

RECENT WISCONSIN RECORDS FOR SOME INTERESTING VASCULAR PLANTS IN THE WESTERN GREAT LAKES REGION

Emmet J. Judziewicz

Wisconsin Department of Natural Resources
P.O. Box 7921
Madison WI 53707-7921

Jeffery C. Nekola

Department of Environmental Science
2420 Nicolet Drive
University of Wisconsin-Green Bay
Green Bay, WI 54311

ABSTRACT

The abundance, habitat preferences, and threats to 21 rare species of Wisconsin's Lake Superior drainage are discussed in the context of their distribution in the western Great Lakes region including Minnesota and Michigan. *Eriophorum chamissonis* and *Ranunculus lapponicus* are reported as new for Wisconsin, while *Lonicera involucrata*, *Pyrola minor*, and *Vaccinium vitis-idaea* were rediscovered after absences of nearly a century. The status of the potentially weedy exotics *Filipendula ulmaria* and *Juncus ensifolius* is discussed. Regional population trends and clarification of habitat preferences are discussed for *Armoracia lacustris*, *Carex pallescens*, *Gnaphalium sylvaticum*, *Juncus vaseyi*, *Listera auriculata*, *L. convallarioides*, *Lycopodium selago*, *Mertensia paniculata*, *Myriophyllum alterniflorum*, *Petasites sagittatus*, *Pinguicula vulgaris*, *Senecio congestus*, *Streptopus amplexifolius*, and *Trisetum spicatum*.

INTRODUCTION

In the 1970s, Wisconsin Department of Natural Resources botanists William E. Tans and the late Robert H. Read (1949–1994) surveyed many wetlands and cliffs of Wisconsin's Lake Superior shorelines (Tans 1983, Tans & Read 1975). More intensive field work in this area from 1991–1996 has resulted in improved knowledge of the distributions and habitat preferences of a number of rare vascular plant species occurring in the western Lake Superior region (Judziewicz 1993, 1995, 1996, 1997; Judziewicz & Koch 1993). The following notes discuss the regional status of 21 rare species selected on the basis of new information gathered concerning their distribution, clarification of their habitat preferences, and demographic trends. Maps are provided for those taxa that were either overlooked and should be sought in a wider geographic area, or have changing distributional status (such as *Eriophorum chamissonis* and *Senecio congestus*).

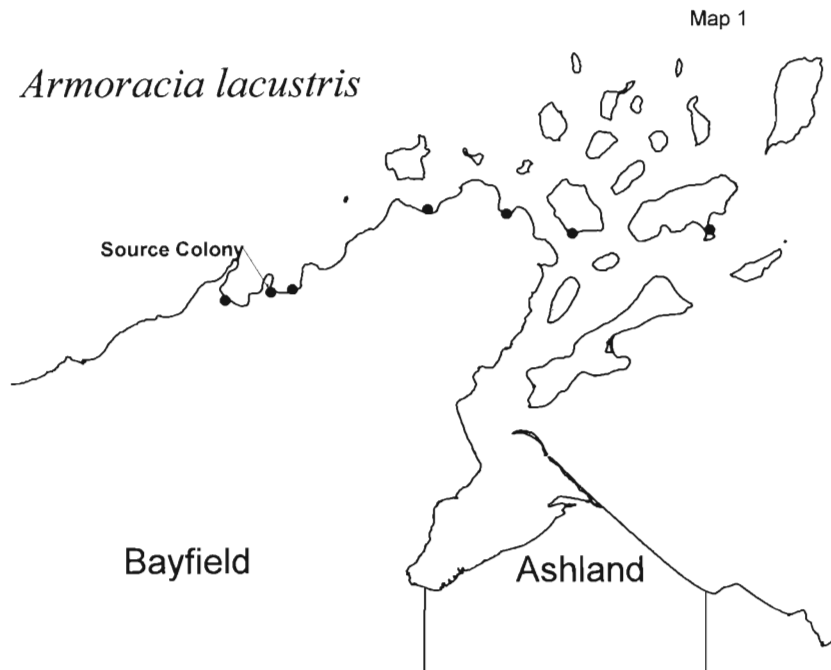
Perhaps these notes will encourage other biologists in the three western Great Lakes states to search afresh for previously "lost" rare species (such as *Pyrola minor*), to search for species that might turn up new to their jurisdictions (*Vaccinium vitis-idaea* in the Upper Peninsula of Michigan), to be alert for potentially pernicious invaders (*Filipendula ulmaria*), to notice and document population trends in species that are adversely affected by herbivores (*Streptopus amplexifolius*) or possibly climate change (*Pinguicula vulgaris*), and to continue monitoring small populations of rare species that are liable to suffer extinctions through stochastic processes (*Gnaphalium sylvaticum*).

The authors' collections are abbreviated "J" and "N", respectively, and unless indicated are deposited at the University of Wisconsin-Madison (WIS) and University of Wisconsin-Green Bay (UWGB) herbaria, respectively. Scientific names follow Gleason & Cronquist (1991), which was also relied upon for continental distributional data. Regional floristic treatments for Michigan (Voss 1972, 1985, and 1996; plus Natural Features Inventory Files) and Minnesota (Coffin & Pfannmuller 1988; Ownbey & Morley 1991) were also consulted and are the basis for many of the distribution records.

1. *Armoracia lacustris* (A. Gray) Al-Shehbaz & V. Bates, lake cress (Mustard family, Brassicaceae). Conservation status: Federal, considered for Category 2 listing; Mich., threatened; Minn., not known from state; Wis., endangered. (Map 1)

This rare aquatic mustard is found in scattered stations from Minnesota to Quebec, south to Texas and Florida. It is rare in Wisconsin, with only a few stations known (Patman & Iltis 1962). In Wisconsin's Lake Superior region lake cress has been known since 1979 from the outlet of Lost Creek near Cornucopia, Bayfield County, Wisconsin, where thousands or tens of thousands of plants occur. However, intensive surveys from 1991–1996 revealed no other populations in Wisconsin's Lake Superior coastal wetlands.

Lake cress reportedly flowers from June through August, but the plants rarely set fruit (Gleason & Cronquist 1991). Vegetative reproduction does occur



by way of floating leaves that readily break off from the stem, then produce adventitious roots, and regeneration can also occur from stem fragments (Voss 1985). In this context, it is interesting to note the great distances that propagules are carried from the presumed parent population at Lost Creek by the eastward flowing Lake Superior currents in the Bayfield Peninsula/Apostle Islands region. Fragments of leaves and stems have been found up to 50 km away, from the source colony near Cornucopia, all the way to Oak and Stockton Islands. At most sites, the fragments were not observed to root, but on the most distant site on Stockton Island a plant occurring near the mouth of a lagoon was beginning to root in shallow water in 1992; however, the species was not relocated at this site in succeeding years. It is rare that such long-distance dispersal can be attributed with fair certainty to a known source colony, and belies the suggestion by Les *et al.* (1995) that "The lack of seed production, however, greatly compromises the ability of the species to disperse beyond local distances. . . . The leaves are probably difficult to transport over any significant distance . . ."

Wisconsin Lake Superior drainage basin sites: Large source population: BAYFIELD CO.: Lost Creek, Sec. 32, T51N R6W, at least 10,000 plants in 1 m of quiet water over sandy bottom, 2 Sept. 1979, *Alverson s.n.* (WIS); in 1995 about 1,000 stems were observed here.

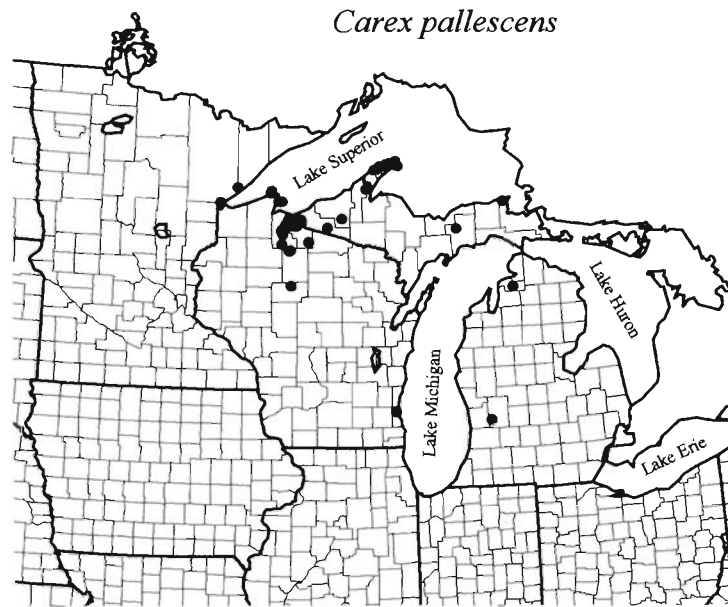
Fragments washed up on Lake Superior beaches: ASHLAND CO.: Oak Island sand spit ca. 35 km [by air] E of Lost Creek colony, 17 Aug. 1991 (not relocated in 1992 or 1996), *J-7767*; Stockton Island, Julian Bay Lagoon outlet ca. 50 km E of Lost Creek colony, 18 Aug. 1992 (not present in 1993–1996), *J-9866*. BAYFIELD CO.: Siskiwit Bay beach over 1 km E of Lost Creek colony, 15 June 1995, *J-11239*; Bark Bay beach ca. 5 km W of Lost Creek colony, 21 June 1995, *J-11239*; Sand River mouth beach ca. 18 km E of Lost Creek colony, 20 June 1995, *J-11266*; Raspberry bay beach ca. 28 km E of Lost Creek colony, summer 1994, J.E. Meeker sight record.

2. *Carex pallescens* L. var. *neogaea* Fern., pale sedge (Sedge family, Cyperaceae). Conservation status: Federal, none; Mich.: special concern; Minn.: none, proposed endangered; Wis.: special concern. (Map 2)

This distinctive circumboreal species is found in North America south to northern Minnesota (several stations in the Lake Superior counties; Coffin & Pfanmuller 1988), northern Wisconsin (Bayfield, Ashland, Iron, Milwaukee, Price, and Taylor Counties), northern Michigan (many Upper Peninsula records, particularly in the Ironwood and Houghton areas), Ohio, and New Jersey.

Surveys in 1996 revealed *Carex pallescens* var. *neogaea* to be locally common in roadside ditches in the Mellen to Hurley area of Ashland and Iron Counties. Here the species prefers periodically disturbed, moist, partially shaded trailsides and roadsides partly shaded by conifers such as balsam-fir and white spruce. The most abundant associates are the native species *Onoclea sensibilis*, *Carex castanea*, *C. vulpinoidea*, *Danthonia spicata*, *Agrostis stolonifera*, *Scirpus atrovirens*, *Euthamia graminifolia*, *Aster lateriflorus*, *A. simplex*, *A. ciliolatus*, *A. umbellatus*, *Solidago canadensis*, *S. uliginosa*, *Platanthera lacera*, *Salix discolor*, *S. pyrifolia*, *Fragaria virginiana*, *Juncus tenuis*, *Juncus effusus*, and *Pteridium aquilinum*. Even more common, usually, are exotic associates such as *Achillea millefolium*, *Trifolium hybridum*, *T. pratense*, *Phleum pratense*, *Plantago lanceolata*, *Chrysanthemum leucanthemum*, *Ranunculus acris*, *Rumex acetosella*, *Anthoxanthum odoratum*, *Prunella vulgaris*, *Lotus corniculatus*, and

Map 2



Juncus ensifolius. In only two of several dozen locations was pale sedge located in seemingly natural vegetation: 1) a single clump in a white cedar swamp near a road a few miles south of the village of Iron Belt, Iron County (1996); and 2) rock crevices in a cedar-dominated forest at Sand Point, Bayfield County (1980). The latter locality could not be relocated in 1995, and it is possible that it was also a roadside collection.

Carex pallescens var. *neogaea* often appears to be associated with areas in which mining was important in the past, and apparently requires periodic disturbance to maintain itself.

MINNESOTA. LAKE CO.: 0.5 mi S of Gooseberry Falls State Park, Sec. 28, T54N R9W, along top of first rocky terrace back from rock shore of Lake Superior, in site getting foot traffic at resort, several plants, 27 July 1993, *Myhre 4283* (MIN). ST. LOUIS CO.: Duluth Waterworks, moist spots of meadow border, Lake Superior terrace, Hwy. 61, 22 July 1953, *Lakela 16260* (DUL); 17 July 1953, *Lakela 16198* (DUL); clearing in north shore woods, Duluth waterworks, 29 June 1954, *Lakela 17696* (DUL).

WISCONSIN. ASHLAND CO.: Madeline Island, Big Bay campground area, roadside ditches, Sec. 19, T50N R2W, 16 June 1992, *J-8717*; Madeline Island, common on damp roadsides and brackish meadows, 1917, *Goessl 8247* (MIL); Hwy. 13 just S of Co. X jct., Sec. 8, T43N R2W, 29 July 1996, *J-11993*; Hwy. 77 2.5–3.5 mi E of Mellen, Sec. 3, T44NR2W, 30 July 1996, *Judziewicz* sight record; Hwy. 77 4 mi E of Mellen, Sec. 35, T45N R2W, 29 July 1996, *Nekola s.n.* (UWGB); Hwy. 13, 3 mi S of Mellen, Sec. 13, T44N R3W, 27 July 1996, *J-11989*, *N s.n.* (UWGB #24875); Hwy. 13 5 mi S of Mellen, Sec. 25, T44N R3W, 29 July 1996, *J-11991*; E side of Popko Road ca. 0.2 mi S of Hwy. 169, Sec. 14, T45N R2W, 31 July 1996, *J-12003*; Sec. 12, T41N R3W, tip-up mound in second-growth sugar

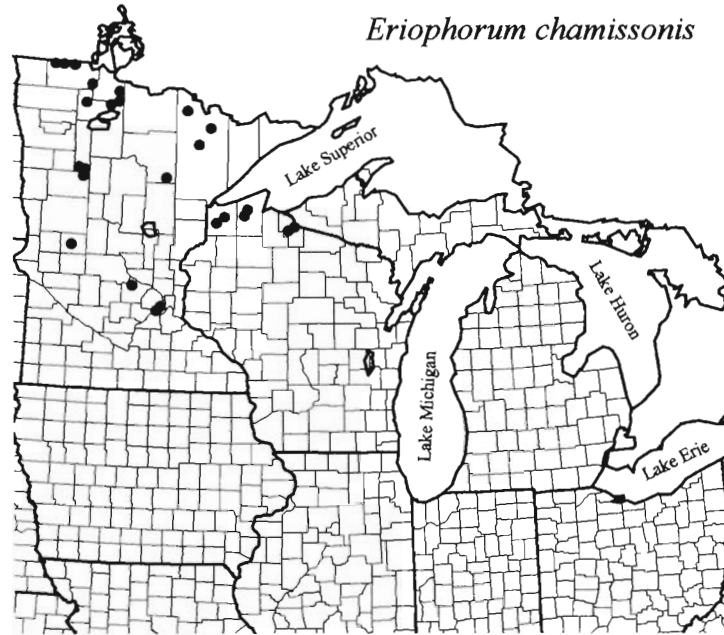
maple stand, 21 July 1992, *Westad s.n.* (WIS). BAYFIELD CO.: Sand Point, Sec. 35, T52N R5W, rock crevices in cedar-dominated forest, 18 July 1980, *Koch 12310* (UWL); Sand Island, on west side of East Bay road, 4 July 1990, *J-6041*, not relocated here on 14 July 1997; Raspberry Bay, Sec. 28, T52N R4W, semi-open disturbed area in sugar maple stand, 27 July 1980, *T.S. & B.A. Cochrane 9135* (WIS). IRON CO.: Sec. 14, T46N R2E, ditch 2 mi N of Hurley on Hwy. 51, 14 June 1975, *Koch 9502* (WIS); Sec. 25, T46N R2E, roadside meadow, hill just S of Hurley on Hwy. 51, 14 June 1975, *Koch 9512* (WIS); Sec. 33, T42N R4E, moist pocket along old logging road, one plant, 11 Aug. 1995, *Clark 856* (WIS); Hwy. 77 1.0 mi E of Iron Belt, Sec. 1, T45N R1E, 30 July 1996, Judziewicz sight record; village of Iron Belt, S side of Severance Street, Sec. 11, T45N R1E, *J-12001*; road just N of Montreal, Sec. 28, T46N R2E, 30 July 1996, *J-12004*; Upson Park Road, Sec. 19, T45N R1E, 30 July 1996, *J-11998*; Hwy. 77 1.5 mi E of Upson, Sec. 16, T45N R1E, 30 July 1996, *J-12000*; cedar swamp 2.5 mi S of Iron Belt, on E side of Island Lake Road, Sec. 24, T45N R1E, 14 July 1996, *J & Nekola 11930* (WIS). MILWAUKEE CO.: Schlitz Audobon Center, Sec. 9–10, T8N R22E, white ash—white birch—basswood forest, 15 July 1997, *E. Zimmerman 499* (WIS). PRICE CO.: Sec. 23–24, T40N R1W, recent specimen in Park Falls herbarium. TAYLOR CO.: Sec. 25, T33N R1W, weedy roadside on east side of FR 106, just W of Mondeaux Flowage; with *Trifolium aureum*, *Geum aleppicum*, *Prunella vulgaris*, *Stellaria graminea* and many other common plants, 4 July 1993, *Fields 326* (WIS). PRICE CO.: Wet pasture near Park Falls, Sec. 28, T40N R1W, 30 May 1992, *P. Wagner s.n.* (WIS). WASHBURN CO.: Hunt Hill Audobon Sanctuary, 4 mi E of Saronia on Hwy. 53, Sec. 4, T37N R11W, grassy, weedy, transition zone on edge of red oak—red maple forest, 29 July 1992, *T.S. & B.A. Cochrane 12701* (WIS).

3. *Eriophorum chamissonis* C.A. Meyer, rusty cotton-grass (Sedge family, Cyperaceae). Conservation status: Federal, none; Mich., not known from state; Minn., none, dozens of records; Wis., special concern. (Map 3)

This circumboreal cotton-grass is found in Eurasia and northern North America from Alaska south to Oregon, Wyoming, eastern North Dakota, central Minnesota, and northwestern Wisconsin. The following five sites, all discovered by Jeffery Nekola in July 1996, represent the first records for this boreal species in Wisconsin. It is rare in very wet floating bog mats or less commonly in poor fens, mostly along the Lake Superior/Mississippi River drainage divide, at elevations from 1,115–1,705 ft (ca. 500–1,100 ft above Lake Superior). *Eriophorum chamissonis* is known from three counties in North Dakota well west of the coniferous forest zone, and is scattered throughout northern and north-central Minnesota south to the Twin Cities area. Therefore, it is probable that more stations may eventually be found in the northwestern counties of Wisconsin such as Burnett, Washburn, Polk, and Barron, perhaps even in prairie pothole “fens” (perhaps with indicator species such as *Triglochin maritimum* and *Platanthera dilatata*) as well as in coniferous bogs. In two of the Wisconsin sites (Sandrock Bog in Iron County and the Poplar River headwaters in Douglas County), rusty cotton-grass grows in very wet mats on the upslope or ponded sides of bogs whose drainage has been impeded by a road or railroad grade. It might also be expected in the western Upper Peninsula of Michigan.

This is a distinctive cotton-grass. Like the common *Eriophorum spissum*, *E. chamissonis* has only one spikelet per head, but this spikelet is huge—nearly the size of a golf ball when mature. It has a slight tawny or brownish cast, but this is not as noticeable as the manuals or common name indicate (other specimens from the southern edge of the range such as Minnesota also show this white rather than rusty coloration). Also, *E. chamissonis* is rhizomatous, so the stems arise scattered

Map 3



through the bog mat, not in dense clumps as in *E. spissum*. Other technical characters that differentiate *E. chamissonis* from *E. spissum* are the fewer spikelet scales (seven or fewer) and the more conspicuously beaked achenes.

WISCONSIN. BAYFIELD CO.: E side of Eagle Lake, Sec. 3, T46N R8W, boreal fen mat dominated by *Carex lasiocarpa*, *Eleocharis elliptica*, *Menyanthes trifoliata*, and *Myrica gale*, also with *Utricularia intermedia*, *Arethusa bulbosa*, and *Liparis loeselii*, ca. 100 plants in small, cold, shallow puddles, 17 July 1996, *N. s.n.* (UWGB #24816), 19 July, *J-11958* (WIS). DOUGLAS CO.: Erickson Creek headwaters swamp, Sec. 19, T45N R13W, open sphagnous muskeg with scattered small black spruce and tamarack, on SW side of intersection of Co. A and Empire Truck Trail ca. 12 mi W of Gordon, with *Chamaedaphne calyculata*, *Ledum groenlandicum*, *Carex paupercula*, *C. chordorrhiza*, *C. pauciflora*, *Eriophorum virginicum*, *Smilacina trifolia*, and *Vaccinium oxycoccos*, 150 plants, 22 July 1996, *N. s.n.* (UWGB #24834), 24 July, *J-11979* (WIS); Poplar River headwaters conifer swamp, Sec. 10, T46N R12W, very wet sphagnous boggy ditch in fiberoptic cable right-of-way on N side of Bennett Line Road ca. 0.6 mi W of Hwy. 53, 250 plants, with *Andromeda glaucophylla*, *Calla palustris*, *Carex oligosperma*, *C. paupercula*, *Chamaedaphne calyculata*, *Eriophorum virginicum*, *Glyceria borealis*, *Kalmia latifolia*, *Ledum groenlandicum*, *Vaccinium oxycoccos*, discovered by Nekola on 22 July 1996, vouchered on 24 July, *J-11978* (WIS). IRON CO.: Island Lake South Bog, S of intersection of Pleasant Lake and Lake Six Roads, Sec. 36, T44N R1E, very open wet sphagnum mat, ca. 1,000 plants, with *Eriophorum angustifolium*, *E. virginicum*, and *Vaccinium oxycoccos* all common, also *Typha latifolia*, *Glyceria borealis*, *Triadenum fraseri*, *Drosera rotundifolia*, *Calla palustris*, *Carex canescens*, *Platanthera lacera*, *Juncus effusus*, *Potentilla palustris*, *Menyanthes trifoliata*, and *Epilobium leptophyllum*, 15 July 1996, *N. s.n.* (UWGB #24871), 17 July 1996, *J-11943* (WIS); Sandrock

Bog, Sec. 5, T44N R3W, open very wet sphagnum bog mat on W side of old RR grade 0.5 mi N of Sandrock Road, ca. 500–1,000 plants, with *Eriophorum tenellum*, *E. virginicum*, *Calla palustris*, *Juncus effusus*, *Vaccinium oxycoccos*, and *Glyceria canadensis*, 15 July 1996, *N s.n.* (UWGB #24868), 17 July 1996, *J-11938* (WIS).

4. *Filipendula ulmaria* (L.) Maxim., queen-of-the-meadow (Rose family, Rosaceae). Conservation status: None; an introduced Eurasian exotic.

Queen-of-the-meadow has the potential to become a troublesome weed of wetlands, as in one boggy inlet of Bibon Lake, Bayfield County, where it is co-dominant at the water's edge with tamarack, sweet gale, tag alder, and giant reed grass. This large (to 1.5 m tall) handsome, perennial also grows in ditches, creekbottoms, and more rarely on wave-splashed sandstone shores. There are apparently no published reports of its naturalization in Michigan and Wisconsin. In Minnesota it is reported only near Duluth (Ownbey & Morley 1991), although Gary Walton (pers. comm. 1997) reports a recent site from south of the Knife River in Lake County, and indicates that it appears to be spreading northeast from Duluth along Hwy. 61. It is possible that queen-of-the-meadow was originally introduced as an ornamental by Finnish-American farmers, as suggested by Olga Lakela's 8 Aug. 1939 collection (3233, DUL) from "along fences in fields" at her old family estate in Kestila, Finland.

Minnesota and northwestern Wisconsin sites: **MINNESOTA.** ST. LOUIS CO.: Duluth, large colony at junction of Duluth Iron Range Railroad and Lakewood Road, 18 Aug. 1943, *Lakela 5415* (DUL); Duluth, large colony on Lake Superior terrace, Lakewood Rd. and Hwy. 61, 4 Sept. 1943, *Lakela 5481* (DUL); Duluth Waterworks, shore of Lake Superior, 8 Aug. 1942, *Lakela 5126* (DUL); border of *Alnus* swamp on Hwy. 53 1 mi N of Jackson's School, 21 Aug. 1943, *Lakela 5426* (DUL).

WISCONSIN. BAYFIELD CO.: NW1/4 NE1/4 Sec. 35, T50N R9W [Jardine Creek just N of Hwy. 13], low brushy area dominated by *Alnus* and sedges, along creek and roadside, 29 July 1981, *Alverson 1816* (WIS), relocated on 16 Aug. 1995, 100s of plants on west bank of creek N of Hwy. 13 bridge, ca. 3 mi W of Port Wing, with tag alders, *Scirpus* sp., and bluejoint, *J-11590*; Bibon Lake, Port Wing bog, SW1/4 SE1/4 Sec. 20 and N1/2 of NE1/4 Sec. 29, T50N R8W, common and thoroughly naturalized along boggy side slough, ca. 1,000 flowering plants, with tamarack, sweet gale, tag alder, and *Phragmites australis*, 16 Aug. 1995, *J-11584*; SW1/4 NW1/4 SW1/4 Sec. 20, T50N R8W, Quarry Point just west of Port Wing, one plant noted on wave-splashed sandstone ledge, 16 Aug. 1995, Judziewicz sight record. DOUGLAS CO.: Junction of Hwy. 2 and Co. U [near Amnicon Falls State Park], meadow opening, low ravines and somewhat shaded, Sec. 32, T48N R12W, 21 July 1981, *Koch 13039* (UWL); City of Superior, SW1/4 NW1/4 Sec. 3, T48N R13W, Moccasin Mike Road 0.5 mi E of Hwy 2, common in ditch on south side, 50 plants with *Calamagrostis canadensis*, *Carex stricta*, *Typha* sp., and *Geum aleppicum*, 3 Aug. 1995, *J-11493*; persisting in vacant lot on W side of Co. Hwy. H, SE1/4 NE1/4 Sec. 26, T48N R10W, 3 Aug. 1996, *Clark 1064* (WIS). TAYLOR CO.: Medford mill pond, abundant in moist meadow; also along a railroad track north of Medford, Sec. 27, T31N R1E, 9 Aug. 1993, *Fields 536* (WIS).

5. *Gnaphalium sylvaticum* L., woodland cudweed (Composite family, Compositae). Conservation status: Federal, none; Mich., none; Minn., not known from state; Wis., special concern.

Woodland cudweed is a slender, shade-loving circumboreal species found in North America south to northern Wisconsin, northern Michigan, northern New York (one site) and northern New England (Penskar 1992). In New England it is known from one station each in Vermont and New Hampshire, and many in

Maine. The species is extremely rare in the Midwest, but perhaps overlooked because of its late flowering season (mostly August and September) and frail appearance. In Michigan, it is known from three colonies totalling 225 plants in second-growth sugar maple-hemlock-yellow birch woods on Grand Island, Alger County, where it was discovered by Don Henson in 1991 (Penskar 1992, Voss 1996). Here woodland cudweed occurs on woodland edges along recently disturbed logging roads, suggesting that the species may be adapted to forest gaps and may have a long life in soil seedbanks. The first and so far only Wisconsin station, on Outer Island, Ashland County (Sec. 24, T53N R1W), was discovered by William Fraundorf on 13 September 1978 and reported by Freckman & Fraundorf (1981). It occupies much the same habitat as the Michigan populations; Freckman & Fraundorf gave the habitat as a moist, muddy trailside at the edge of an upland woods and margin of a beaver pond. After unsuccessful searches in June 1991 and July 1992, the population was finally relocated on 16 September 1993, when 66 flowering and fruiting plants were found along a hiking trail through second-growth red maple, white birch, and balsam fir just south of the beaver pond. However, a return visit on 28 August 1996 revealed only four plants (Judziewicz 1996). If population trends continue it appears that woodland cudweed could become extinct in Wisconsin in the near future. However, it may persist in the seedbank, and is inconspicuous so there may be undetected populations. It is also possible that the Outer Island population were inadvertently introduced during intensive logging operations in the 1940s through early 1960s.

6. *Juncus ensifolius* Wikstrom, iris-leaved rush (Rush family, Juncaceae). Conservation status: None, an exotic introduced from western North America.

Iris-leaved rush is native from Alaska and Saskatchewan south to California, Arizona, Colorado, and the Black Hills of South Dakota, with disjunct (and presumably adventive) populations in Ontario (one site on James Bay), along the Delaware River in New York, and in northwestern Wisconsin. Gleason & Cronquist (1991) give the species as "disjunct" in Wisconsin, but all sites are from ditches and there is no reason to suppose that the species is native here.

This rush was first discovered in the Midwest in 1971 when Hugh H. Iltis collected it along Hwy. 13 south of Mellen in Ashland County. He reported it in 1974 as "common [along Hwy. 13] for 2–7 mi south of Mellen" and this is essentially its status in 1996, although a few sites are known from east and southeast of Mellen along Hwy. 77.

Iris-leaved rush prefers moist, grassy, open ditches, often with basaltic bedrock near the surface. In such sites it often forms prominent stands that are easily picked out from a moving car by the tall, dark brown inflorescences. Frequent associates are *Carex pallescens* var. *neogaea*, *C. vulpinoidea*, *C. castanea*, *Onoclea sensibilis*, *Platanthera lacera*, goldenrods and asters, and many exotics such as *Chrysanthemum leucanthemum*, *Prunella vulgaris*, *Trifolium* species, *Lotus corniculatus*, and *Plantago lanceolata*.

WISCONSIN. ASHLAND CO.: Along Hwy. 13 just S of Mellen, Sec. 7, T44N R2W, 7 Aug. 1971, *Iltis* 26312 (WIS), 22 Sept. 1974, *Iltis* 27727 (WIS); 2.7 mi S of Mellen, Sec. 13, T44N R3W, 27 July 1996, *J-11990*, *N s.n.* (UWGB #24879); 4.5 mi S of Mellen, Sec. 25, T44N R3W, 29 July 1996 Judziewicz sight record; 6.5 mi S of Mellen, Sec. 6, T43N R2W,

29 July 1996, Judziewicz sight record; 8 mi S of Mellen, Sec. 7, T43N R2W, 29 July 1996 Judziewicz sight record; ditch at wayside of Hwy. 13 on continental divide 3 mi S of Morse cut-off, Sec. 21, T43N R2W, 29 July 1996, *J-11994*; Co. MM ditch just SW of jct. with Sackett Road, Sec. 17, T44N R2W, 29 July 1996, *J-11997* (WIS); ditch on N side of Hwy. 77 just W of jct. with Co. MM, ca. 4 mi E of Mellen, Sec. 35, T45N R2W, Sec. 35, 15 July 1996, *N. s.n.* (UWGB #24880).

7. *Juncus vaseyi* Engelm., Vasey's rush (Rush family, Juncaceae). Federal status: none; Mich., threatened; Minn., no status, although listed as "sensitive" in the Chippewa and Superior National Forests; Wis., special concern.

This inconspicuous rush is spottily distributed from British Columbia to Nova Scotia, south to Colorado, Iowa, Indiana, and New York. It was reputed to be nowhere common in its range, but 1995 field work on the Lake Superior clay plain in Douglas County showed it to be widespread in disturbed areas in and surrounding the city of Superior, becoming less common to the east (one Bayfield County site was documented) and inland (no site is more than 6 miles from Lake Superior). In all, several dozen new sites were documented. Vasey's rush occurs in grassy ditches, old fields, and brushy cleared areas in heavy red clay soils. It generally occurs in sites at the stage of old-field succession that has a maximum diversity of herbaceous plants such as asters and goldenrods. Common associates are *Solidago canadensis*, *S. uliginosa*, *S. gigantea*, *Euthamia graminifolia*, *Carex castanea*, *C. vulpinoidea*, *Salix discolor*, *Valeriana officinalis*, *Agrostis gigantea*, *Equisetum arvense*, *Juncus effusus*, *Calamagrostis canadensis*, *Aster simplex*, *A. puniceus*, *A. umbellatus*, *Scirpus cyperinus*, *Carex lacustris*, *Phleum pratense*, *Bromus ciliatus*, *Fragaria virginiana*, and *Lysimachia ciliata*.

Representative populations of Wisconsin's Lake Superior drainage basin (several dozen 1995 sites omitted): BAYFIELD CO.: Sec. 34, T49N R9W, Town of Orienta, Wyat D. Judziewicz tract, 31 July 1993, *J-10481*, only a few plants in old field near Resch Creek, relocated 20 Sept. 1995 by Judziewicz. DOUGLAS CO.: Near Allouez Bay and Wisconsin Point, 24 July 1897, *Cheney 7694* (WIS); Amnicon Falls State Park: moist area of meadow, 25–30 plants, 31 July 1969, *Koch 6087* (WIS); powerline right-of-way, 10–20 plants, Sec. 29, T48N R12W, Oct. 1988, sight record by E.J. Epstein; 1.6 mi E of South Range on Co. Hwy. A, Sec. 1, T47N R14E, forb-rich old field, 10 Aug. 1996, *N & North s.n.* (UWGB #24794); 0.5 mi E of South Range on Co. Hwy. C, Sec. 27, T48N R12E, forb-rich old field, 10 Aug. 1996, *N & North s.n.* (UWGB #24882); Peyton Marsh, Sec. 8, T48N R13W, 100 plants, 7 Sept. 1995, *J-11677*; Boylston Junction Marsh, Sec. 22, T48N R14W, acid ditch on W side of Hwy 35 0.5 mi N of Boylston Junction, 10 plants, 11 Sept. 1995, *J-11683*; Clevedon Road field, Brule River State Forest, Sec. 15, T49N R10W, 21 Sept. 1995, *J-11717*; Pokegama Radio Tower Marsh, Sec. 8, T48N R14W, 1,000–3,000 plants, perhaps the largest population in the state, 31 Aug. 1995, *J-11660*; Hill Avenue ditch by Oil Refinery, Sec. 35, T49N R14W, 5 July 1995, 100s of plants, *J-11384*.

8. *Listera auriculata* Wiegand, auricled twayblade (Orchid family, Orchidaceae). Conservation status: Federal status, none; Mich., special concern; Minn., none, but proposed endangered; Wis., endangered.

In Wisconsin, this small orchid is rare in alluvial sand under streamside alder thickets near creek mouths (Case 1987) on the east side of Chequamegon Bay, Bayfield County. Searches for historical sites on the northwest side of the Bayfield Peninsula have been unsuccessful. Presently it grows at just two sites covering a total area of just a few square meters (Table 1). Auricled twayblade may

TABLE 1. Population trends in *Listera auriculata* at extant Wisconsin sites.

Year	Observer	Sioux River Slough	Pikes Creek
1981	W.S. Alverson	15 plants	Unknown
1992	M. Van Stappen	20 plants	75 plants
1995	E.J. Judziewicz	50 plants	178 plants (121 fertile)
1996	E.J. Judziewicz	38 plants (17 fertile)	114 plants (67 fertile)

be the rarest orchid in Wisconsin, and more information is needed on its population biology.

WISCONSIN: BAYFIELD: Near Herbster (Cranberry River), Sec. 4 or 8, T50N R7W, 7 July 1897, *Cheney 6851* (WIS), not relocated since; Cornucopia (Siskiwit River), T51N R6W, 6 Aug. 1923, *Davis s.n.* (WIS), 9 July 1930, *Fuller & Staffeld 3820* (MIL), 10 July 1938, *Curtis 38-38* (WIS), not relocated since; Barksdale [on Boyd or Bono Creek], Sec. 24, T48N R5W, 8 July 1938, *Curtis 38-39* (WIS), not relocated since; Pikes Creek, T50N R4W, in 1992, M. Van Stappen sight record, visited in 1995–1996 by Judziewicz (see Table 1); Sioux River Slough, T49N R4W, 18 July 1981, *Alverson s.n.* (WIS), revisited in 1992 by M. Van Stappen and in 1995 and 1996 by Judziewicz (see Table 1).

9. *Listera convallarioides* (Swartz) Torrey, Broad-lipped twayblade (Orchid family, Orchidaceae). Conservation status: Federal, none; Mich., none; Minn.: none, but proposed special concern; Wis., threatened. (Map 4)

This small twayblade ranges from Alaska to Newfoundland south to montane Arizona, northern Minnesota, northern Wisconsin, northern Michigan, and montane North Carolina. In Wisconsin it is known only from three (Bayfield, Ashland, and Iron) of the four counties bordering Lake Superior. It is restricted to mesic, ravine bottom forests on Oak Island and on the tip of the Bayfield Peninsula from Little Sand Bay to Frog Bay. There are old records from the Penokee Range in Iron County, but these have not been relocated. Broad-lipped twayblade grows in rich soil of wooded ravine bottoms and seeping, shaded slopes. Common tree associates were hemlock (*Tsuga canadensis*), sugar maple (*Acer saccharum*), white cedar (*Thuja occidentalis*), and birches (*B. allegheniensis* and *B. papyrifera*). Mountain maple (*Acer spicatum*) is a common shrubby associate; common herbaceous associates include the rare drooping sedge (*Carex prasina*), the uncommon *C. scabrata*, *Circaea alpina*, *Aster macrophyllus*, *Clintonia borealis*, *Maianthemum canadense*, *Athyrium angustum*, *Dryopteris carthusiana* and *D. intermedia*, *Lycopodium lucidulum*, *Streptopus amplexifolius*, *Viola cucullata*, *Mitella nuda*, and *Osmorhiza chilensis*.

WISCONSIN. ASHLAND CO.: Oak Island, ravines in all drainages; first collection in 1917, *Goessl 7935* (WIS). Common in 1992 and 1996, with at least 1,000 plants in many populations (Judziewicz 1996). BAYFIELD CO.: Ravines in vicinity of Little Sand Bay, Sec. 32–33, T52N R4W and Sec. 6, T52N R5W, 17 July 1974, *Koch 8575* (UWL); 2,000–3,000 plants in 1992 and 1996 (Judziewicz 1996); Raspberry Point, T51N R4W, also T51N R3W, July 1974 (W.E. Tans) and August 1995 (Judziewicz) sight records; T51N R4W, head of deep ravine in second growth sugar maple forest, in muddy mossy level ravine bottom head in shade, 20 plants, 11 Aug. 1996, Judziewicz sight record; T52N R4W, ravines northeast of Raspberry Bay, under 6–16" white cedar, yellow birch, hemlock, and sugar

maple, 8 July 1996, *J-11896*; ravines from Raspberry Point to Frog Bay, T51N R3/4W; rich mesic ravines through second growth sugar maple, hemlock stands, at least 2,000 plants, 3–4, 10 July 1996, *J-11889, 11891-11892*. IRON CO.: Between Pence and Montreal on Hwy. 77, 6 July 1932, *Knowlton 72199* (MIL), not relocated in 1996; Penokee Range, Sept. 1881, *Monroe 9662* (MIL); Lakeshore, Montreal River to Trout Stream [=Bad River], 21 July 1896, *Cheney 5158* (WIS), not relocated in 1995–1996; Lower 2 mi of Montreal River, 20 July 1896, *Cheney 5104* (WIS), not relocated in 1995–1996.

10. *Lonicera involucrata* (Richardson) Banks, involucred honeysuckle (Honeysuckle family, Caprifoliaceae). Conservation status: Federal, none; Mich., threatened; Minn., not known from state; Wis., endangered.

This showy-fruiting, tropical-looking shrub is found from Alaska south to California, New Mexico, Wisconsin, and Michigan. In Michigan there is one old record from Clifton in the Keweenaw Peninsula (Voss 1996), and over 30 sites from Isle Royale (Judziewicz 1995), where the favored habitat is in partial shade in rich soil at the margins of alder thickets and open cedar swamps. The only known Wisconsin site, discovered in 1897, was not relocated until 1996. The most common associates were mature tamarack (*Larix laricina*), tag alder (*Alnus incana* subsp. *rugosa*), *Calamagrostis canadensis*, and *Calla palustris*; others were *Carex brunnescens*, *C. canescens*, *C. crinita*, *C. disperma*, *Ribes triste*, *Potentilla palustris*, *Sium suave*, *Galium tinctorium*, *Rubus pubescens*, *Caltha palustris*, *Aster puniceus*, and *Lycopus uniflorus*. Deer browsing appeared to be a serious problem at the Port Wing site. In July 1996, water levels were higher, and several plants were relocated but had not flowered or fruited.

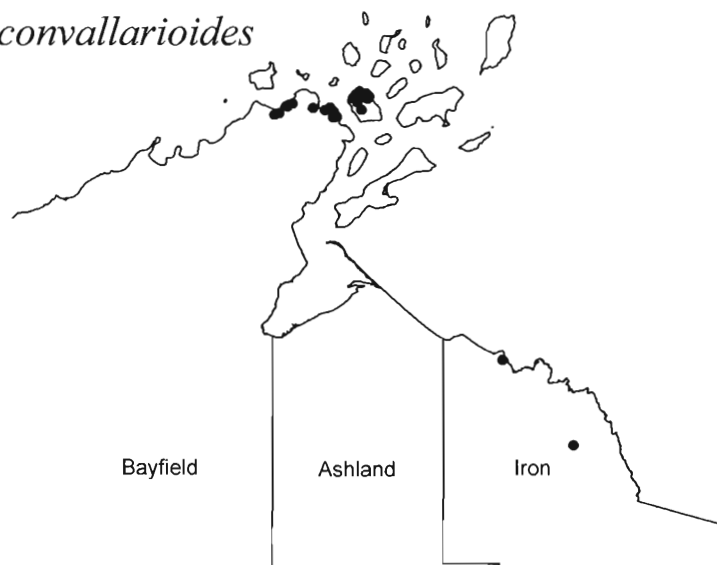
BAYFIELD CO.: Port Wing, 9–11 July 1897, *Cheney 7055, 7169, and 7171* (all WIS), relocated on 15 June 1995, in old growth tamarack swamp S of Bibon Lake, Sec. 29, T50N R8W, eight scattered clones, mostly in very wet, degraded alder SE part of swamp, each clone 1–5 m in diameter with 10–60 (mean ca. 25) stems, stems 15–70 (–100) cm tall, only a few with flowers, and no fruits noted during a visit of 21 Aug. 1995, *J-11237*.

11. *Lycopodium selago* L., fir clubmoss (Clubmoss family, Lycopodiaceae). Conservation status: Federal, none; Mich., special concern; Minn., none; Wis., special concern. (Map 5)

This small, circumpolar clubmoss is found in the New World from Alaska to Greenland, south to Ontario (Given & Soper 1981 map), Minnesota, Wisconsin (Peck & Taylor 1980), Michigan, North Carolina, and New York. Field work in 1995–1996 revealed a number of new stations in Wisconsin, mostly on mossy, seeping wave-splashed sandstone cliffs and ledges on Lake Superior, some of which had been very thoroughly searched in 1991–1992. There is also a new inland station in a conifer swamp, discovered by Andy Clark in 1996. On the other hand, several recent historical sites with precise locality data could not be relocated. All this may indicate that colonies are short-lived and rely on the dynamics of natural disturbance to maintain themselves. In Wisconsin, typical associates on sandstone ledges are *Trisetum spicatum*, *Primula mistassinica*, *Fragaria virginiana*, *Solidago hispida*, *Agrostis scabra*, and alders (*Alnus incana* subsp. *rugosa* and *A. viridis* subsp. *crispa*).

WISCONSIN. ASHLAND CO.: Hermit Island, lakeside boulder at north tip, in 1992, *J-9476*; Devils Island, SE side, in shade of *Cornus stolonifera* and *Alnus viridis* subsp. *crispa*

Map 4

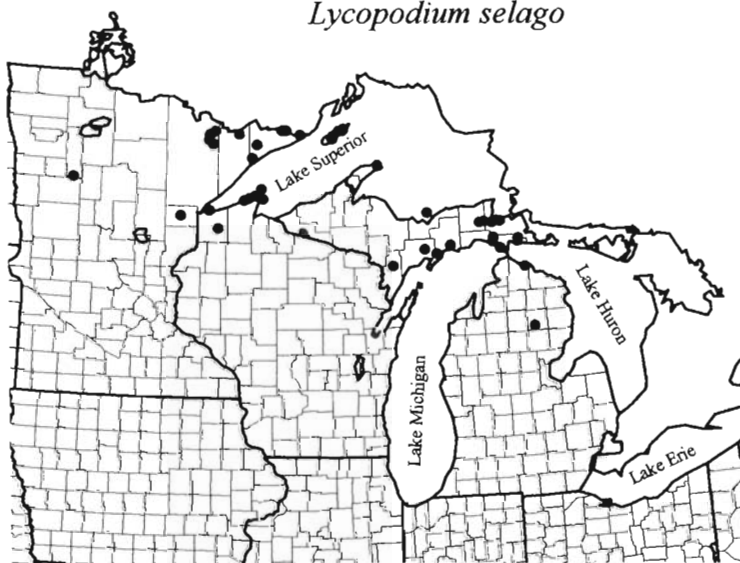
Listera convallarioides

on wet mossy sandstone at edge of wave-splash pool, 22 June 1996, *J-11804*. BAYFIELD CO.: Little Sand Bay Road, Sec. 32, T52N R4W, Sec. 32, N side of road in acid, sphagnum ditch, 1977, *Taylor 4545* (MIL); not relocated during several searches from 1991–1997; Roman Point, Sec. 29, T51N R6W, W-facing sandstone cliff 4–6 m above Lake, with mosses, *Potentilla tridentata*, and *Solidago hispida*, under white birch stand, 28 June 1996, *J-12149*; Squaw Bay cliffs, Sec. 8 and 18, T51N R5W, seeping wet cold shaded sandstone cliffs and shelves 2–8 m above Lake Superior, with *Primula mistassinica*, *Scirpus hudsonianus*, and many mosses, 28 June 1996, Judziewicz & T. Gerstenberger sight record (plants inaccessible); Point Detour cliffs, T52N R4W, on shaded mossy clayey sandstone slope with strawberry, orange hawkweed, *Anaphalis margaritacea*, violets, *Gaultheria hispida*, and seedling maple, cedar, and fir, also on 45° N-facing slope in wet, shaded, clayey sand at base of cliff 3 m above Lake, with few associates save *Trisetum spicatum*, 11 July 1996, *J-11397*, *11872*, also a few plants in Sec. 28, *J-11919*; Eagle Bay cliffs, T52N R4W, moist level mossy sandstone shelf 2 m above Lake, with *Primula mistassinica* and *Trisetum spicatum*, 3 July 1996, *J-11868*; Raspberry Point cliffs, T52N R3W, 75–100 clumps, with 10–50 stems per clump, probably the healthiest population in the state, on moist, shaded, mossy 30–60_ sandstone ledges, 10 July 1996, photograph by Judziewicz. DOUGLAS CO.: Lakeside swale 3/4 mi from tip of Wisconsin Point, 10 April 1985, *Zirngibl s.n.* (SUWS), not relocated in this swale during several searches in 1995–1996; Brule River Divide conifer swamp, Sec. 17, T45N R11W, open swamp of tamarack, black spruce, balsam-fir, white cedar, and black ash with alder, *Ledum groenlandicum*, *Sphagnum* spp., *Lycopodium annotinum*, *Carex disperma*, *C. triperma*, *Linnæa borealis*, *Coptis trifolia*, *Mitella nuda*, and *Osmunda* sp., 1 m diam. colony with 50–100 stems, 25 Sept. 1996, *Clark 1065* (WIS).

12. *Mertensia paniculata* (Ait.) G. Don., northern or tall lungwort (Borage family, Boraginaceae). Conservation status: Federal, Mich., Minn., and Wis.: none. (Map 6)

This “northern bluebells” is found from Alaska and across Canada south to Oregon, Iowa, Wisconsin, and Michigan (but not in New England). Common in northeastern Minnesota, in Wisconsin it is found most commonly in the Lake Superior region, especially in the vicinity of the city of Superior, Douglas County. Farther east and south, it is rare in cedar swamps in the northeastern part of the state, and occurs on one algific talus slope in Grant County in the southwestern part (it is also found on algific talus slopes in Iowa; Pusateri et al. 1993). The species has not, as Cochrane (1975) suggested, turned out to be common in the northern counties of Wisconsin. Northern lungwort has two main habitat preferences in the Lake Superior region. It occurs either in openings in remnant boreal forest dominated by balsam fir, white spruce, and white birch, often on roadsides (the city of Superior area populations are all of this type); or in springy, mucky, mossy seeps dominated by white cedar and other conifers, such as inland sites like McDougal Springs, Sajdak Springs, and Schachte Creek headwaters. Although it is a common plant in the vicinity of the city of Superior, northern lungwort should be considered for special concern status in Wisconsin for several reasons: 1) It has disappeared from many historical sites on the Bayfield Peninsula, although Gary Walton (pers. comm.) reports seeing it in a cedar swamp at Barksdale in 1996. 2) Demographic trends in the few non-Lake Superior stations are unknown. 3) On Isle Royale in 1994, it was seen only at a site that was protected from moose browse—despite the fact that there were many historical collections from the island. This suggests that the other large ungulate in the regional fauna, white-tailed deer, may be having a negative

Map 5

Lycopodium selago

impact on the species. 4) Unlike the white mandarin (*Streptopus amplexifolius*), which has a roughly similar Wisconsin distribution and habitat preference, and is browsed by deer, northern lungwort has no reservoir of populations protected from deer browsing on the Apostle Islands—it does not occur there.

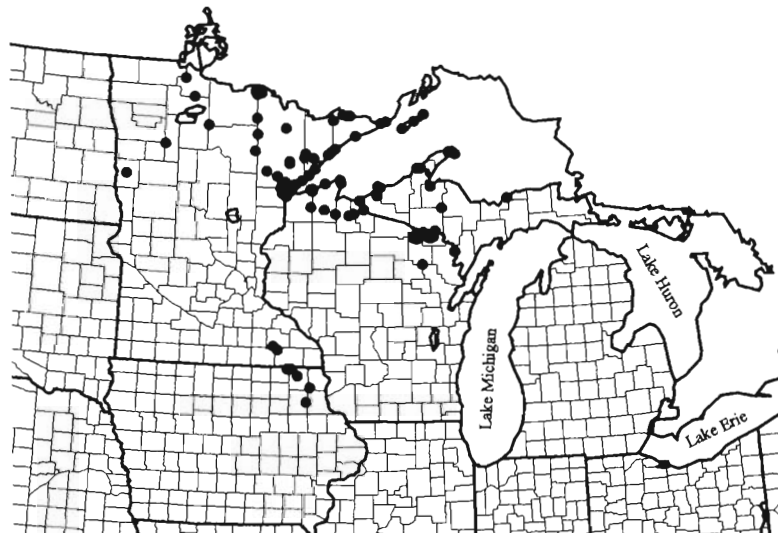
13. *Myriophyllum alterniflorum* DC., delicate or alternate-leaved water-milfoil (Water-milfoil family, Haloragaceae). Federal status: none; Mich., special concern; Minn., no status; Wis., special concern. (Map 7)

This most delicate of Midwestern water-milfoils is also the most northerly ranging, aptly described by Voss (1985) as a “neat, slender plant ... often [with a] sinuous, much-branched stem”. It occurs in northern Eurasia and northeastern North America, ranging south to Minnesota, Michigan, New York, and Massachusetts. Minnesota has about a dozen sites in the four northeasternmost counties, Wisconsin about 15 sites, all but one in the northernmost two tiers of counties (plus Walworth County in the south), and Michigan a dozen stations in the counties bordering Lake Superior, plus a half dozen sites on Isle Royale. Delicate water-milfoil occurs inland in clear oligotrophic lakes and is one of the small subset of aquatics that grows in sheltered bays of Lake Superior itself, as on Isle Royale (Lane Cove; Judziewicz 1995) and Port Superior, Bayfield County, Wisconsin (just south of Bayfield). It may be an overlooked species indicative of high water quality.

Wisconsin site discovered during this survey: BAYFIELD CO.: Pikes Bay at Port Superior marina, NE1/4 NW1/4 Sec. 27, T50N R4W, 10 Aug. 1995, ca. 100 plants in ca. 1 m of water, J-11529.

Map 6

Mertensia paniculata

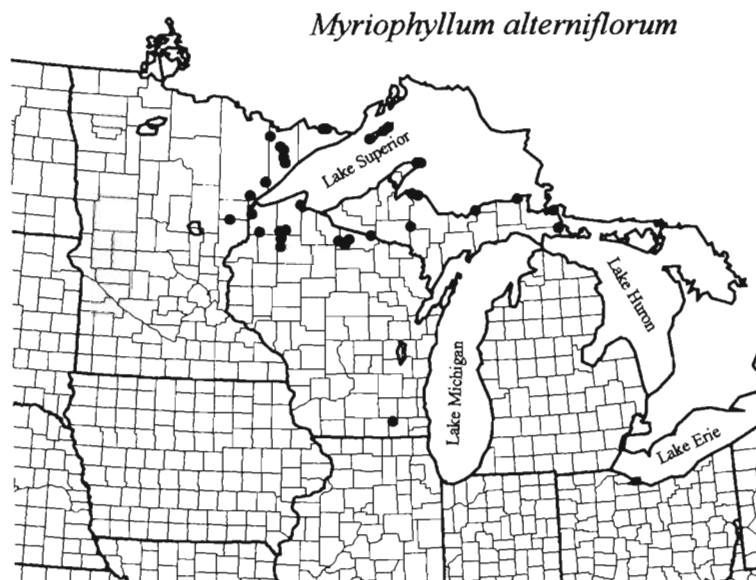


14. *Petasites sagittatus* (Pursh) A. Gray, sweet coltsfoot (Composite family, Compositae). Federal status: none; Mich., threatened; Minn., no status; Wis., threatened. (Map 8)

This handsome perennial with burdock-like leaves is fairly common in Minnesota but quite local in both Wisconsin and Michigan. It occurs from Alaska and Labrador south to Colorado, South Dakota (rare in the Black Hills), and the Lake Superior region. In northwestern Wisconsin, it is locally common in marshes and shrub swamps in the vicinity of Superior (Douglas County) and the Bibon Swamp (Bayfield County), while scattered colonies occur on the Lake Superior clay plain near the Brule and Iron Rivers. Typical habitats are cold, boggy meadows dominated by grasses or sedges such as bluejoint (*Calamagrostis canadensis*) and *Carex lacustris*. While many more stations were found near the city of Superior in 1995, it should be noted that hybridization with the common *P. palmatus* may pose a threat to this species in that area. Many intermediates, presumably the hybrid *P. ×vitifolius* E. Greene (Bogle 1968), were noted in the Superior area in 1995. Fortunately, *P. ×vitifolius* was not noted in the Brule River, Iron River, and Bibon Swamp populations.

WISCONSIN: BAYFIELD CO.: Tar Paper Alley, in ditch, Sec. 19, T49N R9W, small marshy area, recently logged, a large patch in clay soil, 4 Aug. 1975, *Stackler 75-804* (WIS), relocated on 31 May 1995 by Judziewicz, on E side of road at this spot (Sec. 20), 300–500 plants in a marshy willow thicket; Bibon Swamp area, Sec. 1, T45N R6W, in marsh, June 1980, *Tans 1953* (MIL), also Sec. 1 and 11, T45N R5W, July 1989, in past years, "an infinite number in fruit reported along a nine mile stretch of Hwy 63," in 1980, 250–300 plants in an area 150' × 100' in Sec. 1, T45N R6W, on 15 May 1996, the species was found in two areas in the swamp: 1) along west side of Hwy. 63, Sec. 1 and 12, T45N R6W, in ditch and into

Map 7



alder/willow thicket with much *Carex lacustris* and *Calamagrostis canadensis*, 500–1,000 plants, and 2) a few plants at the W end of the swamp, Sec. 32, T46N R6W, sight record by Joan Elias in June 1996 in alder/willow thicket with some *Carex lacustris*; ditch on Hwy. 13 2 mi W of Port Wing, Sec. 31, T50N R8W, 27 June 1995, 200–300 plants, Judziewicz sight record; ditch on Clevedon Road, Sec. 21, T49N R10W, 2.7 mi N of Hwy. 13, on W side of road in bluejoint swamp, 500 plants, 2 June 1995, Judziewicz sight record; ditch on Danielson Road, Sec. 8, T48N R10W, 1 June 1995, cattail swamp/sedge meadow on E side of Co. O opposite junction with Danielson Road, 200–300 plants, Judziewicz sight record. DOUGLAS CO.: Superior, 9 June 1930, *Conklin s.n.* (WIS); Bong Airport, many populations found by G. Walton, R. Koch, and P. Monson in 1993–1994; Superior, Tower Avenue wetlands, Sec. 26, T49N R14W, May 1992, R. Hoffmann sight record; W side Pokegama Road 0.2 mi south of Hwy 105, Sec. 8, T48N R14W, 27–29 June 1979, *Alverson 1446* (WIS); culvert under railroad tracks 1/4 mi W of Patzau, Sec. 10, T46N R15W, 18 May 1976, *Stackler 1233* (UWL); Solon Springs, T45N R12W, *Davis s.n.*, 13 Aug. 1915 (WIS); Gordon, T43/44N R11/12W, W end of large swamp north of village on creek bank, 18 Aug. 1929, *Wilson 1854* (WIS), G. Walton relocated it here in 1996; Pokegama Marsh, Sec. 8, 16 and 17, T48N R14W, 31 Aug. 1995, 10,000–50,000 plants, one of the largest sites in the state, Judziewicz and D. Spuhler sight record; Ambridge, Sec. 13, T48N R14W, 22 May 1995, shrub swamp on E side of Hwy. A, 3,000 flowering plants, 21 May 1996, Judziewicz sight record; marsh on E side of Albany Road, Sec. 27, T49N R14W, 5 June 1995, Judziewicz sight record; South Superior, Sec. 2–3, T48N R14W, 5 July 1995, sedge meadow/shrub swamps next to railroad tracks, Judziewicz sight record; marshes/shrub swamps S of Mariner Mall, Superior, Sec. 25, T49N R14W, 1 June 1995, Judziewicz sight record; W side of Hill Ave. west of the oil refinery, Superior, Sec. 26 and 35, T49N R14W, 5 July 1995, Judziewicz sight record; Brule River Road, Sec. 22, T49N R10W, in 1996, sight record by D. Spuhler and A. Clark in 1996. FOREST CO.: Otter Springs swamp, Sec. 24, T36N R13W, wet, sandy roadside adjacent to alder swamp, with *Equisetum* sp., *Carex* sp., *Onoclea sensibilis*, *Thalictrum* sp., and *Ribes lacustre*, 134 fruiting stems, 7 June 1995, *Krueger & Dobberpuhl s.n.* (WIS).

15. *Pinguicula vulgaris* L., butterwort (Bladderwort family, Lentibulariaceae). Conservation status: Federal, none; Mich., special concern; Minn., special concern; Wis., endangered.

Butterwort is a circumboreal species occurring south in North America to Oregon, Ontario (see regional map in Given & Soper, 1981), Minnesota, Wisconsin, Michigan, and northern New England. In Wisconsin, this species is locally common on Devils, Ironwood, Otter, and Outer Islands, Ashland County (Gurnoe, 1981; Judziewicz 1995, 1996; Judziewicz & Koch 1993), where it occurs on north-, northeast-, or northwest-facing sandstone cliffs in small, mossy, seeping fissures or ledges, usually located from 1–8 meters above the lake surface. The Devils and Otter Island sites were discovered by F.C. Lane in 1955, while Judziewicz and ranger Jim Vickery discovered the Outer and Ironwood Island populations in 1991–1992 (Judziewicz 1993, 1996).

Of interest are population trends in this species (Table 2). The large Devils Island population seems stable over the years, while the large Outer Island population is not well known; i.e., the large increase in numbers of plants between 1992 and 1996 is due to more thorough surveys that included the discovery of several new sub-populations. On both of these islands, plants tend to grow in perennially moist seepage joints on shelves of sandstone cliffs.

The decline in the smaller Ironwood and Otter Island populations seems to be real, with many sub-populations disappearing between 1991 and 1996. On these islands, the plants tend to grow on mossy fallen slabs of sandstone moist-

TABLE 2. Population trends in *Pinguicula vulgaris* in the Apostle Islands, Ashland County, Wisconsin.

Island	1980-81 (Gurnoe 1981)	1991-96 (Judz. 1993, 1996)	1996	Change, 1991-96
Devils	3,047	4,135	4,713	+ 14%
Ironwood	Unknown	1,065	750	-29%
Otter	1,019	2,022	786	-61%
Outer	Unknown	> 463	2,362	< + 457%
Total	> 4,066	> 7,735	8,611	< + 11%

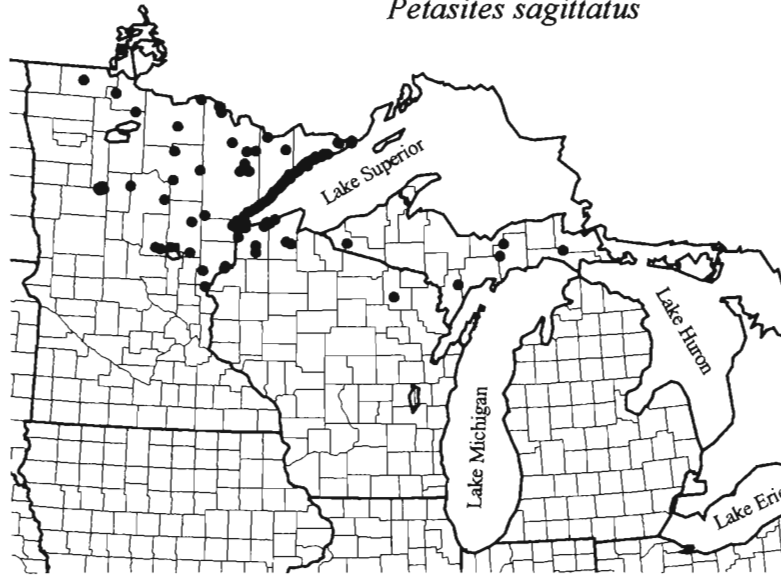
ened by wave splash, but with no internal seepage. The summer of 1995 was extremely dry, and during the 1996 survey it was noted that the moss mats in which the plants grew were either dead or seriously drought-stressed. So, it is possible that the exceptionally calm (with attendant lack of wave-splash) hot weather of 1995 is responsible for the decline on these islands, while those sub-populations with a constant moisture supply on Devils and Outer did not suffer as badly.

16. *Pyrola minor* L., small shinleaf (Shinleaf family, Pyrolaceae). Conservation status: Federal, none; Mich., none; Minn., special concern; Wis., endangered. (Map 9)

This circumboreal shinleaf is found in North America from Alaska south to California, New Mexico, Minnesota, Wisconsin, Michigan, and northern New England. In Minnesota there are several old records, the most recent dating from 1914 (Coffin & Pfannmuller, 1988), but in 1997 Gary Walton (pers. comm.) rediscovered small shinleaf in the state, finding three new sites in the northeastern part of the state. He reports that typical habitat is the transition zone between upland conifer woods and moist to wet lowland alder thickets. In Michigan, the species is occasional in the northeastern part of Isle Royale, and rare in the Upper Peninsula.

Small shinleaf was long known in Wisconsin only from the 1897 L.S. Cheney collection from Cornucopia, Bayfield County, on the Lake Superior coast. Relocation efforts long centered on boreal and pine forests near the coast, but the species was not relocated. It was a surprise, then, when Jeffery Nekola discovered three populations in mixed alder thicket/conifer swamps inland near the Lake Superior/Mississippi River drainage divide, at elevations of 1,115-1,705 ft (ca. 600-1,100 ft above Lake Superior), in 1996. The preferred habitat is one that was not suspected to harbor rare plant species: tag alder thickets (*Alnus incana* subsp. *rugosa*), more specifically those mixed with a mossy but not necessarily sphagnous understory and an overstory of scattered mature tamarack or less commonly black spruce and white cedar. Frequent associates are other shinleaves (*Pyrola elliptica* and *P. secunda*), *Viola pallens*, *Smilacina trifolia*, *Carex trisperma*, *C. disperma*, *C. leptalea*, *Vaccinium oxycoccos*, *Cornus canadensis*, *Platanthera hyperborea*, *Listera cordata*, *Lycopus uniflorus*, *Gaultheria hispidula*, *Calla palustris*, *Caltha palustris*, *Salix pedicellaris*, *Betula pumila*, *Coptis trifolia*, *Rubus pubescens*, *Trientalis borealis*, *Campanula aparinoides*, *Ledum groen-*

Map 8

Petasites sagittatus

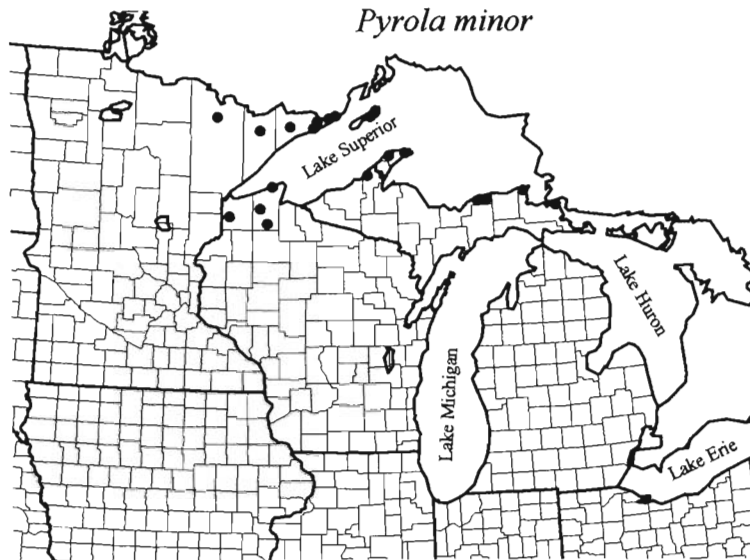
landicum, *Calamagrostis canadensis*, and *Glyceria canadensis*. Specifically, the preferred microhabitat is the bottom and lower sides of small depressions. Colonies are often small, with only a dozen or so plants scattered in an area a meter or two in diameter. These discoveries suggest that *Pyrola minor* may be found in similar sites in Minnesota and Michigan.

WISCONSIN. BAYFIELD CO.: Cornucopia, T51N R6W, 1 July 1897, *Cheney 6647* (WIS), not relocated in 1980–1981 and 1995–1996; Sugarbush Lake alder/conifer swamp, Sec. 26, T44N R7W, in deep sphagnum tamarack/tag alder swamp with bog birch, in cold, wet depressions, 200 plants (25 in fruit), 17 and 19 July 1996, *N s.n.* (UWGB #24841, 24849); E side of Eagle Lake, in tag alder thicket at edge of boreal fen, Sec. 4, T46N R8W, ca. 10 mi S of Iron River, 60 plants (10 in flower), 17 July 1996, *N s.n.* (UWGB #24853), 19 July 1996, *J-11957*. DOUGLAS CO.: Bear Creek headwaters conifer swamp along Summit Fire Tower Road, Sec. 23, T45N R14W, 4 mi E of Moose Jct. on Summit Tower Road, in black spruce/tamarack/alder stand S of road, 63 plants (8 fertile) in area 2 m in diameter, 22 July 1996, *N s.n.* (UWGB #24796), 2 Aug. 1996, *J-12013*.

17. *Ranunculus lapponicus* L., Lapland buttercup (Buttercup family, Ranunculaceae). Conservation status: Federal, none; Mich., threatened; Minn., special concern; Wis., endangered. (Map 10)

This little buttercup bears a striking vegetative resemblance to goldthread (*Coptis trifolia*), and even the flower is reminiscent, but is yellow rather than white. Lapland buttercup is a circumboreal species found south (Given & Soper 1981, map) to northern Minnesota, northern Wisconsin, northern Michigan, and northern Maine. Coffin & Pfannmuller (1988) give ten sites for Minnesota, plus a few new ones reported by Gary Walton (pers. comm., 1997). Michigan Natur-

Map 9



al Features Inventory files give three sites in Delta, Chippewa, and Mackinac Counties. In all cases the habitat is in deep, cold, mossy white cedar swamps. The first two Wisconsin records were found in just such habitats along the Brule and St. Croix Rivers by Chel Anderson in 1994.

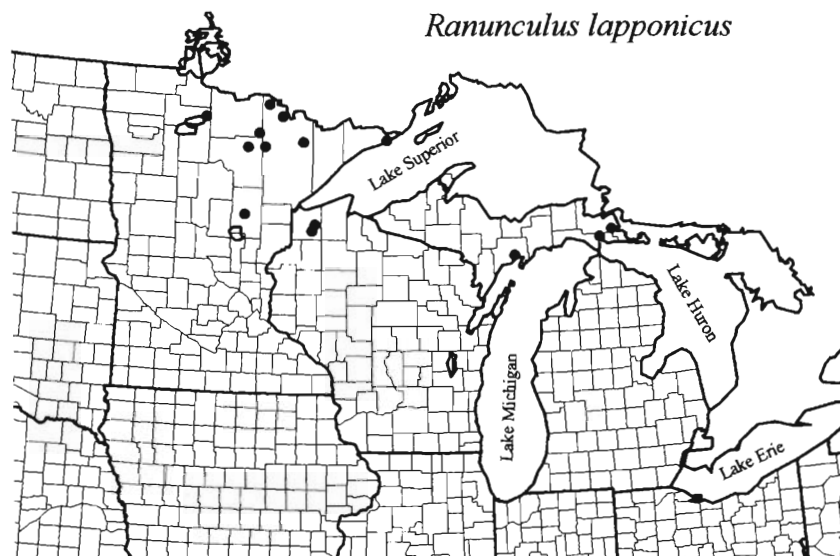
DOUGLAS CO.: Stone Chimney cedar swamp, Sec. 2, T45N R11W and/or Sec. 35, T46N R11W, 29 July 1994, *Anderson s.n.*, 24 June 1995, E.J. Epstein sight record, 25 June 1995, *J-11327*, 200 plants in seeping, mossy (but not very sphagnous) old growth cedar swamp on Brule River, with *Coptis trifolia*, *Ledum groenlandicum*, *Carex vaginata*, *C. disperma*, *C. trisperma*, *C. leptalea*, *Gaultheria hispidula*, *Mitella nuda*, and *Calypso bulbosa*; St. Croix River cedar swamp on E side of river S of Lower Ox Lake, Sec. 8 and 17, T44N R11W, 100+ plants in 6 square meter area in white cedar, balsam-fir, black spruce swamp, 2 July 1994, *Anderson & Lake s.n.* (WIS).

18. *Senecio congestus* (R. Br.) DC., marsh fleabane (Composite family, Compositae). Conservation status: Federal, none; Mich., extirpated; Minn., no status, common; Wis., special concern (perhaps extirpated). (Map 11)

This large, conspicuous fleabane or ragwort (resembling *Erechtites hieracifolia* but with yellow instead of white ray flowers) has a circumpolar to circum-boreal distribution, ranging south to British Columbia, Alberta, North Dakota, Iowa, Wisconsin (Barkley 1963), Michigan (one historical site), Ontario (Given & Soper 1981 map), Quebec, and Labrador.

Although its common name implies that this is a species of marshes, nearly all Wisconsin collection data are vague. However, even this lack of information may offer hints about the species' habitat preferences. It may imply that the col-

Map 10



lections were made in disturbed, human-modified habitats that collectors found hard to characterize in the terse language of collection labels typical of the early 20th century. The species occurs nearly throughout Minnesota (Ownbey & Morley 1991), where Welby Smith (pers. comm., 1997) reports it from “open, sunny, grassy sites” in habitats that are “not pristine.” Iowa collections all pre-date 1950 and are reported as having occurred in “prairie bogs”, forming dense stands on marsh or pond bottoms for a few years, and then disappearing. Marsh fleabane is known in Michigan only from a single collection made in 1934 on the shore of Lake Michigan in Emmet County (E.G. Voss, 28 February 1997 pers. comm.), and not relocated in searches by Voss.

In Wisconsin, marsh fleabane really must be rare or extirpated, because it is a large distinctive composite that would be difficult for even the most casual collector to overlook.

Wisconsin: BAYFIELD CO.: Port Wing (T50N R8W) to Orienta, 14 July 1897, *Cheney 7321* (WIS), site was not relocated in 1995–1996 in spite of searches at such likely sites as the marshes at the mouths of the Brule and Iron Rivers, the Port Wing bog complex, and wet roadside ditches along Hwy. 13; near Drummond, (Sec. 32–33, T45N R7W), 29 June 1896, *Cheney 4341* (WIS), a muskeg on the north side of town was searched without success for this species in Aug. 1996. DOOR CO.: Jack Fish Shoal, T31N R27E, 15 June 1935, *Fassett s.n.* (WIS); this site was searched without success for this species on 6 May 1998. DOUGLAS CO.: “Lake Superior region, near La Chapelle” [see *Rhodora* 47: 256. 1945; this the type specimen and locality for variety *tonsus* Fernald], 16 July 1897, *Cheney 7419* (holotype, GH!, isotypes, MIL!, WIS!) [“La Chapelle” was a tavern/inn run by John La Chapelle on the old stage road from Superior to Ashland, on the banks of the Brule River about 0.7 mi S of the site of the present Co. Hwy. FF bridge (Jerrard 1956), Sec. 23, T48N R10W]; city of

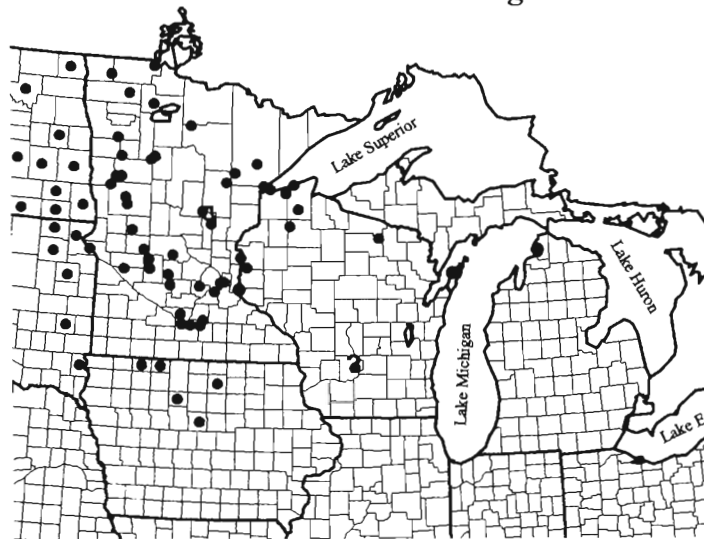
Superior docks, Northwest Hanna Fuel Dock No. 1, sandy beach and adjacent shallow water on E side of coal yard, plant three ft tall in shallow water, probably Sec. 29, T49N R13W, 23 July 1960, *Monson 4126* (UWL, DUL), this or a site nearby was searched in June 1995, and it was not relocated. ONEIDA CO.: Three Lakes (probably Sec. 6 or 7, T38N R11E), 24 June 1898, *Wadmond s.n.* (MIN). POLK CO.: Bog along E shore of Cedar Lake, Wisconsin" (Note by W.S. Alverson: "Could be Sec. 26, T32N R18W at NE end of lake, but *not* in Sec. 35; more likely in Sec. 2, T31N R18W at SE end of lake in St. Croix Co."), 11 June 1937, *Moore 10033* (MIN). ST. CROIX CO. [*sic*, for PIERCE CO., probably Sec. 12 or 14, T27N R20W], bluffs near mouth of Kinnickinnic River, 2 June 1935, *Fassett s.n.* (WIS), this site searched without success by Judziewicz in Aug. 1989 and May 1993. SAWYER CO.: Hayward [T41N R9W], July–August 1926, *Gilbert & Gilbert s.n.* (WIS). COUNTY UNKNOWN [probably SAUK CO.]: "Devil's Lake, Wis." [note on sheet by J.H. Zimmerman: "probably the Devils Lake at Webster, Burnett Co., or SE of Spooner, Washburn Co. Not Sauk Co."], 30 May 1896, *Cheney s.n.* (WIS) [But can the possibility of Sauk County be dismissed? Devils Lake, Sauk County was a favorite field destination for Cheney and his taxonomy classes. *Senecio congestus* was collected on a Kinnickinnic River bluff near the St. Croix River, and occurs on algal talus slopes in Iowa (J. Nekola pers. comm.), so its historic occurrence on cool-air draining quartzite talus such as occurs on the East Bluff of Devils Lake is not impossible. The species is occasional in prairies nearly throughout Minnesota. Devils Lake, Sauk County is a well-known refugium for northern species.]

19. *Streptopus amplexifolius* (L.) DC., white mandarin (Lily family, Liliaceae). Conservation status: Federal, none; Mich., none; Minn., none; Wis., special concern. (Map 12)

White mandarin grows from Alaska to Greenland, south to Arizona, South Dakota, northern Minnesota, northern Wisconsin, northern Michigan, New England, and in the Appalachian Mountains to North Carolina. In Wisconsin, this handsome species is widespread on the Apostle Islands, especially the larger islands lacking past or present deer populations, such as Outer, Sand, and Stockton Islands. Transect data suggest populations in the tens of thousands on each of these three islands. On islands with large deer populations, such as Madeline, and on the Wisconsin mainland it is much less common. It is still occasional in rich mesic ravines near the coast on the Bayfield Peninsula, but most populations either 1) are small and show considerable deer-browse damage or 2) are *very* small (one or a few individuals) and occur in sites inaccessible to deer (steep ravine bottoms, or on tall fallen boulders in shaded canyons). Many collections were made inland in the Penochee Range in the 1920s and 1930s, but in spite of intensive collecting in the past few years, only a few small extant populations have been documented there. It is likely that there are less than 1,000 individuals on the Wisconsin mainland, compared with over 100,000 on the Apostle Islands. There are also a few records of this species from Door County, Wisconsin. In Minnesota, Ownbey & Morley (1991) map many occurrences near the Lake Superior shoreline, but Gary Walton (pers. comm.) reports it as uncommon in that state. Don Henson (pers. comm.) notes that it is rare in the Upper Peninsula of Michigan, and states that "deer will climb for it!"

White mandarin is characteristic of rich, well-drained upland woods, often near large stands of sugar maple or hemlocks. It is also locally frequent in rich ravine bottoms. The species is not colonial; seldom does one find more than a few plants growing close together. Common herbaceous associates include *Osmorhiza chilensis*, *Trillium cernuum*, *Panax trifolius*, as well as ubiquitous

Map 11

Senecio congestus

understory species such as *Clintonia borealis*, *Maianthemum canadense*, and *Trientalis borealis*.

WISCONSIN. ASHLAND CO.: Occasional on nearly all the Apostle Islands (Judziewicz & Koch 1993) except Madeline, where rare (6 Aug. 1931, *Fuller 4433*, MIL); at various sites in the Penokee Range by Fassett in the 1920s and 1930s, perhaps last seen at following site: S of Eagle's Peak near Mellen, Sec. 11, T44N R2W, wet sedgy ground near spring-fed stream, in red maple-white cedar woods with birch, gooseberry, *Mertensia paniculata*, and *S. roseus*, 7 Aug. 1971, *Schwarzmeier s.n.* (WIS); Morgan Creek area, Sec. 29–30, T45N R4W, 17 Sept. 1997, M. Brzeskiewicz sight record. BAYFIELD CO.: Lenawee, shady ravine, 6 Aug. 1917, *Goessl 8285* (MIL); gorge of Larson Creek at Twin Falls Park, Port Wing, Sec. 32, T50N R8W, in 1970s, *Koch 10204* (UWL), not relocated here in June 1995 by Judziewicz; Little Sand Bay, in 1962, *Ilitis & Kawano 20505* (WIS), still present here, 1991–1996; Sand Island, common in 1992 (Judziewicz & Koch 1993); deep dry ravine (with second growth hardwoods) in lakeshore cliffs between Port Wing and Herbster, Sec. 12, T50N R8W, 3 plants, 31 May 1995, Judziewicz sight record; Siskiwit River at Siskiwit Falls, Cornucopia, Sec. 34, T51N R6W, 4 plants in gorge, June 1995, Judziewicz sight record; Sec. 12, T51N R5W, 6–9" birch, maple and aspen stand in ravine bottom in cut-over county forest, 2 plants, 11 Aug. 1996, Judziewicz sight record; West Branch of Saxine Creek, Sec. 30, T51N R5W, ravine bottom with pole-sized yellow birch, the adjacent uplands cutover, 3 plants, 1 Aug. 1996, Judziewicz sight record; T51N R4W, deep ravine bottom with remnant 12–24" hemlock, 8 mature unbrowsed plants, 10 July 1996, Judziewicz sight record; Eagle Bay brook hemlock-hardwoods, T52N R4W, ravine bottom, 88 plants, robust and with little evidence of deer browsing, perhaps the healthiest and most substantial population on the Wisconsin mainland, 3 July 1996, *J-11854*; Raspberry Point to Frog Bay ravines; T51N R3/4W, rich ravine bottoms in second growth sugar maple, hemlock, yellow and white birch, balsam fir, and red maple stands, 30 plants; 2–10 July 1996, Judziewicz sight records; Red

Cliff Point, T51N R3W, scattered and uncommon in small hardwood ravines and uplands near the lake, 5 July 1996, Judziewicz sight record; North Branch of Pikes Creek, Sec. 5, T50N R4W, 15 robust plants at base of steep slope on S bank of creek, with yew and under sugar maple, 1 July 1996, *J-11845*; Birch Run white cedar stand, just N of Bayfield Fish Hatchery, Sec. 21, T50N R4W, browsed white cedars next to cold brook, 3 plants, 20 June 1996, Judziewicz sight record; Houghton Falls, ravine just N of Washburn and W of railroad grade, Sec. 27, T49N R4W, sandstone gorge bottom shaded by hemlock and yellow birch, 7 plants, 9 Aug. 1996, Judziewicz sight record. DOUGLAS CO.: Solon Springs (T45N R12W), 1907, only 1 plant, *J. Davis s.n.* (MIL). IRON CO.: Rich boreal ravine bottom woods near mouth of Carpenter Creek just W of Saxon Harbor, Sec. 11, T47N R1W, a few plants, 24 May 1995, Judziewicz sight record; Vaughn Creek, Sec. 9, T46N R1W, rich wooded bottoms along creek, 28 May 1996, J. Nekola sight record; also at two sites near Saxon Harbor and the mouth of the Montreal River in the 1930s.

20. *Trisetum spicatum* (L.) K. Richter, spike trisetum (Grass family, Gramineae). Conservation status: Federal, none; Mich., special concern; Minn., no status; Wis., threatened. (Map 13)

This grass is found in northern Eurasia and North America, ranging south in the New World to Central America in the mountains. Spike trisetum is uncommon in the Great Lakes region, and in Wisconsin it occurs only in the Lake Superior region in Ashland and Bayfield Counties. Its principal habitat is north-, northeast-, or northwest-facing sandstone cliffs, where it grows in small, moist pockets of soil in fissures or on mossy, seeping or wave-splashed ledges, usually located from 1–5 meters above Lake Superior. Individuals grow singly or in lines up to 12 meters long in joints and fissures in the rock. Spike trisetum frequently grows in areas that are semi-shaded by cliff-top “krummholz” forest consisting of stunted trees of white cedar (*Thuja occidentalis*), yellow birch (*Betula alleghaniensis*), white birch (*B. papyrifera*), white spruce (*Picea glauca*), showy mountain-ash (*Sorbus decora*), and balsam poplar (*Populus balsamifera*), as well as the shrubs red-osier dogwood (*Cornus stolonifera*) and green alder (*Alnus viridis* subsp. *crispa*). Herbaceous associates are infrequent but may include *Poa nemoralis*, *Stellaria borealis*, *Agrostis scabra*, and, on Ironwood, Otter, and Outer Islands, *Pinguicula vulgaris*. At its stations on Madeline Island and on the mainland at Raspberry Point, other associates include *Primula mistassinica*, *Potentilla tridentata*, and *Senecio pauperculus*.

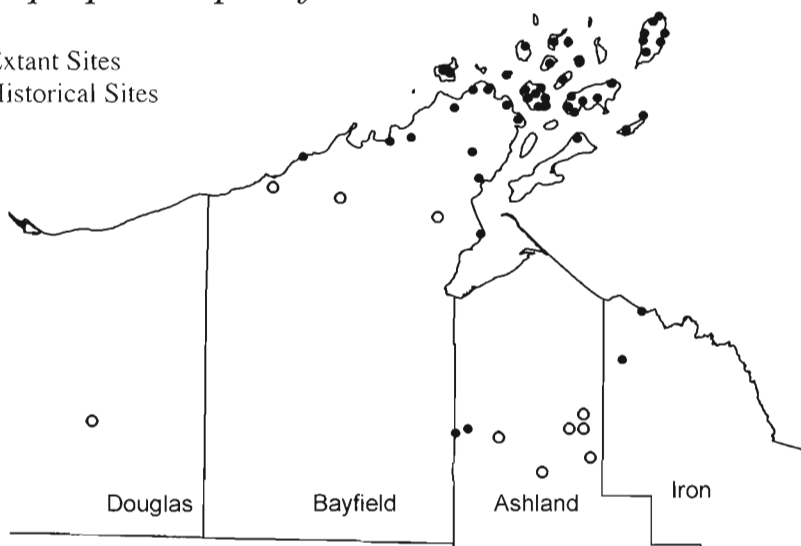
Surveys from 1991–1996 turned up numerous new sites for this grass on the Bayfield Peninsula and on the Apostle Islands (Judziewicz 1993, 1996, 1997). Most populations are small with only a few individuals, suggesting that populations are dynamic with establishment due to long-distance dispersal of seeds by lake currents, and frequent local extinctions.

WISCONSIN. ASHLAND: Apostle Islands: Bear, Otter, Manitou, Ironwood, Stockton, Hermit, Basswood, and Outer Islands (see Judziewicz 1993 and Judziewicz & Koch 1993); Madeline Island, south shore of Big Bay, sandstone cliffs, 10 Aug. 1973, *Tans 166* (MIL); also at Steamboat Point at the north tip of the island (Tans); both sites not relocated, 1990–1996 by Judziewicz; Devils Island, rare on wave-splashed sandstone ledges on SE side of island, 22 June 1996, *J-11800*; Outer Island, rare on wave-splashed sandstone ledge with abundant *Pinguicula vulgaris* on SE side of island, 15 July 1996, *J-11933*. BAYFIELD: Port Wing to Orienta, 14 July 1897, *Cheney 7333* (MIL) [the only suitable habitat here would be the sandstone ledges and low cliffs on Quarry Point just west of Port Wing; these were thor-

Streptopus amplexifolius

Map 12

- Extant Sites
- Historical Sites



oughly searched on foot and by canoe several times during 1995, with no success in finding *Trisetum* or other rare plants]; Near Herbster to Port Wing, 8 July 1897, *Cheney 6971* (WIS); relocated on sandstone cliffs and ledges at three sites west of Herbster on 22 Aug. 1995: Sec. 6–7, T50N R7W, 8 clumps, *J-11603*; Sec. 12, T50N R8W, 20 clumps, *J-11604*; Raspberry Point cliffs, T52N R4W, 31 July 1974, *Tans & Read 900* (MIL), relocated on 10 July 1996 by Judziewicz; Apostle Islands: Sand and York Islands (see Judziewicz 1993 and 1996, also Judziewicz & Koch 1993); Sand Point cliffs, Sec. 34, T52N R5W, 75 fruiting stems, 25 July 1995, *J-11475*; Allen Road cliffs, T52N R4W, 3 clumps, 22 Aug. 1996, *J-11606*; Point Detour cliffs, T52N R4W, 4 plants, 11 July 1996, *J-11870*; Eagle Bay cliffs, T52N R4W, 10 plants, 3 July 1996, *J-11855*; Red Cliff Point cliffs, T51N R3W, E-facing sandstone wave-splashed ledges with *Euthamia graminifolia*, *Epilobium angustifolium*, *Hieracium florentinum*, and *Polypodium virginianum*, 5 July 1996, *J-11884*.

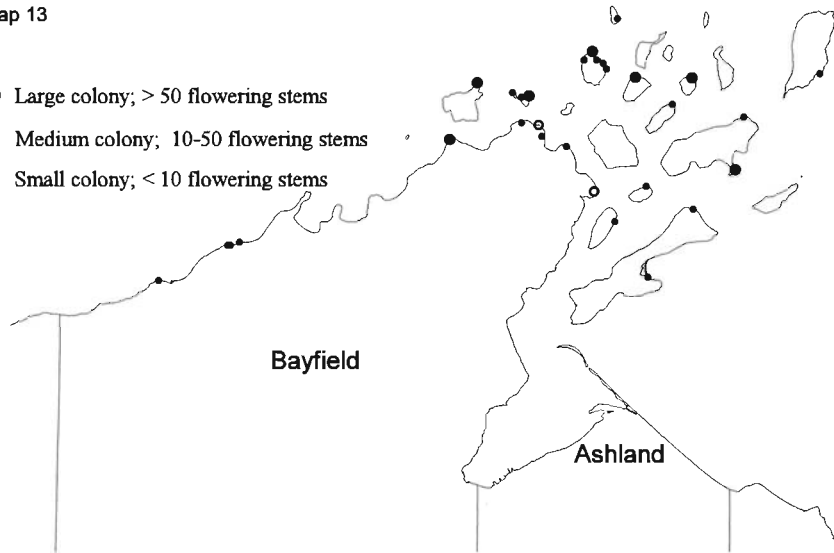
21. *Vaccinium vitis-idaea* L. var. *minus* Lodd., mountain-cranberry or lingonberry (Heath family, Ericaceae). Conservation status: Federal, none; Mich., endangered; Minn., no status; Wis., endangered. (Map 14)

This inconspicuous (except in fruit) trailing shrub grows in northern Eurasia and northern North America south to Minnesota, Wisconsin, Michigan, and northern New England, and was long considered extirpated in both Wisconsin and Michigan. In Wisconsin, it was re-discovered in June 1994 by Kristin Westad, Mark Jaunzems, Gary Fewless and Steve Janke after a 64 year “hiatus”, while Judziewicz re-discovered it in Michigan the same month after a 126 year gap (Judziewicz 1995, Voss 1996). Now it is known in Wisconsin from five sites, where it is rare on sandstone lakeshore cliffs in Bayfield County, and in mature black spruce swamp in inland Ashland and Forest Counties. North of

Trisetum spicatum

Map 13

- Large colony; > 50 flowering stems
- Medium colony; 10-50 flowering stems
- Small colony; < 10 flowering stems

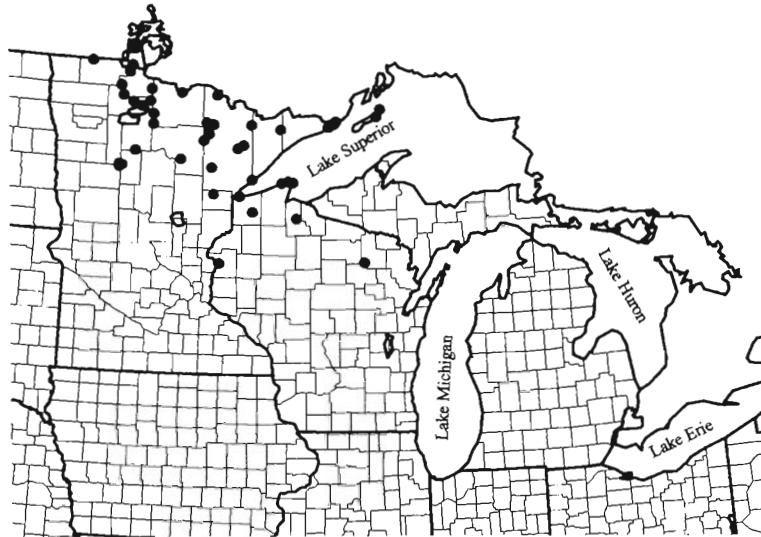


Lake Superior, mountain-cranberry often grows in burnt muskegs, and fire may be an important component in maintaining viable populations (Hall & Shay 1981).

Mountain-cranberry could easily be overlooked. At a distance its trailing stems and glossy, sometimes reddened leaves resembled a patch of unusually small bearberry (*Arctostaphylos uva-ursi*). Bearberry, however, besides its generally larger stature and shreddy reddish-brown bark, has larger, flatter, more obovate or paddled-shaped leaves. Mountain-cranberry has elliptical leaves with a distinctive crease along the midrib on the upper (adaxial) surface, and at least a few tiny black dots on the lower surface. In flower, it is easily recognized by its 4-merous flowers, campanulate rather than urceolate corolla, and bright red globular fruit. Despite the common name the flowers are not at all “shooting-starlike” as in the common cranberries *Vaccinium oxycoccos* and *V. macrocarpon*. Common understory associates at the Michigan and Wisconsin sites are *Cornus canadensis*, *Maianthemum canadense*, *Ledum groenlandicum*, *Gaultheria hispida*, and the blueberries *Vaccinium angustifolium* and/or *V. myrtilloides*, plus those species listed under each site below. The Wisconsin cliff edge sites are always associated with deep mats of the moss *Hylocomium splendens*, and grow under green alder (*Alnus viridis* subsp. *crispa*), showy mountain-ash (*Sorbus decora*), and white birch (*Betula papyrifera*).

MICHIGAN. KEWEENAW CO.: Isle Royale, Smithwick Island, in 1868, A.E. Foote s.n. (MICH), site not relocated in searches by Edward G. Voss (17 July 1974), Janet (Gereau) Marr (12 July 1982) and Judziewicz (8 and 19 Aug. 1993); Isle Royale, Passage Island, rocky SE-facing shore ca. 1 km NE of lighthouse, shoreline basalt bedrock beach, 1,000-1,250 stems in mat of *Sphagnum compactum* DC. (J-10933, MICH) about 5-7 vertical

Map 14

Vaccinium vitis-idaea

meters above Lake Superior and 10–13 meters inland, partly shaded by sapling white cedar, and with scattered associates *Carex deflexa*, *Scirpus cespitosus*, *Potentilla tridentata*, and *Calamagrostis canadensis*, in fruit on 15 August 1994, *J-10932* (MICH). The colony was revisited on 4 June 1997, was healthy, and had expanded slightly in the intervening three years.

WISCONSIN. ASHLAND CO.: Conifer swamp W of Meder Lake, Sec. 19, T44N R2W, mature, dryish sphagnum black spruce/tamarack swamp, with *Vaccinium oxycoccos* and *V. myrtilloides*, locally common in understory with ca. 500 stems scattered in an area of 10 x 30 m in diameter, 14 June 1996, *N s.n.* (UWGB #24856), 16 June 1996, *J & N 11782* (WIS). BAYFIELD CO.: Apostle Islands National Lakeshore, Squaw Bay cliffs, Sec. 18, T51N R5W, second-growth boreal forest on edge of wet acid sandstone cliff of Lake Superior, 29 June 1995, ca. 2,000 stems, *J-11372*; Eagle Bay cliffs, T52N R4W, shaded cliff in dense moss mat under green alder and level bluff top edge forest in open 6–12" white birch stand with small red maple and balsam-fir, common associates, 1 sq. m. of colony is on steep 45° N-facing bluff ca. 2 m below bluff edge, while the majority (75 sq. m) on level bluff top edge forest in fairly dense shade with a total of 5,000–10,000 stems, ca. 10% in old flower, 10 July 1996, *J-11393*; Raspberry Point cliffs, T52N R3/4W, moist shaded sandstone lake cliff in dense moss under canopy of scattered green alder, white spruce, and white birch, 1,000 stems (100 fertile) in area ca. 5 m in diameter, 10 July 1996, *J-11392*. DOUGLAS CO.: Superior, 64th Street and Hammond Avenue, intersection of Sec. 2, 3, 10, and 11, T49N R14W, 22 Apr. 1927, *L.R. Wilson 80* (WIS), not relocated during searches in 1979 (by W.S. Alverson) and 1995 (Judziewicz); Solon Springs, head of St. Croix Lake, Sec. 17, T45N R12W, 4 July 1930, *G.H. Conklin s.n.* (WIS). FOREST CO.: Forested area S of Crandon, Sec. 26, T35N R12E, lowland conifer swamp dominated by black spruce and balsam fir, June 1994, *Westad, Jaunzems, Fewless, and Janke s.n.* (WIS). POLK CO.: "Peatbogs," June 1887, ex Herb. J.H. Sandberg (MIN).

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