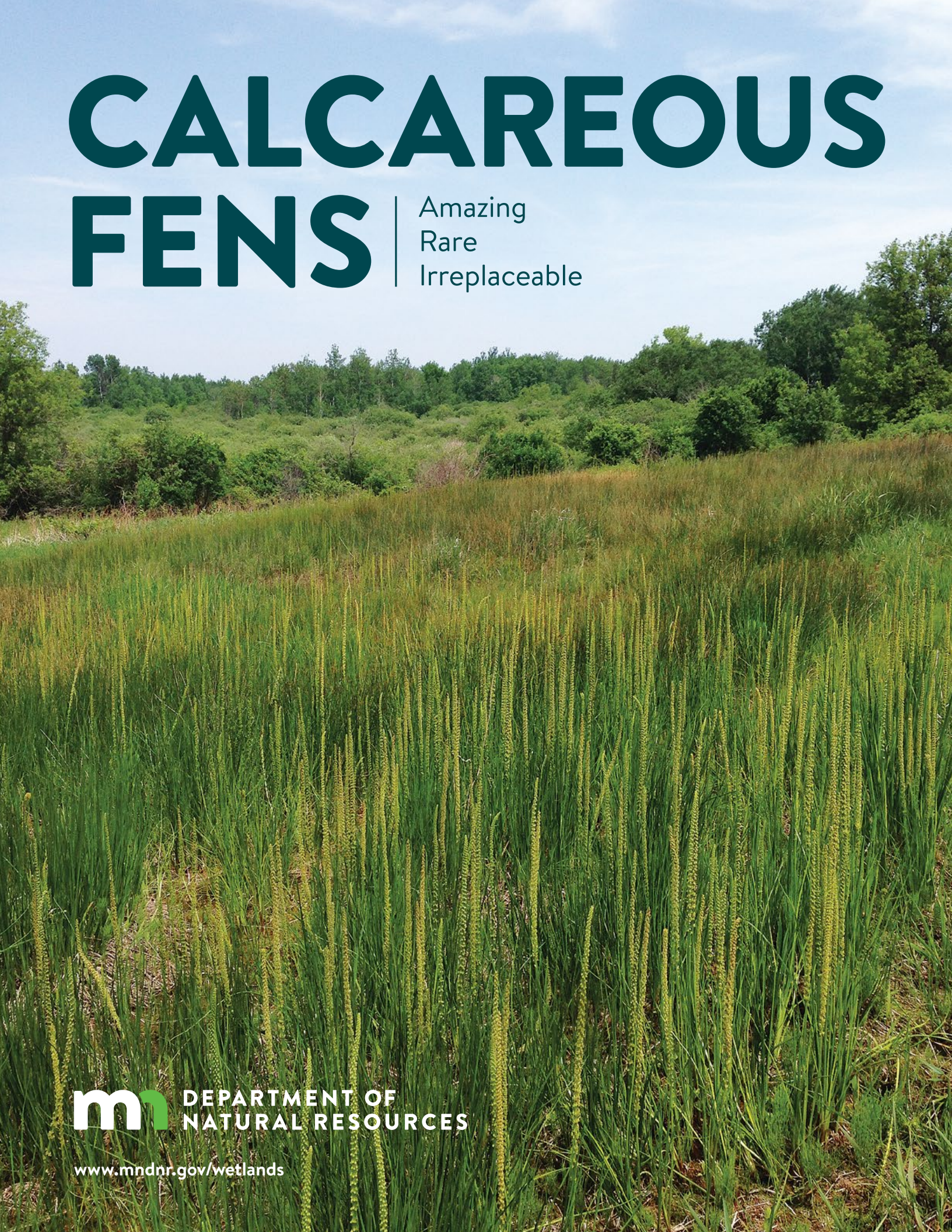
CALCAREOUS FENS

Amazing
Rare
Irreplaceable



DEPARTMENT OF NATURAL RESOURCES

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American grass of parnassus
Parnassia glauca

What are calcareous fens?

Calcareous fens are rare and distinctive peat-accumulating wetlands. They depend on a constant supply of upwelling groundwater rich in calcium and other minerals. This calcium-rich environment supports highly diverse and unique rare plants that tolerate low oxygen conditions, calcium carbonate deposits, low nutrient availability, and relatively cold organic soils (peat)—the calcareous fen ecosystem.

Iron-stained, marly pools are one sign of a healthy calcareous fen like this one at Sioux Nation Wildlife Management Area.

Where can you find calcareous fens?

In Minnesota, calcareous fens are mostly found in the western part of the state associated with remnant glacial features, along the Minnesota River Valley, and in the limestone-dominated (karst) geologic regions of the southeast. Calcareous fens have been in western Minnesota for at least 4,000 years and in the Minnesota River Valley for more than 10,000 years. They typically occur on slopes where groundwater rises to the surface and saturates the peat before draining away, causing the area to be spongy and wet. The upwelling groundwater can either create a "peat dome," rising a few feet above the ground or an "apron" where the peat spreads out along a hillside. You might also notice shallow pools of water that can be surrounded by sedges growing in small raised clumps, called hummocks. The shallow pools contain white calcium carbonate deposits that look like snow or salt. Water levels in calcareous fens remain at or very near the soil surface, even during summer because groundwater input balances evaporation and the use of water by plants (transpiration). They are rarely, if ever, flooded by surface water because of their position on the landscape.

Calcareous fens are fragile

Fens are highly susceptible to disturbance. The soft peat makes almost any activity within them, by humans or livestock, highly disruptive. A loss of groundwater supply to the fen can break down the peat and release nutrients that can alter the plant community. Flooding can drown fen species and deposit sediment and excess nutrients. Most of these disturbances result in an invasion of shrubs, upland plants, and invasive species such as reed canary grass, which eventually outcompete and crowd out fen species, ultimately leading to the loss of the calcareous fen community.

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Cover photo: The Nature Conservancy's Regal Meadow calcareous fen.

State-listed rare plant species found in calcareous fens

Hairy fimbry	*Fimbristylis puberula*	State endangered
Sterile sedge	*Carex sterilis*	State threatened
Hair-like beak rush	*Rhynchospora capillacea*	State threatened
Beaked spikerush	*Eleocharis rostellata*	State threatened
Whorled nutrush	*Scleria verticillata*	State threatened
Cut-leaf water parsnip	*Berula erecta*	State threatened
Edible valerian	*Valeriana edulis*	State threatened
Twig rush	*Cladium mariscoides*	State special concern
Small white lady's-slipper	*Cypripedium candidum*	State special concern
Wild sweet William	*Phlox maculata*	State special concern

Sterile sedge, *Carex sterilis*

Why are calcareous fens protected?

Fens are connected to a larger groundwater system. They are good indicators of groundwater sustainability, contribute to improved water quality and ecological diversity, and are an invaluable part of Minnesota's rich natural heritage. Calcareous fens formed after the glaciers receded, which makes them an old and constant feature in the landscape. Because of this they are irreplaceable and have special protection in Minnesota to prevent them from being lost forever. (Minn. Statutes 103G.223). In addition, any state-threatened or endangered plants occurring in a calcareous fen are protected under Minnesota's endangered species law (Minn. Statutes 84.0895).

Calcareous fens are one of the rarest natural communities and are threatened throughout much of their range by land use conversion, changes in groundwater supply, and development. There are approximately 200 known calcareous fens in Minnesota. They range in size from a tenth of an acre to dozens of acres, but most are less than 4 acres. Calcareous fens support a large number of uncommon and rare plant species. Four of these species are found almost exclusively in calcareous fens.

DNR scientist, Jennie Leete, stands on an ice dome formed by upwelling groundwater freezing as it hits the cold winter air.

How can you help calcareous fens?

If you are interested in the conservation of calcareous fens or suspect you have one on your property, the DNR can serve as a resource to help you manage the fen for its long-term health and survival. If you are considering an activity that may impact a calcareous fen, a permit may be required. For more information, contact the DNR, Ecological and Water Resources at 651-259-5100.

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