



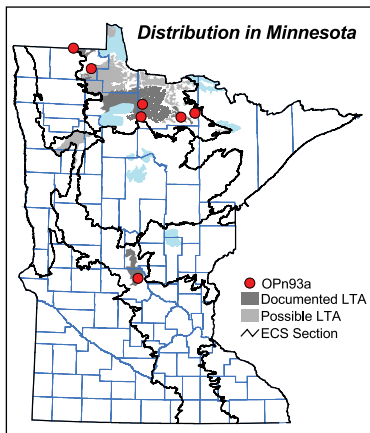
Northern Extremely Rich Fen

Open peatlands dominated by fine-leaved graminoids scattered in channels of standing water. Present in areas of calcium-rich groundwater discharge in large patterned peatlands.

Vegetation Structure & Composition

Description is based on summary of vascular plant data from 8 plots (relevés).

- **Moss layer** is dominated by brown mosses such as *Scorpidium scorpioides*.
- **Graminoid layer** is characterized by fine-leaved graminoids such as candle-lantern sedge (*Carex limosa*), tufted bulrush (*Scirpus cespitosus*), twig rush (*Cladium mariscoides*), and fen wiregrass sedge (*Carex lasiocarpa*) scattered in channels of standing water.
- **Forb layer** is sparse, usually with < 25% cover. Pitcher plant (*Sarracenia purpurea*), buckbean (*Menyanthes trifoliata*), and intermediate bladderwort (*Utricularia intermedia*) are typically present, with seaside arrowgrass (*Triglochin maritima*) common.
- **Shrub** cover is sparse (< 5%), with bog birch (*Betula pumila*) typically present and shrubby cinquefoil (*Potentilla fruticosa*) occasional.
- **Tree layer** is sparse (< 5% cover), with scattered stunted white cedar typically present and tamarack common.
- **Notes:** High Ca^{++} concentrations in groundwater discharge create conditions favorable for calciphilic species such as tufted bulrush (*Scirpus cespitosus*), Kalm's lobelia (*Lobelia kalmii*), grass-of-Parnassus (*Parnassia* spp.), and rare species such as twig rush (*Cladium mariscoides*), sterile sedge (*Carex sterilis*), hair-like beak rush (*Rhynchospora capillacea*), marsh arrowgrass (*Triglochin palustris*), and beaked spikerush (*Eleocharis rostellata*).



Landscape Setting & Soils

OPn93 is rare, occurring mainly in large patterned peatlands in the MOP that have an interconnecting network of nonforested channels draining through conifer swamp forests. OPn93 has also been documented in a few smaller peatlands in areas of calcareous glacial till south and west of the MOP. Substrate is deep peat (> 15in [40cm]). Calcium carbonate precipitates are common, forming marl in pools.

Natural History

OPn93 develops in areas where highly calcareous groundwater is discharged from underlying calcareous mineral soil and forced through peat by artesian pressure. Water in OPn93 is characterized by high pH (> 7.0) and high Ca^{++} concentrations, providing conditions favorable for calciphilic species. Cold water temperatures, low dissolved oxygen content, and high water levels likely minimize competition from species that dominate fen areas lacking significant calcareous groundwater discharge. The unique hydrological conditions of sites where OPn93 occurs are very rare.

Similar Native Plant Community Classes

• OPp93 Prairie Extremely Rich Fen

OPp93 and OPn93 are both calcareous fens and have similar hydrology and water chemistry. OPp93 occurs within the prairie region of Minnesota and has prairie species that are absent from OPn93. Conversely, OPn93 has a number of species from the



northern forest region that are absent from OPp93.

OPn93 Indicator Species	(freq%)	
	OPn93	OPp93
Bog rosemary (<i>Andromeda glaucophylla</i>)	89	-
Intermediate bladderwort (<i>Utricularia intermedia</i>)	78	-
White cedar (U)	67	-
White beak rush (<i>Rhynchospora alba</i>)	44	-
Twig rush (<i>Cladium mariscoides</i>)	67	4
Buckbean (<i>Menyanthes trifoliata</i>)	78	6
Pitcher plant (<i>Sarracenia purpurea</i>)	89	9
Candle-lantern sedge (<i>Carex limosa</i>)	89	13

OPp93 Indicator Species	(freq%)	
	OPn93	OPp93
Spotted Joe pye weed (<i>Eupatorium maculatum</i>)	-	71
Mat muhly grass (<i>Muhlenbergia richardsonis</i>)	-	69
Flat-topped aster (<i>Aster umbellatus</i>)	-	67
Narrow reedgrass (<i>Calamagrostis stricta</i>)	-	54
Big bluestem (<i>Andropogon gerardii</i>)	-	49
Northern bedstraw (<i>Galium boreale</i>)	-	47
Riddell's goldenrod (<i>Solidago riddellii</i>)	-	45
Marsh arrowgrass (<i>Triglochin palustris</i>)	-	38

• OPn91 Northern Rich Fen (Water Track)

Graminoid-dominated occurrences of OPn91 (OPn91b) are similar to OPn93 but occur in water tracks and do not have upwelling of groundwater discharge or marl precipitates.

OPn93 Indicator Species	(freq%)	
	OPn93	OPn91
Beaked spikerush (<i>Eleocharis rostellata</i>)	38	-
Slender sedge (<i>Carex echinata</i>)	25	-
Sterile sedge (<i>Carex sterilis</i>)	25	-
White cedar (U)	75	4
Dwarf alder (<i>Rhamnus alnifolia</i>)	25	2
American grass-of-Parnassus (<i>Parnassia glauca</i>)	25	2
Twig rush (<i>Cladium mariscoides</i>)	75	7
Shrubby cinquefoil (<i>Potentilla fruticosa</i>)	38	7

OPn91 Indicator Species	(freq%)	
	OPn93	OPn91
Water horsetail (<i>Equisetum fluviatile</i>)	-	47
Bog willow (<i>Salix pedicularis</i>)	-	36
Leatherleaf (<i>Chamaedaphne calyculata</i>)	-	29
Marsh cinquefoil (<i>Potentilla palustris</i>)	-	22
Slender cottongrass (<i>Eriophorum gracile</i>)	-	22
Creeping sedge (<i>Carex chordorrhiza</i>)	13	69
Scheuchzeria (<i>Scheuchzeria palustris</i>)	13	60
Small cranberry (<i>Vaccinium oxycoccos</i>)	13	42

Native Plant Community Types in Class

• OPn93a Spring Fen

OPn93a is the only community type recognized in this class.



OPn93 Northern Extremely Rich Fen – Species Frequency & Cover

freq% cover			freq% cover		
Forbs					
Pitcher plant (<i>Sarracenia purpurea</i>)	89	•	Common reed grass (<i>Phragmites australis</i>)	56	••
Intermediate bladderwort (<i>Utricularia intermedia</i>)	78	•	Lead-colored sedge (<i>Carex livida</i>)	44	•
Buckbean (<i>Menyanthes trifoliata</i>)	78	••	White beak rush (<i>Rhynchospora alba</i>)	44	•
Kalm's lobelia (<i>Lobelia kalmii</i>)	56	•	Interior sedge (<i>Carex interior</i>)	33	•
Seaside arrowgrass (<i>Triglochin maritima</i>)	56	•	Hudson Bay bulrush (<i>Scirpus hudsonianus</i>)	33	•
Marsh grass-of-Parnassus (<i>Parnassia palustris</i>)	44	•	Beaked spikerush (<i>Eleocharis rostellata</i>)	33	••
Horned bladderwort (<i>Utricularia cornuta</i>)	33	•	Creeping sedge (<i>Carex chordorhiza</i>)	22	•
Round-leaved sundew (<i>Drosera rotundifolia</i>)	33	•	Clustered muhly grass (<i>Muhlenbergia glomerata</i>)	22	•
English sundew (<i>Drosera anglica</i>)	33	•	Slender sedge (<i>Carex echinata</i>)	22	•
Bog aster (<i>Aster borealis</i>)	33	•	Coastal sedge (<i>Carex exilis</i>)	22	••
American grass-of-Parnassus (<i>Parnassia glauca</i>)	22	•	Sterile sedge (<i>Carex sterilis</i>)	22	••
Spatulate-leaved sundew (<i>Drosera intermedia</i>)	22	•	Prairie sedge (<i>Carex praterea</i>)	11	•
Marsh bellflower (<i>Campanula aparinoides</i>)	11	•	Soft stem bulrush (<i>Scirpus validus</i>)	11	•
Labrador bedstraw (<i>Galium labradoricum</i>)	11	•	Low Shrubs		
Wild calla (<i>Calla palustris</i>)	11	•	Bog rosemary (<i>Andromeda glaucophylla</i>)	89	•
Marsh cinquefoil (<i>Potentilla palustris</i>)	11	•	Labrador tea (<i>Ledum groenlandicum</i>)	22	•
Lesser bladderwort (<i>Utricularia minor</i>)	11	•	Small cranberry (<i>Vaccinium oxycoccos</i>)	22	•
Sticky false asphodel (<i>Tofieldia glutinosa</i>)	11	•	Tall Shrubs		
Grasses & Sedges			Bog birch (<i>Betula pumila</i>)	78	•
Candle-lantern sedge (<i>Carex limosa</i>)	89	•	Shrubby cinquefoil (<i>Potentilla fruticosa</i>)	33	••
Tufted bulrush (<i>Scirpus cespitosus</i>)	78	•••	Dwarf alder (<i>Rhamnus alnifolia</i>)	22	•
Fen wiregrass sedge (<i>Carex lasiocarpa</i>)	78	•••	Tree Seedlings or Saplings (< 6ft)		
Flattened spikerush (<i>Eleocharis compressa</i>)	67	•	White cedar	67	•
Twig rush (<i>Cladium mariscoides</i>)	67	•••	Tamarack	56	••
			Black spruce	33	•