

Ecological Systems

Marsh (MR)

Wet Meadow/Carr (WM)

Open Rich Peatland (OP)

Acid Peatland (AP)

Native Plant Community Types (NPC)

Cattail-Sedge Marsh (Northern)
 Cattail Marsh (Northern)
 Bulrush Marsh (Northern)
 Spikerush-Bur Reed Marsh (Northern)
 Estuary Marsh (Lake Superior)
 Cattail-Sedge Marsh (Prairie)
 Cattail Marsh (Prairie)
 Bulrush Marsh (Prairie)
 Spikerush-Bur Reed Marsh (Prairie)
 Arrowhead Marsh (Prairie)

Sedge Meadow
 Seepage Meadow/Carr
 Basin Meadow/Carr
 Prairie Meadow/Carr

Graminoid Rich Fen (Water Track)
 Graminoid Rich Fen (Basin)
 Graminoid-Sphagnum Rich Fen (Basin)
 Spring Fen
 Rich Fen (Mineral Soil)
 Rich Fen (Peatland)
 Rich Fen (Prairie Seepage)
 Calcareous Fen (Northwestern)
 Calcareous Fen (Southwestern)
 Calcareous Fen (Southeastern)

Graminoid Bog
 Graminoid Poor Fen (Basin)
 Graminoid Poor Fen (Water Track)

NPC Codes

MRn83a
 MRn83b
 MRn93a
 MRn93b
 MRu94a
 MRp83a
 MRp83b
 MRp93a
 MRp93b
 MRp93c

WMn82b
 WMs83a
 WMs92a
 WMp73a

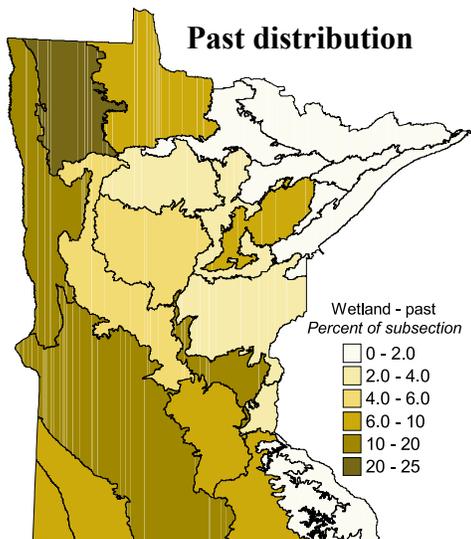
OPn91b
 OPn92a
 OPn92b
 OPn93a
 OPp91a
 OPp91b
 OPp91c
 OPp93a
 OPp93b
 OPp93c

APn90b
 APn91b
 APn91c

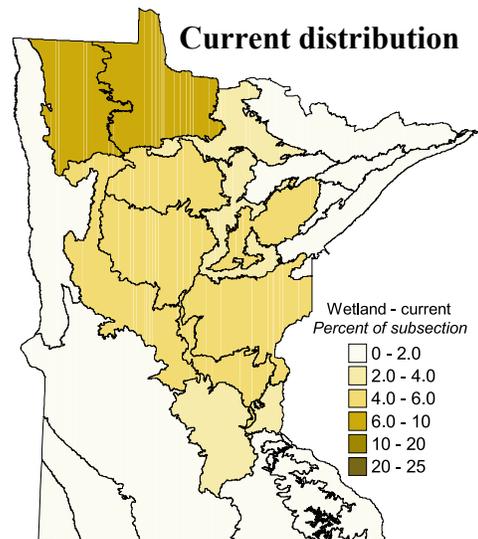


E.R. Rowe MN DNR

Sedge Meadow (WMn82b)



Source: Marschner 1930



Source: MN GAP 1993

General Description

The nonforested wetland habitat is a collection of wetland plant communities dominated by herbaceous plant species. Like all wetlands, this habitat occurs on sites with a high water table, and many nonforested wetland communities are flooded for most or all of the year. Because of the high water table or flooding, soils in these habitats are usually saturated for prolonged periods and are often anaerobic. Many dominant plants in wetland communities are tolerant of persistently deep water levels and have stems, leaves, and roots that contain intercellular air spaces (aerenchyma) that store oxygen and diffuse it from above-water structures to roots during waterlogged conditions. Nonforested wetlands are found throughout Minnesota and consist of several major types: marshes, wet meadows, fens, and bogs.

Marshes occur on permanently or periodically inundated sites. These communities are typically inundated by nutrient-rich water. They include emergent marshes and open marshes. Emergent marshes are dominated by vascular plants, such as cattails (*Typha* spp.), that can survive indefinitely with their roots and lower stem submerged and their aerial shoots above water. In addition to cattails, emergent marshes are characterized by perennial emergent plants, such as bulrushes (*Scirpus* spp.) and arrowheads (*Sagittaria* spp.), mixed with annual forbs during low-water periods when substrates are exposed, and with floating-leaved and submergent aquatic plants in settings with persistent standing water. Emergent plants provide important habitat for a variety of wetland bird species. Plants with floating leaves, such as water lilies, dominate open marshes, which are sometimes classified as aquatic communities. Variation in species composition over time in response to changes in hydrological conditions is common in marshes.

Wet meadows are graminoid-dominated wetlands that are annually subjected to moderate inundation following spring thaw and heavy rains, and to periodic drawdowns during summer. The dominant graminoids are broad-leaved species such as lake sedge (*Carex lacustris*), tussock sedge (*C. stricta*), and bluejoint (*Calamagrostis canadensis*). Peak water levels are high and persistent enough to prevent trees and most shrubs from becoming established. However, there may be little or no standing water present during much of the growing season. As a result, the substrate surface alternates between aerobic and anaerobic conditions. Any organic matter that accumulates over time is usually oxidized during periodic drawdowns and may even burn during severe droughts. Soils range from mineral soils to muck and peat. Because surface water is derived from runoff, stream flow, or groundwater, it is circumneutral (pH 6.0–8.0) and has high mineral and nutrient content. Wet meadows are present statewide in wetland basins, along streams and drainageways, in drained beaver ponds, in shallow bays, and as semifloating mats along sheltered lake shorelines. Wet meadows grade into lowland shrub communities where water levels are lower and less persistent.

Open rich peatland communities are graminoid- or low shrub-dominated wetlands on actively forming deep peat. The dominant graminoids are most often fine-leaved sedges (*Carex* spp.). Mosses, particularly brown mosses, are common in wet hollows. Open rich peatland communities are widespread in the Laurentian Mixed Forest Province, where cool climate, abundant precipitation, and the presence of poorly drained basins and glacial lake plains provide suitable conditions for peat development. They also occur throughout much of the Eastern Broadleaf Forest Province and into the Prairie Parkland and Tallgrass Aspen Parklands provinces. In these three provinces, open rich peatland communities are near the southern and western limits of the range of peatland development in Minnesota and are generally confined to floating mats or settings where groundwater discharge is sufficient to offset higher rates of evapotranspiration caused by warmer temperatures.

Examples of Important Features for Species in Greatest Conservation Need

Wet meadows and fens typically provide optimal habitat for **sedge wrens**, **yellow rails**, and **Nelson's sharp-tailed sparrows**. Permanent water a few centimeters in depth and dense vegetation less than 12 inches (30 centimeters) tall appear to be important habitat features for Nelson's sharp-tailed sparrows, whereas yellow rails use wet meadows with water depths ranging from moist soil to 12 inches (30 centimeters). A key habitat feature for the latter species is a canopy of dead sedges that allows the bird to move freely beneath. **Two-spotted skippers** are found in wet meadows, but little else is known about their habitat requirements.

Least bitterns, **American bitterns**, **marsh wrens**, and **Virginia rails** require emergent marshes as breeding habitat. Least bitterns show a strong association with cattails, preferring dense, tall stands interspersed with woody vegetation and open water. American bitterns use similar habitats but use less densely vegetated sites in shallower water. Both bitterns tend to be limited to wetlands greater than 25 acres (10 hectares) in size. Virginia rails need a mixture of emergent vegetation of cattails or bullrushes, open water, and mud flats for foraging. They frequent younger, earlier successional marshes, avoiding older marshes with dense vegetation.

Forster's terns require large deep-water marshes with considerable open water. Muskrat houses or floating mats of vegetation are important nest sites.

General Description (continued)

The plants characteristic of graminoid fens are adapted to full sunlight, sustained water levels, low nutrient levels, and high mineral levels. This environment is well suited to dominance by sun-loving herbaceous species, brown mosses, and minerotrophic *Sphagnum* species. The lack of shade from trees and shrubs favors dominance in the ground layer by shade-intolerant species, especially graminoids. Like many wetland plants, the characteristic species in these communities, such as sedges (*Carex* spp.) and buckbean (*Menyanthes trifoliata*), have aerenchyma to store oxygen. Other plants, such as tufted bulrush (*Scirpus cespitosus*), form hummocks that elevate the plant above persistently anaerobic peat surfaces.

Although nutrients are low in graminoid fen communities, concentrations of minerals such as calcium can be very high near groundwater discharge points, particularly where peatlands are underlain by calcareous glacial deposits. Plants that thrive in areas of calcareous groundwater discharge (e.g., calcareous fens) include tufted bulrush, Kalm's lobelia (*Lobelia kalmii*), and grass of Parnassus (*Parnassia* spp.), along with the rare species twig rush (*Cladium mariscoides*) and hairlike beak rush (*Rhynchospora capillacea*).

Nonforested wetlands have declined by more than 50 percent in 13 of the 25 Minnesota ecological classification subsections, most notably in the subsections of the Prairie Parkland Province, but also including the Anoka Sand Plain, Aspen Parklands, and Big Woods subsections. The Wetland Conservation Act regulates the alteration of wetlands through a variety of methods; however the common strategy of developing replacement wetlands often lacks the diversity and complexity of natural wetlands. Invasive species such as purple loosestrife (*Lythrum salicaria*) and glossy buckthorn (*Rhamnus cathartica*) threaten many remaining wetlands. Water appropriations may cause changes in hydrology that in turn cause shifts in the composition of plant species and decrease habitat suitability for animals.

Management Options to Support Species in Greatest Conservation Need

- Prevent loss or degradation of all types of nonforested wetlands.
- Preserve nonforested wetlands, especially in the Eastern Broadleaf Forest and Prairie Parkland provinces.
- Focus on protecting wetlands larger than 10 hectares (25 acres) and wetland complexes.
- Restore large wetland complexes, with attention to the habitat features required by SGCN.
- Avoid creating impoundments that flood wet meadows.
- Manage the invasions of invasive exotic plants in nonforested wetlands (e.g., purple loosestrife, *Phragmites*).
- Protect known nesting areas of Forster's terns.
- Enforce wetland protection regulations ("no-net loss").



D. Woycha MN DNR

Graminoid Rich Fen (Water Track) (Opn91b)



D. Woycha MN DNR

Cattail-Sedge Marsh (Prairie) (MRp83a)