

## III.D. Calcareous Fens

Calcareous fens are the rarest wetland plant community in Minnesota and Wisconsin, and probably one of the rarest in North America. These are plant communities of saturated, seepage sites that have an internal flow of groundwater rich in calcium and magnesium bicarbonates, and sometimes calcium and magnesium sulfates as well (Curtis 1971). The calcium and magnesium bicarbonates and sulfates precipitate out at the surface creating a harsh, alkaline soil condition. Only a select group of calcium-tolerant plants, referred to as **calciphiles**, can tolerate these conditions. Healthy (unaltered) calcareous fens are sedge-dominated by *Carex* species (e.g., sterile sedge (*C. sterilis*), prairie sedge (*C. prairea*), common stiff sedge (*C. tetanica*), Buxbaum's sedge (*C. buxbaumii*)) as well as beaked spike-rush (*Eleocharis rostellata*), twig-rush (*Cladium mariscoides*) and hair beak-rush (*Rhynchospora capillacea*). Characteristic grasses and forbs include wild timothy, Ohio goldenrod, Grass-of-Parnassus, common valerian, brook lobelia and lesser fringed gentian. Shrubby cinquefoil and sage willow are characteristic shrubs. Included are species disjunct from the tundra, alpine meadows and salt marshes. Therefore, calcareous fens are described as a hybrid community by Curtis (1971).

Calcareous fen communities in general have a disproportionate number of rare, threatened and endangered plant species compared to other plant communities in the Great Lakes Region.

Trout streams are often associated with calcareous fens because of the cold, pure water provided by the springs and seepages.



Steve D. Eggers

Active springs are frequently associated with calcareous fens. The example shown by the photograph is within Nicols Meadow Fen in Dakota County, Minnesota. The aquatic plant is water cress (*Rorippa nasturtium-aquaticum*).

Two Eurasian shrubs, glossy buckthorn (*Frangula alnus*) and common buckthorn (*Rhamnus cathartica*), have become established within many fen complexes in Minnesota and Wisconsin. Without control measures, buckthorns can form dense thickets that shade out calcareous fen species including the rare taxa.

## CALCAREOUS FENS

**VEGETATION:** The calcareous fen community shown on the following page supports five species listed as threatened (T) by the State of Minnesota as well as two species listed as being of special concern (SC): sterile sedge (*Carex sterilis*) (T); beaked spike-rush (*Eleocharis rostellata*) (T); hair beak-rush (*Rhynchospora capillacea*) (T); whorled nut-rush (*Scleria verticillata*) (T); common valerian (*Valeriana edulis* var. *ciliata*) (T); twig-rush (*Cladium mariscoides*) (SC) and white lady's-slipper (*Cypripedium candidum*) (SC). Additional species present include Buxbaum's sedge (*Carex buxbaumii*), limestone meadow sedge (*Carex granularis*), common stiff sedge (*Carex tetanica*), prairie sedge (*Carex prairea*), hummock sedge (*Carex stricta*), hardstem bulrush (*Schoenoplectus acutus*), Grass-of-Parnassus (*Parnassia glauca*), lesser fringed gentian (*Gentianopsis procera*), brook lobelia (*Lobelia kalmii*), wild timothy (*Muhlenbergia glomerata*), mat muhly grass (*Muhlenbergia richardsonis*), swamp thistle (*Cirsium muticum*), blazing star (*Liatris ligulistylis*), Riddell's goldenrod (*Solidago riddellii*), great blue lobelia (*Lobelia siphilitica*), mountain mint (*Pycnanthemum virginianum*), northern bedstraw (*Galium boreale*), northern bog aster (*Symphotrichum boreale*), giant goldenrod (*Solidago gigantea*), shrubby cinquefoil (*Dasiphora fruticosa*), sage willow (*Salix candida*), beaked willow (*Salix bebbiana*) and red-osier dogwood (*Cornus sericea*). Invasive species present include glossy buckthorn (*Frangula alnus*), common buckthorn (*Rhamnus cathartica*) and an invasive genotype of common reed (*Phragmites australis*).

**SOILS:** Houghton muck (Typic Borosapristis), sloping, calcareous. Muck "domes" created by upwelling groundwater pressure are present within the sloping, organic muck deposit that is up to 25 feet in depth overlaying dolomite bedrock. Muck deposits of calcareous fens in southern Minnesota have been found to be 4,700 to 11,000 years old (Almendinger and Leete 1998).

**HYDROLOGY:** Upwelling, calcareous, groundwater discharge. Small, calcareous streams originate within the fen complex due to groundwater discharges. Houghton soils (sloping) are typically saturated at or near the surface throughout the growing season.

**LOCATION:** Savage Fen Scientific and Natural Area, Scott County, Minnesota.

## CALCAREOUS FENS



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**The photograph above was taken from the lower edge of a muck “dome” looking towards the center high spot. This dome is approximately 2 acres in extent.**

**The photograph to the right illustrates a typical assemblage of sedges and forbs.**



## CALCAREOUS FENS



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### STERILE SEDGE (*Carex sterilis* Willd.)

**SEDGE FAMILY** (Cyperaceae)

**IND. STATUS:** OBL

**C of C:** Native (10); listed as a threatened species in Minnesota

**FIELD CHARACTERISTICS:** A perennial, dioecious sedge with stems forming tufts 20-70 cm. high (Figure a on the opposing page). The many slender leaves (1-2 mm. wide) are 30 cm. or more long. Spikelets (Figure b) usually number four and are stalkless (sessile). The perigynium (Figure c) is egg-shaped, 2-4 mm. long and up to 2 mm. wide, with a double-toothed beak 0.6-1.6 mm. long. At maturity, perigynia are dark brown and often spreading or bent backward. Nutlet is shown by Figure d. In the central photograph above, the stem labeled [Fertile] has pistillate (seed-producing) spikelets, while the stem labeled [Sterile] has only staminate spikelets (pollen producing but not seed producing). Some of the tufts are all staminate giving it the appearance of being sterile.

Interior sedge (*Carex interior*) [page 384] is similar but usually has only 3 spikelets per stem and the terminal spikelet has a club-shaped mass of staminate flowers at its base. Interior sedge also occurs in a wider range of habitats including bogs and calcareous inland fresh meadows, particularly those with fluctuating water levels.

**ECOLOGICAL NOTES:** Sterile sedge is a characteristic sedge of calcareous fens and other inland fresh meadows supported by stable, calcareous groundwater seepages. The authors have observed that, in Minnesota and Wisconsin, sterile sedge is essentially an obligate calcareous fen species; however, it occasionally occurs on wet dolomite pavements and other calcareous seepages.

**SOURCE:** Fassett (1976); Gleason and Cronquist (1991); and Swink and Wilhelm (1994).



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**Sterile Sedge**  
(*Carex sterilis*)

## CALCAREOUS FENS



### PRAIRIE SEDGE

(*Carex prairea* Dewey ex Alph. Wood)

**SEDGE FAMILY** (Cyperaceae)

**C of C:** Native (10)

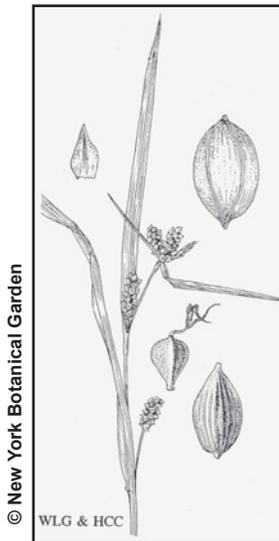
**IND. STATUS:** FACW

**FIELD CHARACTERISTICS:** A perennial sedge forming dense clusters (tussocks) of stems 50-100 cm. tall, exceeding the leaves. Leaf sheaths are prolonged 2-3 mm. beyond the leaf base and are tinged a coppery brown color on the ventral (inner) side toward the sheath summit. Numerous, small sessile spikes in a short, but loose, panicle-like arrangement are present. Reddish-brown scales conceal the perigynia. The pale brown perigynia are lance-shaped, 2.5-3 mm. long, appressed, and taper to a pale beak. Two stigmas are present and the nutlets are lens-shaped.

**ECOLOGICAL NOTES:** Prairie sedge is frequently found in wet prairies, calcareous fens and related wet meadows. It is most frequently seen in and south of the vegetation tension zone.

**SOURCE:** Fassett (1976); Gleason and Cronquist (1991); Swink and Wilhelm (1994); and Voss (1972).

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### LIMESTONE MEADOW SEDGE

(*Carex granularis* Muhl. ex Willd.)

**SEDGE FAMILY** (Cyperaceae)

**C of C:** Native (3)

**IND. STATUS:** FACW

**FIELD CHARACTERISTICS:** A clump-forming, perennial sedge with very short rhizomes, with stems about 30-80 cm. tall. The stems and leaves are glaucous with a bluish green tint. Mature leaves are 4-10(13) mm. wide and typically surpass the stems in height. Staminate and pistillate flowers occur in separate spikelets. The terminal spikelet is sessile, or very short-stalked, and staminate. The lateral pistillate spikelets are 1-3 cm. long. A subtending bract usually exceeds its spikelet. The tightly clustered, erect perigynia are elliptical to oval in shape, 2.2-4 mm. long, conspicuously nerved, and abruptly contracted to a short beak.

**ECOLOGICAL NOTES:** Limestone meadow sedge chiefly occurs in open calcareous areas, such as wet meadows and swales, calcareous fens and seepages. It also occurs in wooded swamps.

**SOURCE:** Gleason and Cronquist (1991); Swink and Wilhelm (1994); and Voss (1972).

## CALCAREOUS FENS



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Fertile stem  
(spikelet).

Vegetative  
stem rooting at  
the tip.

### BEAKED SPIKE-RUSH

(*Eleocharis rostellata* (Torr.) Torr.)

**SEDGE FAMILY** (Cyperaceae)

**IND. STATUS:** OBL

**C of C:** Native (10); listed as a threatened species in both Minnesota and Wisconsin

**FIELD CHARACTERISTICS:** A perennial spike-rush 40-100 cm. high (Figure a on opposing page). Stems are leafless and stout, but conspicuously narrower than the spikelets (Figure b). Two stem types are present: fertile and vegetative (labeled in the photograph above). The vegetative stems are characteristically long and arching, and root at the tip. No other spike-rush (*Eleocharis* sp.) found in Minnesota and Wisconsin has this trait. The nutlet (Figure c) is 1.9-2.8 mm. long and three-sided to planoconvex.

**ECOLOGICAL NOTES:** This rare spike-rush is restricted to calcareous fens, spring fens in northern peatlands, and calcareous shores. It can form dense stands.

**SOURCE:** Gleason and Cronquist (1991); Swink and Wilhelm (1994); and Voss (1972).

CALCAREOUS FENS



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**Beaked Spike-Rush**  
(*Eleocharis rostellata*)

## CALCAREOUS FENS



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### NARROW-LEAVED COTTONGRASS

(*Eriophorium angustifolium* Honck.)

**SEDGE FAMILY** (Cyperaceae)

**C of C:** Native (8)

**IND. STATUS:** OBL

**FIELD CHARACTERISTICS:** A colonial, perennial sedge with stems growing to a height of 20-60 cm. Stem leaf blades are generally flat for most of their length and up to 4 mm. or more wide. The 2 or 3 involucre bracts are leaf-like and often exceed the inflorescence. The summit of the leaf sheaths, as well as the base of the involucre bracts, are tinged with a dark red color. Scales are single (mid-) nerved. Nutlets are blackish in color, 2-3 mm. long and are surrounded by long, silky white bristles. In flower, and thus conspicuous, in late April to mid-May.

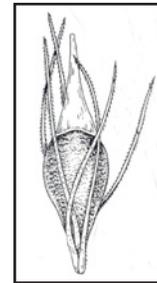
**ECOLOGICAL NOTES:** Narrow-leaved cottongrass is common in calcareous fens and also occurs in bogs and open conifer swamps. It is a circumboreal species.

**SOURCE:** Gleason and Cronquist (1991); Swink and Wilhelm (1994); and Voss (1972).

## CALCAREOUS FENS



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Nutlet

### HAIR BEAK-RUSH

(*Rhynchospora capillacea* Torr.)

**SEDGE FAMILY** (Cyperaceae)

**IND. STATUS:** OBL

**C of C:** Native (10), listed as a threatened species in Minnesota

**FIELD CHARACTERISTICS:** A perennial, tufted sedge 10-40 cm. tall. The wiry stems are erect or curved, hair-like, and leafy. Leaves are ascending, outwardly curved, and hair-like. Leaf blades are 0.2-0.4 mm. wide with inwardly rolled margins. The inflorescence consists of 1-4 spikelets in narrow, ascending clusters. Each cluster is subtended by an ascending green, scale-like leaf (involucral bract). Spikelets are pale reddish brown to brown, spindle-shaped and 6-7 mm. long. Each spikelet is usually 1-2 flowered. Nutlets are pale brown, usually 1-4 per spikelet, and surrounded by 6 bristles (perianth bristles). The nutlet body surfaces have small longitudinally marked fine lines. Each nutlet terminates with a distinct, 5 mm. or less, beak-like tubercle.

Two similar *Rhynchospora* species also occur in fens: the usually taller *R. capitellata* with wider (to 3 mm.) flat leaves and slightly shorter spikelets (3.5-4 mm. long) and *R. alba* with its distinct tan to white spikelets and 9-12 perianth bristles.

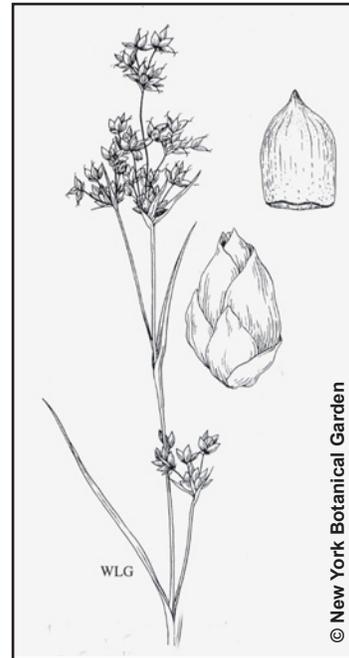
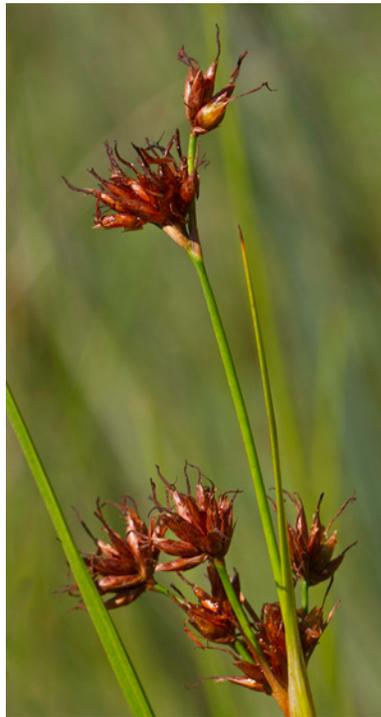
**ECOLOGICAL NOTES:** Hair beak-rush characteristically occurs in calcareous fens and on open, marly, sedge flats. It also occurs on seepages over dolomite pavements and on calcareous sands of interdunal swales. The similar *Rhynchospora alba* is usually found on open bog mats.

**SOURCE:** Crow and Hellquist (2000); Gleason and Cronquist (1991); Swink and Wilhelm (1994); and Voss (1972).

## CALCAREOUS FENS



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### **TWIG-RUSH**

(*Cladium mariscoides* (Muhl.) Torr.)

**SEDGE FAMILY** (Cyperaceae)

**IND. STATUS:** OBL

**C of C:** Native (10), listed as a species of special concern in Minnesota

**FIELD CHARACTERISTICS:** A solitary to sparsely colonial perennial sedge with stiff, slender stems growing to about 1 m. The 1-3 mm. wide stem leaf blades are folded or inrolled inward lengthwise. The compound inflorescence is much branched, each bearing a cluster of 1-2 flowered spikelets. A perianth (floral envelope) is absent. The flattish scales are in a shingle-like spiral arrangement forming a lance- to oval-shaped spikelet. Nutlets are ovoid, pointed at the summit, and whitish to pale green in color. In flower June-August.

**ECOLOGICAL NOTES:** Twig-rush prefers calcareous fens and calcareous watertracks of northern peatlands. In addition, it is found on floating mats, sandy seepage areas, and in interdunal swales.

**SOURCE:** Crow and Hellquist (2000); Gleason and Cronquist (1991); and Swink and Wilhelm (1994); and Voss (1972).

## CALCAREOUS FENS



Illustration is from Hitchcock (1950).



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### WILD TIMOTHY

(*Muhlenbergia glomerata* (Willd.) Trin.)

**GRASS FAMILY** (Gramineae or Poaceae)

**C of C:** Native (8)

**IND. STATUS:** FACW

**FIELD CHARACTERISTICS:** A perennial grass 50-120 cm. high. Stems usually do not branch above the base. Ligules are 0.25-0.5 mm. long. The inflorescence is a terminal, stout, condensed head of compact spikelets. The glumes are longer than the lemmas, which taper to a slender point.

**ECOLOGICAL NOTES:** Wild timothy is a characteristic grass of calcareous fens and is occasionally found growing on calcareous soils of wet to wet-mesic prairies and other inland fresh meadows supported by groundwater seepages.

**SOURCE:** Fassett (1951); Gleason and Cronquist (1991); and Swink and Wilhelm (1994).

## CALCAREOUS FENS



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### SPRING-CRESS

(*Cardamine bulbosa* (Muhl.) BSP)

**MUSTARD FAMILY** (Brassicaceae or Cruciferae)    **C of C:** Native (6)    **IND. STATUS:** OBL

**FIELD CHARACTERISTICS:** A perennial herb 20-45 cm. high and up to 60 cm. high when in flower. The erect stems are borne singly, or a few together, from a bulbous, tuber-like rhizome. The unbranched stems support 4-8 simple, rounded leaves. Basal leaves are rotund to heart shaped. The lower leaves are supported by petioles, while upper leaves are tapered to their bases. The upper part of the stem and inflorescence is glabrous. The showy flowers have 4 white petals 7-16 mm. long. The sepals are bright green turning yellow with age. Seed pod is a silique with a single row of seeds. In flower from late April through June.

**ECOLOGICAL NOTES:** Spring-cress is typically found in calcareous fens and other open, springs or seepages. It also occurs in openings of hardwood swamps.

**SOURCE:** Crow and Hellquist (2000); Fassett (1976); Gleason and Cronquist (1991); Swink and Wilhelm (1994); and Voss (1985).

## CALCAREOUS FENS



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### GRASS-OF-PARNASSUS

(*Parnassia glauca* Raf.)

**SAXIFRAGE FAMILY** (Saxifragaceae)

**C of C:** Native (9)

**IND. STATUS:** OBL

**FIELD CHARACTERISTICS:** A perennial herb 15-30 cm. high. The stalked basal leaves are entire, smooth, rounded, 2-7 cm. long x 1-5 cm. wide, forming a basal rosette. The stem leaf, if present, is stalkless and located at or below the middle of the stem. Flowers are white with five star-like, green-striped petals 1-2 cm. long, and solitary at the end of a single stem. The fruit is a conspicuous, terminal capsule. In flower August-October.

**ECOLOGICAL NOTES:** Grass-of-Parnassus is a characteristic species of calcareous fens. It also occurs along calcareous shores and on wet lake dune flats if groundwater seepages are present.

## CALCAREOUS FENS



### COMMON VALERIAN

(*Valeriana edulis* var. *ciliata* (T. & G.) Cronq.)

**VALERIAN FAMILY** (Valerianaceae)

**IND. STATUS:** FACW

**SYNONYM:** *Valeriana edulis* Nutt. ex Torr. & A. Gray

**C of C:** Native (10); listed as a threatened species in Minnesota

**FIELD CHARACTERISTICS:** A perennial herb 10-50 cm. tall, occasionally to 120 cm. Leaves are generally parallel-veined with a margin of dense white hairs (ciliated). The basal leaves are linear to oblanceolate, entire or with 1-2 divisions toward the base. The stem leaves are pinnately parted. The inflorescence is an elongate panicle with creamy white flowers. In flower April-June.

**ECOLOGICAL NOTES:** Common valerian is characteristic of calcareous fens and calcareous wet to wet-mesic prairies. It is one of the first herbs to flower during the spring in these habitats. In Minnesota, railroad rights-of-way are one of the few remaining habitats where this species occurs.

**SOURCE:** Fassett (1976); Gleason and Cronquist (1991); and Swink and Wilhelm (1994).

## CALCAREOUS FENS



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### OHIO GOLDENROD

(*Oligoneuron ohioense* (Frank x Riddell) G.N. Jones)

**ASTER FAMILY** (Compositae or Asteraceae)

**IND. STATUS:** OBL

**SYNONYM:** *Solidago ohioensis* Riddell     **C of C:** Native (9); a species of special concern in WI

**FIELD CHARACTERISTICS:** A perennial herb 40-90 cm. high. Leaves of the lower and upper stem are dissimilar; the lower or basal leaves are better developed than the upper, and are usually persistent. Leaves are flat, not triple-nerved, and are not dotted with glands. The inflorescence is a flat-topped corymb that is without hairs. Flowers are yellow. In flower June-October.

This species is similar to Riddell's goldenrod (*Solidago riddellii*) [page 210], which occurs in similar Wisconsin habitats. However, the leaves of *S. riddellii* are sickle-shaped, folded and triple-nerved, and its inflorescence is hairy. Refer to Appendix A for a key to wetland goldenrods.

**ECOLOGICAL NOTES:** In Wisconsin, Ohio goldenrod is characteristic of calcareous fens and also occurs in wet to wet-mesic prairies supported by groundwater seepages. Eastern Wisconsin is the western extent of its range. This goldenrod has not been recorded in Minnesota.

**SOURCE:** Gleason and Cronquist (1991); and Swink and Wilhelm (1994).



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**SWAMP THISTLE**  
(*Cirsium muticum* Michaux)

**ASTER FAMILY** (Compositae or Asteraceae)      **C of C:** Native (8)      **IND. STATUS:** OBL

**FIELD CHARACTERISTICS:** A biennial herb 50-200 cm. high. Leaves are pinnatifid, green beneath and have weak spines. A basal rosette is formed the first year, and an unwinged flowering stalk the second year. The flower head does not have stiff spines as in most other thistles, but instead is weakly spined and sticky because of a gummy resin. Flowers are pink to purple. In flower July-October.

**ECOLOGICAL NOTES:** Swamp, or fen, thistle is characteristic of calcareous fens and also occurs in wet to wet-mesic prairies and sedge meadows supported by groundwater seepages.

**SOURCE:** Gleason and Cronquist (1991); and Swink and Wilhelm (1994).

## CALCAREOUS FENS



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### **GOLDEN RAGWORT**

(*Packera aurea* (L.) A.Love & D.Love)

**ASTER FAMILY** (Compositae or Asteraceae)

**C of C:** Native (6)

**IND. STATUS:** FACW

**SYNONYM:** *Senecio aureus* L.

**FIELD CHARACTERISTICS:** A perennial herb to 30-80 cm. in height. Basal leaves are heart-shaped, 5-10 cm. long and as wide, on long petioles with rounded teeth. Stem leaves are much smaller and pinnately-lobed becoming sessile. Flower heads number several to many, the disc is 5-10 mm. wide. Rays are golden yellow and 6-13 mm. long. The involucre is 5-8 mm. tall, the tips often purple. Fruit is a smooth achene. In flower May-June.

**ECOLOGICAL NOTES:** Golden ragwort occurs primarily in wet to wet-mesic prairies and calcareous fens.

**SOURCE:** Gleason and Cronquist (1991); Chadde (2002); and Black and Judziewicz (2009).

## CALCAREOUS FENS



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### **SWAMP LOUSEWORT**

(*Pedicularis lanceolata* Michx.)

**FIGWORT FAMILY** (Scrophulariaceae)

**C of C:** Native (8)

**IND. STATUS:** FACW

**FIELD CHARACTERISTICS:** A perennial herb with stems 30-80 cm. tall. Leaves are opposite, or in part alternate, lanceolate, 4-9 cm. long and 1-2 cm. wide, pinnately-lobed with margins of rounded teeth. Flowers are in spikes 2-10 cm. long at the end of branches from the upper leaf axils. Flowers are pale yellow, two-lipped and about 2 cm. long. Fruit is a capsule. In flower July-August.

**ECOLOGICAL NOTES:** Swamp lousewort primarily occurs in calcareous fens and wet to wet-mesic prairies.

**SOURCE:** Gleason and Cronquist (1991); Chadde (2002); and Black *et al.* (2009).

## CALCAREOUS FENS



### **BROOK LOBELIA** (*Lobelia kalmii* L.)

**BELLFLOWER FAMILY** (Campanulaceae)

**C of C:** Native (9)

**IND. STATUS:** OBL

**FIELD CHARACTERISTICS:** A perennial herb 10-40 cm. high. Basal leaves are spatula-shaped and may be deciduous. The stem leaves are linear. The inflorescence is a loose raceme. The small (7-13 mm. long) flowers are blue with a white “eye”. The flower consists of an erect, upper, 2-lobed lip and spreading, lower, 3-lobed lip. In flower July-October.

**ECOLOGICAL NOTES:** Brook lobelia is characteristic of calcareous fens and shores. It also occurs on calcareous soils of wet to wet-mesic prairies and wet lake dune flats if groundwater seepages are present.

**SOURCE:** Gleason and Cronquist (1991).

## CALCAREOUS FENS



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### **FEN TWAYBLADE** (*Liparis loeselii* (L.) Rich.)

**ORCHID FAMILY** (Orchidaceae)      **C of C:** Native (6 MN)(7 WI)      **IND. STATUS:** FACW

**FIELD CHARACTERISTICS:** A perennial herb 10-25 cm. tall from a bulb-like base. Two shiny leaves, lanceolate to oval and 4-15 cm. long by 1-4 cm. wide, arise from the base of the plant. Flowers number 2-15 and are arranged in an open raceme 2-10 cm. long and 1-2 cm. wide. Flowers are yellow-green with lanceolate sepals 4-6 mm. long and linear petals 3-5 mm. long. The lip is obovate, 4-5 mm. long and 2-3 mm. wide. Fruit is a capsule that is short-cylindric and 8-12 mm. long. In flower June-August.

**ECOLOGICAL NOTES:** Fen twayblade primarily occurs in calcareous fens but also coniferous swamps.

**SOURCE:** Gleason and Cronquist (1991); Chadde (2002); and Black and Judziewicz (2009).

## CALCAREOUS FENS



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### **WHITE LADY'S-SLIPPER** (*Cypripedium candidum* Willd.)

**ORCHID FAMILY** (Orchidaceae)

**IND. STATUS:** OBL

**C of C:** Native (10); a threatened species in Wisconsin and a species of special concern in Minnesota

**FIELD CHARACTERISTICS:** A perennial herb 15-40 cm. high. Stems range in number from 1-30 per plant. Leaves on the stem number 3-5 and are curved and strongly ribbed or pleated. The leaves tend to form an erect cluster near the ground, sheathing the stem. Flowers are distinctive and solitary with a white lip (1.5-2.5 cm. long) streaked with violet. Sepals and lateral petals are 2-4 cm. long, green-yellow and streaked with purple. Lateral petals are often spirally twisted. In flower from mid-May to early June, only for a few days in hot weather.

**ECOLOGICAL NOTES:** White lady's-slipper is a rare orchid that occurs on calcareous, wet soils of calcareous fens and wet to wet-mesic prairies. The flowers and flower buds are eaten by white-tailed deer and eastern cottontail.

**SOURCE:** Gleason and Cronquist (1991); and Swink and Wilhelm (1994).

## CALCAREOUS FENS



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### **NODDING LADIES' TRESSES ORCHID**

(*Spiranthes cernua* (L.) Richard)

**ORCHID FAMILY** (Orchidaceae)

**C of C:** Native (5)

**IND. STATUS:** FACW

**FIELD CHARACTERISTICS:** A perennial herb seldom over 20 cm. high. Stem leaves are usually persistent at flowering time. Several white flowers, with lips 7-12 mm. long, form a 3-ranked, spirally twisted spike. Callosities at the base of the lip are conspicuous, projecting, and rounded. Flowers are sometimes fragrant. In flower August-October.

**ECOLOGICAL NOTES:** Nodding ladies' tresses is a frequent orchid of inland fresh meadows, particularly calcareous fens and wet to wet-mesic prairies that have been slightly disturbed.

**SOURCE:** Gleason and Cronquist (1991); and Swink and Wilhelm (1991).

## CALCAREOUS FENS



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### NORTHERN BOG VIOLET

(*Viola nephrophylla* Greene)

**VIOLET FAMILY** (Violaceae)

**C of C:** Native (8 MN)(7 WI)

**IND. STATUS:** FACW

**FIELD CHARACTERISTICS:** A low perennial herb 10-15 cm. in height and spreading by rhizomes. Leaves are all basal, smooth, heart-shaped to kidney-shaped, 1-4 cm. long and 2-6 cm. wide, and rounded at the tip. Leaves arise from long petioles that are 2-16 cm. long. Leaf margins have rounded tips. Flowers are violet, single, nodding on slender stalks and held above the leaves. The spurred petal is densely hairy within. Fruit is a capsule 5-10 mm. long. In flower in May, but sometimes flowering again in August or September.

**ECOLOGICAL NOTES:** Northern bog violet prefers cold, groundwater-fed, calcareous habitats such as calcareous fens and some interdunal swales.

**SOURCE:** Gleason and Cronquist (1991); Chadde (2002); and Black and Judziewicz (2009).

## CALCAREOUS FENS



### LESSER FRINGED GENTIAN

(*Gentianopsis procera* (Holm) MA)

**GENTIAN FAMILY** (Gentianaceae)

**IND. STATUS:** OBL

**SYNONYM:** *Gentiana procera* Holm.

**C of C:** Native (8); a species of special concern in WI

**FIELD CHARACTERISTICS:** A biennial herb up to 80 cm. tall. Leaves are opposite, without stalks, linear to lance-shaped, and less than 1 cm. (8 mm.) wide. Flowers are blue with four fringed corolla lobes, and are solitary to numerous at the end of branches. In bloom September–October.

Greater fringed gentian (*Gentianopsis crinita*) is similar, but occurs in less calcareous habitats. *G. crinita* leaves are greater than 1 cm. wide and the flowers are more box-shaped. These two species may hybridize.

**ECOLOGICAL NOTES:** Lesser fringed gentian is characteristic in calcareous fens, and also occurs on calcareous soils of wet to wet-mesic prairies and along shores, particularly if groundwater seepages are present.

**SOURCE:** Gleason and Cronquist (1991); and Swink and Wilhelm (1994).

## CALCAREOUS FENS



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### **SHRUBBY CINQUEFOIL**

(*Dasiphora fruticosa* (L.) Rydb.)

**ROSE FAMILY** (Rosaceae)

**C of C:** Native (7)

**IND. STATUS:** FACW

**SYNONYMS:** *Potentilla fruticosa* L., *Pentaphylloides floribunda* (Pursh) A. Love

**FIELD CHARACTERISTICS:** A low, bushy, deciduous shrub with woody stems usually 20-50 cm. tall, but can be up to 1 m. high. Leaves are pinnately compound with 5-7 fuzzy leaflets that are gray-green and about 1-2 cm. long. The five-petaled flowers are yellow, 2-3 cm. wide, and solitary to few at the ends of branches. In flower May-October.

**ECOLOGICAL NOTES:** Shrubby cinquefoil occurs on calcareous soils, particularly in calcareous fens. Occasionally, it is found in wet to wet-mesic prairies, bogs and along shores. It tends to increase aggressively with declining water levels. A horticultural variety of this species is used for landscaping.

**SOURCE:** Fassett (1976); Gleason and Cronquist (1991); and Swink and Wilhelm (1994).

## CALCAREOUS FENS



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Pistillate catkins.

### SAGE WILLOW

(*Salix candida* Willd.)

**WILLOW FAMILY** (Salicaceae)

**C of C:** Native (9)

**IND. STATUS:** OBL

**FIELD CHARACTERISTICS:** A low deciduous shrub usually up to 1 m. high. Leaves are entire with inrolled margins, have dense white-matted hairs on the undersides, and are 4-8 cm. long by 0.7-2 cm. wide (between 5-10 times as long as wide). Twigs are also covered by dense white-matted hairs, but they tend to become somewhat hairless with age. Capsules are woolly and pink-white in color (see photograph). In flower April-May.

**ECOLOGICAL NOTES:** In addition to calcareous fens, this small willow is found in wet to wet-mesic prairies, coniferous swamps and bogs. It usually is found growing solitary and scattered.

**SOURCE:** Gleason and Cronquist (1991); and Swink and Wilhelm (1994).