



**Figure 1.** Gull, Hat, Pismire, and Shoe Islands in northern Lake Michigan.

# Methods

## ***Study Area***

Gull, Hat, Shoe, and Pismire Islands are part of the Beaver Island Archipelago, which occurs in northern Lake Michigan (Figure 1). The bedrock in this cluster of islands is characterized by Early Devonian limestone of the Bois Blanc Formation and is covered by a layer of sand and glacial till (Millstein 1997). All four islands became part of the Michigan Islands National Wildlife Refuge in 1943, and in 1970, Shoe and Pismire Islands were designated as Wilderness Areas (Designation of Wilderness Areas within National Wildlife Refuges 1970). All four islands are managed by the NWR to maintain the existing natural communities to support the needs of priority and migratory bird species, threatened and endangered species, and resident wildlife. Access to these islands is restricted to permitted research and public access is prohibited.

## **Gull Island**

Gull Island is 230 acres in size and is the farthest west island in the Beaver Island Archipelago. It is located 7 miles west of High Island, 43 miles west of the Northern Lower Peninsula, and 36 miles east of the Garden Peninsula. Gull Island supports both mesic northern forest and boreal forest in the interior. The western shoreline is primarily composed of limestone cobble shore and the

eastern shoreline is primarily sand and gravel beach with localized low foredunes. Nesting herring gulls (*Larus argentatus*) utilize the shoreline of Gull Island and double-crested cormorant (*Phalacrocorax auritus*) and great blue heron (*Ardea herodias*) nests are concentrated in the northern and southern portions of the island. These areas are both characterized by open canopies and standing snags resulting from decades of nesting shorebirds.

## **Hat Island**

Hat Island is 16 acres in size and is located on the far eastern edge of the Beaver Island Archipelago. Hat Island lies 11 miles west-northwest of Waugoshance Island, 27.5 miles west of the Mackinac Bridge, and 11 miles northeast of the northeastern coast of Beaver Island. During World War II, Hat Island was used as a practice range for aerial bombing. The center of the island was burned and portions were covered with tar. The aerial bombings left craters on the land surface, which have been gradually eroded by wave action, other weathering processes, and vegetative growth (Gates 1950). Hat Island has been an important site for a double-crested cormorant breeding colony since 1984, and has been the focus of study for breeding colonies of other species of waterbirds (Cuthbert 1985, Seefelt 2018).



Ruderal vegetation and nesting double-breasted cormorants (*Phalacrocorax auritus*) on the south end of Gull Island.



### **Pismire Island**

Pismire Island is a small island that ranges from 2 to 2.5 acres in size depending on the Lake Michigan water level. Pismire Island is located in between Garden and Hog Islands in the Beaver Island Archipelago and 18 miles west of Waugoshance Island. A double-crested cormorant breeding population has been tracked on Pismire Island since 1984, with the highest number occurring in 2007 (660 individuals estimated); however, by 2016 the nesting sites on Pismire Island had been abandoned (Seefelt 2018).

### **Shoe Island**

Shoe Island is the smallest island in this group, its size varying from 1 to 3 acres depending on the Lake Michigan water level. It is located 0.5 miles south of Hat Island at the eastern edge of the Beaver Island Archipelago. Shoe Island has been an important nesting site for breeding waterbirds in the past (Cuthbert 1985); however, when Lake Michigan water levels are high, Shoe Island is either greatly reduced in size or fully submerged, rendering it unsuitable as nesting habitat.

### ***Prioritization and survey targets***

Prior to conducting rare and invasive plant surveys, we reviewed previous data and generated target species lists to focus survey effort on known locations and potential habitat for these species. Invasive species targets are prioritized

by USFWS for the Great Lakes region (see Table 1). We prioritized survey effort by reviewing natural community delineations and evaluating the conservation status (G- and S-ranks; Appendix 1.1) of each natural community (Table 2; Cohen et al 2023b). Rare plant survey targets included species with previously documented element occurrences (EOs) in the Michigan Natural Heritage Database from nearby Beaver, Garden, Hog, and High Islands supporting similar natural communities, as no EOs were known from Gull, Hat, Shoe, and Pismire islands (Table 3; MNFI 2023). An EO is an area of land or water where a significant element of biodiversity including rare species and natural communities currently occurs or historically occurred. Each EO may be comprised of multiple observations of a species or community through space or time, and is given a unique numeric identifier, an EOID.

### ***Field surveys***

We conducted meander surveys on each island, using the following approach to maximize the probability of encountering targets and incidental observations of rare and invasive plant species. This approach was repeated across all the NWRs surveyed by MNFI in 2021-2022 (Bassett et al. 2022a, 2022b, 2023a, 2023b, 2023c, 2023d). We surveyed the entire perimeter of each island, as a potential entry point for invasive species and due to the



Ruderal vegetation and flocks of nesting herring gulls (*Larus argentatus*) on Pismire Island.

high probability of encountering rare species in the unique primary limestone and sand and gravel communities. We conducted meanders through the interior of each island, crossing through each natural community as delineated prior to surveys (USFWS 2021, Cohen et al. 2023c). The survey route adequately covered the natural community and micro-habitats or areas of non-homogenous habitat within each community type. These were noted in either aerial imagery and other GIS data prior to the survey, or while meandering during the survey. We conducted floristic surveys during the course of meanders. On large islands (> 25 acres; in this case, Gull Island), we generated a species list for each natural community on each island. If a natural community was represented by multiple patches or polygons on an island, we pooled species lists across that natural community type. On small islands ( $\leq 25$  acres), we generated a species list for the whole island. Botanical surveys were conducted on Gull Island on May 24 and August 8, 2022; and on Hat, Shoe, and Pismire Islands on August 9, 2022. This was the first visit to Gull, Shoe, and Pismire Islands by MNFI staff.

We collected data on rare and invasive plant species using applications on a Samsung tablet, augmented by hand-written field notes. For rare species we used a custom Survey123 form, “MNFI Rare Species App Form” (see Appendix E in USFWS 2021). In this form, we collected data on population parameters including an estimate of abundance and proportion of fertile plants; habitat, including natural community designation and dominant species; any notable microhabitat features; and threats such as invasive species. Refuge staff have access to rare species data through the USFWS subscription to the Michigan Natural Heritage Database. Floristic surveys were completed by recording species lists in a field notebook. Nomenclature follows Voss and Reznicek (2012). We provide a crosswalk of Ojibwe names to scientific and common names in Appendix 3.1 for all species observed on Gull, Hat, and Pismire Islands that are listed in “Plants used by the Great Lakes Ojibwa” (Meeker et al. 1993). These culturally significant plants are also indexed to natural community type (Appendix 3.2).

For target invasive plant species in high-quality natural communities (Table 1), and for select invasive plant species occurrences outside high-quality natural communities, we mapped invasive species occurrences as a point, line, or polygon using the ArcCollector Web Map “R3 Invasive and Weed Observations layer” managed by the USFWS (see Appendix F in USFWS 2021). In this form, we estimated the percent of mapped area occupied by each invasive plant species, and observer data (e.g., name of observer, observation date). We also noted the presence and abundance of non-target non-native plant species and target

**Table 1.** USFWS Great Lakes Region target invasive species.

Scientific Name	Common Name
<i>Alliaria petiolata</i>	Garlic mustard
<i>Alnus glutinosa</i>	Black alder
<i>Berberis thunbergii</i>	Japanese barberry
<i>Butomus umbellatus</i>	Flowering rush
<i>Celastrus orbiculatus</i>	Oriental bittersweet
<i>Centaurea stoebe</i>	Spotted knapweed
<i>Cirsium arvense</i>	Canada thistle
<i>Dioscorea polystachya</i>	Chinese yam
<i>Dipsacus fullonum</i>	Wild teasel
<i>Dipsacus laciniatus</i>	Cut-leaf teasel
<i>Eichhornia crassipes</i>	Water hyacinth
<i>Elaeagnus umbellata</i>	Autumn olive
<i>Fallopia japonica</i>	Japanese knotweed
<i>Fallopia sachalinensis</i>	Giant knotweed
<i>Frangula alnus</i> (syn. <i>Rhamnus frangula</i> )	Glossy buckthorn
<i>Hesperis matronalis</i>	Dame’s rocket
<i>Hydrocharis morsus-ranae</i>	European frog-bit
<i>Iris pseudacorus</i>	Yellow flag iris
<i>Ligustrum vulgare</i>	Common privet
<i>Lonicera</i> spp.	Bush honeysuckle
<i>Ludwigia peploides</i>	Floating primrose willow
<i>Myriophyllum aquaticum</i>	Parrot-feather milfoil
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Phragmites australis</i> subsp. <i>australis</i>	Invasive reed
<i>Pistia stratiotes</i>	Water lettuce
<i>Populus alba</i>	White poplar
<i>Rhamnus cathartica</i>	Common buckthorn
<i>Robinia pseudoacacia</i>	Black locust
<i>Rosa multiflora</i>	Multiflora rose
<i>Vincetoxicum nigrum</i> (syn. <i>Cynanchum louiseae</i> )	Black swallow-wort
<i>Vincetoxicum rossicum</i> (syn. <i>Cynanchum rossicum</i> )	Dog-strangling vine

**Table 2.** Natural community types targeted for surveys on Gull, Hat, Pismire, and Shoe Islands. Natural community delineations are based on Michigan Natural Features Inventory Classification System, were determined remotely, and may differ from natural communities observed during field surveys. (Cohen et al. 2020). Global and State Rank (G- and S-Rank) values are based on NatureServe (2002) (see Appendix 1).

Natural community	Gull	Hat	Shoe	Pismire
Boreal forest	GU/S3	-	-	-
Great Lakes marsh	G2/S3	-	-	-
Hardwood-conifer swamp	G4/S3	-	-	-
Mesic northern forest	G4/S3	-	-	-
Northern fen	G3/S3	-	-	-
Open dunes	G3/S3	-	-	-
Rich conifer swamp	G4/S3	-	-	-
Sand and gravel beach	G3?/S3			

invasive plant species in degraded areas in field notebooks. Refuge staff have access to invasive plant species data through the USFWS R3 portal on ArcGIS Online.

### Ranking and assessment

We assessed the viability of each rare plant EO using standard Natural Heritage Methodology (NatureServe 2002). According to this methodology, each EO is assigned a rank from A (excellent estimated viability/ecological



integrity) to D (poor estimated viability/ecological integrity) when sufficient data is available to assess a rank. When data is not available and for instances where an EO is not located, additional ranks include E (Verified extant), F (Failed to find), H (Historical), and X (Extirpated). See Appendix 1.2 for EO Rank definitions.

Finally, we conducted Floristic Quality Assessments (FQAs) for each natural community on Gull Island and FQAs for the entirety of Hat and Pismire Islands (Shoe Island was not vegetated; Reznicek et al. 2014). The FQA utilizes plant species composition to derive the Floristic Quality Index (FQI), a quantitative metric of habitat quality that can be used as a relatively objective comparison among natural community occurrences of the same type. Drawing upon expert consensus among botanists familiar with the

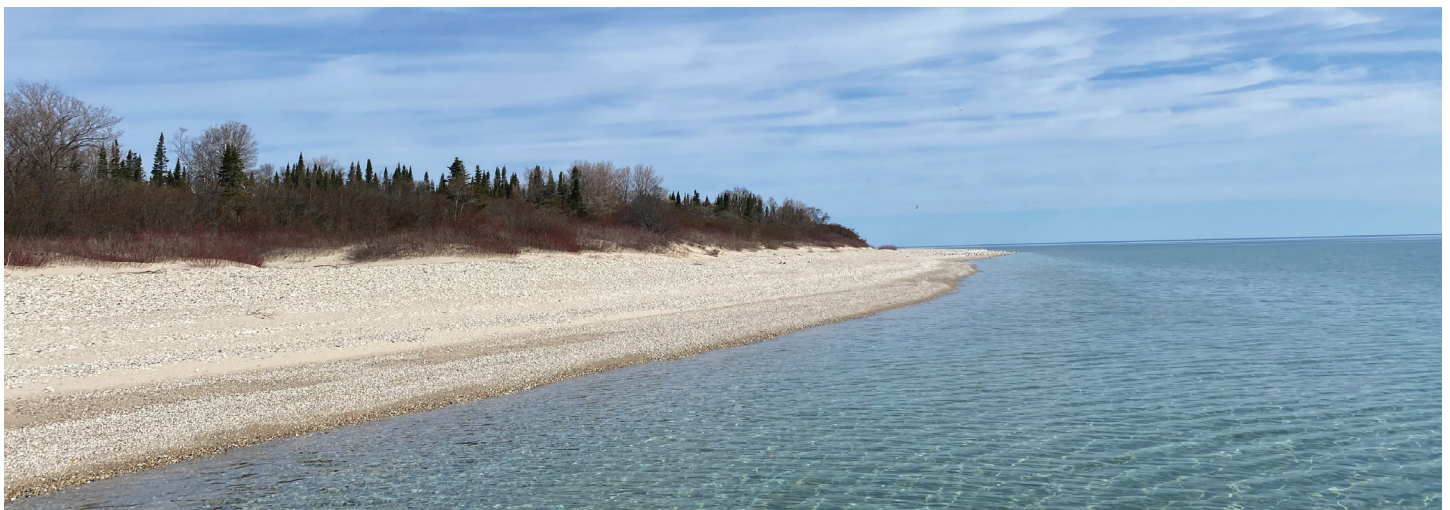
flora of Michigan, each vascular plant species in Michigan has been assigned an a priori coefficient of conservatism (C-value) that ranges from 0 to 10 on a scale of increasing conservatism or fidelity to pre-European colonization habitats (Reznicek et al. 2014). Plant species with a C-value of 7 to 10 are considered highly conservative (Herman et al. 2001). A C-value of 4 to 6 indicates moderate conservatism and a C-value of 1 to 3 indicates low or no conservatism (e.g., ruderal species). Non-native species were given a C-value of 0 for these calculations. We calculated FQI for each natural community occurrence as

$$FQI = \bar{C} \times \sqrt{n}$$

where  $\bar{C}$  = mean C-value and  $n$  = species richness. Sites with an FQI of 35 or greater are generally considered to be floristically important from a statewide perspective (Herman et al. 2001).

**Table 3.** Rare plant species targeted during surveys. Element occurrences of each species have been documented on nearby islands in the Beaver Island Archipelago, as indicated by an “X.” See Appendix 1 for G/S Rank definitions.

Scientific Name	Common Name	State Status	Federal Status	G/S Rank	Garden	Hog	Beaver	High
<i>Calypso bulbosa</i>	Calypso orchid	T		G5/S2	X		X	
<i>Cirsium pitcheri</i>	Pitcher's thistle	T	LT	G3/S3	X	X	X	X
<i>Cypripedium arietinum</i>	Ram's-head lady slipper	T		G4/S2		X	X	
<i>Iris lacustris</i>	Dwarf lake iris	T	LT	G3/S3	X	X	X	
<i>Solidago houghtonii</i>	Houghton's goldenrod	T	LT	G3/S3	X	X	X	
<i>Tanacetum bipinnatum</i> var. <i>huronense</i>	Lake huron tansy	T		G5T4T5/ S3	X	X	X	X



Sand and gravel beach on Gull Island, potential habitat for several rare plant species. Photo by Joshua G. Cohen.

# Results and Discussion

Across Gull, Hat, Pismire, and Shoe Islands in the Michigan Islands NWR, we documented no rare plant species EOs (Table 3), conducted FQAs in eight natural communities (Table 4), and documented occurrences of seven invasive plant species, including three target species (Table 5).

## Gull Island

We recorded 183 plant species in five natural communities and one disturbed cover type on Gull Island, with a mean coefficient of conservatism of 3.8 (Table 4, Appendix 2.1). We did not document any rare plant species on Gull Island. Non-native plant species were concentrated along the shoreline.

Four high-quality natural community element occurrences were surveyed on Gull Island including boreal forest, limestone cobble shore, mesic northern forest, and sand and gravel beach (Cohen et al. 2023c; Appendix 2.2-2.5). Boreal forest and sand and gravel beach were the most species-rich natural communities on Gull Island, supporting 90 and 80 species, respectively. Mesic northern forest and limestone cobble shore were notably less diverse, with 56 and 43 species, respectively. The flora of limestone cobble shore and sand and gravel beach were 58% and 75% native, respectively, while the flora of mesic northern forest and boreal forest were 100% and 90% native, respectively.

Additionally, we recorded a plant species list in a northern wet meadow community in the southeastern portion of the

island that was too small to qualify as an EO (Appendix 2.6). The northern wet meadow was the least diverse natural community with 29 species, due in part to its limited spatial extent. We recorded plant species in portions of the island too disturbed from windthrow and coromorant nesting to qualify as a natural community (Appendix 2.7). We documented 12 plant species in the disturbed portions of the island.

We documented six invasive species on Gull Island (Table 5, Figure 2), including three target species, including spotted knapweed (*Centaurea stoebe*), Canada thistle (*Cirsium arvense*), and Tatarian honeysuckle (*Lonicera tatarica*). We also mapped three non-target species: wild parsnip (*Pastinaca sativa*), poison hemlock (*Conium maculatum*), and sweetbrier (*Rosa rubiginosa*). Spotted knapweed is the most problematic species on Gull Island. It is frequent along both the limestone cobble shore and sand and gravel beach with some particularly abundant patches along the eastern shore. The large population of spotted knapweed here may also serve as a seed source for spread to other islands in the Beaver Island Archipelago.

Although wild parsnip is currently rare on Gull Island, it is an extremely aggressive weed of shores, roadsides, and other openings in northern Michigan. Tatarian honeysuckle currently occurs in only two small areas on Gull Island, but it is highly invasive in forested ecosystems throughout eastern North America. More patches of Tatarian honeysuckle could have gone undetected within

**Table 4.** Floristic quality summaries for Gull, Hat, Pismire, and Shoe Islands. SR = Species richness (% native); C = mean coefficient of conservatism; FQI = Floristic quality index.

		Limestone		Mesic	Sand and	Northern	Whole	
		Boreal Forest	Cobble Shore	Northern Forest	Gravel Beach	Wet Meadow Disturbed		Island
Gull	SR	90 (90%)	43 (58%)	56 (100%)	80 (75%)	29 (83%)	12 (83%)	183 (85%)
	C	4.1	1.7	4.6	3	3.6	3	3.8
	FQI	38.9	11.1	34.4	26.8	19.4	10.4	
Hat	SR							47 (43%)
	C							1
	FQI							6.9
Pismire	SR							18 (44%)
	C							1.4
	FQI							5.9
Shoe	SR							0
	C							0
	FQI							NA



**Table 5.** Invasive plant species observed on Gull, Hat, Pismire, and Shoe Islands, with abundance estimates for each island. Species names in **bold** are target invasive plant species. High abundance estimates are also in **bold**.

Scientific Name	Common Name	Gull	Hat	Pismire	Shoe
<b><i>Centaurea stoebe</i></b>	<b>Spotted knapweed</b>	<b>frequent</b>	<b>dominant</b>	<b>abundant</b>	
<b><i>Cirsium arvense</i></b>	<b>Canada thistle</b>	occasional			
<i>Conium maculatum</i>	Poison hemlock	occasional			
<i>Epilobium hirsutum</i>	Great hairy willow-herb		rare		
<b><i>Lonicera spp.</i></b>	<b>Bush honeysuckle</b>	rare			
<i>Pastinaca sativa</i>	Wild parsnip	rare	<b>abundant</b>	<b>abundant</b>	
<i>Rosa rubiginosa</i>	Sweetbrier	rare			

the difficult-to-traverse forested interior. It is unclear whether poison hemlock is as aggressive as the previously mentioned herbs, but it is currently a small infestation on Gull Island. We recommend prompt treatment of the wild parsnip, Tatarian honeysuckle, and poison hemlock to limit their spread on Gull Island and to surrounding islands in the Beaver Island Archipelago.

Sweetbrier was detected in one location in the southeast of the island. Though it is generally not considered a pernicious invasive, it could be approached with an early detection, rapid response strategy at this stage of invasion. Sweetbrier appears to be gaining a foothold on the islands of northern Lakes Michigan and Huron and may become locally dominant if left untreated (Reznicek et al. 2011). Finally, Canada thistle did not appear to be widespread across the island, so control or eradication may be feasible.

We observed 20 other non-native species on the island, which we did not consider to be management priorities so did not map. These species included mossy stonecrop (*Sedum acre*), orange hawkweed (*Hieracium aurantiacum*), false buckwheat (*Fallopia convolvulus*), hounds-tongue (*Cynoglossum officinale*), and bull thistle (*Cirsium vulgare*) (Appendix 2.1).

### **Hat Island**

We recorded 47 plant species on Hat Island, with a mean coefficient of conservatism of 1.0 (Table 4, Appendix 2.8). We did not differentiate natural communities on this 10-acre island, as it was less than 25 acres. We did not document any rare plant species on Hat Island. Only 43% of the species documented on Hat Island were native species. The island is dominated by ruderal habitat characteristic of “bird islands” and the flora is composed largely of weedy opportunists, both native and non-native, that are annual, biennial, and short-lived perennial species.

Spotted knapweed, a target invasive species, was widespread across the island, as was wild parsnip. We did not map these populations (Table 5). We mapped great

hairy willow-herb (*Epilobium hirsutum*) as its population was very local (Figure 3).

We observed 24 other non-native species, which we did not consider to be management priorities so did not map. These included burdock (*Arctium minus*), bull thistle, and curly dock (*Rumex crispus*), (*Viola arvensis*), bouncing bet (*Saponaria officinalis*), and lambs-quarters (*Chenopodium album*) (Appendix 2.8).



Sea-rocket (*Cakile edentula*), a native annual species typical of Great Lakes shores, on Hat Island.



Points

- Centaurea stoebe (Spotted knapweed)
- Cirsium arvense (Canada thistle)
- Conium maculatum (Poison hemlock)
- Pastinaca sativa (Wild parsnip)
- ▲ Lonicera spp. (Bush honeysuckle)
- ▲ Rosa rubiginosa (Sweetbrier)

Lines

- Centaurea stoebe (Spotted knapweed)
- Conium maculatum (Poison hemlock)



Figure 2. Invasive plant species mapped on Gull Island during our surveys.





**Figure 3.** Invasive plant species mapped on Hat Island during our surveys.



### ***Pismire Island***

We recorded 18 plant species on Pismire Island, with a mean coefficient of conservatism of 0.9 (Table 4, Appendix 2.9). We did not differentiate natural communities on this 2-acre island, as it was less than 25 acres. We did not document any rare plant species on Pismire Island. Only 39% of the species documented on Pismire Island were native species. The island is dominated by ruderal habitat characteristic of “bird islands” and the flora is composed largely of weedy opportunists, both native and non-native, that are annual, biennial, and short-lived perennial species.

We observed spotted knapweed and wild parsnip, both of which were so widespread on this island that mapping was

not meaningful. We observed nine other non-native species on the island, which we did not consider to be management priorities so did not map. These included white campion (*Silene latifolia*), bull thistle, cheeseweed (*Malva neglecta*), and motherwort (*Leonurus cardiaca*) (Appendix 2.9).

### ***Shoe Island***

No plant species were recorded on Shoe Island during our 2022 survey. We attribute the lack of plant species to the high Great Lakes water levels from 2016 through 2020. In low water years, herbaceous vegetation has been documented (USFWS 2021) on Shoe Island. In 2022, Shoe Island was a newly exposed sand bar.



Shoe Island, recently exposed following high lake levels from 2016 to 2020 and lacking vegetation.





Gay-wings (*Polygala paucifolia*) interspersed with Canada mayflower (*Maianthemum canadense*) in boreal forest on Gull Island.



Northern wet meadow on Gull Island, with Kalm's lobelia (*Lobelia kalmii*) in full bloom.



## Conclusion

We conducted botanical surveys on four Great Lakes islands in Michigan Islands NWR (Lake Michigan) to collect updated and new data for rare and invasive plant species occurrences. Data on the extent and distribution of these occurrences was collected to guide management prioritization and serve as a baseline for tracking the efficacy of that management. We also conducted natural community surveys on Gull Island, and a separate report outlines a management prioritization across the natural community EOs (Cohen et al. 2023c). Here, we summarize our findings, emphasizing the management of invasive plant species. We highlight natural communities with exceptional floristic quality and invasive species that are of regional management concern.

We did not document any rare species on Gull, Hat, Pismire, or Shoe Islands. We conducted focused surveys for Calypso orchid (*Calypso bulbosa*, State Threatened) and ram's-head lady slipper (*Cypripedium arietinum*, Special Concern) on Gull Island during their blooming period in late May, the ideal detection period. The density of Canada yew (*Taxus canadensis*) made detection in the forest interior difficult. We encourage future surveys for these species as they could have been overlooked. The lack of deer on Gull Island also works in the favor of these species, which are threatened by deer browse. Houghton's goldenrod (*Solidago houghtonii*, Federal and State Threatened) and dwarf lake iris (*Iris lacustris*, Federal and State Threatened) are both known from adjacent islands in the Beaver Island Archipelago. With receding lake levels exposing shoreline habitat, these species may be detected in future surveys, particularly on Gull Island.

Floristic quality of natural community types can help managers to prioritize systems with the greatest native plant diversity. Natural community occurrences with a FQA above 35 are considered management priorities with exceptional floristic quality (Herman et al. 2001). Boreal forest and mesic northern forest on Gull Island have an FQI

near or greater than 35 (Table 4). The calculation of FQI, however, does not take species abundance into account, so a high FQI can be misleading if invasive species abundances are high and conservative species abundances are low. As such, the interpretation of FQA results should be weighed against the more in-depth considerations of ecological integrity and regional scope provided in the natural community descriptions in Cohen et al. (2023c).

The species lists for Gull Island in this report are associated with overlapping, yet often different areas than in Cohen et al. (2023c; Appendix 2.2-2.7). Different surveyors may interpret community boundaries differently and include species that are associated with species of neighboring natural communities, and here our descriptions are more inclusive as they are not limited to EO boundaries. For example, we include a species list for northern wet meadow on Gull Island, which was not mapped as a natural community due to its small size. We also include degraded portions of boreal forest and mesic northern forest not mapped with their respective natural community EOs.

The prioritization of invasive species management is best focused on conserving high-quality natural communities and rare species. Hat, Pismire, and Shoe islands do not support natural communities and floristic quality is low as these communities are comprised of largely ruderal "weedy" species. We do not recommend invasive species management on those islands. Exceptions may include efforts to reduce the spread of certain species throughout the Beaver Island Archipelago, such as wild parsnip (*Pastinaca sativa*) and spotted knapweed (*Centaurea stoebe*). Invasive species were highly concentrated in the lakeshore natural communities on Gull Island, and largely absent from the higher-quality forests (Figure 2). In the absence of rare species in limestone cobble shore and sand and gravel beach, addressing the incipient invasions of Tartarian honeysuckle (*Lonicera tatarica*) within boreal forest and mesic northern forest should be prioritized.



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# Appendix 1. Element and Element Occurrence Ranking Criteria

## Appendix 1.1. Subnational (State) and Global element ranking criteria.

Subnational Rank		DEFINITION
S1	Critically Imperiled	At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
S2	Imperiled	At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3	Vulnerable	At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
S4	Apparently Secure	At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5	Secure	At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
Global Rank		DEFINITION
G1	Critically Imperiled	At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
G2	Imperiled	At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3	Vulnerable	At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
G4	Apparently Secure	At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
G5	Secure	At very low risk of extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
GU	Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. NOTE: Whenever possible (when the range of uncertainty is three consecutive ranks or less), a range rank (e.g., G2G3) should be used to delineate the limits (range) of uncertainty.

## Appendix 1.2. Element occurrence ranking criteria.

Rank	Definition
A	<b>Excellent estimated viability</b> - Based on current information on EO rank factors (i.e., condition, size, and landscape context) for the EO, it is believed to have an excellent probability of persisting, if current conditions prevail, for a defined period of time, typically 20-100 years (for communities, persistence within the bounds of natural disturbance regimes).
B	<b>Good estimated viability</b> - Based on current information on EO rank factors (i.e., condition, size, and landscape context) for the EO, it is believed to have a good probability of persisting, if current conditions prevail, for a defined period of time, typically 20-100 years (for communities, persistence within the bounds of natural disturbance regimes).
C	<b>Fair estimated viability</b> - Based on current information on EO rank factors (i.e., condition, size, and landscape context) for the EO, it is believed to have a fair probability of persisting, if current conditions prevail, for a defined period of time, typically 20-100 years (for communities, persistence within the bounds of natural disturbance regimes).
D	<b>Poor estimated viability</b> - Based on current information on EO rank factors (i.e., condition, size, and landscape context) for the EO, it is believed to have a poor probability of persisting, if current conditions prevail, for a defined period of time, typically 20-100 years (for communities, persistence within the bounds of natural disturbance regimes).
E	<b>Verified Extant</b> - EO has been recently verified as still existing, but sufficient information on the factors used to estimate viability of the occurrence has not yet been obtained. Use of the E rank should be reserved for those situations where the occurrence is thought to be extant, but an A, B, C, D, or range rank cannot be assigned.
H	<b>Historical</b> - There is a lack of recent <sup>1</sup> field information verifying the continued existence of the EO, such as when the occurrence is based only on historical collections data, or when the occurrence was ranked A, B, C, D, or E at one time and is later, without field survey work, considered to be possibly extirpated due to general habitat loss or degradation of the environment in the area.
F	<b>Failed to find</b> - EO has not been found despite a search by an experienced observer at a time and under conditions appropriate for the Element at a location where it was previously reported, but that still might be confirmed to exist at that location with additional field survey efforts. For EOs with vague locational information, the search must include areas of appropriate habitat within the range of locational uncertainty. An F rank, when applicable, supersedes an A, B, C, D, E, or H rank.
X	<b>Extirpated</b> - There is documented destruction of the habitat or environment of the EO, or persuasive evidence of its eradication based on adequate survey (i.e., thorough or repeated survey efforts by one or more experienced observers at times and under conditions appropriate for the Element at that location).
U	<b>Unrankable</b> - An EO rank cannot be assigned due to lack of sufficient information on the occurrence.
NR	<b>Not Ranked</b> - An EO rank has not yet been assigned to the occurrence.



## Appendix 2. Floristic Quality Assessments

We conducted Floristic Quality Assessments (FQAs) for each natural community on Gull Island and FQAs for the entirety of Hat and Pismire Islands (Shoe Island was not vegetated; Reznicek et al. 2014). The FQA utilizes plant species composition to derive the Floristic Quality Index (FQI), a quantitative metric of habitat quality that can be used as a relatively objective comparison among natural community occurrences of the same type. Drawing upon expert consensus among botanists familiar with the flora of Michigan, each vascular plant species in Michigan has been assigned an a priori coefficient of conservatism (C-value) that ranges from 0 to 10 on a scale of increasing conservatism or fidelity to pre-European colonization habitats (Reznicek et al. 2014). Plant species with a C-value of 7 to 10 are considered highly conservative (Herman et al. 2001). A C-value of 4 to 6 indicates moderate conservatism and a C-value of 1 to 3 indicates low or no conservatism (e.g., ruderal species). Non-native species were given a C-value of 0 for these calculations. We calculated FQI for each natural community occurrence as

$$FQI = \bar{C} \times \sqrt{n}$$

where  $\bar{C}$  = mean C-value and  $n$  = species richness. Sites with an FQI of 35 or greater are generally considered to be floristically important from a statewide perspective (Herman et al. 2001).

<b>Appendix</b>	<b>Natural Community or Habitat</b>	<b>Page</b>
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2.4	Gull Island Mesic Northern Forest	29
2.5	Gull Island Sand and Gravel Beach	32
2.6	Gull Island Northern Wet Meadow	35
2.7	Gull Island Disturbed Habitat	37
2.8	Hat Island	39
2.9	Pismire Island	41

## Appendix 2.1. Gull Island FQA.

### Conservatism-Based Metrics:

Total Mean C:	3.8
Native Mean C:	4.5
Total FQI:	51.4
Native FQI:	56
Adjusted FQI:	41.4
% C value 0:	16.9
% C value 1-3:	25.1
% C value 4-6:	45.4
% C value 7-10:	12.6
Native Tree Mean C:	3.4
Native Shrub Mean C:	4.7
Native Herbaceous Mean C:	4.6

### Species Richness:

Total Species:	183	
Native Species:	155	84.70%
Non-native Species:	28	15.30%

### Species Wetness:

Mean Wetness:	1.3
Native Mean Wetness:	1

### Physiognomy Metrics:

Tree:	14	7.70%
Shrub:	28	15.30%
Vine:	7	3.80%
Forb:	101	55.20%
Grass:	11	6%
Sedge:	6	3.30%
Rush:	4	2.20%
Fern:	12	6.60%
Bryophyte:	0	0%

### Duration Metrics:

Annual:	12	6.60%
Perennial:	154	84.20%
Biennial:	17	9.30%
Native Annual:	8	4.40%
Native Perennial:	138	75.40%
Native Biennial:	9	4.90%



**Appendix 2.1.** Gull Island FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Abies balsamea</i>	balsam fir	ABIBAL	native	3	0
<i>Acer pensylvanicum</i>	striped maple	ACEPEN	native	5	3
<i>Acer saccharum</i>	sugar maple	ACESAU	native	5	3
<i>Acer spicatum</i>	mountain maple	ACESPI	native	5	3
<i>Achillea millefolium</i>	yarrow	ACHMIL	native	1	3
<i>Actaea pachypoda</i>	dolls-eyes	ACTPAC	native	7	5
<i>Agrimonia gryposepala</i>	tall agrimony	AGRGRY	native	2	3
<i>Agrostis scabra</i>	ticklegrass	AGRSCA	native	4	0
<i>Allium tricoccum</i>	wild leek	ALLTRI	native	5	3
<i>Anemone cylindrica</i>	thimbleweed	ANECYL	native	6	5
<i>Anticlea elegans</i>	white camas	ANTELE	native	10	-3
<i>Aquilegia canadensis</i>	wild columbine	AQUCAN	native	5	3
<i>Arabidopsis lyrata</i>	sand cress	ARALYR	native	7	3
<i>Arabis pycnocarpa</i>	hairy rock cress	ARAPYC	native	6	3
<i>Aralia nudicaulis</i>	wild sarsaparilla	ARANUD	native	5	3
<i>Aralia racemosa</i>	spikenard	ARARAC	native	8	3
<i>Arctium minus</i>	common burdock	ARCMIN	non-native	0	3
<i>Arctostaphylos uva-ursi</i>	bearberry	ARCUVA	native	8	5
<i>Arisaema triphyllum</i>	jack-in-the-pulpit	ARITRI	native	5	0
<i>Artemisia campestris</i>	wormwood	ARTCAM	native	5	5
<i>Asclepias syriaca</i>	common milkweed	ASCSYR	native	1	5
<i>Athyrium filix-femina</i>	lady fern	ATHFIL	native	4	0
<i>Barbarea vulgaris</i>	yellow rocket	BARVUL	non-native	0	0
<i>Betula papyrifera</i>	paper birch	BETPAP	native	2	3
<i>Boechera grahamii</i>	rock cress	BOEGRA	native	6	3
<i>Botrypus virginianus</i>	rattlesnake fern	BOTVIR	native	5	3
<i>Cakile edentula</i>	sea-rocket	CAKEDE	native	5	3
<i>Calamagrostis canadensis</i>	blue-joint	CALCAN	native	3	-5
<i>Calamagrostis stricta</i>	narrow-leaved reedgrass	CALSTR	native	10	-3
<i>Campanula rotundifolia</i>	harebell	CAMROT	native	6	3
<i>Carex aquatilis</i>	sedge	CXAQUA	native	7	-5
<i>Carex arctata</i>	sedge	CXARTT	native	3	5
<i>Carex bebbii</i>	sedge	CXBEBB	native	4	-5
<i>Carex pedunculata</i>	sedge	CXPEDU	native	5	3
<i>Carex scoparia</i>	sedge	CXSCOP	native	4	-3
<i>Caulophyllum thalictroides</i>	blue cohosh	CAUTHA	native	5	5
<i>Celastrus scandens</i>	american bittersweet	CELSCA	native	3	3
<i>Centaurea stoebe</i>	spotted knapweed	CENSTO	non-native	0	5
<i>Chamerion angustifolium</i>	fireweed	CHAANG	native	3	0
<i>Chimaphila umbellata</i>	pipsissewa	CHIUMB	native	8	5
<i>Circaea alpina</i>	small enchanters-nightshade	CIRALP	native	4	-3
<i>Circaea canadensis</i>	enchanters-nightshade	CIRCAN	native	2	3
<i>Cirsium arvense</i>	canada thistle	CIRARV	non-native	0	3
<i>Cirsium vulgare</i>	bull thistle	CIRVUL	non-native	0	3
<i>Clinopodium vulgare</i>	wild-basil	CLIVUL	native	3	5
<i>Clintonia borealis</i>	bluebead-lily; corn-lily	CLIBOR	native	5	0

**Appendix 2.1.** Gull Island FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Conium maculatum</i>	poison-hemlock	CONMAC	non-native	0	-3
<i>Conyza canadensis</i>	horseweed	CONCAN	native	0	3
<i>Corallorhiza striata</i>	striped coral-root	CORSTR	native	6	3
<i>Cornus amomum</i>	silky dogwood	CORAMO	native	2	-3
<i>Cornus canadensis</i>	bunchberry	CORCAA	native	6	0
<i>Cornus rugosa</i>	round-leaved dogwood	CORRUG	native	6	5
<i>Cornus sericea</i>	red-osier	CORSER	native	2	-3
<i>Corydalis aurea</i>	golden corydalis	CORAUR	native	5	5
<i>Corylus cornuta</i>	beaked hazelnut	CORCOR	native	5	3
<i>Cynoglossum officinale</i>	hounds-tongue	CYNOFF	non-native	0	5
<i>Dendrolycopodium dendroideum</i>	tree clubmoss	DENDEN	native	5	3
<i>Descurainia pinnata</i>	tansy mustard	DESPIN	non-native	0	5
<i>Dicentra cucullaria</i>	dutchmans-breeches	DICCUC	native	7	5
<i>Diervilla lonicera</i>	bush-honeysuckle	DIELON	native	4	5
<i>Dryopteris carthusiana</i>	spinulose woodfern	DRYCAR	native	5	-3
<i>Dryopteris intermedia</i>	evergreen woodfern	DRYINT	native	5	0
<i>Dryopteris marginalis</i>	marginal woodfern	DRYMAR	native	5	3
<i>Eleocharis elliptica</i>	golden-seeded spike rush	ELEELL	native	6	-5
<i>Elymus canadensis</i>	canada wild rye	ELYSAN	native	5	3
<i>Epilobium ciliatum</i>	willow-herb	EPICIL	native	3	-3
<i>Epilobium coloratum</i>	cinnamon willow-herb	EPICOL	native	3	-5
<i>Epilobium parviflorum</i>	willow-herb	EPIPAR	non-native	0	-5
<i>Erigeron strigosus</i>	daisy fleabane	ERISTR	native	4	3
<i>Eurybia macrophylla</i>	big-leaved aster	EURMAC	native	4	5
<i>Fallopia cilinodis</i>	fringed false buckwheat	FALCIL	native	3	5
<i>Fallopia convolvulus</i>	false buckwheat	FALCON	non-native	0	3
<i>Festuca occidentalis</i>	western fescue	FESOCC	native	6	5
<i>Festuca subverticillata</i>	nodding fescue	FESSUB	native	5	3
<i>Fragaria virginiana</i>	wild strawberry	FRAVIR	native	2	3
<i>Fraxinus pennsylvanica</i>	red ash	FRAPEN	native	2	-3
<i>Galium triflorum</i>	fragrant bedstraw	GALTRR	native	4	3
<i>Gaultheria procumbens</i>	wintergreen	GAUPRO	native	5	3
<i>Geranium robertianum</i>	herb robert	GERROB	native	3	3
<i>Glyceria striata</i>	fowl manna grass	GLYSTR	native	4	-5
<i>Goodyera oblongifolia</i>	menzies rattlesnake plantain	GOOOBL	native	8	3
<i>Gymnocarpium dryopteris</i>	oak fern	GYMDRY	native	5	3
<i>Hackelia deflexa</i>	stickseed	HACDEF	native	2	5
<i>Hepatica acutiloba</i>	sharp-lobed hepatica	HEPACU	native	8	5
<i>Heracleum maximum</i>	cow-parsnip	HERMAX	native	3	-3
<i>Hieracium aurantiacum</i>	orange hawkweed	HIEAUR	non-native	0	5
<i>Huperzia lucidula</i>	shining clubmoss	HUPLUC	native	5	0
<i>Hypericum perforatum</i>	common st. johns-wort	HYPPER	non-native	0	5
<i>Impatiens capensis</i>	spotted touch-me-not	IMPCAP	native	2	-3
<i>Juncus balticus</i>	rush	JUNBAL	native	4	-5
<i>Juncus brachycephalus</i>	rush	JUNBRP	native	7	-5
<i>Juncus canadensis</i>	canadian rush	JUNCAN	native	6	-5



**Appendix 2.1.** Gull Island FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Juncus nodosus</i>	joint rush	JUNNOD	native	5	-5
<i>Juniperus communis</i>	common or ground juniper	JUNCOI	native	4	3
<i>Juniperus horizontalis</i>	creeping juniper	JUNHOR	native	10	3
<i>Lactuca biennis</i>	tall blue lettuce	LACBIE	native	2	0
<i>Lactuca canadensis</i>	tall lettuce	LACCAN	native	2	3
<i>Lathyrus japonicus</i>	beach pea	LATJAP	native	10	3
<i>Leonurus cardiaca</i>	motherwort	LEOCAR	non-native	0	5
<i>Leucanthemum vulgare</i>	ox-eye daisy	LEUVUL	non-native	0	5
<i>Linnaea borealis</i>	twinflower	LINBOR	native	6	0
<i>Lobelia kalmii</i>	bog lobelia	LOBKAL	native	10	-5
<i>Lonicera canadensis</i>	canadian fly honeysuckle	LONCAN	native	5	3
<i>Lonicera dioica</i>	red honeysuckle	LONDIO	native	5	3
<i>Lonicera tatarica</i>	tartarian honeysuckle	LONTAT	non-native	0	3
<i>Lycopodium clavatum</i>	running ground-pine	LYCCLA	native	4	0
<i>Lycopus americanus</i>	common water horehound	LYCAME	native	2	-5
<i>Lysimachia thyrsiflora</i>	tufted loosestrife	LYSTHY	native	6	-5
<i>Maianthemum canadense</i>	canada mayflower	MAICAN	native	4	3
<i>Maianthemum racemosum</i>	false spikenard	MAIRAC	native	5	3
<i>Maianthemum stellatum</i>	starry false solomon-seal	MAISTE	native	5	0
<i>Melampyrum lineare</i>	cow-wheat	MELLIN	native	6	3
<i>Milium effusum</i>	wood millet	MILEFF	native	8	3
<i>Mitella nuda</i>	naked miterwort	MITNUD	native	8	-3
<i>Nepeta cataria</i>	catnip	NEPCAT	non-native	0	3
<i>Oenothera biennis</i>	common evening-primrose	OENBIE	native	2	3
<i>Orthilia secunda</i>	one-sided pyrola	ORTSEC	native	7	0
<i>Osmorhiza claytonii</i>	hairy sweet-cicely	OSMCLI	native	4	3
<i>Pastinaca sativa</i>	wild parsnip	PASSAT	non-native	0	5
<i>Persicaria maculosa</i>	lady's-thumb	PERMAC	non-native	0	0
<i>Phalaris arundinacea</i>	reed canary grass	PHAARU	native	0	-3
<i>Physocarpus opulifolius</i>	ninebark	PHYOPU	native	4	-3
<i>Picea glauca</i>	white spruce	PICGLA	native	3	3
<i>Pinus strobus</i>	white pine	PINSTR	native	3	3
<i>Platanthera orbiculata</i>	round-leaved orchid	PLAORB	native	10	0
<i>Poa compressa</i>	canada bluegrass	POACOM	non-native	0	3
<i>Poa palustris</i>	fowl meadow grass	POAPAS	native	3	-3
<i>Polygala paucifolia</i>	gay-wings	POLPAU	native	7	3
<i>Polygonatum pubescens</i>	downy solomon seal	POLPUB	native	5	5
<i>Polypodium virginianum</i>	common polypody	POLVIR	native	8	5
<i>Populus balsamifera</i>	balsam poplar	POPBAL	native	2	-3
<i>Potentilla anserina</i>	silverweed	POTANS	native	5	-3
<i>Prunus pensylvanica</i>	pin cherry	PRUPEN	native	3	3
<i>Prunus pumila</i>	sand cherry	PRUPUM	native	8	5
<i>Prunus serotina</i>	wild black cherry	PRUSER	native	2	3
<i>Prunus virginiana</i>	choke cherry	PRUVIR	native	2	3
<i>Pteridium aquilinum</i>	bracken fern	PTEAQU	native	0	3
<i>Ranunculus sceleratus</i>	cursed crowfoot	RANSCE	native	1	-5

**Appendix 2.1.** Gull Island FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Rhus typhina</i>	staghorn sumac	RHUTYP	native	2	3
<i>Ribes cynosbati</i>	prickly or wild gooseberry	RIBCYN	native	4	3
<i>Ribes triste</i>	swamp red currant	RIBTRI	native	6	-5
<i>Rosa acicularis</i>	wild rose	ROSACI	native	4	3
<i>Rosa blanda</i>	wild rose	ROSBLA	native	3	3
<i>Rosa rubiginosa</i>	sweetbrier	ROSRUB	non-native	0	3
<i>Rubus pubescens</i>	dwarf raspberry	RUBPUB	native	4	-3
<i>Rubus strigosus</i>	wild red raspberry	RUBSTR	native	2	0
<i>Rumex crispus</i>	curly dock	RUMCRI	non-native	0	0
<i>Rumex triangulivalvis</i>	dock	RUMTRI	native	1	0
<i>Sambucus racemosa</i>	red-berried elder	SAMRAC	native	3	3
<i>Sanguinaria canadensis</i>	bloodroot	SANCAA	native	5	3
<i>Scutellaria galericulata</i>	marsh skullcap	SCUGAL	native	5	-5
<i>Sedum acre</i>	mossy stonecrop	SEDACR	non-native	0	5
<i>Silene antirrhina</i>	sleepy catchfly	SILANT	native	2	5
<i>Silene vulgaris</i>	bladder campion	SILVUL	non-native	0	5
<i>Solanum dulcamara</i>	bittersweet nightshade	SOLDUL	non-native	0	0
<i>Solanum ptychanthum</i>	black nightshade	SOLPTY	native	1	3
<i>Solidago flexicaulis</i>	zigzag goldenrod	SOLFLE	native	6	3
<i>Solidago simplex</i>	gillmans goldenrod	SOLSIM	native	10	3
<i>Sonchus arvensis</i>	perennial sow-thistle	SONARV	non-native	0	3
<i>Sorbus americana</i>	american mountain-ash	SORAME	native	4	0
<i>Sorbus decora</i>	mountain-ash	SORDEC	native	4	3
<i>Spinulum annotinum</i>	stiff clubmoss	SPIANN	native	5	0
<i>Symphoricarpos albus</i> var. <i>albus</i>	snowberry	SYMALA	native	5	3
<i>Taraxacum officinale</i>	common dandelion	TAROFF	non-native	0	3
<i>Taxus canadensis</i>	yew	TAXCAN	native	5	3
<i>Thalictrum dasycarpum</i>	purple meadow-rue	THADAS	native	3	-3
<i>Thalictrum dioicum</i>	early meadow-rue	THADIO	native	6	3
<i>Thuja occidentalis</i>	arbor vitae	THUOCC	native	4	-3
<i>Toxicodendron radicans</i>	poison-ivy	TOXRAD	native	2	0
<i>Trientalis borealis</i>	star-flower	TRIBOR	native	5	0
<i>Trillium grandiflorum</i>	common trillium	TRIGRA	native	5	3
<i>Typha latifolia</i>	broad-leaved cat-tail	TYPLAT	native	1	-5
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0
<i>Verbascum thapsus</i>	common mullein	VERTHA	non-native	0	5
<i>Verbena hastata</i>	blue vervain	VERHAS	native	4	-3
<i>Viburnum trilobum</i>	american highbush-cranberry	VIBTRI	native	5	-3
<i>Viola arvensis</i>	field pansy	VIOARV	non-native	0	5
<i>Viola blanda</i>	sweet white violet	VIOBLA	native	5	-3
<i>Viola canadensis</i>	canada violet	VIOCAN	native	5	3
<i>Viola cucullata</i>	marsh violet	VIOCUC	native	5	-5
<i>Viola labradorica</i>	dog violet	VIOLAB	native	3	0
<i>Viola pubescens</i>	yellow violet	VIOPUB	native	4	3
<i>Viola renifolia</i>	kidney-leaved violet	VIOREN	native	6	-3



## Appendix 2.2. Gull Island Boreal Forest FQA.

### Conservatism-Based Metrics:

Total Mean C:	4.1
Native Mean C:	4.6
Total FQI:	38.9
Native FQI:	41.4
Adjusted FQI:	43.6
% C value 0:	11.1
% C value 1-3:	22.2
% C value 4-6:	56.7
% C value 7-10:	10
Native Tree Mean C:	3.8
Native Shrub Mean C:	4.7
Native Herbaceous Mean C:	4.7

### Species Richness:

Total Species:	90	
Native Species:	81	90%
Non-native Species:	9	10%

### Species Wetness:

Mean Wetness:	1.8
Native Mean Wetness:	1.6

### Physiognomy Metrics:

Tree:	9	10%
Shrub:	17	18.90%
Vine:	5	5.60%
Forb:	45	50%
Grass:	1	1.10%
Sedge:	2	2.20%
Rush:	0	0%
Fern:	11	12.20%
Bryophyte:	0	0%

### Duration Metrics:

Annual:	1	1.10%
Perennial:	82	91.10%
Biennial:	7	7.80%
Native Annual:	1	1.10%
Native Perennial:	76	84.40%
Native Biennial:	4	4.40%

**Appendix 2.2.** Gull Island Boreal Forest FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Abies balsamea</i>	balsam fir	ABIBAL	native	3	0
<i>Acer pensylvanicum</i>	striped maple	ACEPEN	native	5	3
<i>Acer saccharum</i>	sugar maple	ACESAU	native	5	3
<i>Acer spicatum</i>	mountain maple	ACESPI	native	5	3
<i>Achillea millefolium</i>	yarrow	ACHMIL	native	1	3
<i>Actaea pachypoda</i>	dolls-eyes	ACTPAC	native	7	5
<i>Agrimonia gryposepala</i>	tall agrimony	AGRGRY	native	2	3
<i>Aquilegia canadensis</i>	wild columbine	AQUCAN	native	5	3
<i>Aralia nudicaulis</i>	wild sarsaparilla	ARANUD	native	5	3
<i>Aralia racemosa</i>	spikenard	ARARAC	native	8	3
<i>Arisaema triphyllum</i>	jack-in-the-pulpit	ARITRI	native	5	0
<i>Athyrium filix-femina</i>	lady fern	ATHFIL	native	4	0
<i>Betula papyrifera</i>	paper birch	BETPAP	native	2	3
<i>Boechera grahamii</i>	rock cress	BOEGRA	native	6	3
<i>Botrypus virginianus</i>	rattlesnake fern	BOTVIR	native	5	3
<i>Carex bebbii</i>	sedge	CXBEBB	native	4	-5
<i>Carex pedunculata</i>	sedge	CXPEDU	native	5	3
<i>Celastrus scandens</i>	american bittersweet	CELSCA	native	3	3
<i>Chimaphila umbellata</i>	pipsissewa	CHIUMB	native	8	5
<i>Cirsium vulgare</i>	bull thistle	CIRVUL	non-native	0	3
<i>Clintonia borealis</i>	bluebead-lily; corn-lily	CLIBOR	native	5	0
<i>Corallorhiza striata</i>	striped coral-root	CORSTR	native	6	3
<i>Cornus canadensis</i>	bunchberry	CORCAA	native	6	0
<i>Cornus rugosa</i>	round-leaved dogwood	CORRUG	native	6	5
<i>Cornus sericea</i>	red-osier	CORSER	native	2	-3
<i>Corylus cornuta</i>	beaked hazelnut	CORCOR	native	5	3
<i>Cynoglossum officinale</i>	hounds-tongue	CYNOFF	non-native	0	5
<i>Dendrolycopodium dendroideum</i>	tree clubmoss	DENDEN	native	5	3
<i>Diervilla lonicera</i>	bush-honeysuckle	DIELON	native	4	5
<i>Dryopteris carthusiana</i>	spinulose woodfern	DRYCAR	native	5	-3
<i>Dryopteris marginalis</i>	marginal woodfern	DRYMAR	native	5	3
<i>Eurybia macrophylla</i>	big-leaved aster	EURMAC	native	4	5
<i>Fallopia cilinodis</i>	fringed false buckwheat	FALCIL	native	3	5
<i>Festuca occidentalis</i>	western fescue	FESOCC	native	6	5
<i>Fragaria virginiana</i>	wild strawberry	FRAVIR	native	2	3
<i>Galium triflorum</i>	fragrant bedstraw	GALTRR	native	4	3
<i>Gaultheria procumbens</i>	wintergreen	GAUPRO	native	5	3
<i>Goodyera oblongifolia</i>	menzies rattlesnake plantain	GOOOBL	native	8	3
<i>Gymnocarpium dryopteris</i>	oak fern	GYMDRY	native	5	3
<i>Hackelia deflexa</i>	stickseed	HACDEF	native	2	5
<i>Heracleum maximum</i>	cow-parsnip	HERMAX	native	3	-3
<i>Hieracium aurantiacum</i>	orange hawkweed	HIEAUR	non-native	0	5
<i>Huperzia lucidula</i>	shining clubmoss	HUPLUC	native	5	0
<i>Hypericum perforatum</i>	common st. johns-wort	HYPPER	non-native	0	5
<i>Lactuca biennis</i>	tall blue lettuce	LACBIE	native	2	0
<i>Lactuca canadensis</i>	tall lettuce	LACCAN	native	2	3



**Appendix 2.2.** Gull Island Boreal Forest FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Linnaea borealis</i>	twinflower	LINBOR	native	6	0
<i>Lonicera canadensis</i>	canadian fly honeysuckle	LONCAN	native	5	3
<i>Lonicera dioica</i>	red honeysuckle	LONDIO	native	5	3
<i>Lonicera tatarica</i>	tartarian honeysuckle	LONTAT	non-native	0	3
<i>Lycopodium clavatum</i>	running ground-pine	LYCCLA	native	4	0
<i>Lycopus americanus</i>	common water horehound	LYCAME	native	2	-5
<i>Maianthemum canadense</i>	canada mayflower	MAICAN	native	4	3
<i>Maianthemum stellatum</i>	starry false solomon-seal	MAISTE	native	5	0
<i>Melampyrum lineare</i>	cow-wheat	MELLIN	native	6	3
<i>Mitella nuda</i>	naked miterwort	MITNUD	native	8	-3
<i>Nepeta cataria</i>	catnip	NEPCAT	non-native	0	3
<i>Orthilia secunda</i>	one-sided pyrola	ORTSEC	native	7	0
<i>Osmorhiza claytonii</i>	hairy sweet-cicely	OSMCLI	native	4	3
<i>Physocarpus opulifolius</i>	ninebark	PHYOPU	native	4	-3
<i>Pinus strobus</i>	white pine	PINSTR	native	3	3
<i>Platanthera orbiculata</i>	round-leaved orchid	PLAORB	native	10	0
<i>Polygala paucifolia</i>	gay-wings	POLPAU	native	7	3
<i>Polygonatum pubescens</i>	downy solomon seal	POLPUB	native	5	5
<i>Polypodium virginianum</i>	common polypody	POLVIR	native	8	5
<i>Prunus pensylvanica</i>	pin cherry	PRUPEN	native	3	3
<i>Prunus virginiana</i>	choke cherry	PRUVIR	native	2	3
<i>Pteridium aquilinum</i>	bracken fern	PTEAQU	native	0	3
<i>Ribes triste</i>	swamp red currant	RIBTRI	native	6	-5
<i>Rubus pubescens</i>	dwarf raspberry	RUBPUB	native	4	-3
<i>Sambucus racemosa</i>	red-berried elder	SAMRAC	native	3	3
<i>Solanum dulcamara</i>	bittersweet nightshade	SOLDUL	non-native	0	0
<i>Solidago flexicaulis</i>	zigzag goldenrod	SOLFLE	native	6	3
<i>Sorbus decora</i>	mountain-ash	SORDEC	native	4	3
<i>Spinulum annotinum</i>	stiff clubmoss	SPIANN	native	5	0
<i>Symphoricarpos albus</i> var. <i>albus</i>	snowberry	SYMALA	native	5	3
<i>Taraxacum officinale</i>	common dandelion	TAROFF	non-native	0	3
<i>Taxus canadensis</i>	yew	TAXCAN	native	5	3
<i>Thalictrum dioicum</i>	early meadow-rue	THADIO	native	6	3
<i>Thuja occidentalis</i>	arbor vitae	THUOCC	native	4	-3
<i>Toxicodendron radicans</i>	poison-ivy	TOXRAD	native	2	0
<i>Trientalis borealis</i>	star-flower	TRIBOR	native	5	0
<i>Trillium grandiflorum</i>	common trillium	TRIGRA	native	5	3
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0
<i>Verbascum thapsus</i>	common mullein	VERTHA	non-native	0	5
<i>Viburnum trilobum</i>	american highbush-cranberry	VIBTRI	native	5	-3
<i>Viola blanda</i>	sweet white violet	VIOBLA	native	5	-3
<i>Viola labradorica</i>	dog violet	VIOLAB	native	3	0
<i>Viola pubescens</i>	yellow violet	VIOPUB	native	4	3
<i>Viola renifolia</i>	kidney-leaved violet	VIOREN	native	6	-3

## Appendix 2.3. Gull Island Limestone Cobble Shore FQA.

### Conservatism-Based Metrics:

Total Mean C:	1.7
Native Mean C:	2.9
Total FQI:	11.1
Native FQI:	14.5
Adjusted FQI:	22.1
% C value 0:	41.9
% C value 1-3:	41.9
% C value 4-6:	16.3
% C value 7-10:	0
Native Tree Mean C:	3.2
Native Shrub Mean C:	3.4
Native Herbaceous Mean C:	2.5

### Species Richness:

Total Species:	43	
Native Species:	25	58.10%
Non-native Species:	18	41.90%

### Species Wetness:

Mean Wetness:	1.6
Native Mean Wetness:	0.5

### Physiognomy Metrics:

Tree:	5	11.60%
Shrub:	7	16.30%
Vine:	4	9.30%
Forb:	26	60.50%
Grass:	1	2.30%
Sedge:	0	0%
Rush:	0	0%
Fern:	0	0%
Bryophyte:	0	0%

### Duration Metrics:

Annual:	6	14%
Perennial:	32	74.40%
Biennial:	5	11.60%
Native Annual:	3	7%
Native Perennial:	22	51.20%
Native Biennial:	0	0%



**Appendix 2.3.** Gull Island Limestone Cobble Shore FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Aquilegia canadensis</i>	wild columbine	AQUCAN	native	5	3
<i>Asclepias syriaca</i>	common milkweed	ASCSYR	native	1	5
<i>Betula papyrifera</i>	paper birch	BETPAP	native	2	3
<i>Celastrus scandens</i>	american bittersweet	CELSCA	native	3	3
<i>Centaurea stoebe</i>	spotted knapweed	CENSTO	non-native	0	5
<i>Chamerion angustifolium</i>	fireweed	CHAANG	native	3	0
<i>Cirsium arvense</i>	canada thistle	CIRARV	non-native	0	3
<i>Cirsium vulgare</i>	bull thistle	CIRVUL	non-native	0	3
<i>Conium maculatum</i>	poison-hemlock	CONMAC	non-native	0	-3
<i>Cornus sericea</i>	red-osier	CORSER	native	2	-3
<i>Cynoglossum officinale</i>	hounds-tongue	CYNOFF	non-native	0	5
<i>Descurainia pinnata</i>	tansy mustard	DESPIN	non-native	0	5
<i>Epilobium ciliatum</i>	willow-herb	EPICIL	native	3	-3
<i>Fallopia convolvulus</i>	false buckwheat	FALCON	non-native	0	3
<i>Fragaria virginiana</i>	wild strawberry	FRAVIR	native	2	3
<i>Geranium robertianum</i>	herb robert	GERROB	native	3	3
<i>Hypericum perforatum</i>	common st. johns-wort	HYPPER	non-native	0	5
<i>Impatiens capensis</i>	spotted touch-me-not	IMPCAP	native	2	-3
<i>Leonurus cardiaca</i>	motherwort	LEOCAR	non-native	0	5
<i>Maianthemum stellatum</i>	starry false solomon-seal	MAISTE	native	5	0
<i>Nepeta cataria</i>	catnip	NEPCAT	non-native	0	3
<i>Persicaria maculosa</i>	ladys-thumb	PERMAC	non-native	0	0
<i>Physocarpus opulifolius</i>	ninebark	PHYOPU	native	4	-3
<i>Picea glauca</i>	white spruce	PICGLA	native	3	3
<i>Poa compressa</i>	canada bluegrass	POACOM	non-native	0	3
<i>Prunus pensylvanica</i>	pin cherry	PRUPEN	native	3	3
<i>Prunus virginiana</i>	choke cherry	PRUVIR	native	2	3
<i>Ribes triste</i>	swamp red currant	RIBTRI	native	6	-5
<i>Rubus strigosus</i>	wild red raspberry	RUBSTR	native	2	0
<i>Rumex triangulivalvis</i>	dock	RUMTRI	native	1	0
<i>Sambucus racemosa</i>	red-berried elder	SAMRAC	native	3	3
<i>Sedum acre</i>	mossy stonecrop	SEDACR	non-native	0	5
<i>Silene vulgaris</i>	bladder campion	SILVUL	non-native	0	5
<i>Solanum dulcamara</i>	bittersweet nightshade	SOLDUL	non-native	0	0
<i>Solanum ptychanthum</i>	black nightshade	SOLPTY	native	1	3
<i>Sonchus arvensis</i>	perennial sow-thistle	SONARV	non-native	0	3
<i>Sorbus americana</i>	american mountain-ash	SORAME	native	4	0
<i>Taraxacum officinale</i>	common dandelion	TAROFF	non-native	0	3
<i>Thuja occidentalis</i>	arbor vitae	THUOCC	native	4	-3
<i>Toxicodendron radicans</i>	poison-ivy	TOXRAD	native	2	0
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0
<i>Verbascum thapsus</i>	common mullein	VERTHA	non-native	0	5
<i>Viburnum trilobum</i>	american highbush-cranberry	VIBTRI	native	5	-3

## Appendix 2.4. Gull Island Mesic Northern Forest FQA.

### Conservatism-Based Metrics:

Total Mean C:	4.6
Native Mean C:	4.6
Total FQI:	34.4
Native FQI:	34.4
Adjusted FQI:	46
% C value 0:	0
% C value 1-3:	23.2
% C value 4-6:	66.1
% C value 7-10:	10.7
Native Tree Mean C:	3.8
Native Shrub Mean C:	4.3
Native Herbaceous Mean C:	4.8

### Species Richness:

Total Species:	56	
Native Species:	56	100%
Non-native Species:	0	0%

### Species Wetness:

Mean Wetness:	2
Native Mean Wetness:	2

### Physiognomy Metrics:

Tree:	8	14.30%
Shrub:	7	12.50%
Vine:	3	5.40%
Forb:	27	48.20%
Grass:	2	3.60%
Sedge:	1	1.80%
Rush:	0	0%
Fern:	8	14.30%
Bryophyte:	0	0%

### Duration Metrics:

Annual:	1	1.80%
Perennial:	55	98.20%
Biennial:	0	0%
Native Annual:	1	1.80%
Native Perennial:	55	98.20%
Native Biennial:	0	0%

**Appendix 2.4.** Gull Island Mesic Northern Forest FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Acer pensylvanicum</i>	striped maple	ACEPEN	native	5	3
<i>Acer saccharum</i>	sugar maple	ACESAU	native	5	3
<i>Acer spicatum</i>	mountain maple	ACESPI	native	5	3
<i>Actaea pachypoda</i>	dolls-eyes	ACTPAC	native	7	5
<i>Allium tricoccum</i>	wild leek	ALLTRI	native	5	3
<i>Aquilegia canadensis</i>	wild columbine	AQUCAN	native	5	3
<i>Aralia nudicaulis</i>	wild sarsaparilla	ARANUD	native	5	3
<i>Arisaema triphyllum</i>	jack-in-the-pulpit	ARITRI	native	5	0
<i>Betula papyrifera</i>	paper birch	BETPAP	native	2	3
<i>Botrypus virginianus</i>	rattlesnake fern	BOTVIR	native	5	3
<i>Carex arctata</i>	sedge	CXARTT	native	3	5
<i>Caulophyllum thalictroides</i>	blue cohosh	CAUTHA	native	5	5
<i>Circaea alpina</i>	small enchanters-nightshade	CIRALP	native	4	-3
<i>Circaea canadensis</i>	enchanters-nightshade	CIRCAN	native	2	3
<i>Clintonia borealis</i>	bluebead-lily; corn-lily	CLIBOR	native	5	0
<i>Cornus rugosa</i>	round-leaved dogwood	CORRUG	native	6	5
<i>Corylus cornuta</i>	beaked hazelnut	CORCOR	native	5	3
<i>Dendrolycopodium dendroideum</i>	tree clubmoss	DENDEN	native	5	3
<i>Dicentra cucullaria</i>	dutchmans-breeches	DICCUC	native	7	5
<i>Dryopteris carthusiana</i>	spinulose woodfern	DRYCAR	native	5	-3
<i>Dryopteris intermedia</i>	evergreen woodfern	DRYINT	native	5	0
<i>Dryopteris marginalis</i>	marginal woodfern	DRYMAR	native	5	3
<i>Eurybia macrophylla</i>	big-leaved aster	EURMAC	native	4	5
<i>Fallopia cilinodis</i>	fringed false buckwheat	FALCIL	native	3	5
<i>Festuca subverticillata</i>	nodding fescue	FESSUB	native	5	3
<i>Hepatica acutiloba</i>	sharp-lobed hepatica	HEPACU	native	8	5
<i>Heracleum maximum</i>	cow-parsnip	HERMAX	native	3	-3
<i>Huperzia lucidula</i>	shining clubmoss	HUPLUC	native	5	0
<i>Lonicera canadensis</i>	canadian fly honeysuckle	LONCAN	native	5	3
<i>Lonicera dioica</i>	red honeysuckle	LONDIO	native	5	3
<i>Lycopodium clavatum</i>	running ground-pine	LYCCLA	native	4	0
<i>Maianthemum canadense</i>	canada mayflower	MAICAN	native	4	3
<i>Maianthemum racemosum</i>	false spikenard	MAIRAC	native	5	3
<i>Maianthemum stellatum</i>	starry false solomon-seal	MAISTE	native	5	0
<i>Milium effusum</i>	wood millet	MILEFF	native	8	3
<i>Polygala paucifolia</i>	gay-wings	POLPAU	native	7	3
<i>Polygonatum pubescens</i>	downy solomon seal	POLPUB	native	5	5
<i>Polypodium virginianum</i>	common polypody	POLVIR	native	8	5
<i>Prunus pensylvanica</i>	pin cherry	PRUPEN	native	3	3
<i>Prunus serotina</i>	wild black cherry	PRUSER	native	2	3
<i>Prunus virginiana</i>	choke cherry	PRUVIR	native	2	3
<i>Ranunculus sceleratus</i>	cursed crowfoot	RANSCE	native	1	-5
<i>Ribes cynosbati</i>	prickly or wild gooseberry	RIBCYN	native	4	3
<i>Sambucus racemosa</i>	red-berried elder	SAMRAC	native	3	3
<i>Sanguinaria canadensis</i>	bloodroot	SANCAA	native	5	3
<i>Sorbus americana</i>	american mountain-ash	SORAME	native	4	0



**Appendix 2.4.** Gull Island Mesic Northern Forest FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Taxus canadensis</i>	yew	TAXCAN	native	5	3
<i>Thalictrum dasycarpum</i>	purple meadow-rue	THADAS	native	3	-3
<i>Thalictrum dioicum</i>	early meadow-rue	THADIO	native	6	3
<i>Thuja occidentalis</i>	arbor vitae	THUOCC	native	4	-3
<i>Toxicodendron radicans</i>	poison-ivy	TOXRAD	native	2	0
<i>Trientalis borealis</i>	star-flower	TRIBOR	native	5	0
<i>Trillium grandiflorum</i>	common trillium	TRIGRA	native	5	3
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0
<i>Viola blanda</i>	sweet white violet	VIOBLA	native	5	-3
<i>Viola canadensis</i>	canada violet	VIOCAN	native	5	3

## Appendix 2.5. Gull Island Sand and Gravel Beach FQA.

### Conservatism-Based Metrics:

Total Mean C:	3
Native Mean C:	4.1
Total FQI:	26.8
Native FQI:	31.8
Adjusted FQI:	35.5
% C value 0:	27.5
% C value 1-3:	31.3
% C value 4-6:	31.3
% C value 7-10:	10
Native Tree Mean C:	2.6
Native Shrub Mean C:	4.3
Native Herbaceous Mean C:	4.1

### Species Richness:

Total Species:	80	
Native Species:	60	75%
Non-native Species:	20	25%

### Species Wetness:

Mean Wetness:	1.9
Native Mean Wetness:	1.4

### Physiognomy Metrics:

Tree:	5	6.30%
Shrub:	17	21.30%
Vine:	4	5%
Forb:	47	58.80%
Grass:	3	3.80%
Sedge:	1	1.30%
Rush:	2	2.50%
Fern:	1	1.30%
Bryophyte:	0	0%

### Duration Metrics:

Annual:	6	7.50%
Perennial:	59	73.80%
Biennial:	15	18.80%
Native Annual:	4	5%
Native Perennial:	49	61.30%
Native Biennial:	7	8.80%

**Appendix 2.5.** Gull Island Sand and Gravel Beach FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Achillea millefolium</i>	yarrow	ACHMIL	native	1	3
<i>Agrimonia gryposepala</i>	tall agrimony	AGRGRY	native	2	3
<i>Anemone cylindrica</i>	thimbleweed	ANECYL	native	6	5
<i>Anticlea elegans</i>	white camas	ANTELE	native	10	-3
<i>Aquilegia canadensis</i>	wild columbine	AQUCAN	native	5	3
<i>Arabidopsis lyrata</i>	sand cress	ARALYR	native	7	3
<i>Arabis pycnocarpa</i>	hairy rock cress	ARAPYC	native	6	3
<i>Arctium minus</i>	common burdock	ARCMIN	non-native	0	3
<i>Arctostaphylos uva-ursi</i>	bearberry	ARCUVA	native	8	5
<i>Artemisia campestris</i>	wormwood	ARTCAM	native	5	5
<i>Asclepias syriaca</i>	common milkweed	ASCSYR	native	1	5
<i>Barbarea vulgaris</i>	yellow rocket	BARVUL	non-native	0	0
<i>Betula papyrifera</i>	paper birch	BETPAP	native	2	3
<i>Boechera grahamii</i>	rock cress	BOEGRA	native	6	3
<i>Cakile edentula</i>	sea-rocket	CAKEDE	native	5	3
<i>Campanula rotundifolia</i>	harebell	CAMROT	native	6	3
<i>Carex bebbii</i>	sedge	CXBEBB	native	4	-5
<i>Celastrus scandens</i>	american bittersweet	CELSCA	native	3	3
<i>Centaurea stoebe</i>	spotted knapweed	CENSTO	non-native	0	5
<i>Cirsium arvense</i>	canada thistle	CIRARV	non-native	0	3
<i>Cirsium vulgare</i>	bull thistle	CIRVUL	non-native	0	3
<i>Clinopodium vulgare</i>	wild-basil	CLIVUL	native	3	5
<i>Conium maculatum</i>	poison-hemlock	CONMAC	non-native	0	-3
<i>Conyza canadensis</i>	horseweed	CONCAN	native	0	3
<i>Cornus amomum</i>	silky dogwood	CORAMO	native	2	-3
<i>Cornus rugosa</i>	round-leaved dogwood	CORRUG	native	6	5
<i>Cornus sericea</i>	red-osier	CORSER	native	2	-3
<i>Corydalis aurea</i>	golden corydalis	CORAUR	native	5	5
<i>Cynoglossum officinale</i>	hounds-tongue	CYNOFF	non-native	0	5
<i>Descurainia pinnata</i>	tansy mustard	DESPIN	non-native	0	5
<i>Diervilla lonicera</i>	bush-honeysuckle	DIELON	native	4	5
<i>Elymus canadensis</i>	canada wild rye	ELYCAN	native	5	3
<i>Fragaria virginiana</i>	wild strawberry	FRAVIR	native	2	3
<i>Fraxinus pennsylvanica</i>	red ash	FRAPEN	native	2	-3
<i>Galium triflorum</i>	fragrant bedstraw	GALTRR	native	4	3
<i>Hypericum perforatum</i>	common st. johns-wort	HYPPER	non-native	0	5
<i>Juncus balticus</i>	rush	JUNBAL	native	4	-5
<i>Juncus nodosus</i>	joint rush	JUNNOD	native	5	-5
<i>Juniperus communis</i>	common or ground juniper	JUNCOI	native	4	3
<i>Juniperus horizontalis</i>	creeping juniper	JUNHOR	native	10	3
<i>Lactuca biennis</i>	tall blue lettuce	LACBIE	native	2	0
<i>Lathyrus japonicus</i>	beach pea	LATJAP	native	10	3
<i>Leucanthemum vulgare</i>	ox-eye daisy	LEUVUL	non-native	0	5
<i>Lycopus americanus</i>	common water horehound	LYCAME	native	2	-5
<i>Maianthemum canadense</i>	canada mayflower	MAICAN	native	4	3
<i>Maianthemum stellatum</i>	starry false solomon-seal	MAISTE	native	5	0



**Appendix 2.5.** Gull Island Sand and Gravel Beach FQA, continued.

<i>Nepeta cataria</i>	catnip	NEPCAT	non-native	0	3
<i>Oenothera biennis</i>	common evening-primrose	OENBIE	native	2	3
<i>Pastinaca sativa</i>	wild parsnip	PASSAT	non-native	0	5
<i>Physocarpus opulifolius</i>	ninebark	PHYOPU	native	4	-3
<i>Poa compressa</i>	canada bluegrass	POACOM	non-native	0	3
<i>Poa palustris</i>	fowl meadow grass	POAPAS	native	3	-3
<i>Polygala paucifolia</i>	gay-wings	POLPAU	native	7	3
<i>Populus balsamifera</i>	balsam poplar	POPBAL	native	2	-3
<i>Potentilla anserina</i>	silverweed	POTANS	native	5	-3
<i>Prunus pensylvanica</i>	pin cherry	PRUPEN	native	3	3
<i>Prunus pumila</i>	sand cherry	PRUPUM	native	8	5
<i>Prunus virginiana</i>	choke cherry	PRUVIR	native	2	3
<i>Pteridium aquilinum</i>	bracken fern	PTEAQU	native	0	3
<i>Ranunculus sceleratus</i>	cursed crowfoot	RANSCE	native	1	-5
<i>Rhus typhina</i>	staghorn sumac	RHUTYP	native	2	3
<i>Rosa acicularis</i>	wild rose	ROSACI	native	4	3
<i>Rosa blanda</i>	wild rose	ROSLA	native	3	3
<i>Rosa rubiginosa</i>	sweetbrier	ROSRUB	non-native	0	3
<i>Rubus strigosus</i>	wild red raspberry	RUBSTR	native	2	0
<i>Rumex crispus</i>	curly dock	RUMCRI	non-native	0	0
<i>Sambucus racemosa</i>	red-berried elder	SAMRAC	native	3	3
<i>Sedum acre</i>	mossy stonecrop	SEDACR	non-native	0	5
<i>Silene antirrhina</i>	sleepy catchfly	SILANT	native	2	5
<i>Solanum dulcamara</i>	bittersweet nightshade	SOLDUL	non-native	0	0
<i>Solidago simplex</i>	gillmans goldenrod	SOLSIM	native	10	3
<i>Taraxacum officinale</i>	common dandelion	TAROFF	non-native	0	3
<i>Taxus canadensis</i>	yew	TAXCAN	native	5	3
<i>Thalictrum dioicum</i>	early meadow-rue	THADIO	native	6	3
<i>Thuja occidentalis</i>	arbor vitae	THUOCC	native	4	-3
<i>Toxicodendron radicans</i>	poison-ivy	TOXRAD	native	2	0
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0
<i>Verbascum thapsus</i>	common mullein	VERTHA	non-native	0	5
<i>Verbena hastata</i>	blue vervain	VERHAS	native	4	-3
<i>Viola arvensis</i>	field pansy	VIOARV	non-native	0	5

## Appendix 2.6. Gull Island Northern Wet Meadow FQA.

### Conservatism-Based Metrics:

Total Mean C:	3.6
Native Mean C:	4.3
Total FQI:	19.4
Native FQI:	21.1
Adjusted FQI:	39.1
% C value 0:	20.7
% C value 1-3:	27.6
% C value 4-6:	37.9
% C value 7-10:	13.8
Native Tree Mean C:	n/a
Native Shrub Mean C:	2.7
Native Herbaceous Mean C:	4.5

### Species Richness:

Total Species:	29	
Native Species:	24	82.80%
Non-native Species:	5	17.20%

### Species Wetness:

Mean Wetness:	-2.8
Native Mean Wetness:	-3.9

### Physiognomy Metrics:

Tree:	0	0%
Shrub:	3	10.30%
Vine:	0	0%
Forb:	15	51.70%
Grass:	5	17.20%
Sedge:	3	10.30%
Rush:	3	10.30%
Fern:	0	0%
Bryophyte:	0	0%

### Duration Metrics:

Annual:	1	3.40%
Perennial:	27	93.10%
Biennial:	1	3.40%
Native Annual:	1	3.40%
Native Perennial:	23	79.30%
Native Biennial:	0	0%

**Appendix 2.6.** Gull Island Northern Wet Meadow FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Agrostis scabra</i>	ticklegrass	AGRSCA	native	4	0
<i>Calamagrostis canadensis</i>	blue-joint	CALCAN	native	3	-5
<i>Calamagrostis stricta</i>	narrow-leaved reedgrass	CALSTR	native	10	-3
<i>Carex aquatilis</i>	sedge	CXAQUA	native	7	-5
<i>Carex scoparia</i>	sedge	CXSCOP	native	4	-3
<i>Cirsium arvense</i>	canada thistle	CIRARV	non-native	0	3
<i>Cornus amomum</i>	silky dogwood	CORAMO	native	2	-3
<i>Cornus sericea</i>	red-osier	CORSER	native	2	-3
<i>Eleocharis elliptica</i>	golden-seeded spike rush	ELEELL	native	6	-5
<i>Epilobium coloratum</i>	cinnamon willow-herb	EPICOL	native	3	-5
<i>Epilobium parviflorum</i>	willow-herb	EPIPAR	non-native	0	-5
<i>Glyceria striata</i>	fowl manna grass	GLYSTR	native	4	-5
<i>Hypericum perforatum</i>	common st. johns-wort	HYPPER	non-native	0	5
<i>Impatiens capensis</i>	spotted touch-me-not	IMPCAP	native	2	-3
<i>Juncus balticus</i>	rush	JUNBAL	native	4	-5
<i>Juncus brachycephalus</i>	rush	JUNBRP	native	7	-5
<i>Juncus canadensis</i>	canadian rush	JUNCAN	native	6	-5
<i>Lobelia kalmii</i>	bog lobelia	LOBKAL	native	10	-5
<i>Lycopus americanus</i>	common water horehound	LYCAME	native	2	-5
<i>Lysimachia thyrsiflora</i>	tufted loosestrife	LYSTHY	native	6	-5
<i>Phalaris arundinacea</i>	reed canary grass	PHAARU	native	0	-3
<i>Physocarpus opulifolius</i>	ninebark	PHYOPU	native	4	-3
<i>Potentilla anserina</i>	silverweed	POTANS	native	5	-3
<i>Scutellaria galericulata</i>	marsh skullcap	SCUGAL	native	5	-5
<i>Sedum acre</i>	mossy stonecrop	SEDACR	non-native	0	5
<i>Typha latifolia</i>	broad-leaved cat-tail	TYPLAT	native	1	-5
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0
<i>Verbascum thapsus</i>	common mullein	VERTHA	non-native	0	5
<i>Viola cucullata</i>	marsh violet	VIOCUC	native	5	-5



## Appendix 2.7. Gull Island Disturbed FQA.

### Conservatism-Based Metrics:

Total Mean C:	3
Native Mean C:	3.6
Total FQI:	10.4
Native FQI:	11.4
Adjusted FQI:	32.9
% C value 0:	25
% C value 1-3:	25
% C value 4-6:	50
% C value 7-10:	0
Native Tree Mean C:	5
Native Shrub Mean C:	3.3
Native Herbaceous Mean C:	3.6

### Species Richness:

Total Species:	12	
Native Species:	10	83.30%
Non-native Species:	2	16.70%

### Species Wetness:

Mean Wetness:	3.7
Native Mean Wetness:	3.4

### Physiognomy Metrics:

Tree:	1	8.30%
Shrub:	4	33.30%
Vine:	0	0%
Forb:	5	41.70%
Grass:	0	0%
Sedge:	0	0%
Rush:	0	0%
Fern:	2	16.70%
Bryophyte:	0	0%

### Duration Metrics:

Annual:	0	0%
Perennial:	12	100%
Biennial:	0	0%
Native Annual:	0	0%
Native Perennial:	10	83.30%
Native Biennial:	0	0%

**Appendix 2.7.** Gull Island Disturbed FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Acer saccharum</i>	sugar maple	ACESAU	native	5	3
<i>Campanula rotundifolia</i>	harebell	CAMROT	native	6	3
<i>Clinopodium vulgare</i>	wild-basil	CLIVUL	native	3	5
<i>Dendrolycopodium dendroideum</i>	tree clubmoss	DENDEN	native	5	3
<i>Diervilla lonicera</i>	bush-honeysuckle	DIELON	native	4	5
<i>Erigeron strigosus</i>	daisy fleabane	ERISTR	native	4	3
<i>Hypericum perforatum</i>	common st. johns-wort	HYPPER	non-native	0	5
<i>Leucanthemum vulgare</i>	ox-eye daisy	LEUVUL	non-native	0	5
<i>Prunus virginiana</i>	choke cherry	PRUVIR	native	2	3
<i>Pteridium aquilinum</i>	bracken fern	PTEAQU	native	0	3
<i>Rhus typhina</i>	staghorn sumac	RHUTYP	native	2	3
<i>Taxus canadensis</i>	yew	TAXCAN	native	5	3

**Appendix 2.8. Hat Island FQA.**

Conservatism-Based Metrics:

Total Mean C:	1
Native Mean C:	2.5
Total FQI:	6.9
Native FQI:	11.2
Adjusted FQI:	16.3
% C value 0:	61.7
% C value 1-3:	27.7
% C value 4-6:	8.5
% C value 7-10:	2.1
Native Tree Mean C:	n/a
Native Shrub Mean C:	2.3
Native Herbaceous Mean C:	2.5

Species Richness:

Total Species:	47	
Native Species:	20	42.60%
Non-native Species:	27	57.40%

Species Wetness:

Mean Wetness:	2.6
Native Mean Wetness:	1.6

Physiognomy Metrics:

Tree:	0	0%
Shrub:	4	8.50%
Vine:	2	4.30%
Forb:	41	87.20%
Grass:	0	0%
Sedge:	0	0%
Rush:	0	0%
Fern:	0	0%
Bryophyte:	0	0%

Duration Metrics:

Annual:	14	29.80%
Perennial:	25	53.20%
Biennial:	8	17%
Native Annual:	6	12.80%
Native Perennial:	13	27.70%
Native Biennial:	1	2.10%



**Appendix 2.8.** Hat Island FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Achillea millefolium</i>	yarrow	ACHMIL	native	1	3
<i>Aquilegia canadensis</i>	wild columbine	AQUCAN	native	5	3
<i>Arctium minus</i>	common burdock	ARCMIN	non-native	0	3
<i>Artemisia absinthium</i>	absinth wormwood	ARTABS	non-native	0	5
<i>Asclepias syriaca</i>	common milkweed	ASCSYR	native	1	5
<i>Barbarea vulgaris</i>	yellow rocket	BARVUL	non-native	0	0
<i>Berteroa incana</i>	hoary alyssum	BERINC	non-native	0	5
<i>Cakile edentula</i>	sea-rocket	CAKEDE	native	5	3
<i>Centaurea stoebe</i>	spotted knapweed	CENSTO	non-native	0	5
<i>Chenopodium album</i>	lamb-quarters	CHEALB	non-native	0	3
<i>Cirsium vulgare</i>	bull thistle	CIRVUL	non-native	0	3
<i>Conyza canadensis</i>	horseweed	CONCAN	native	0	3
<i>Cornus sericea</i>	red-osier	CORSER	native	2	-3
<i>Epilobium hirsutum</i>	great hairy willow-herb	EPIHIR	non-native	0	-3
<i>Erysimum cheiranthoides</i>	wormseed mustard	ERYCHE	non-native	0	3
<i>Fallopia convolvulus</i>	false buckwheat	FALCON	non-native	0	3
<i>Fragaria virginiana</i>	wild strawberry	FRAVIR	native	2	3
<i>Geranium bicknellii</i>	northern cranes-bill	GERBIC	native	4	5
<i>Heracleum maximum</i>	cow-parsnip	HERMAX	native	3	-3
<i>Hypericum perforatum</i>	common st. johns-wort	HYPPER	non-native	0	5
<i>Leonurus cardiaca</i>	motherwort	LEOCAR	non-native	0	5
<i>Leucanthemum vulgare</i>	ox-eye daisy	LEUVUL	non-native	0	5
<i>Maianthemum stellatum</i>	starry false solomon-seal	MAISTE	native	5	0
<i>Malva neglecta</i>	cheeses	MALNEG	non-native	0	5
<i>Nepeta cataria</i>	catnip	NEPCAT	non-native	0	3
<i>Oenothera biennis</i>	common evening-primrose	OENBIE	native	2	3
<i>Pastinaca sativa</i>	wild parsnip	PASSAT	non-native	0	5
<i>Persicaria maculosa</i>	ladys-thumb	PERMAC	non-native	0	0
<i>Polygonum ramosissimum</i>	bushy knotweed	POLRAM	native	7	0
<i>Potentilla norvegica</i>	rough cinquefoil	POTNOR	native	0	0
<i>Potentilla recta</i>	rough-fruited cinquefoil	POTREC	non-native	0	5
<i>Prunus virginiana</i>	choke cherry	PRUVIR	native	2	3
<i>Rubus strigosus</i>	wild red raspberry	RUBSTR	native	2	0
<i>Rumex crispus</i>	curly dock	RUMCRI	non-native	0	0
<i>Sambucus racemosa</i>	red-berried elder	SAMRAC	native	3	3
<i>Saponaria officinalis</i>	bouncing bet	SAPOFF	non-native	0	3
<i>Sedum acre</i>	mossy stonecrop	SEDACR	non-native	0	5
<i>Silene latifolia</i>	white campion	SILLAT	non-native	0	5
<i>Silene vulgaris</i>	bladder campion	SILVUL	non-native	0	5
<i>Sisymbrium altissimum</i>	tumble mustard	SISALT	non-native	0	3
<i>Solanum dulcamara</i>	bittersweet nightshade	SOLDUL	non-native	0	0
<i>Solanum ptychanthum</i>	black nightshade	SOLPTY	native	1	3
<i>Solidago altissima</i>	tall goldenrod	SOLALT	native	1	3
<i>Symphotrichum lanceolatum</i>	panicled aster	SYMLAN	native	2	-3
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0
<i>Verbascum thapsus</i>	common mullein	VERTHA	non-native	0	5
<i>Viola arvensis</i>	field pansy	VIOARV	non-native	0	5

**Appendix 2.9. Pismire Island FQA.**

Conservatism-Based Metrics:

Total Mean C:	0.9
Native Mean C:	2.3
Total FQI:	3.8
Native FQI:	6.1
Adjusted FQI:	14.3
% C value 0:	72.2
% C value 1-3:	16.7
% C value 4-6:	5.6
% C value 7-10:	5.6
Native Tree Mean C:	n/a
Native Shrub Mean C:	3
Native Herbaceous Mean C:	2.2

Species Richness:

Total Species:	18	
Native Species:	7	38.90%
Non-native Species:	11	61.10%

Species Wetness:

Mean Wetness:	2.3
Native Mean Wetness:	1.1

Physiognomy Metrics:

Tree:	0	0%
Shrub:	1	5.60%
Vine:	1	5.60%
Forb:	16	88.90%
Grass:	0	0%
Sedge:	0	0%
Rush:	0	0%
Fern:	0	0%
Bryophyte:	0	0%

Duration Metrics:

Annual:	6	33.30%
Perennial:	7	38.90%
Biennial:	5	27.80%
Native Annual:	4	22.20%
Native Perennial:	3	16.70%
Native Biennial:	0	0%

**Appendix 2.9.** Pismire Island FQA, continued.

Scientific Name	Common Name	Acronym	Native?	C	W
<i>Arctium minus</i>	common burdock	ARCMIN	non-native	0	3
<i>Barbarea vulgaris</i>	yellow rocket	BARVUL	non-native	0	0
<i>Centaurea stoebe</i>	spotted knapweed	CENSTO	non-native	0	5
<i>Chenopodium album</i>	lambs-quarters	CHEALB	non-native	0	3
<i>Geranium bicknellii</i>	northern cranes-bill	GERBIC	native	4	5
<i>Leonurus cardiaca</i>	motherwort	LEOCAR	non-native	0	5
<i>Malva neglecta</i>	cheeses	MALNEG	non-native	0	5
<i>Nepeta cataria</i>	catnip	NEPCAT	non-native	0	3
<i>Pastinaca sativa</i>	wild parsnip	PASSAT	non-native	0	5
<i>Persicaria lapathifolia</i>	nodding smartweed	PERLAP	native	0	-3
<i>Polygonum ramosissimum</i>	bushy knotweed	POLRAM	native	7	0
<i>Potentilla norvegica</i>	rough cinquefoil	POTNOR	native	0	0
<i>Rumex crispus</i>	curly dock	RUMCRI	non-native	0	0
<i>Sambucus racemosa</i>	red-berried elder	SAMRAC	native	3	3
<i>Silene latifolia</i>	white campion	SILLAT	non-native	0	5
<i>Solanum dulcamara</i>	bittersweet nightshade	SOLDUL	non-native	0	0
<i>Symphotrichum pilosum</i>	hairy aster	SYMPIL	native	1	3
<i>Urtica dioica</i>	stinging nettle	URTDIO	native	1	0



## Appendix 3. Ojibwe names for plants observed on Gull, Hat, and Pismire Islands

This appendix includes a crosswalk between Ojibwe names, scientific names, and common English names for all species observed on Gull Island that are listed in “Plants used by the Great Lakes Ojibwa” (Meeker et al. 1993). The crosswalk constitutes Appendix 3.1. In addition, in Appendix 3.2 we list the observed plants by their Ojibwe names indexed by the natural community types where they were recorded on Gull Island.

Within the crosswalk, when multiple Ojibwe names are known for the same plant, the Ojibwe names are separated by a semi-colon. Many names were originally documented by non-Ojibwe speakers and the spellings of some of the names were not restored by Ojibwe speakers so are reproduced here phonetically (29; 27%). We indicate whether or not a plant has been restored. Note that we do not reproduce accents (diacritical marks) for names included only under a phonetic name in Meeker et al. (1993) and this may affect pronunciation (for example, some “s” = “zh”). Multiple scientific names separated by semi-colons indicate closely related species we have crosswalked to a single Ojibwe name. The first scientific name listed is the species listed in Meeker et al. (1993). If Meeker et al. (1993) lists a synonym or only includes a closely related species, then the scientific name used in Meeker et al. (1993) is listed in parentheses (\*different but closely related species). Page numbers within the crosswalk indicate the page in Meeker et al. (1993) where the plant is referenced.

**Appendix 3.1.** Crosswalk between Ojibwe names and scientific and English names.

Ojibwe Name	Restored	Page	Scientific Name	English Name
(g)odotaagaans	Yes	318	<i>Clintonia borealis</i>	bluebead-lily; corn-lily
(g)odotaagaans; ?ziiginise; ziiginish(e)	Yes	35	<i>Campanula rotundifolia</i>	harebell
(gi)chi-mazaan; wiisagibag, -oon; wiisagijiibik	Yes	96	<i>Arctium minus</i>	common burdock
(gi)chi-mazaanashk	Yes	103	<i>Cirsium vulgare</i>	bull thistle
(gi)chi-okaadaak; nezhikewang; okaadaak	Yes	274	<i>Aralia racemosa</i>	spikenard
?bebaamaabiig; okaadaak; waaboozojiibik	Yes	235	<i>Aralia nudicaulis</i>	wild sarsaparilla
a 'sawan; ana ' ganuck; nokomi ' skinun	No	238	<i>Athyrium filix-femina</i>	lady fern
aagamaak	Yes	358	<i>Fraxinus pennsylvanica</i>	red ash
aandegopin	Yes	174	<i>Lycopus americanus;</i> <i>Lycopus uniflorus</i> (*L. <i>asper</i> )	common water horehound
aginiiminagaawanzh	Yes	225	<i>Rosa blanda</i>	wild rose
agongosimin, -ag	Yes	217	<i>Melampyrum lineare</i>	cow-wheat
agongosimin, -an, -ag	Yes	326	<i>Maianthemum canadense</i>	canada mayflower
agongosimizh (plant); agongosimin, -an (berry); agongosi(wi)jiibik; ginebigwashk	Yes	260	<i>Maianthemum racemosum</i> <i>(Smilacina racemosa)</i>	false spikenard
ah-o-je-mahg (adjimag)	No	333	<i>Sorbus americana; Sorbus</i> <i>decora</i>	american mountain-ash
ajidamoowaanow	Yes	262	<i>Solidago flexicaulis</i> <i>Solidago canadensis; S.</i>	zigzag goldenrod
ajidamoowaanow; giiziso-mashkiki	Yes	349	<i>altissima</i>	canada goldenrod
ajidamoowaanow; waabigwan	Yes	93	<i>Achillea millefolium</i>	yarrow
aniibimin, -an (berry); aniibiminagaawashk (plant)	Yes	351	<i>Viburnum trilobum</i> (V. <i>opulus</i> )	american highbush- cranberry
animikiibag	Yes	135	<i>Toxicodendron radicans</i>	poison-ivy
animozid	Yes	291	<i>Hepatica acutiloba</i>	sharp-lobed hepatica
aninaandag, -oog; ininaandag, -oog; bigiwaandag, -oog; zhinbog, --g; zhingobaaandag, -oog; zhingob bigiwaandag	Yes	313	<i>Abies balsamea</i>	balsam fir
aninaatig, -oog	Yes	270	<i>Acer saccharum</i>	sugar maple
anungokauh	No	56	<i>Maianthemum stellatum</i> <i>(Smilacina stellata)</i>	starry false solomons- seal
apaakozigan; miskwaabiimag	Yes	18	<i>Arctostaphylos uva-ursi</i>	bearberry
apakway; apakweshk; apakweshkway; nabagashk	Yes	152	<i>Typha latifolia</i>	broad-leaved cat-tail
asa/isaweminagaawanzh (plant); asa/isawemin (berry)	Yes	256	<i>Prunus virginiana</i>	choke cherry
azaadi(i); maanzaadi(i)	Yes	328	<i>Populus balsamifera</i>	balsam poplar
baakwaanaatig; baakwaanimizh	Yes	28	<i>Rhus typhina</i>	staghorn sumac
baasibagak	Yes	128	<i>Silene latifolia</i>	white campion
bagaan, -ag; bagaanens; bagaanimizh; bagaanak	Yes	243	<i>Corylus cornuta</i>	beaked hazelnut
bagwaji-zhi/agaagawanzh, -iig; zhi/agaagawanzh, -iig; zhi/agaagawanzhiins	Yes	272	<i>Allium tricoccum</i>	wild leek
bawa'iminaan; gozigwaakomin, -ag	Yes	329	<i>Prunus pensylvanica</i>	pin cherry
bezhigojiibik	Yes	281	<i>Caulophyllum thalictroides</i>	blue cohosh

**Appendix 3.1.** Crosswalk between Ojibwe names and scientific and English names (continued).

Ojibwe Name	Restored	Page	Scientific Name	English Name
bibigwewanashk, -oon	Yes	167	<i>Heracleum maximum</i> ( <i>H. lanatum</i> )	cow-parsnip
biimaakwad; manidoo-biimaakwad	Yes	36	<i>Celastrus scandens</i>	american bittersweet
cigona ' gan	No	250	<i>Dendrolycopodium obscurum</i> ; <i>D. dendroideum</i> ( <i>*Lycopodium o.</i> )	ground-pine
doodooshaaboo	Yes	361	<i>Lactuca biennis</i>	tall blue lettuce
doodooshaaboojiibik; mindimooyenh	Yes	134	<i>Taraxacum officinale</i>	common dandelion
gaagigebag	Yes	209	<i>Chimaphila umbellata</i>	pipsissewa
gaanda'igwaasoning ezhinaagwak	Yes	206	<i>Anemone cylindrica</i>	thimbleweed
gaawaandag; gaawaandagwaatig; mina'ig; wadab; zesegaandag	Yes	327	<i>Picea glauca</i>	white spruce
gaazha/igensibag; (gi)chi-namewashk	Yes	115	<i>Nepeta cataria</i>	catnip
giboodiyegwaazon	Yes	37	<i>Corydalis aurea</i>	golden corydalis
gichi-ode'iminijiibik	Yes	49	<i>Potentilla norvegica</i>	rough cinquefoil
gickensine ' namukuk	Yes	240	<i>Botrypus virginianus</i> ( <i>Botrychium virginianum</i> )	rattlesnake fern common or ground
giizhigaandagizi; ogaawa/inzh	Yes	43	<i>Juniperus communis</i>	juniper
giizhik, -ag; gizhikens, -ag; giizhikenh	Yes	387	<i>Thuja occidentalis</i>	arbor vitae
ginoozhewashk; ozawijiibik; zhiiwibag	Yes	127	<i>Rumex crispus</i>	curly dock
ini ' niwin ' dibige ' gun'; baushkindjibgwaun	No	308	<i>Trillium grandiflorum</i>	common trillium
ininiwa/inzh; zhaabozigan	Yes	99	<i>Asclepias syriaca</i>	common milkweed
kauwe-sabu-min; me ' skwacabo ' minuk	No	257	<i>Ribes cynosbati</i>	prickly or wild gooseberry
main 'gamuna 'tig; anigomiji ' minaga 'wunj	No	59	<i>Symphoricarpos albus</i> var. <i>albus</i>	snowberry
maskwi ' widzhi ' wiko 'kok	No	312	<i>Viola canadensis</i>	canada violet
mazaan; mazaanaatig	Yes	373	<i>Urtica dioica</i>	stinging nettle
mazaanashk	Yes	102	<i>Cirsium arvense</i>	canada thistle
meskojiibikak; meskwijiibikak; miskojiibik; miskwijiibik	Yes	306	<i>Sanguinaria canadensis</i>	bloodroot
migiziibag; migiziwibag; naemgosibag	Yes	237	<i>Eurybia macrophylla</i> ( <i>Aster macrophyllus</i> )	big-leaved aster
miishijiiminagaawanzh, iig (plant); miishijiimin -ag (berry); zhaaboomin	Yes	385	<i>Ribes triste</i>	swamp red currant
miskominagaawanzh; miskwiminagaawanzh; miskomin, -ag; miskimin, -ag	Yes	125	<i>Rubus strigosus</i> ( <i>R. idaeus</i> )	wild red raspberry
miskoobimizh; miskwaabiimizh	Yes	340	<i>Cornus sericea</i>	red-osier
miskwazi-wusk	No	47	<i>Physocarpus opulifolius</i>	Rosaceae
misudidjeebik	No	234	<i>Aquilegia canadensis</i>	wild columbine
moose-ojiibik; moosewijiibik	Yes	97	<i>Artemisia absinthium</i>	absinth wormwood
moosewijiibik	Yes	34	<i>Artemisia campestris</i>	wormwood
moozomizh	Yes	314	<i>Acer pensylvanicum</i>	striped maple
naaniibide'oodegin	Yes	303	<i>Polygonatum pubescens</i>	downy solomon seal

**Appendix 3.1.** Crosswalk between Ojibwe names and scientific and English names (continued).

Ojibwe Name	Restored	Page	Scientific Name	English Name
nawo 'buguk; wunukibugauh	No	336	<i>Trientalis borealis</i>	star-flower
ne 'bagandag '; pebamabid-singup	No	335	<i>Taxus canadensis</i>	yew
neezhodaeyun	No	325	<i>Linnaea borealis</i>	twinflower
nookwezigan	Yes	71	<i>Erigeron strigosus; E. annuus</i>	daisy fleabane
ode'imin, -an; ode'iminiibik	Yes	109	<i>Fragaria virginiana</i>	wild strawberry
ode'iminiibik; zhakaagomin; zhaashaagomin; zhaashaagominens	Yes	319	<i>Cornus canadensis</i>	bunchberry
odjici ' gomin	No	362	<i>Lactuca canadensis</i>	tall lettuce
oginiiminagaawanzh	Yes	82	<i>Rosa acicularis</i>	wild rose
ogitebagoons	Yes	269	<i>Viola pubescens</i>	yellow violet
ojidimo miskishmandamin	No	38	<i>Dicentra cucullaria</i>	dutchmans-breeches
ookwemizh (plant); ookwemin (berry)	Yes	255	<i>Prunus serotina</i>	wild black cherry
ozaawaabigwan	Yes	108	<i>Erysimum cheiranthoides</i>	wormseed mustard
ozaawashkojiibik	Yes	360	<i>Impatiens capensis</i>	spotted touch-me-not
ozagadigom	Yes	295	<i>Osmorhiza claytonii</i>	hairy sweet-cicely
ozhaashijiibik; ozhaashijiibikens; zhooshkijiibik	Yes	106	<i>Chamerion angustifolium (Epilobium a.)</i>	fireweed
papshkisiganak; papskatciksi ' gana 'tig	Yes	305	<i>Sambucus racemosa</i>	red-berried elder
pigwe 'wunusk	No	118	<i>Pastinaca sativa</i>	wild parsnip
sabankuk	No	215	<i>Lonicera dioica</i>	red honeysuckle
sewa 'komin	No	50	<i>Prunus pumila</i>	sand cherry
skizgu-min	No	331	<i>Rubus pubescens</i>	dwarf raspberry
tcatcabonu ' ksik; zheebaunkudohnse	No	182	<i>Scutellaria galericulata</i>	marsh skullcap
tikizidgeebikohnse	Yes	24	<i>Polygala paucifolia</i>	gay-wings
waabigwan	Yes	104	<i>Conyza canadensis</i>	horseweed
wapkadak; weekizigun	Yes	271	<i>Actaea pachypoda (A. alba)</i>	dolls-eyes
wewai ' bugug	Yes	338	<i>Viola labradorica (V. conspersa)</i>	dog violet
wezauskwagmik; osawa ' skanet	No	245	<i>Diervilla lonicera</i>	bush-honeysuckle
wiigwaas, -an, -ag; wiigwaasaatig; wiigwaasi-mitig; wiigwaasimizh	Yes	239	<i>Betula papyrifera</i>	paper birch
wiinisiibag; wiinisiibagoons; wiinisiibagad	Yes	213	<i>Gaultheria procumbens</i>	wintergreen
zaesikanibowin	No	92	<i>Anticlea elegans (Zigadenus e.)</i>	white camas
zhaashaagobiimag	Yes	315	<i>Acer spicatum</i>	mountain maple
zhaashaagomin	Yes	275	<i>Arisaema triphyllum</i>	jack-in-the-pulpit
zhawaseshkoohnse	No	186	<i>Verbena hastata</i>	blue vervain
zhingwaak	Yes	220	<i>Pinus strobus</i>	white pine
No name given ( <i>C. rugosa</i> )	No	242	<i>Cornus rugosa</i>	round-leaved dogwood
No name given ( <i>H. lucidula</i> )	No	292	<i>Huperzia lucidula (Lycopodium lucidulum)</i>	shining clubmoss
No name given ( <i>O. biennis</i> )	No	116	<i>Oenothera biennis</i>	common evening-primrose



**Appendix 3.1.** Crosswalk between Ojibwe names and scientific and English names (continued).

Ojibwe Name	Restored	Page	Scientific Name	English Name
No name given ( <i>P. maculosa</i> )	No	48	<i>Persicaria maculosa</i> ( <i>Polygonum persicaria</i> )	ladys thumb
No name given ( <i>R. sceleratus</i> )	No	180	<i>Ranunculus sceleratus</i>	cursed crowfoot
No name given ( <i>S. ptychanthum</i> )	No	130	<i>Solanum ptychanthum</i> (* <i>Solanum nigrum</i> )	black nightshade
No name given ( <i>T. dasycarpum</i> )	No	185	<i>Thalictrum dasycarpum</i>	purple meadow-rue

**Appendix 3.2.** Ojibwe plant names indexed by natural community type and island (a = Gull, b = Hat, c = Pismire).

Ojibwe Name	Scientific Name	English Name	Dry-mesic		Great	Limestone	Mesic	Rich	Stan-		
			Boreal Forest	Northern Forest	Lakes Marsh	Cobble Shore	Northern Forest	Conifer Swamp		Other Harbor	derson
(gi)chigamiwashk, -oon	<i>Juncus tenuis</i>	path rush	b			a		a	X	X	
(gi)chi-mazaanashk	<i>Cirsium vulgare</i>	bull thistle	a		a	a, b	a	a	X	X	
?bebaamaabiig; okaaadaak; waaboozojiibik	<i>Antennaria howellii</i> (* <i>A. neglecta</i> )	small pussytoes						a	X		
aaboojigan	<i>Phragmites australis</i> var. <i>americanus</i>	reed			a	b		a	X	X	
aagimaak	<i>Fraxinus pennsylvanica</i>	red ash	a, b		a	a, b	a	a	X	X	
aagimaak; baapaagimaak	<i>Fragaria virginiana</i>	wild strawberry	a					a	X		
aagimaak; wiisagaak	<i>Fraxinus nigra</i>	black ash	a, b	a	a			a	X	X	
aandegobagoons; namepin; namewashkoons	<i>Mentha canadensis</i> (* <i>M. arvensis</i> )	field mint	b		a				X	X	
aandegopin	<i>Lycopus americanus</i> ; <i>Lycopus uniflorus</i> (*L. <i>asper</i> )	common water horehound	b		a	a, b		a	a	X	X
agongosimin, -ag	<i>Maianthemum stellatum</i> ( <i>Smilacina stellata</i> )	starry false solomons-seal		a						X	
agongosimin, -an	<i>Persicaria amphibia</i> (* <i>Polygonum amphibium</i> )	water smartweed			a	a, b			X	X	
agongosimin, -an, -ag agongosimizh (plant); agongosimin, -an (berry); agongosi(wi)jiibik; ginebigwashk	<i>Linnaea borealis</i>	twinflower	a					a	X		
ah-o-je-mahg (adjimag)	<i>Maianthemum canadense</i>	canada mayflower	a	a			a	a	X		
ajidamoowaanow	<i>Sorbus americana</i>	american mountain-ash	a					a	X		
ajidamoowaanow; waabigwan	<i>Hepatica americana</i>	round-lobed hepatica	a						X		
akandamoo	<i>Acer spicatum</i>	mountain maple	a					a	X		
ana ' ganuck	<i>Nuphar variegata</i>	yellow pond-lily			a				X		
anaakan; anaakanashk; (gi)chigamiwashk, -oon	<i>Diervilla lonicera</i>	bush-honeysuckle	a					a	X		
aniib, -iig	<i>Schoenoplectus tabernaemontani</i> (* <i>Scirpus validus</i> )	softstem bulrush			a	a			X		
aniibimin	<i>Ulmus americana</i>	american elm				a			X		
animozid	<i>Vaccinium macrocarpon</i>	large cranberry						a	X		
aninaandag, -oog; ininaandag, -oog; bigiwaandag, -oog; zhinbog, -- g; zhingobaaandag, -oog; zhingob bigiwaandag	<i>Gaultheria hispidula</i>	creeping-snowberry						a	X		
aninaatig, -oog	<i>Abies balsamea</i>	balsam fir	a, b	a	a	a	a	a	X	X	
anungokauh	<i>Acer rubrum</i>	red maple		a	a	a	a	a	X		
apakwanagemag; bapakwanagemag; zhingobiins; zhingwaak	<i>Maianthemum racemosum</i> ( <i>Smilacina racemosa</i> )	false spikenard	a					a	X		
apakway; apakweshk; apakweshkway; nabagashk	<i>Picea mariana</i>	black spruce						a	X		
asa/isaweminagaawanzh (plant); asa/isawemin (berry)	<i>Typha latifolia</i>	broad-leaved cat-tail			a	a		a	X		
azaadi(i); azaadiins	<i>Prunus virginiana</i>	choke cherry	a						X		
azaadi(i); maanzaadi(i)	<i>Populus tremuloides</i>	quaking aspen	a, b	a		a, b	a	a	X	X	
baasibagak; nameswashk; namewashkoons	<i>Populus balsamifera</i>	balsam poplar	a, b	a	a	a, b	a	a	X	X	
bagizowin; zesab	<i>Potentilla norvegica</i>	rough cinquefoil	b		a	a			X	X	
	<i>Asclepias incarnata</i>	swamp milkweed	b		a				X	X	

**Appendix 3.2.** Ojibwe plant names indexed by natural community type and island (a = Gull, b = Hat, c = Pismire) (continued).

Ojibwe Name	Scientific Name	English Name	Dry-mesic		Great	Limestone	Mesic	Rich		Stan- derson
			Boreal Forest	Northern Forest	Lakes Marsh	Cobble Shore	Northern Forest	Conifer Swamp	Other	
bagwajipin, iig; baasibagak bawa'iminaan;	<i>Juniperus communis</i>	common or ground juniper		a			a		a	X
gozigwaakomin, -ag	<i>Prunus pensylvanica</i>	pin cherry	a				a			X
bebezhighooganshii-mashkiki	<i>Lathyrus palustris</i> <i>Menispermum</i>	marsh pea	b		a	a, b			a	X X
bima ' kwit wa 'bigons	<i>canadense</i> <i>Pyrola americana</i> (P. <i>rotundifolia</i> )	moonseed				a, b				X
bine(wi)bag	<i>Comarum palustre</i>	round-leaved pyrola	a							X
bine(wi)bag; gidagi-bineobag;	<i>Potentilla palustris</i>	marsh cinquefoil	b		a					X X
mashkiigojiibik	<i>Cornus sericea</i>	red-osier	a					a		X
cigona ' gan										
doodooshaaboojiibik;	<i>Taraxacum officinale</i>	common dandelion	a	a		a	a	a	a	X
mindimooyenh										
gaagaagiwanzh;										
zesegaandag; zhingob;	<i>Pastinaca sativa</i>	wild parsnip							a	X
zhingob gaawaandag	<i>Anemone cylindrica</i>	thimbleweed							a	X
gaagigebag	<i>Amelanchier arborea</i> ;									
gaanda'igwaasoning	<i>A. interior</i> ; <i>A.</i>									
ezhinaagwak	<i>sanguinea</i> (* <i>A. laevis</i> )	juneberry	a							X
gaawaandag;										
gaawaandagwaatig; mina'ig;										
wadab; zesegaandag	<i>Picea glauca</i>	white spruce	a, b	a		a	a	a	a	X X
gaie ' wuckuk	<i>Scirpus cyperinus</i> <i>Polygonatum</i>	wool-grass			a			a		X
gichi-ode'iminiijiibik	<i>pubescens</i>	downy solomon seal	a				a			X
gickensine ' namukuk	<i>Betula alleghaniensis</i>	yellow birch	a					a		X
giizhigaandagizi;										
ogaawa/inzh	<i>Juncus effusus</i>	soft-stemmed rush			a	a				X
giizhik, -ag; gizhikens, -ag;										
giizhikenh	<i>Scutellaria galericulata</i>	marsh skullcap	b		a	a, b	a	a	a	X X
ginoozhewashk; ozawijiibik;										
zhiiwibag	<i>Rumex crispus</i>	curly dock				a				X
gozgwaaakominagaawanzh										
(plant); gozigwaakomin, -ag										
(berry); ozagadigom;										
zazigaakominagaawamzh	<i>Actaea rubra</i>	red baneberry		a						X
ini ' niwin ' dibige ' gun';										
baushkindjibgwaun	<i>Trillium grandiflorum</i>	common trillium					a	a		X
ininiwa/inzh; zhaabozigan	<i>Asclepias syriaca</i>	common milkweed				b	a		a	X X
ishkodewijiibik	<i>Caltha palustris</i>	marsh-marigold						a		X
jasibonskok; aiankosing;										
gezibnusk; giji ' binusk	<i>Dryopteris cristata</i>	crested shield fern						a		X
maananoons, -ag	<i>Nymphaea odorata</i>	sweet-scented waterlily			a					X
mashkiigwaatig	<i>Larix laricina</i>	tamarack	b			a, b				X X
mashkode-miizhimizh;										
mitigomizh; wiisagi-										
mitigomizh	<i>Quercus rubra</i>	red oak		a			a		a	X
mauwidaekwaegozeediwush										
k	<i>Lathyrus ochroleucus</i>	pale vetchling	a				a			X
mazaan; mazaanaatig	<i>Thuja occidentalis</i>	arbor vitae	a, b	a	a	a, b	a	a		X X
mazaanashk	<i>Cirsium arvense</i>	canada thistle	a, b		a	a, b	a		a	X X
midewijiibik	<i>Anemone canadensis</i>	canada anemone	b			a, b				X X
	<i>Turritis glabra</i> ( <i>Arabis</i> <i>glabra</i> )	tower mustard							a	X
midodjidamo ' anuk										
migiziibag; migiziwibag;	<i>Erigeron strigosus</i> ; <i>E.</i>									
naemgosibag	<i>annus</i>	daisy fleabane			a	a				X
miinagaawanzh (plant); miin, -	<i>Vaccinium</i>									
an (berry)	<i>angustifolium</i>	low sweet blueberry		a						X

**Appendix 3.2.** Ojibwe plant names indexed by natural community type and island (a = Gull, b = Hat, c = Pismire) (continued).

Ojibwe Name	Scientific Name	English Name	Dry-mesic		Great	Limestone	Mesic	Rich		Stan- derson	
			Boreal Forest	Northern Forest	Lakes Marsh	Cobble Shore	Northern Forest	Conifer Swamp	Other		Harbor
miskominagaawanzh; miskwiminagaawanzh; miskomin, -ag; miskimin, -ag	<i>Rubus pubescens</i>	dwarf raspberry	b					a		X	X
miskoobimizh; miskwaabiimizh	<i>Cornus canadensis</i>	bunchberry						a		X	
moozomizh	<i>Verbena hastata</i>	blue vervain			a	a, b			a	X	X
naaniibide'oodegin	<i>Polygala paucifolia</i>	gay-wings	a	a				a		X	
nabagashk; wiikenh; zhaabozigan	<i>Iris versicolor</i>	wild blue flag	b		a	a, b		a	a	X	X
naubishkaukoot	<i>Sisyrinchium montanum</i>	mountain blue-eyed-grass				a, b				X	
nawo 'buguk; wunukibugauh nbiish-waawaasgone;	<i>Trientalis borealis</i>	star-flower	a	a			a	a		X	
gauwaukmeesh	<i>Nuphar advena</i>	yellow pond-lily						a		X	
ne 'bagandag '; pebamabid- singup	<i>Taxus canadensis</i>	yew	a					a		X	
neezhodaeyun	<i>Lemna minor; L. turionifera</i>	common or red duckweed			a			a		X	
niya 'wibukuk '; siabuksing, sasabwaksing; piskagamisag	<i>Eupatorium perfoliatum</i>	boneset			a	b				X	X
nookwezigan	<i>Erigeron philadelphicus</i>	philadelphia fleabane				a, b				X	X
nookwezigan	<i>Equisetum sylvaticum</i>	woodland horsetail						a		X	
ode'immin, -an; ode'iminiijibik	<i>Eurybia macrophylla (Aster macrophyllus)</i>	big-leaved aster					a			X	
ode'iminiijibik; zhakaagomin; zhaashaagomin;											
zhaashaagominens	<i>Coptis trifolia</i>	goldthread						a		X	
oga ' da mun; odite 'abug	<i>Melampyrum lineare</i>	cow-wheat		a						X	
oginiimnagaawanzh	<i>Rosa acicularis</i>	wild rose					a			X	
ogitebag	<i>Botrypus virginianus (Botrychium virginianum)</i>	rattlesnake fern	a				a			X	
ojiibikens; waashkobijiibikak; wiishkobijiibik	<i>Achillea millefolium</i>	yarrow							a	X	
ojiibwe ' owe ' cuwun	<i>Galium tinctorium</i>	stiff bedstraw								X	
ozaawaaijibik; ozaawijiibik	<i>Conyza canadensis</i>	horseweed				a				X	
ozaawashkoijiibik	<i>Impatiens capensis</i>	spotted touch-me-not	b		a	a, b		a	a	X	X
papshkisiganak; papskatckisi ' gana 'tig	<i>Sambucus racemosa</i>	red-berried elder	a					a		X	
pigwe 'wunusk	<i>Ostrya virginiana</i>	ironwood; hop-hornbeam				a	a			X	
pis-naknishkuns	<i>Hordeum jubatum</i>	squirrel-tail grass				a		a		X	
siba ' muckun	<i>Equisetum arvense</i>	common horsetail	a			a		a	a	X	
skizgu-min	<i>Ranunculus sceleratus</i>	cursed crowfoot				b					X
sus-sabu-min	<i>Ribes hirtellum</i>	swamp gooseberry						a		X	
tcatcabonu ' ksik; zheebaunkudohnse	<i>Rubus strigosus (R. idaeus)</i>	wild red raspberry	a, b			a	a	a	a	X	X
tikizidgeebikohnse	<i>Pinus strobus</i>	white pine	a	a			a		a	X	
wa 'sawasni 'mike	<i>Myrica gale</i>	sweet gale			a	a, b				X	X
waabigwan	<i>Capsella bursa-pastoris Anaphalis</i>	shepherds-purse			a					X	
waabigwan; baasibagak	<i>margaritacea Sagittaria graminea (*S. latifolia)</i>	pearly everlasting grass-leaved arrowhead	a			a, b	a		a	X	X
waabiziipin					a					X	
waaboozobagoons; waaboozobanzh	<i>Galium trifidum</i>	small bedstraw						a		X	



**Appendix 3.2.** Ojibwe plant names indexed by natural community type and island (a = Gull, b = Hat, c = Pismire) (continued).

Ojibwe Name	Scientific Name	English Name	Dry-mesic		Great	Limestone	Mesic	Rich		Stan- derson
			Boreal Forest	Northern Forest	Lakes Marsh	Cobble Shore	Northern Forest	Conifer Swamp	Other	
waboskiki ' minun	<i>Fraxinus americana</i>	white ash	a				a			X
wadoop, -iin	<i>Alnus incana</i>	speckled alder	b		a	b				X X
wewai ' bugug	<i>Viola labradorica</i> ( <i>V. conspersa</i> )	dog violet	a			a	a	a	a	X
wezaawaaskoneg	<i>Euthamia graminifolia</i>	flat-topped goldenrod	b							X
wezauskwagmik; osawa ' skanet	<i>Dendrolycopodium obscurum</i> ; <i>D. dendroideum</i> ( <i>*Lycopodium o.</i> )	ground-pine	a				a			X
wiigwaas, -an, -ag; wiigwaasaatig; wiigwaasi-mitig; wiigwaasimizh	<i>Betula papyrifera</i>	paper birch	a, b	a	a	a	a	a		X X
wiikenh; nabagashk, -oon; makshosii-zhaabozigan	<i>Acorus americanus</i> ( <i>A. calamus</i> )	sweet-flag				b				X
wiiniziikens	<i>Symphyotrichum puniceum</i> ; <i>S. firmum</i> ( <i>Aster puniceus</i> )	swamp aster				a				X
wiinizik	<i>Aralia nudicaulis</i>	wild sarsaparilla	a					a		X
zesabiins	<i>Apocynum cannabinum</i>	indian-hemp				b				X
zhaashaagobiimag	<i>Acer saccharum</i>	sugar maple	a	a		a	a	a		X
zhawaseshkoohnse	<i>Urtica dioica</i>	stinging nettle	a			a, b	a	a		X X
zhiishiiginewanzh, iig; zhiishiigimiiwanzh, -iig	<i>Acer pensylvanicum</i>	striped maple	a					a		X
zhingwaak	<i>Pinus resinosa</i>	red pine		a			a		a	X
No name given ( <i>P. vulgaris</i> )	<i>Prunella vulgaris</i>	self-heal				b			a	X X





















