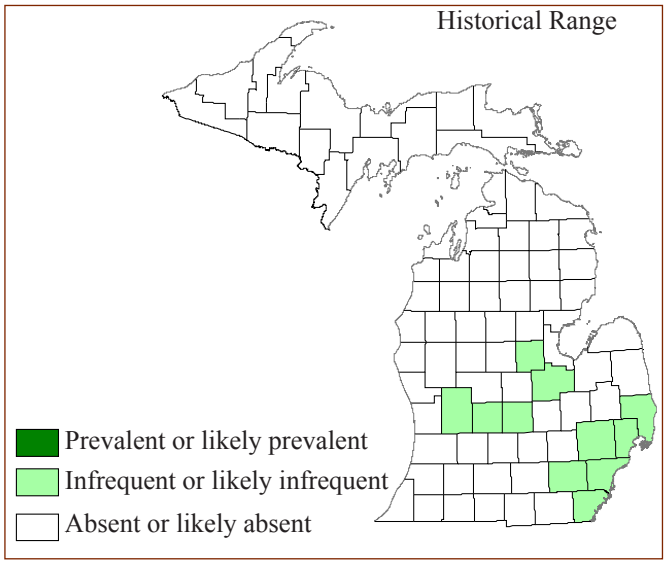
Inland Salt Marsh — Community Abstract

Inland salt marsh in wet year. Photo by Kim Chapman



Overview: This community is a wetland dominated by tall graminoid plants that are salt tolerant. The vegetation may be sparse with areas of bare mud.

Global and State Rank: G1/S1.

Range: The present range for inland salt marsh in the eastern United States is restricted to Michigan, Illinois, and New York (Faber-Langendoen 2001, NatureServe 2001). This rare plant community was originally known from New York, Missouri, Illinois, Ohio, Pennsylvania, Virginia, and Michigan.

Rank Justification: Inland salt marsh was always a rare community with only local occurrences in the eastern United States, but postsettlement exploitation destroyed most known sites (Chapman et al. 1985). While the plant community was known from Illinois, Michigan, Missouri, New York, Ohio, Pennsylvania, and Virginia, it persists only in Illinois, Michigan, and New York. Known salt seepages throughout this range have been surveyed for inland salt marsh (Chapman et al. 1985). However, most sites with saline or brine seeps do not support halophytes (salt tolerant vegetation) and few additional occurrences are expected to be discovered.

Landscape and Abiotic Context: This community occurs on peat, muck, or mineral soils saturated by sodium- or chlorine-rich groundwater seeping from saline aquifers (Faber-Langendoen 2001, NatureServe 2001). These sites are most common along streams or rivers where glacial drift is thin enough to permit brine from deep saline aquifers to remain concentrated and emerge at discrete points. In Michigan, salt marshes and seeps were concentrated in three areas where Silurian or Devonian halites (rock salt deposits) were near the surface. The greatest concentration of sites was along the floodplain and slopes adjacent to the Maple River and Grand River, where there are Silurian halites. Our only intact salt marshes occur in this area, along the Maple River in northern Clinton County. A second concentration of Salurian salt seeps occurred near Lake St. Clair and Lake Erie in Macomb, Monroe, St. Clair, Washtenaw, and Wayne counties. None of these remain intact. A third large concentration of Devonian salt seeps occurred in Midland and Saginaw counties. No intact salt marshes remain from this group of wetlands.

Soils of the Maple River salt marsh were sampled and found to be high in several ions, including sodium, chloride, potassium, calcium, and magnesium (Chapman et al. 1985). The pH ranged from 5.8 to 8.0 within the marsh.

Historically, there has always been strong interest in salt marshes. To the aboriginal populations, salt seeps were important as sites visited by deer and other wild animals (Houghton 1838, Chapman et al. 1985). Salt marshes were also known to early settlers from Europe, who called them deer licks, salt licks, salt springs, and natural brine (Chapman et al. 1985). Salt was an important preservative for food as the Midwest and West were being settled, so most salt seeps were heavily exploited (Winchell 1861, Cook 1914, Allen 1918, Gere 1974).

Natural Processes: Inland salt marshes form where salt-rich seeps emerge to the surface from glacial deposits

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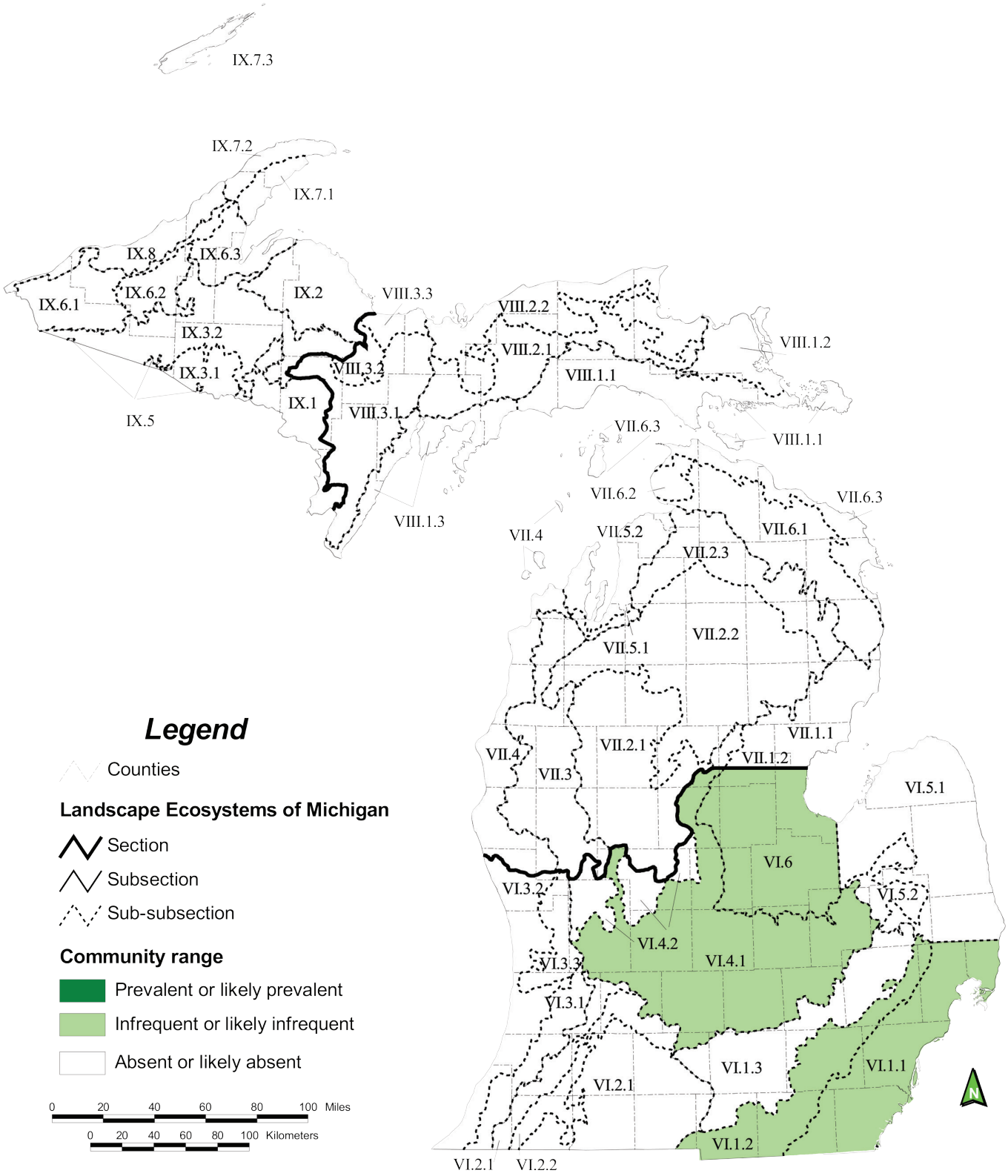

Ecoregional map of Michigan (Albert 1995) depicting historical distribution of inland salt marsh (Albert et al. 2008)

(Kost et al. 2007). A limited number of wetland species can tolerate the high salt levels and wetland soils develop over time. Open, unvegetated sediments are often found within the wetland, either because of extreme saline conditions or because of disturbance from animals seeking salts. At the Maple River salt marsh, there was strong evidence that deer were responsible for the open sediment within the marsh (D. Albert, personal observation). Deer tracks were dense in the moist, organic-rich sediment of the unvegetated opening (see photo).

There is evidence that birds may have played a role in the introduction of halophytes inland from the extensive saline habitats of the Atlantic coast (Ogle 1981, Chapman et al. 1985). Salty habitats created by humans through brine drilling and road salting sometimes support halophytes, either through accidental or intentional introduction (Reznicek 1980, Chapman et al. 1985). Such artificial habitats are not tracked in the MNFI database.

The amount of seepage within the salt marshes can vary greatly, both seasonally and annually. On some mid-summer visits to the Maple River salt marsh by the author, deep water covered the entire marsh. In other years the marsh was dry, with the exception of shallow water in areas disturbed by deer and other animals.

Fire may have been important for maintaining the open conditions required by most plant species found in salt marshes (Chapman et al. 1985). While fires may have occurred naturally in some salt marshes, Native American use of fire for either agricultural or game management may have also been significant at many sites.

Open salt marsh in dry year. Photo by Dennis Albert.

Vegetation Description: Because occurrences are small and widely scattered, each site tends to have a distinct composition (Faber-Langendoen 2001, NatureServe 2001). Dominant species vary from marsh to marsh, and eastern sites are richer in halophytic species than western sites. Species that are found across the range of the community are *Atriplex patula* (spearscale) and *Eleocharis parvula* (dwarf spike-rush). The number of species found within the halozone is always low (Chapman et al. 1985, Reschke 1990, Faber-Langendoen 2001, NatureServe 2001); sodium chloride-saturated ground creates intolerable conditions for most vascular plants.

At the Maple River salt marshes, eight species were found only in the halozone. These were:

Scientific Name	Common Name
Alisma plantago-aquatica	water-plantain
Eleocharis parvula	dwarf spike-rush
Eleocharis erythropoda	spike-rush
Phragmites australis	giant reed
Portulaca oleracea	purslane
Samolus floribundus	water-pimpernel
Schoenoplectus americanus	three-square bulrush
Sium suave	water-parsnip

Other species found within the both the halozone and other zones of the wetlands include:

Scientific Name	Common Name
Acorus calamus	sweet-flag
Aster lanceolatus	panicled aster
Atriplex patula var. *hastata*	spearscale
Eupatorium perfoliatum	boneset
Mentha arvensis	wild mint
Schoenoplectus pungens	three-square
Typha angustifolia	narrow-leaved cat-tail
Typha latifolia	broad-leaved cat-tail

Michigan Indicator Species: *Atriplex patula* var. *hastata*, *Eleocharis parvula* (state endangered), *Schoenoplectus americanus* (state endangered), and *Schoenoplectus pungens*.

Other Noteworthy Species: Two rare plant species, *Eleocharis parvula* (dwarf spike-rush, state endangered) and *Schoenoplectus americanus* (three-square bulrush, state endangered), are known from this plant community in Michigan.

Conservation/Management: The amount of open seepage at the Maple River salt marshes has decreased

significantly over the last twenty-five years of observation. Fire may have been important for maintaining open conditions within the salt marsh, with fire originating in the upland forest near the salt marsh. It is assumed that upland fires probably carried into the marshes, where herbaceous cover is probably dense enough to carry fire. Without fire, the herbaceous vegetation cover in the Maple River salt marshes has become quite dense, possibly resulting in the loss of some of the halophites known from the site; *Eleocharis parvula* has not been found in surveys during the last fifteen years.

Research Needs: Further research on hydrological restoration is needed for degraded systems. Research on the effects of fire is needed for the Maple River site. There is also need for faunal inventories of invertebrates and herptiles. Revisits of vegetation transects (Chapman et al. 1985) could allow for monitoring of temporal changes in vegetation.

Similar Communities: emergent marsh, southern wet meadow.

Other Classifications:

Michigan Natural Features Inventory (MNFI) Presettlement Vegetation: 6225 (Inland Salt Marsh)

Michigan Department of Natural Resources (MDNR): N (marsh)

Michigan Resource Information Systems (MIRIS): 622 (Emergent wetland)

The Nature Conservancy (Code, Alliance, Common Name): V.A.5.N.1; *Schoenoplectus maritimus – Atriplex patula – Eleocharis parvula* Herbaceous Vegetation. Saltmarsh clubrush – Halberd-leaf Orach – Dwarf Spike-rush Herbaceous Vegetation.

Related Abstracts: Southern wet meadow.

Selected References:

Albert, D.A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: A working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: USDA, Forest Service, North Central Forest Experiment Station, St. Paul, MN. http://nrs.fs.fed.us/pubs/242 (Version 03JUN1998). 250 pp.

Albert, D.A., J.G. Cohen, M.A. Kost, B.S. Slaughter, and H.D. Enander. 2008. Distribution maps of Michigan's Natural Communities. Michigan Natural Features Inventory, Report No. 2008-01, Lansing, MI. 174 pp.

Allen, R.C. 1918. Mineral resources of Michigan for 1917 and prior years. Mich. Geol. And Biol. Survey Publ. 27, Geo. Series 22. 204 pp.

Chapman, K.A., V.L. Dunevitz, and H.T. Kuhn. 1985. Vegetation and chemical analysis of a salt marsh in Clinton County, Michigan. Michigan Botanist 24: 135-144.

Cook, W.C. 1914. The brine and salt deposits of Michigan. Mich. Geol. And Biol. Survey Publ. 15, Geo. Series 12. 188 pp.

Faber-Langendoen, D. editor. 2001. Plant communities of the Midwest: Classification in an Ecological Context. Association for Biodiversity Information, Arlington, VA. 61 pp. + appendix (705 pp.).

Gere, M.A. 1979. Michigan mineral producers, 1978. Geology Division, Michigan DNR, Lansing, MI. pp. 25-27, 32-33.

Houghton, D. 1838. Report of the state geologist. *In* Geol. Reports of D. Houghton, ed. G.N. Fuller (1928), House Documents 24: 11-33, 95-96. Mich. Hist. Soc., Lansing, MI.

Kost, M.A., D.A. Albert, J.G. Cohen, B.S. Slaughter, R.K. Schillo, C.R. Weber, and K.A. Chapman. 2007. Natural communities of Michigan: Classification and description. Michigan Natural Features Inventory, Report Number 2007-21, Lansing, MI. 314 pp.

NatureServe: An online encyclopedia of life [web application]. 2001. Version 1.4. Arlington (VA): Association for Biodiversity Information. Available: http://www.natureserve.org. (Accessed: Sept. 26, 2001.)

Ogle, D.W. 1981. Long distance dispersal of vascular halophytes: The marshes of Saltville, Virginia. Castanea 46: 8-15.

Reschke, C. 1990. Ecological Communities of New York State. New York Natural Heritage Program. N.Y.S. Department of Environmental Conservation. Latham, NY. 96 pp.

Reznicek, A.A. 1980. Halophytes along a Michigan roadside with comments on the occurrence of halophytes in Michigan. Michigan Bot. 19: 23-30.

Winchell, A. 1861. First biennial report of the progress of the geological survey of Michigan. State of Michigan, Lansing, MI. pp. 59, 165-193.

Abstract citation:

Albert, D.A. 2001. Natural community abstract for Inland salt marsh. Michigan Natural Features Inventory, Lansing, MI. 4 pp.

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