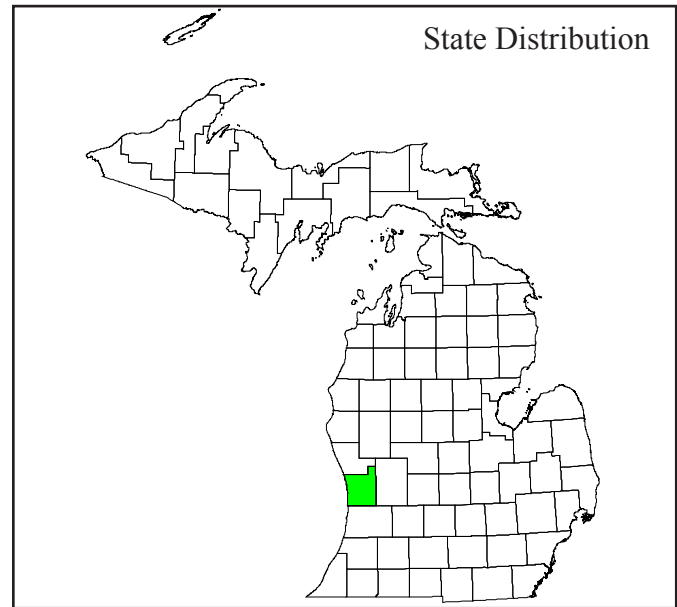
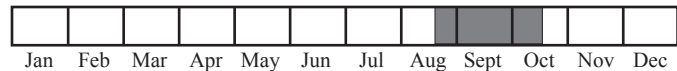




Photo by Susan R. Crispin



Best Survey Period



Status: State endangered

Global and state rank: G5/S1

Other common names: comb-leaved mermaid-weed, coastal plain mermaid-weed

Family: Haloragaceae (water-milfoil family)

Taxonomy: According to Voss (1985), hybrids with *P. palustris* have been named *P. ×intermedia* Mack.

Range: This species ranges principally along the Atlantic Coastal Plain from New Brunswick to Florida and west to Louisiana and Texas in the Gulf region. Elsewhere it is also known from disjunct locations in the Upper Midwest (Michigan) and Tennessee. It is considered rare in Maine, New York, and Virginia, extirpated in Pennsylvania, and is known only from historical records in New Hampshire (NatureServe 2007).

State distribution: This rare mermaid-weed is known from a single locality in southwest Lower Michigan, where it was collected in 1941 from a sandy ditch in Ottawa County but misidentified as *P. palustris*, a similar but widespread and common species. The specimen was subsequently redetermined by E.G. Voss in 1983, and the original site rediscovered by A.A.

Reznicek in 1984, who found the species to be extant in a former peaty excavation where it occurred with *P. palustris* and apparent hybrids (Voss 1985). Michigan's occurrence represents a marked disjunction from the main range along the Atlantic and Gulf Coastal Plain (Reznicek 1994).

Recognition: *P. pectinata* is an aquatic to a semi-upright wetland plant, typically with somewhat trailing, prostrate lower stems that tend to root at the nodes and erect but weakly ascending upper stems. The leaves are **alternate and uniformly dissected throughout, with both submersed and emersed (i.e. emergent) leaves deeply divided into very narrow, linear segments resembling a two-sided comb**. Small bisexual, three-parted flowers, which bear tiny, triangular, nut-like fruits, are borne individually in the axils (bases) of emersed leaves near the tip of the stem.

P. pectinata is mostly likely to be confused with the common *P. palustris*, whose range completely overlaps that of *P. pectinata* and is thus likely to occur with it. In contrast to *P. pectinata*, the emersed leaves of the *P. palustris* tend to be lanceolate and merely toothed, and typically both dissected and toothed leaves occur on the same plant. As noted below (see biology section), the leaves of *P. palustris* are highly variable, with some plants bearing dissected leaves below, toothed lanceolate leaves above, and then via further growth



reverting to dissected leaves in response to certain environmental variables. However, the uniformity of the leaves in *P. pectinata*, in contrast to the variation in *P. palustris*, should allow these two taxa to be reliably distinguished. Species of *Myriophyllum* (water-milfoil) could possibly be confused with *P. pectinata*, but the similarity is very superficial, since in *Myriophyllum* the leaves are borne mostly in whorls, and the flowers are unisexual and four-parted.

Best survey time/phenology: Fertile (flowering or fruiting) plants are necessary to identify this species. The two state collections, both of fruiting specimens, were collected in mid-September and early October, as is typical of many of Michigan's coastal plain disjunct species. The species is thus best sought from about late August through mid-October and possibly somewhat earlier and later depending on annual and local conditions.

FQI Coefficient and Wetland Category: 6, OBL

Habitat: In the sole Michigan locality, *Proserpinaca pectinata* is restricted to a moist, sandy ditch on peaty sand where it is associated with such species as *Lycopus americanus* (water-horehound), *Spiraea tomentosa* (steeplesh), *Onoclea sensibilis* (sensitive fern), *Ludwigia palustris* (marsh purslane), *Panicum spretum* (panic grass), *Polygala cruciata* (cross-leaved milkwort), *Carex longii* (sedge), and *P. palustris*, apparently hybridizing with the latter and producing morphologically intermediate plants as noted above. The ditch lies along a paved highway and drains the adjacent fields of a blueberry farm; the presence of the above associated species, including two additional coastal plain disjuncts (*P. spretum* and *P. cruciata*), suggests that the converted habitat of the blueberry fields or other sites in proximity may have once comprised coastal plain marsh. In the main portion of its range along the Atlantic Coastal Plain, this species grows in sandy bogs and savannas, and especially along the periphery of sandy, acid ponds, lakes, streams, ditches, and also in wet pine savannas and flatwoods, cypress-black gum ponds, swamps, and damp clearings (Shelingoski et al. 2005, Crow and Hellquist 2000, Godfrey and Wooten 1981, Radford et al. 1968, Ellis 1955).

Biology: *P. pectinata* is a perennial plant, arising from a persistent rhizome-like base (Gleason and Cronquist 1991). Like many coastal plain disjunct taxa, this rare

mermaid-weed prefers relatively acidic substrates and aquatic environments, particularly in and around soft-water lakes, ponds, and intermittent, seasonally flooded wetlands. Although the leaves of this species remain "pectinate" (i.e. divided or cleft into comb-like divisions) throughout the growing season, whether submerged in water or not, the emergent (above water) leaves of the closely related *P. palustris*, which it occurs with, are known to be highly variable in relation to photoperiod or other environmental conditions, such as fluctuating water levels (Godfrey and Wooten 1981, Schmidt and Millington 1968). Short-day periods appear to cause the emergent leaves of *P. palustris* to revert to the more dissected juvenile form (Davis 1967), further underscoring the need for fertile plants to reliably distinguish *P. palustris* from *P. pectinata*.

Conservation/management: It is remarkable that this plant has survived at least 40 years in such a tiny, degraded fragment of its original habitat. The single known locality occurs within a Michigan Department of Transportation (MDOT) right-of-way (ROW), where it is protected, monitored, and managed to maintain the current roadside habitat, including the hand removal of successional, woody vegetation and modification of other normal maintenance activities (e.g. the local use of herbicides) to prevent adverse impacts. Despite good local protection measures, the population remains vulnerable simply due to its small size, restricted habitat, and the correspondingly low potential of dispersing and establishing in suitable habitat nearby. A carefully monitored experimental translocation of some individuals to a coastal plain marsh may merit future consideration.

Research needs: Beyond a continuation of the current protection and monitoring for *P. pectinata*, inventory remains a primary need. This species may be easily overlooked and confused with *P. palustris*, and thus it should be sought, particularly in the many coastal plain marshes and similar intermittent wetlands that are concentrated in southwest Lower Michigan.

Related abstracts: Coastal plain marsh, intermittent wetland, American bittern, Eastern massasauga, Freija fritillary, incurvate emerald, Northern harrier, secretive locust, short-eared owl, spotted turtle, merlin, northern appressed clubmoss, meadow-beauty, Hall's bulrush, few-flowered nut-rush, zig-zag bladderwort.



Selected references:

- Crow, G.E. and C.B. Hellquist. 2000. Aquatic and Wetland Plants of Northeastern North America. Volume 1. Pteridophytes, Gymnosperms, and Angiosperms: Dicotyledons. University of Wisconsin Press, Madison. 480 pp.
- Crow, G.E. and C.B. Hellquist. 1983. Aquatic vascular plants of New England: Part 6. Trapaceae, Haloragaceae, Hippuridaceae. Station Bulletin 524. New Hampshire Agricultural Experiment Station. Univ. of New Hampshire, Durham. 26 pp.
- Davis, G.J. 1967. *Proserpinaca*: photoperiodic and chemical differences of leaf development and flowering. *Pl. Physiol.* 42: 667-669.
- Ellis, L.L. 1955. Preliminary notes on the correlation between alkalinity [sic] and the distribution of some free-floating and submerged aquatic plants. *Ecology* 36: 763-764.
- Gleason, H. A., and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. Second edition. The New York Botanical Garden. Bronx, New York. lxxv + 910 pp.
- Godfrey, R.K. and Wooten. 1981. Aquatic and Wetland Plants of Southeastern United States. Dicotyledons. Athens, GA. Univ. of Georgia Press. 712 pp.
- NatureServe. 2007. NatureServe Explorer: an online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: September 11, 2007).
- Radford, A. E., H. E. Ahles, and C. R. Bell. 1968. Manual of the vascular flora of the Carolinas. Univ. of North Carolina Press, Chapel Hill. 1183 pp.
- Reznicek, A.A. 1994. The disjunct coastal plain flora in the Great Lakes region. *Biological Conservation* 68: 203-215.
- Schmidt, B.L. and W.F. Millington. 1968. Regulation of leaf shape in *Proserpinaca palustris*. *Bull. Torrey Bot. Club* 95: 264-286.
- Shelingoski, S., R.J. LeBlond, J.M. Stucky, and T.R. Wentworth. 2005. Flora and soils of Wells Savannah, an example of a unique savanna type. *Castanea* 70: 101-114.
- Voss, E. G. 1985. Michigan Flora. Part II. Dicots (Saururaceae-Cornaceae). *Bull. Cranbrook Inst. Sci.* 59 and *Univ. of Michigan Herbarium*. xix + 724 pp.

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