



**North Dakota's  
100 Plant Species of Conservation Priority**

## Appendix A

### Level I

#### Plant Species of Conservation Priority

Meadow Onion.....	7
Wooly Milkweed.....	9
Cooper's Milkvetch.....	12
Prairie Grapefern.....	15
Handsome Sedge.....	18
Smooth Goosefoot.....	20
White Lady's-slipper.....	22
Dakota Buckwheat.....	24
Bicknell's Sunrose.....	27
Dwarf Mentzelia.....	29
Western Prairie Fringed Orchid.....	31
Thin-fruited knotweed.....	34
Sticky False-asphodel.....	36

## Appendix A

### Level II

#### Plant Species of Conservation Priority

Moonwort.....	39
Leathery Grapefern.....	41
Least Grapefern.....	44
Marsh Bellflower.....	47
Foxtail Sedge.....	49
Spiny Sedge.....	51
Delicate Sedge.....	53
Sterile Sedge.....	56
Blue Cohosh.....	58
Slender Lip Fern.....	60
Slender-lobed Clematis.....	62
Blue Lips.....	64
Torrey's Cryptantha.....	66
Brook Flatsedge.....	68
Small Yellow Lady's-slipper Orchid.....	70
Showy Lady's-slipper.....	72
Leatherwood.....	74
Round-leaved Sundew.....	76
Marsh Horsetail.....	79
Meadow Horsetail.....	81
Cushion Fleabane.....	83
Nodding Buckwheat.....	85
Slender Cottongrass.....	87
Wahoo.....	89
Bog Bedstraw.....	91

Oakfern.....	93
Wooly Beach-heather.....	95
Stickseed.....	97
Upright Pinweed.....	99
Sand Lily.....	101
Loesel's Twayblade.....	103
Small-flowered Lipocarpha.....	105
Buckbean.....	107
Stiff Sandwort.....	109
Sensitive Fern.....	111
Adder's-tongue Fern.....	113
Alyssum-leaved Phlox.....	115
Limber Pine.....	117
Rose Pogonia.....	119
Swamp Smartweed.....	121
Lanceleaf Cottonwood.....	123
American Primrose.....	125
Prickly Gooseberry.....	127
Hayden's Yellowcress.....	129
Swamp Willow.....	131
Bog Willow.....	133
Pod Grass.....	135
Ledge Spike-moss.....	137
Zigzag Goldenrod.....	139
Round-leaved Sphagnum.....	141
Alkali Sacaton.....	143
Prairie Fameflower.....	145
Hooker's Townsendia.....	147
Purple Sandgrass.....	149

## Appendix A

### Level III

#### Plant Species of Conservation Priority

Drummond's Milkvetch.....	151
Bent-flowered Milkvetch.....	153
Chamomile Grapefern.....	155
Back's Sedge.....	157
Hair-like Sedge.....	159
Large Yellow Lady's-slipper.....	161
Nine-anthered Dalea.....	163
Prairie Mimosa.....	165
Dutchman's Breeches.....	167
Dwarf Spikerush.....	169
Wolf's Spikerush.....	171
Wood Horsetail.....	174
Chamisson's Cottongrass.....	176
Green Keeled Cottongrass.....	179
Wild Geranium.....	181
Creeping Barberry.....	183
Yellow Monkeyflower.....	185
Naked Mitrewort.....	187
Rhombic Evening-primrose.....	189
One-flowered Broomrape.....	191
Small-flowered Grass of Parnassus.....	193

Small-flowered Penstemon.....	195
Sweet Coltsfoot.....	197
Downy Phlox.....	199
Green Woodland Orchid.....	201
Mountain Meadow Cinquefoil.....	203
Heart-leaved Buttercup.....	205
Hair Beakrush.....	207
Nodding Ladies'-tresses.....	209
Hooded Ladies'-tresses.....	211
Flat-leaved Bladderwort.....	214
Culver's-root.....	216
Bog Violet .....	218

# Meadow Onion

Level I

**Scientific Name:** *Allium canadense*

**General Description:** Tall perennial forb standing 8-24in (20.32-60.96cm). Leaf is grass like clasping on lower third of stalk. White to pink umbel flower with six parts, ½ in (1.27cm) wide; ¼-1in (.64-2.54cm) stalks replaced by ¼ in (.64cm) bulblets; Blooms May-June.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range extends from Maine, south to Florida and west to Texas, Oklahoma, Kansas, Nebraska, South Dakota, Montana and North Dakota.

**Primary Habitat:** Prairies, open woods; Moist to mesic black soil prairies, upland and floodplain woodlands, tall-grass prairie, moist meadows near rivers and woodlands, thickets, borders of lakes, edges of bluffs, abandoned fields and pastures, areas along.

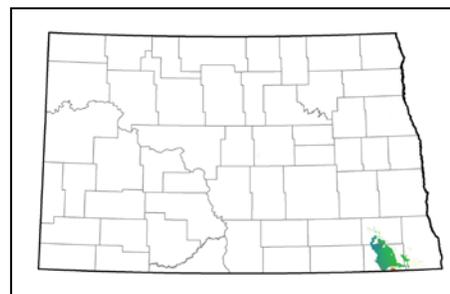
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.

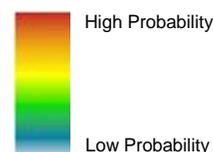


© Thomas G. Barnes

[www.plants.usda.gov](http://www.plants.usda.gov)



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- There is an insufficient amount of data relating to this species whereabouts in North Dakota. Only known documentation occurs in Sargent County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade factors

- Logging and removal of the canopy are potential threats.

# Meadow Onion

Level I

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Allium canadense*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. Welcome to the PLANTS Database | USDA PLANTS. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Ecoregions of North Dakota and South Dakota." *Science for a Changing World*. U.S. Geological Survey, 3 Aug. 2006. Web. 24 July 2012. <<http://www.npwrc.usgs.gov/resource/habitat/ndsdeco/46e.htm>>.
5. "Wild Garlic (*Allium Canadense*)." Illinois Wildflowers, 5 Jan. 2010. Web. 24 July 2012. <[http://www.illinoiswildflowers.info/prairie/plantx/wild\\_garlicx.htm](http://www.illinoiswildflowers.info/prairie/plantx/wild_garlicx.htm)>.
6. Kamenetsky, R. and Rabinowitch, H. D. (2010) The Genus *Allium*: A Developmental and Horticultural Analysis, in Horticultural Reviews, Volume 32 (ed J. Janick), John Wiley & Sons, Inc., Oxford, UK. DOI: 10.1002/9780470767986.ch7

# Woolly Milkweed

Level I

**Scientific Name:** *Asclepias lanuginosa*

**General Description:** Perennial forb standing weakly erect 6-12in (15.25-30.5cm) on a single stem with hairs. Plant is alternately leaved, lanceolate in shape with hairs umbel umbel on each side. Flower has five parts and is umbel yellow green in color in an umbel formation. Flowers are present in June-July. Fruit is produced as a pod filled with many seeds attached to silky hairs to aid with wind dispersal.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4? - Critically Imperiled/Apparently Secure Inexact  
Numeric Rank

**Federal Status:** Not listed

**Range:** Small range that includes North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, Wisconsin, and Indiana.

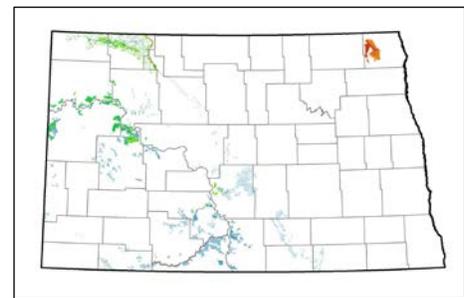
**Primary Habitat:** Sandy or rocky calcareous prairie, dry upland woods, gravelly hillside prairies.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

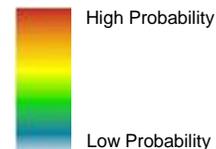
**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



wisplants.uwsp.edu James R. Sime



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, this species has been documented in Dunn, Stark, Grant, Ward, Stutsman, and Pembina Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Woolly Milkweed

Level I

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Asclepias lanuginosa*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Previous Research or Surveys

- Studies were conducted on flower, pod, and seed production in Woolly Milkweed, as well as about 20 other different species of Milkweed.
- Studies on reproductive phenology and pollinators have been conducted for this species.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Woolly Milkweed

Level I

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Endangered Resources Program Species Information Woolly Milkweed (*Asclepias Lanuginosa*)." Wisconsin Department of Natural Resources, 7 Jan. 2010. Web. 24 July 2012. <<http://www.dnr.state.wi.us/org/LAND/er/biodiversity/index.asp?mode=info&Grp=20&Spec...>>.
5. Winter, Stephen L., and Ralph E. Charlton. "Rediscovery of Woolly Milkweed, *Asclepias Lanuginosa*, in Saline County, and Management Considerations." *Transactions of the Kansas Academy of Science* 103.3/4 (1903): 185-90. JSTOR. Web. 11 Jan. 2010. <<http://www.jstor.org/stable/3628268>>.
6. Illinois Endangered Species Protection Board-Minutes of the 143rd Meeting. Springfield, Illinois: Illinois Audubon Society Headquarters, 14 Aug. 2009. PDF.
7. Agrawal, Anurag A. Resistance and Susceptibility of Milkweed: Competition, Root Herbivory, and Plant Genetic Variation. Toronto, Ontario, Canada: Department of Botany, University of Toronto, 2004. PDF.

# Cooper's Milkvetch

Level I

**Scientific Name:** *Astragalus neglectus*

**General Description:** Semi-erect perennial forb 1-3ft (30-90cm) with a taproot. Stem is normally hollow. Has 11-23 pinnately divided leaflets 1/3-1in (1-2.5cm) long oblong in shape. Leaflets have long hairs on underside. Flowers occur during early June through-out July. Creamy white in color displayed in several clusters on a raceme. Flowers are five parted 1/2in (1cm) long. .

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4 – Critically Imperiled/Apparently Secure

**Federal Status:** Not listed

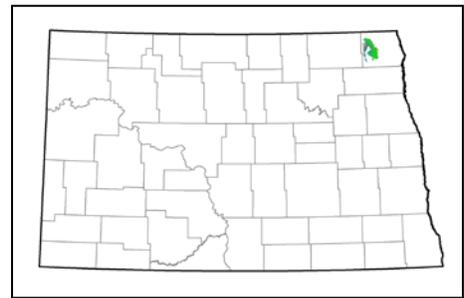
**Range:** Occurs in North Dakota, South Dakota, Minnesota, Wisconsin, Michigan, Ohio, Pennsylvania, New York, Massachusetts, West Virginia, and Virginia.

**Primary Habitat:** Located in calcareous soils associated with a limestone base. These soils are located near water or what was historically water in a grassland setting.

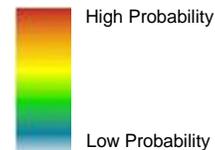
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Emmet J. Judziewicz



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- This species has been documented in Pembina County of North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Fact

- Mostly unknown; however excessive shading from woody species is likely a hazard to this species.

# Cooper's Milkvetch

Level I

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently this species is poorly documented and little is known about its reproductive biology.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- This species in particular requires natural disturbances associated with prairie habitat such as prescribed fire or brush removal to prevent woody plant succession.
- This species is often lost in the later stages of succession.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Cooper's Milkvetch

Level I

## REFERENCES

1. Burns, James. "Astragalus Neglectus." Ohio Division of Natural Areas and Preserves/ Ohio Department of Natural Resources, Jan. 1984. Web. 24 July 2012. <[http://ohiodnr.com/Portals/3/Abstracts/Abstract\\_pdf/A/ASTRAGALUS\\_NEGLECTUS.pdf](http://ohiodnr.com/Portals/3/Abstracts/Abstract_pdf/A/ASTRAGALUS_NEGLECTUS.pdf)>.
2. Welcome to the PLANTS Database | USDA PLANTS. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
3. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
5. Voss, E.G. 1985. Michigan Flora. Part II. Dicots (Saururaccae-Cornaceae). Bulletin of the Cranbok Institute of Science and University of Michigan Herbarium. 724 pp
6. Bartgis, Rodney L. "The Limestone Glades and Barrens of West Virginia." *Southern Appalachian Botanical Society* 58.2 (1993): 69-89. JSTOR. Web. 1 Nov. 2010. <<http://www.jstor.org/stable/10.2307/4033660>>.
7. Karron, Jeffery D. "Breeding Systems and Levels of Inbreeding Depression in Geographically Restricted and Widespread Species of Astragalus." *American Journal of Botany* 76.3 (1989): 331-40. JSTOR. Web. 27 Jan. 2010. <<http://www.jstor.org/stable/2444601>>.
8. Hutton, Jr., Eugene E. "Four Western Plants New to West Virginia." *Southern Appalachian Botanical Society* 54.3 (1989): 203-07. JSTOR. Web. 11 Jan. 2010. <<http://www.jstor.org/stable/4033377>>.
9. "Endangered Resources Program Species Information Coopers Milkvetch (Astragalus Neglectus)." Wisconsin Department of Natural Resources, 9 Aug. 2009. Web. 24 July 2012. <<http://dnr.wi.gov/org/land/er/biodiversity/index.asp?mode=info&Grp=20&specCode=PDF>>.
10. Catling, P. M., and A. Sinclair. "Initial Beneficial Effects of Fire and Burning on Neglected Milkvetch." Biology Department, University of Ottawa, Ontario, 11 Jan. 2010. Web. 24 July 2012. <<http://www.cababstractplus.org/abstracts/Abstract.aspx?AcNo=20043013393>>.
11. Astragalus Neglectus: UW-Stevens Point Freckmann Herbarium: Plant Details Page. University of Wisconsin-Stevens Point, 11 Jan. 2010. Web. 24 July 2012. <<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=ASTNEG>>.

# Prairie Grapefern

Level I

**Scientific Name:** *Botrychium campestre*

**General Description:** Small plant that stands roughly 1.5in (4cm) tall and .5in (1.3cm) wide. Very similar to other moonworts except it appears very early in the spring; early May-Early June. Displays very small propagules on the stem and leaves are sessile. Leaves are broken into small fan shaped segment.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G3G4 – Critically Imperiled/Vulnerable-Apparently Secure

**Federal Status:** Not listed

**Range:** Ranges from the Great Lakes, across Iowa and Nebraska to eastern Colorado, in Wyoming in the Black Hills, and Northward to Alberta and Saskatchewan.

**Primary Habitat:** Typically located in open dry upland prairie settings preferably in undisturbed virgin prairie settings.

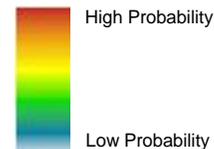
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- The prairie moonwort prefers well drained soils over bedrock in dry upland prairies. Primarily found in short and mid-grass prairies in the Missouri Coteau region of the state. Prairie moonwort doesn't deal well with disturbances and is primarily found on high quality prairie habitat that has no history of agriculture practice.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat loss, habitat fragmentation, succession human disturbances and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Prairie Grapefern

Level I

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Botrychium campestre*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Additional Research or Surveys Needed

- Long term habitat and population monitoring would likely be the most beneficial investigations at this time, in addition to continued inventory along coastal areas and potential inland habitats.

## MANAGEMENT RECOMMENDATIONS

- Protect large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Prairie Grapefern

Level I

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Higman, P.J., and M.R. Penskar. *Botrychium Campestre* (prairie Moonwort). Lansing, Michigan: Michigan Natural Features Inventory, 1999. PDF.
5. "*Botrychium Campestre*." Species Profile: Minnesota DNR. Minnesota Department of Natural Resources, 2012. Web. 24 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PPOPH010W0>>.
6. *Botrychium Campestre*. Ames, IA: Iowa State University, ND PDF.
7. Johnson-Groh, Cindy L., and Jennifer M. Lee. "Phenology and Demography of Two Species of *Botrychium* (Ophioglossaceae)." *American Journal of Botany* 89.10 (2002): 1624-633. *American Journal of Botany*. Web. 24 July 2012. <<http://www.amjbot.org/content/89/10/1624.short>>.
8. Muller, Serge. *Plant Communities and Conservation of Botrychium-rich Graslands in the Bitcherland (Northern Vosges Biosphere Reserve, France)*. *Biodiversity and Conservation*. Netherlands: Kluwer Academic, 1999. 1519-532. Print.
9. Anderson, D.G. and D. Cariveau (2003, November 18). *Botrychium campestre* W.H. Wagner & Farrar (Iowa moonwort): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/botrychiumcampestre.pdf>

# Handsome Sedge

Level I

**Scientific Name:** *Carex formosa*

**General Description:** Tufted perennial that is 12-31.5in (30-80cm) tall. Leaves are basal sheaths and maroon at their bases. The stem has secondary branches which hold the 3-5 spikes that occur per stem; most easily identifiable in early June-July.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4 – Critically Imperiled/Apparently Secure

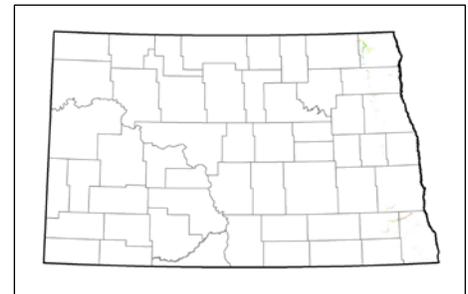
**Federal Status:** Not listed

**Range:** Distribution is centered around the Great Lakes area and extends east to New England, west to North Dakota, north from Quebec and Ontario, and south to the Mid-Atlantic States.

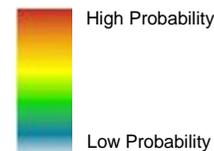
**Primary Habitat:** Moist deciduous valleys and woodlands associated with rivers.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Handsome sedge is primarily located in the lowland woods surrounding the Sheyenne River in the Sand Deltas and Beach Ridges eco-region. It is found calcareous soils with varying levels of moisture but usually seasonally moist.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations. The areas this plant inhabits are very common for residential development. Another risk is livestock grazing in the wooded valleys leading to the river. Timber harvest practices also pose a threat by opening up the canopy and allowing more light penetration than this species desires.

# Handsome Sedge

Level I

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Carex formosa*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Utilize best management practices for woodlands and moist prairies.
- Protect habitat this species relies upon.
- Prevent encroachment of invasive species.
- Any habitat that alters the specific light, temperature, and moisture regime would almost certainly harm *C. formosa*.
- Prevent overgrazing.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "North Dakota's Federally Listed Endangered, Threatened, and Candidate Species-Handsome Sedge (*Carex Formosa*)." NPWRC. U.S. Geological Survey, 3 Aug. 2006. Web. 25 July 2012. <<http://www.npwrc.usgs.gov/resource/wildlife/nddanger/species/careform.htm>>.
5. "Carex Formosa." Species Profile: Minnesota DNR. Minnesota Department of Natural Resources, ND Web. 25 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMCYPO34Y0>>.
6. "Handsome Sedge (*Carex Formosa*)." New York Natural Heritage Program ND Web. 25 July 2012. <<http://www.acris.nynhp.org/guide.php?id=9481>>.
7. "Endangered Resources Program Species Information Handsome Sedge (*Carex Formosa*)." Wisconsin Department of Natural Resources, ND Web. 25 July 2012. <<http://dnr.wi.gov/topic/EndangeredResources/Plants.asp?mode=detail&SpecCode=PMCYPO34Y0>>.
8. Gleason, Henry A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. The New York Botanical Garden, Bronx, New York. 910 pp

# Smooth Goosefoot

Level I

**Scientific Name:** *Chenopodium subglabrum*

**General Description:** Erect annual with 2-3 stems 12in(30cm). Leaves are alternate with a single vein and 1in (3cm) in length. Small flowers occur on spikes in June and fruiting in late June through July. Each flower produces a fruit that contains a jet black seed.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G3G4 - Critically Imperiled/Vulnerable-Apparently Secure

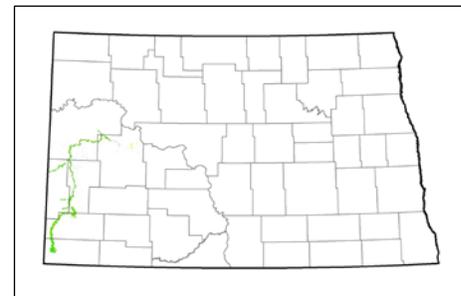
**Federal Status:** Not listed.

**Range:** Range includes Oregon, Washington, Nevada, Idaho, Montana, Utah, Wyoming, Colorado, Kansas, Nebraska, South Dakota, North Dakota, Michigan, Ohio, and Maryland.

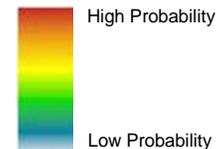
**Primary Habitat:** Found in loose sandy soils in sparsely vegetated areas related to riparian areas; can be found on eroding south and west facing slopes of sandy soils.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Sandy soils in riparian areas along the Little Missouri River. Tends to occur in areas that get flooded annually for short periods. Prefers to be on flat surfaces but will occur at the base of slopes where sand is being deposited through erosion. Also sand dunes, sandy terraces, and river sandbars.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- Naturally occurring succession possess a large threat as it takes away the habitat which is crucial to smooth goosefoot. If natural annual flooding doesn't occur it is possible that seeds will not be dispersed and the amount of suitable habitat would be reduced. Invasive plants such as leafy spurge and Canada thistle competing for resources.

# Smooth Goosefoot

Level I

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Chenopodium subglabrum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- A combination of fire and grazing during the appropriate seasons will keep blowouts active and provide habitat for this species.
- Controlling noxious weeds, especially leafy spurge.
- Lack of fire may increase vegetation and reduce suitable habitat for this species.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Smooth Goosefoot-*Chenopodium subglabrum*. Montana Field Guide. Montana Natural Heritage Program. Retrieved on November 30, 2012, from [http://FieldGuide.mt.gov/detail\\_PDCHE091G0.aspx](http://FieldGuide.mt.gov/detail_PDCHE091G0.aspx).

# White Lady's-slipper

Level I

**Scientific Name:** *Cypripedium candidum*

**General Description:** Stands 4-15.5in (10-40cm) tall. Leaves number 2-5, are 2-6in (5-15cm) long, and very pubescent. Flowers usually number one and is present May-June. It is presented on a green bract 1.2-4.3in (3-11cm) long. Sepals are greenish yellow with purple lateral veins, ovate to elliptical, and .5-1in (1.-2.5cm) long. Petals are the same color as sepals and .8-1.6in (2-4cm) long. The labellum is white in color with purple streaking on the inside and is .66-1.3in (1.7-3.3cm) long.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G4 - Imperiled/Apparently Secure

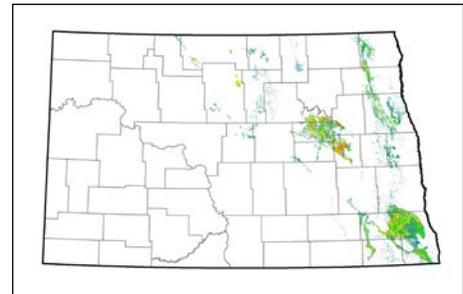
**Federal Status:** Not listed

**Range:** Extends from Manitoba to Connecticut, south to Ohio, Indiana, Missouri, and Nebraska.

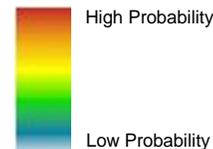
**Primary Habitat:** Wet rich prairies and calcareous fens.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Primarily found in wet prairies, meadows, and bogs in the Eastern third of the state and expanding farther west in the north central part of the state. Some plants found on saline soils but typically associated with alkaline soils.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a significant threat due to changes in precipitation affecting the suitable habitat and growing conditions for this species. Suppression of fire, grazing, and noxious weeds have all been seen as a threat to the species. Fire and mowing during the right time period has been shown to reduce competition from other species. Livestock should be kept out of areas where the species is present because heavy grazing and trampling can occur.

# White Lady's-slipper

Level I

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Cypripedium candidum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect current habitat known to support this species.
- Prevent heavy grazing.
- Avoid soil disturbance, incidental herbicide exposure, hydrologic alterations, competition from non-native species, and shading from encroaching shrubs.
- Encourage vegetative diversity.
- Practice sound prairie management techniques.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Cypripedium Candidum (Small White Lady's-Slipper)." *Department of Botany-University of Wisconsin Madison*. University of Wisconsin-Madison Herbarium, ND. Web. 31 July 2012. <<http://www.botany.wisc.edu/orchids/candidum.html>>.
5. Michigan Natural Features Inventory. 1998. Special plant abstract for *Cypripedium candidum* (small white lady's-slipper). Lansing, MI. 3 pp.

# Dakota Buckwheat

Level I

**Scientific Name:** *Eriogonum visherii*

**General Description:** Erect annual herb from a slender taproot and is widely branched resulting in a skeletal appearance. Several basal leaves are arranged in a rosette. Stem leaves are located on the lower portion of the stem and are more oblong and smaller than the basal leaves. Flowers are extremely small and pale yellow and appear from July through September.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G3 – Imperiled/Vulnerable

**Federal Status:** Not listed.

**Range:** Found in western South Dakota and western North Dakota to southeastern Montana.

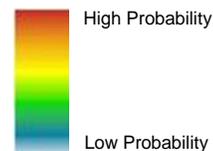
**Primary Habitat:** Barren shale and clay outcrops of badlands, eroded hillsides, slopes of bluffs, and outwash fans at the base of slopes.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species predominantly grows on barren, highly erodible, rock outcrops in badlands habitats.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Dakota Buckwheat

## Level I

### Other Natural or Manmade Factors

- Invasion of introduced plants such as Russian thistle and Kochia.
- Extra sensitive to habitat alterations because it typically grows in areas where it is rich in minerals, oils, and gas.
- Genetic depression, seed bank decay, and habitat alteration from mining are also potential threats.

## RESEARCH AND SURVEY EFFORTS

### Previous Research or Surveys

- Target Plant Survey for *Eriogonum visherii* in the Little Missouri National Grasslands and Mountrail, Grant, and Sioux Counties of North Dakota.

### Additional Research or Surveys Needed

- The following are some of the data needs to be considered for populations of *E. visherii*
  - Annual monitoring over a series of years to understand population responses to external factors.
  - Maintain viable populations. Define what a viable population is, given population fluctuations common to annual species.
  - Examine seed biology and demographic characteristics.
  - Verify/describe reproductive biology characteristics.
  - Plan a conservation strategy.
  - Genetic characteristics (including potential hybridization, genetic diversity among and between populations.)
  - Test the roles of herbivores, grazers, interspecific competition, disturbance, invasive species, fire, etc.
  - Identify habitat requirements.
  - Coordinate work with other state and federal agencies and private landowners.

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Dakota Buckwheat

Level I

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Smooth Buckwheat — *Eriogonum salsuginosum*. Montana Field Guide. Montana Natural Heritage Program. Retrieved on July 31, 2012, from [http://FieldGuide.mt.gov/detail\\_PDPGN0Q020.aspx](http://FieldGuide.mt.gov/detail_PDPGN0Q020.aspx)
5. Lenz, Darla. *Target Plant Survey for Eriogonum Visherii in the Little Missouri National Grasslands and Mountrail, Grant, and Sioux Counties North Dakota*. Bismarck, ND: North Dakota Natural Heritage Inventory/North Dakota Parks and Recreation Department, Nov. 1995. PDF.
6. "North Dakota's Federally Listed Endangered, Threatened, and Candidate Species-Dakota Buckwheat (*Eriogonum Visherii*)." Northern Prairie Wildlife Research Center. U.S. Geological Survey, 7 Aug. 2006. Web. 31 July 2012. <<http://www.npwrc.usgs.gov/resource/wildlife/nddanger/species/eriovish.htm>>.

# Bicknell's Sunrose

Level I

**Scientific Name:** *Helianthemum bicknellii*

**General Description:** Perennial forb standing 8-24in (20-61cm). Branching occurs once the plant reaches maturity. Leaves are triangular shaped. Has 2-10 stalked flowers appearing in June and July, arranged in a cyme five parted 2/3-1in (1.5-5cm) wide and are yellow.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 - Critically Imperiled/Secure

**Federal Status:** Not listed.

**Range:** Occurs from Maine, west to North Dakota, South Dakota, and Colorado; south to Maryland, North Carolina, Ohio, Indiana, Missouri, and Kansas.

Wisplants.uwsp.edu Merel R. Black

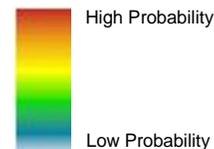
**Primary Habitat:** Dry sandy soils located in open upland woods and prairies; Prefers ample sunlight.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- There have been five documented occurrences occurring in the sand deltas and beach ridges ecoregions of Ransom and Pembina counties. The Sheyenne Grasslands in Ransom County comprises a large area with suitable habitat. It is typically located in dry sandy soils in open prairies or open wood lots. Bicknell's Sunrose is not a shade tolerant species.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The largest threat to this species is climate change because of its specific habitat requirements. With climate change a change in precipitation and temperature can be expected and with that the plants that exist will change. Increased precipitation and temperature would change the soil chemistry and the nutrients that are available. Loss of habitat poses the most immediate threat.

# Bicknell's Sunrose

Level I

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Helianthemum bicknellii*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Avoid soil disturbances that encourage erosion and invasive species introductions.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>..
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Dwarf Mentzelia

Level I

**Scientific Name:** *Mentzelia pumila*

**General Description:** Herbaceous biennial or short-lived perennial herb with branched, white stems that arise from a stout taproot. Lance-shaped leaves are 8-10 cm long and have short stems. The alternate leaves become sessile, smaller, and more deeply lobed the higher they are on the stem. The foliage is covered with short, barbed hairs. 1-3 flowers are borne on short stalks arising from the axils of the reduced upper leaves. Flowers have 10 yellow petals that are 9-15 mm long and numerous stamens.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G4 - Critically Imperiled/Apparently Secure

**Federal Status:** Not listed.

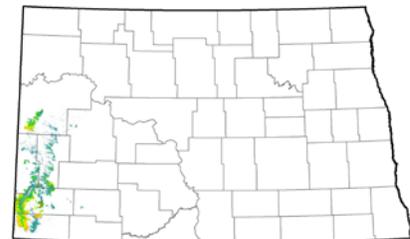
**Range:** Distributed throughout North Dakota, south-central Montana to Colorado, Utah, New Mexico, Arizona, Wyoming, and Nevada.

**Primary Habitat:** Open, usually sandy soil in desert shrubland and woodlands in the valley and foothill zones.

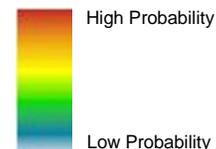
**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS):

Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Historical records in North Dakota show that this species has been limited to one location in Slope County, near the Limber Pines Area.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations.

# Dwarf Mentzelia

Level I

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Mentzelia pumila*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Dwarf mentzelia — *Mentzelia pumila*. Montana Field Guide. Montana Natural Heritage Program. Retrieved on July 26, 2012, from [http://FieldGuide.mt.gov/detail\\_PDLOA031G0.aspx](http://FieldGuide.mt.gov/detail_PDLOA031G0.aspx)
5. *Braunberger Materials Pit Biological Assessment and Biological Evaluation*. Billings County, ND: Yellowfield Biological Surveys, 11 Jan. 2010. PDF.

# Western Prairie Fringed Orchid

Level I

**Scientific Name:** *Platanthera praeclara*

**General Description:** Single stemmed perennial that stands up to 85 cm tall. Has a showy open raceme of up to 24 white to creamy white flowers, each with a long nectar spur. The lip, or lower petal of each flower, is deeply three-lobed and fringed. Flowering plants have three or more smooth, elongate leaves.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G3 – Imperiled/Vulnerable

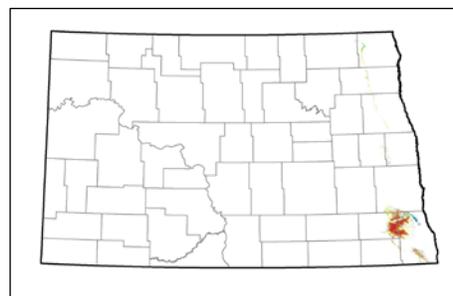
**Federal Status:** Threatened

**Range:** Range includes Iowa, Kansas, Minnesota, Missouri, Nebraska, and North Dakota.

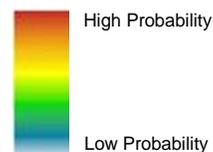
**Primary Habitat:** Occurs in mesic upland tallgrass in the southern part of its range, often in swales, and wet-mesic tallgrass prairie and sedge meadows in the northern part of its range; also known from prairies and swales in sand dune complexes that are fed by shallow underground water.

**Climate Index Rank:** Extremely Vulnerable (EV):  
Abundance and/or range extent within geographical area assessed extremely likely to substantially decrease or disappear by 2050.

**Reason for Designation:** Habitat loss and degradation, mostly through conversion to cropland. Competition with invasive plant species and pesticide threats to pollinators.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, this species has been documented in Cass, Ransom, and Richland Counties in the southeastern part of the state. Currently restricted to Richland and Ransom counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Western Prairie Fringed Orchid

Level I

## Other Natural or Manmade Factors

- Conversion of pasture and hayfield habitat to cropland.
- Fire suppression and woody plant encroachment.
- Invasion of noxious weeds.
- Herbicides and insecticides.
- Hydrologic changes.
- Intensive cattle grazing and trampling.
- Collecting plants from the wild.

## **RESEARCH AND SURVEY EFFORTS**

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Platanthera praeclara*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Previous Research or Surveys

- Research on propagation, pollination, population genetics, and habitats requirements has been performed on this species.

## **MANAGEMENT RECOMMENDATIONS**

- Determine the role of disturbance in maintaining population vigor.
- Protect and manage existing populations.
- Monitor pesticide use in orchid habitat.
- Monitoring of populations.

## **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Western Prairie Fringed Orchid

Level I

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. *Species Profile: Minnesota DNR*. Minnesota Department of Natural Resources, n.d. Web. 25 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMORC1Y0S0>>.
5. Goedeke, T., Sharma, J., Delphey, P. & Marshall Mattson, K. 2008. *Platanthera praeclara*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. <[www.iucnredlist.org](http://www.iucnredlist.org)>. Downloaded on 25 July 2012.
6. "Platanthera Praeclara." Center for Plant Conservation, 4 Mar. 2010. Web. 25 July 2012. <[http://www.centerforplantconservation.org/collection/cpc\\_viewprofile.asp?CPCNum=9293](http://www.centerforplantconservation.org/collection/cpc_viewprofile.asp?CPCNum=9293)>.
7. Sharma, Jyotsna, Lawrence W. Zettler, J.W. Van Sambeek, and Mark R. Ellersieck. "Symbiotic Seed Germination and Mycorrhizae of Federally Threatened Platanthera Praeclara." *American Midland Naturalist* 149.1 (2003): 104-20. JSTOR. Web. 25 July 2012. <<http://www.jstor.org/stable/3083178>>.

# Thin-fruited Knotweed

Level I

**Scientific Name:** *Polygonum leptocarpum*

**General Description:** Annual, glabrous plant that stands very slender with an abundance of branches. Stands up to one foot tall and has a variety of different leaves. Leaves at the bottom are broader and have a reddish-brown color. Upper leaves are more slender and long. Flowers are sessile.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G2G4Q – Critically Imperiled/Imperiled-Apparently Secure  
Questionable Taxonomy

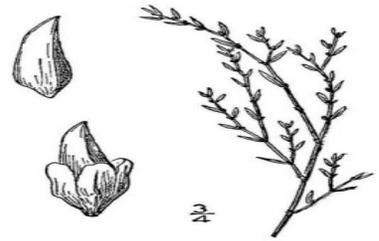
**Federal Status:** Not listed

**Range:** Range is small; includes Montana, North Dakota, South Dakota, and Kansas.

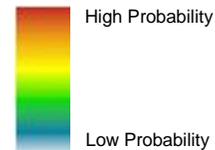
**Primary Habitat:** This species primary habitat is unknown.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- There is an insufficient amount of data relating to this species whereabouts in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Polygonum leptocarpum*. However, further research is always needed as it will help us better understand a multitude of sensitive plant populations and their life cycle requirements necessary for survival.

# Thin-fruited Knotweed

Level I

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Britton, Nathaniel Lord, and Addison Brown. *An Illustrated Flora of the Northern United States, Canada and the British Possessions from Newfoundland to the Parallel of the Southern Boundary of Virginia, and from the Atlantic Ocean Westward to the 102d Meridian,*. New York: C. Scribner's Sons, 1896. Print.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Sticky False-asphodel

Level I

**Scientific Name:** *Triantha glutinosa*

**General Description:** Perennial herb that is 4-20in (10-50cm) tall with a stem that is sticky. Leaves appear in a basal arrangement and are narrow and 2-18in (5-20cm) long. Flowers appear June-August are white and are arranged in raceme that is 1-2in (2-5cm) in length. Fruits are formed June-September and are yellow or red seeds.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

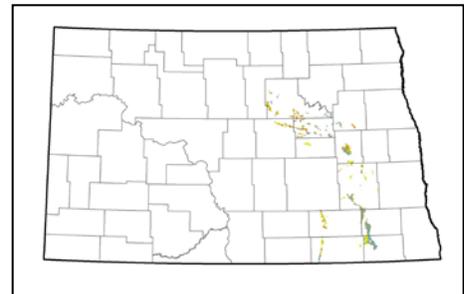
**Federal Status:** Not Listed.

**Range:** Present in Oregon, North Dakota, Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Tennessee, Georgia, North Carolina, Virginia, West Virginia, Maryland, New York, Connecticut, Vermont, New Hampshire, and Maine.

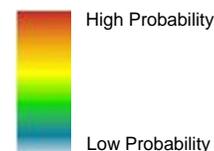
**Primary Habitat:** Primarily moist bogs or fens with a calcareous soil.

**Climate Index Rank:** Extremely Vulnerable (EV): Abundance and/or range extent within geographical area assessed extremely likely to substantially decrease or disappear by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Only one physical occurrence has been documented in the state in the Drift Plains region in southwestern Benson County. Sticky false asphodel is primarily associated with bogs or fens with calcareous soils

# Sticky False-asphodel

Level I

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because the species needs continually moist conditions to thrive. With climate change precipitation occurrence and amount can be expected to change from what historically has occurred. If a drought occurs species that need drier conditions will encroach and take over the bog. Human activities in and around areas where the bogs are present also pose a threat. Diversion of ground water or surface water that flows into the bog can change the composition allowing other species to take over. Examples would include irrigation practices and impoundment creation. Other land practice such as logging, construction, and agriculture pose threats as well. Logging to close to a bog will allow sediments and nutrients into the ecosystem that are not normally present. Livestock allowed to travel through the bog could trample the habitat and deposit excrement high in nitrogen into the bog. Addition of fertilizers and other chemical could be carried by surface water into the bog also altering the composition and nutrient loads in the water.

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Tofieldia glutinosa*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Sticky False-asphodel

Level I

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Sticky False Asphodel (*Tofieldia Glutinos*)." *The Field Guide for the next Millennium*. Mountain Nature, N.D. Web. 30 July 2012. <<http://www.mountainnature.com/plants/PlantsLatinNameResult.asp?ID=123>>.
5. Burns, James F. "*Tofieldia Glutinosa*." Ohio Division of Natural Areas and Preserves/ Ohio Department of Natural Resources, Mar. 1982. Web. 30 July 2012. <<http://www.dnr.state.oh.us/dnap/Abstracts/t/tofeglut/tabid/1632/Default.aspx>>.
6. "*Triantha Glutinosa*." Robert W. Freckmann Herbarium. University of Wisconsin-Stevens Point, N.D.. Web. 30 July 2012. <<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=TRIGLU>>.

## Moonwort Level II

**Scientific Name:** *Botrychium minganense*

**General Description:** Is a small perennial fern that stands 3-10in (8-25cm) tall. Has a fertile blade (sporophore) and a fertile blade (trophophore) which is yellow-green in color and has ten pairs of pinnae which are fan shaped. Can be easily identified June-August.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4 – Critically Imperiled/Apparently Secure

**Federal Status:** Not listed

**Range:** Fairly large distribution; Extends from Oregon, south to California and east to Arizona and north to Montana. Also includes North Dakota, Minnesota, Wisconsin, Michigan, New York, Vermont, New Hampshire, and Maine.

**Primary Habitat:** Primarily found in mesic hardwood forests.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

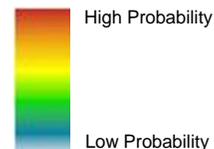
**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



© Mary Clay Stensvold



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- The Mingan Moonwort is typically located in mesic hardwood forests, associated with the Turtle Mountains and Pembina Escarpment regions of the state. It is also commonly found in meadows, fens, and old disturbed sites such as road edges; grows in sunny to densely shaded areas that can range from dry to completely saturated.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threat to this species is habitat loss or degradation. Land use practices pose the largest threat such as cattle or other livestock trampling an area. Heavy equipment used in timber harvest or agriculture would also pose an immediate threat. Unregulated recreational use such as off trail use by ATV's and OHV's could also significantly disturb and degrade vital habitat.

## Moonwort

### Level II

#### RESEARCH AND SURVEY EFFORTS

##### Current Research or Surveys

- A paper that is currently being worked on is going to analyze the different plant communities where this *Botrychium* species occurs and to establish the best conservation and management strategies.

##### Previous Research or Surveys

- Detailed studies and follow-ups have been conducted in the last five years on the phenology of *Botrychium minganense*.

#### MANAGEMENT RECOMMENDATIONS

- Maintain deep shade.
- Avoid impacts caused by livestock such as trampling or grazing.
- Maintain existing hydrologic regime.
- Avoid disturbance of duff layer where this species occurs.

#### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

#### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "*Botrychium Minganense*." *Species Profile: Minnesota DNR*. Minnesota Department of Natural Resources, n.d. Web. 25 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PPOPH010R0>>.

# Leathery Grapefern

Level II

**Scientific Name:** *Botrychium multifidum*

**General Description:** Presents itself in two stages either fertile or sterile. The sporophore is the fertile part and when present the plant is 3-15.75in (8-40cm) tall. The trophophore is the sterile blade of the plant and always present and 2.5-12in (6-30cm) long green to reddish brown in color.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

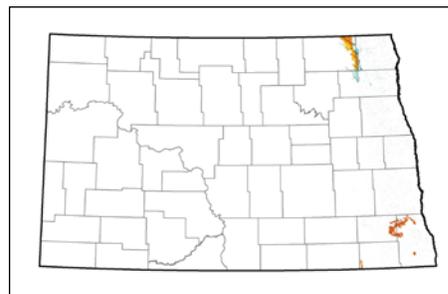
**Federal Status:** Not listed

**Range:** Circumboreal; extends south in North America to North Carolina and west to California.

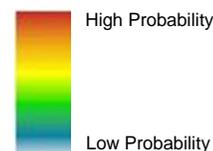
**Primary Habitat:** Moist meadows and rich woods in the Eastern part of the state.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Leathery grapefern has been documented in Cavalier and Richland counties in the Pembina Escarpment and Sand Delta Beach Ridges eco-regions of the state. It is primarily located in moist meadows and rich woods with acidic sandy soils that are moist during wet periods of the year and dry out in the summer.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat degradation and invasive species. Recreational activities on the landscape are the largest threat for habitat degradation. Activities such as OHV and ATV riding be the largest through the construction of trails and the off trail use tearing up and compacting suitable soils. Noxious weeds pose a large threat because they can adapt easily and take over an area choking out the native vegetation.

# Leathery Grapefern

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Botrychium multifidum*. However, further research is always needed and will allow us to better understand a multitude of sensitive plant species populations and their life cycle requirements that are necessary for survival.

#### Additional Research or Surveys Needed

- Monitoring study that compares reproductive and mortality rates of this species in burned vs. unburned, grazed vs. ungrazed, weedy vs. natural, and shaded vs. unshaded would answer many questions about this species and would be beneficial in determining management practices.
- Descriptive data for the habitat and community ecology of occurrences should be gathered whenever a new colony of this species is encountered.
- Research of the life history and demography is needed.
- Research is needed to determine the role of non-reproductive plants in the population biology of this species.

### MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Leathery Grapefern

## Level II

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation... U.S. Geological Survey, 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Anderson, David G. *Botrychium Multifidum: A Technical Conservation Assessment*. Tech. Fort Collins, Colorado: Colorado Natural Heritage Program, 2005. Print.
4. "Botrychium Multifidum." Ohio Division of Natural Areas and Preserves/ Ohio Department of Natural Resources, Apr. 1993. Web. 19 July 2012. <[http://ohiodnr.com/Portals/3/Abstracts/Abstract\\_pdf/B/Botrychium\\_multifidum.pdf](http://ohiodnr.com/Portals/3/Abstracts/Abstract_pdf/B/Botrychium_multifidum.pdf)>.
5. Mesipuu, Meeli, Richard P. Shefferson, and Tiiu Kull. "Weather and Herbivores Influence Fertility in the Endangered Fern Botrychium Multifidum." *Plant Ecology* 203.1 (2009): 23-31. *SpringerLink*. Web. 19 July 2012. <<http://http://www.springerlink.com/content/h1t36667tv03n610/references/>>.
6. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Least Grapefern

## Level II

**Scientific Name:** *Botrychium simplex*

**General Description:** Small, inconspicuous, fern with thin fleshy appendages. Up to seven pairs of well-developed lobes can form. Basal lobes are much larger and are fan shaped. The apex of the fern is usually rounded and undivided. Best time to identify is late June through early September.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

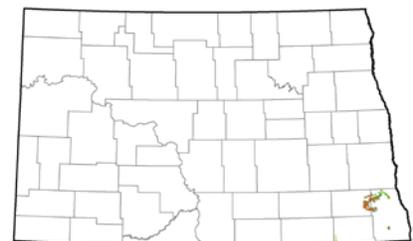
**Range:** *Botrychium simplex* is one of the most widely dispersed of all moonwort species. It occurs across the northern United States and southern Canada and southward at high elevations in the Appalachian Mountains to North Carolina and in western mountains south to New Mexico and southern Nevada and California. It also extends westward across the Great Plains and into the Rocky Mountains from New Mexico to Wyoming.

**Primary Habitat:** Primarily occurs in open sites such as prairies, wetlands, marshes, bogs, and swamps. Also found in low moist areas of deciduous hardwood and coniferous forests.

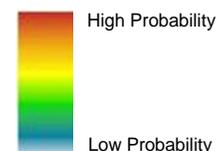
**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this fern has only been documented in the Sheyenne National Grassland along swale margins that are sometimes partially shaded by willows.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Least Grapefern

## Level II

### Other Natural or Manmade Factors

- There are a number of man-made and natural factors that affect this species of plant. Soil compaction, drying of habitat and removal of vegetation are all fairly common factors that would affect a particular species. Also documented to have a significant effect on the decline of *Botrychium simplex* includes, exotic earth worms, exotic plants, succession to a closed canopy forest, and canopy thinning. Things like domestic livestock, recreational activities, logging, road maintenance, fire, woody plant encroachment, pollution, and development also have significant impacts on *Botrychium simplex*.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Establish population trends.
- Monitor fungal associates, their habitat requirements, and the role they play in the life history of each species.
- Establishing effective management areas (sizes) and habitat characteristics necessary to maintain known occurrences in project areas.
- Determine the short and long-term effects of timber harvest, grazing, recreation, fire, fire suppression, and exotic plants on the maintenance of known occurrences
- Identification of high likelihood habitat to help prioritize surveys and ensure appropriate habitat conservation.

### Additional Research or Surveys Needed

- Develop and implement inventory and monitoring protocols; establish priorities and inventory high likelihood habitats.

## POPULATION ESTIMATES

- *Botrychium simplex* has been documented in 35 states and 10 provinces, as well as in Greenland and Sweden.

## MANAGEMENT/ MONITORING RECOMMENDATIONS

- Management of suitable, unoccupied habitat that will be available for colonization of spores.
- Maintain existing populations of *Botrychium simplex*.
- Maintain light regime, hydrology, and microclimatic conditions.
- Maintaining conditions that sustain mycorrhizal diversity.
- Avoiding disturbance of above ground plants and the substrate in the area.
- Avoiding actions that would establish competing exotic vegetation.
- Avoiding excessive siltation or deposition of soil.
- Providing early to mid-stages of plant succession.

## Least Grapefern

### Level II

#### REFERENCES

1. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
2. Welcome to the PLANTS Database | USDA PLANTS. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
3. "Botrychium Simplex." Species Profile: Minnesota DNR. Minnesota Department of Natural Resources, 2012. Web. 18 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PPOPH010E0>>.
4. Ahlenslager, Kathy, and Laura Potash. "Conservation Assessment for 13 Species of Moonworts." USDA Forest Service Region 6 and USDI Bureau of Land Management, 17 Apr. 2007. Web. 18 July 2012. <<http://www.blm.gov/or/plans/surveyandmanage/files/ca-va-botrychium-13-species-2007-04-18.pdf>>.
5. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Marsh Bellflower

Level II

**Scientific Name:** *Campanula aparinoides*

**General Description:** Inconspicuous perennial wetland plant. Produces small pale blue flowers and grows to 20-60 cm tall.

**Natural Heritage State Status/NatureServe Global Status:**  
S2S3/G5 – Imperiled-Vulnerable/Secure

**Federal Status:** Not listed

**Range:** Fairly abundant. Range includes Nova Scotia west to Saskatchewan, south to Georgia, Kentucky, Missouri, and Nebraska.

**Primary Habitat:** Occasionally found in marshes, wet sunny meadows, swales, calcareous fens, and shrubby or boggy sites.

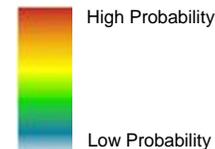
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species occurs in fresh wet meadows and boggy places. It is also found in fens and in spring-fed sites on the Sheyenne National Grassland. On the Sheyenne National Grassland, this plant is found most often in shrub or graminoid dominated seepage peat lands, wetland thickets dominated by alder, dogwood, bog birch, or sedge meadows.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Marsh Bellflower

Level II

## RESEARCH AND SURVEY EFFORTS

- Studies have been done to develop a criterion for natural resource professionals when they are determining the best management strategies for a wetland habitat.

## MANAGEMENT RECOMMENDATIONS

- Exact management needs for this particular species are not yet known. However, it is important to place emphasis on protecting this species habitat and keeping it intact.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. "Campanula Aparinoides." *VPlants*. N.p., 20 Feb. 2007. Web. 19 July 2012. <<http://www.vplants.org/plants/species/species.jsp?gid=91027>>.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Foxtail Sedge

Level II

**Scientific Name:** *Carex alopecoidea*

**General Description:** Perennial, herbaceous grass-like plant that is densely tufted and soft but stout and grows to be 1-2.5 feet tall. Species also contains fruity stems that are usually shorter than the thin and soft leaves. Mature from mid-June through mid-August.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** The documented range of Foxtail Sedge extends from Quebec and Maine west to Michigan and Minnesota and south to New Jersey, Indiana, and Iowa.

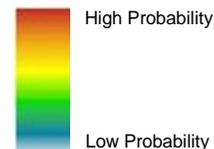
**Primary Habitat:** Found in calcareous wet meadows of river floodplains. In Great Plains regions Foxtail Sedge grows in wooded areas and swamps and may include springs and stream banks.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant species, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species is documented from poplar swamps, wooded areas, and bog areas around swamps, creek banks, and mesic woodlands. It has also been documented on north-facing slopes under green ash, bur oak, and basswood.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Foxtail Sedge

## Level II

### Other Natural or Manmade Factors

- Loss of occurrences and alteration of the hydrology in the riparian areas where Foxtail Sedge occurs
- Grazing by cattle and other large herbivores
- Presence of invasive species
- Increased recreational traffic

### **RESEARCH AND SURVEY EFFORTS**

- Additional research needs to be conducted on this species before any real management considerations can take place. Some research priorities include the following:
- Monitor existing occurrences and inventory for additional occurrences; land use history and current management practices are important data to be recorded for each occurrence.
- Investigate the hydrology where the species occurs.
- Investigate the species response to disturbance.
- Determine threats to the species persistence.
- Develop and implement a monitoring program to identify population trends.
- Investigate the habitat requirements for this species and its interactions with the surrounding plant community.

### **MANAGEMENT RECOMMENDATIONS**

- Exact management needs for this particular species are not yet known. However, since this species requires floodplain habitat for survival, it is important to place emphasis on protecting the habitat and keeping it intact.
- The disturbance of seasonal flooding may be necessary to perpetuate Foxtail Sedge populations by limiting shrub and tree growth and maintaining an open community structure.
- Control of invasive plant species is especially important since they are often common in the same river floodplain environment as the Foxtail Sedge.

### **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### **REFERENCES**

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Moore, Lynn, Sandy Friedley, and Donald L. Hazlett. *Carex Alopecoidea: A Technical Conservation Assessment*. Casper, Wyoming; Durango, Colorado; Pierce, Colorado: Windom Floristics/Ecosphere Environmental Services/New World Plants and People, 31 July 2006. PDF.
5. Foxtail Sedge (*Carex Alopecoidea*). Westborough, MA: Massachusetts Division of Fisheries & Wildlife, 20 Jan. 2009. PDF.

## Spiny Sedge

Level II

**Scientific Name:** *Carex echinata* ssp. *echinata*

**General Description:** Perennial herb standing 4-24in (10-60cm) with a fibrous root system. Two to four leaves for each flowering stem and leaves are slightly shorter than stems. Flowers occur in clusters on an inflorescence 1-4in (2.5-8cm) long with two to seven star shaped spikes.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5T5 – Critically Imperiled/Secure-Secure Intraspecific  
Taxon

**Federal Status:** Not listed

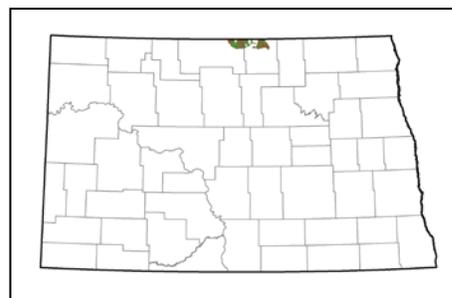
**Range:** Range includes most of the New England states, West Virginia, Virginia, North Carolina, Tennessee, the Great Lakes states, Iowa, North Dakota, and from Montana south to New Mexico, and westward to California, Oregon, and Washington.

**Primary Habitat:** Moist sandy soils along lakes, creeks, and rivers. Also occurs commonly in and around peat bogs and swamps.

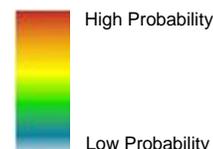
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- This species can occur in many places around North Dakota. Standing water, tributaries, wetland areas, and swamps are potential habitat for *Carex echinata*.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat fragmentation and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Spiny Sedge

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Carex echinata*. However, further research is always needed as it will give us a better understanding of a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect wetland areas and avoid disturbances in these settings.
- Avoid overgrazing and trampling.
- Control noxious weeds.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Cusick, Allison W. "CAREX ECHINATA Murray Ssp. ECHINATA Little Prickly Sedge." Ohio Division of Natural Areas and Preserves/ Ohio Department of Natural Resources, Feb. 1984. Web. 23 July 2012. <[http://ohiodnr.com/Portals/3/Abstracts/Abstract\\_pdf/C/Carex\\_echinata.pdf](http://ohiodnr.com/Portals/3/Abstracts/Abstract_pdf/C/Carex_echinata.pdf)>.
4. "Little Prickly Sedge." Alberta Native Plant Council, n.d. Web. 23 July 2012. <[http://www.anpc.ab.ca/assets/Carex\\_echinata\\_Addendum.pdf](http://www.anpc.ab.ca/assets/Carex_echinata_Addendum.pdf)>.
5. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

## Delicate Sedge

Level II

**Scientific Name:** *Carex leptalea*

**General Description:** Densely clustered perennial plant that rises from a network of rhizomes. Typically grows 15-70 cm tall. Leaf blades are deep green and smooth and measure .5-1.33 mm wide. Sheaths are membranous and have a brownish tint when mature. This plant also bears solitary greenish-yellowish spikes that measure 4-16 mm long and 2-3 mm thick.

**Natural Heritage State Status/NatureServe Global Status:**

S3/G5 – Vulnerable/Secure

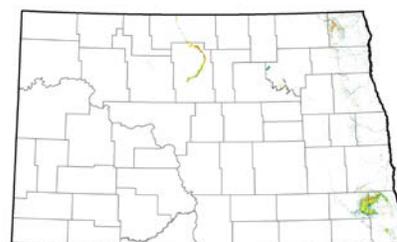
**Federal Status:** Not listed

**Range:** Very widespread over much of North America. Range includes Newfoundland to Alaska, south to Florida, Texas, and California. The only states where Delicate Sedge has not been documented are Nebraska, Kansas, Nevada, and Arizona.

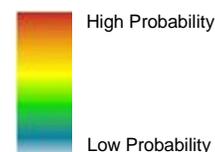
**Primary Habitat:** has a very diverse range of habitats but occurs mostly in wetland areas. Other documented areas of habitat include mossy or wet woods, conifer swamps and bogs, wet and often calcareous fens and meadows, swales, lakeshores, stream banks, as well as damp, shaded rock ledges, marshy fields, and swampy ditches.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota this plant species is found in dense alder and bog birch wetland thickets. It may also be found in shrubby fens or wetland thickets typically dominated by species such as willow, bog birch, and dogwood. This sedge may occupy the margins of these wetlands and extend up into low woodlands.

## Delicate Sedge

Level II

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

#### Other Natural or Manmade Factors

- Hydrologic alteration
- Timber harvest
- Fire
- Roads and trails being established
- Peat Extraction
- Livestock grazing
- Recreational impacts
- Exotic species
- Atmospheric deposition of pollutants

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Research has been conducted, but there is a large amount of information that we don't know about the habitats, populations, etc. Future research is being planned so that we can better understand rare plant species.

#### Previous Research or Surveys

- Some population research and restoration studies have been conducted.

### MANAGEMENT RECOMMENDATIONS

- Species and habitat inventory
- Establishment of protected areas
- Presence/absence surveys should be conducted to better understand of habitat abundance and distribution
- Collection of basic hydrologic and sediment data

### MONITORING PLANS

- Population and habitat monitoring would improve our knowledge of the population dynamics of *Carex leptalea*. Population monitoring is most productively conducted in junction with habitat monitoring. For example, by monitoring the water levels in wetlands, observed changes in the abundance of *Carex leptalea* can be more easily tied to changes in hydrologic drivers.

## Delicate Sedge

### Level II

#### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Gage, Edward, and David J. Cooper. *Carex Leptalea: A Technical Conservation Assessment*. Fort Collins, CO: Department of Forest, Rangeland, and Watershed Stewardship-Colorado State University, 15 June 2006. PDF.

# Sterile Sedge

Level II

**Scientific Name:** *Carex sterilis*

**General Description:** A perennial herb that rises from tufts and stands 8-27.5in (20-70cm) tall. Has many slender leaves that are 12in (30cm) long. Sterile sedge contains four spikelets per stalk.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4 – Critically Imperiled/Apparently Secure

**Federal Status:** Not listed

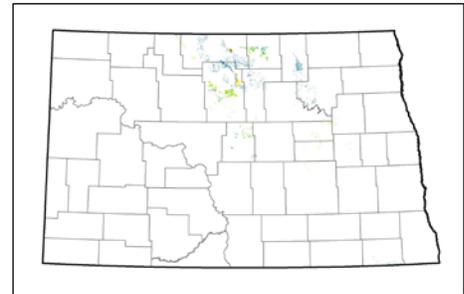
**Range:** Range includes a majority of the New England and Great Lakes States. Also includes Montana, North Dakota, Iowa, Missouri, Alabama, Tennessee, Virginia, and West Virginia.

**Primary Habitat:** Fens, wet calcareous prairies, fresh interdunal meadows, calcareous seeps, lake and river shores, and wet sunny limestone outcrops.

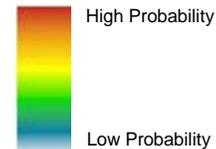
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Derek Anderson



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Sterile sedge is primarily located near or around calcareous fens in the Glacial Lake Deltas and Glacial Lake Basins eco-regions in the north central part of the state. The habitat needed for sterile sedge to survive is considered one of the rarest types of wetlands in North America.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because the species is a wetland dependent species and is primarily supported by groundwater supplies. Livestock grazing or creation of ponds for livestock poses a threat to the plant. Lowering of the water table through drain tiling increases the risk that encroachment or invasive species could inhibit the plant from growing or existing. Any negative effects to the groundwater supply through artificial manipulation or tainting with chemicals will negatively affect sterile sedge.

# Sterile Sedge

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Carex sterilis*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements that are necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- The conservation is directly linked to the conservation of its habitat, especially fen wetlands.
  - Protect habitat from overgrazing and trampling.
  - Avoid any alteration in groundwater flow that feeds these fens.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. "*Carex Sterilis*." *EOL*. Eyclopedia of Life, n.d. Web. 19 July 2012. <<http://eol.org/pages/1123319/details>>.
4. "*Carex Sterilis*." *Species Profile: Minnesota DNR*. Minnesota Department of Natural Resources, 2012. Web. 19 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMCYPO3CY0>>.
5. "*Carex Sterilis* Willd." *Maine Natural Areas Program Rare Plant Fact Sheet for Carex Sterilis*. N.p., n.d. Web. 19 July 2012. <<http://www.maine.gov/doc/nrimc/mnap/features/carxste.htm>>.
6. "Wetland Plants and Plant Communities of Minnesota and Wisconsin." *NPWRC*. N.p., n.d. Web. 19 July 2012. <<http://www.npwrc.usgs.gov/resource/plants/mnplant/caste.htm>>.
7. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Blue Cohosh

Level II

**Scientific Name:** *Caulophyllum thalictroides*

**General Description:** Perennial forb that is 1-3ft (30.5-91.5cm) tall. Leaves stem off the stalk from the middle of the stalk. They are three parted into leaflets then three parted again into sub-leaflets 1-3in (2.5-7.6cm) long that have 2-5 lobes. Green or yellow flowers are present April-May. They are six parted and presented in a cyme of 5-70 flowers that are about .5in (1.3cm) wide. The fruit is present in a dark blue berry.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4G5 – Critically Imperiled/Apparently Secure-Secure

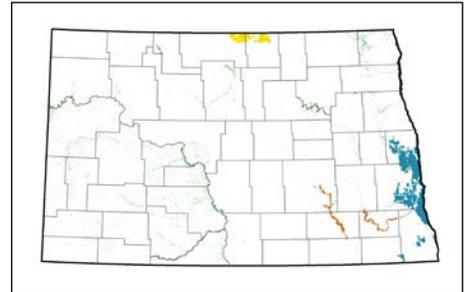
**Federal Status:** Not listed

**Range:** Range extends from Maine, south to Georgia and west to Oklahoma. From there it reaches north to North Dakota and Minnesota.

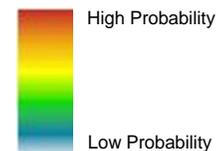
**Primary Habitat:** Rich woods in valleys, ravines, north-facing wooded slopes, moist base of bluffs.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, all five species records are specimens from the Red River Valley in Cass and Richland Counties.

# Blue Cohosh

## Level II

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss.

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Caulophyllum thalictroides*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- Avoid timber harvesting or practices that would greatly alter woodlands.
- Reduce any off road vehicle use through known habitat.
- Avoid overgrazing in known habitat.
- Management goals need to be based on the current conditions.
- Gaining knowledge of population locations, extent, demographic characteristics, and changes in populations characteristics over time.
- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With this information you can use population viability analysis to estimate the minimum population size to sustain the taxon which can help you establish management practices.
- Preserving habitat and restricting/limiting harvest would be beneficial while gathering population information.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "*Caulophyllum thalictroides* (Blue Cohosh)." Missouri Plants. N.p., 13 Apr. 2004. Web. 31 July 2012. <[http://www.missouriplants.com/Greenalt/Caulophyllum\\_thalictroides\\_page.html](http://www.missouriplants.com/Greenalt/Caulophyllum_thalictroides_page.html)>.
5. "*Caulophyllum thalictroides* (Blue Cohosh)." Robert W. Freckmann Herbarium. University of Wisconsin-Stevens Point, n.d. Web. 31 July 2012. <<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=CAUTHA>>.

# Slender Lip Fern

Level II

**Scientific Name:** *Cheilanthes feei*

**General Description:** Short fern that stems off of a rhizome. Can stand erect or appear to be creeping. Fronds range from 2-10in (4-25cm) thin and dark brown or black in color; lanceolate in shape.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Widespread range from British Columbia and Alberta, south to Texas, north to Wisconsin and east to Kentucky and Virginia.

**Primary Habitat:** Typically found in open areas in the hills associated with calcareous soils and cliffs.

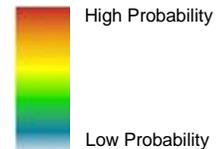
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



## Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Occurring in the crevices of limestone or sandstone on sloping hills at 850-2650ft (259-808m) elevations.

### Key Areas and Conditions for Slender Lipfern in North Dakota

- There is only one documented occurrence occurring in northeast Dunn County in the Missouri Plateau. A calcareous soil key to this species occurrence and on rocky slopes.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- With the recent boom in oil activity in western North Dakota where this species has been documented, mining and exploration for new wells sites and road construction poses the largest immediate threat. Other recreation activities such as hiking, biking, and climbing could cause damage to the plants and their surrounding habitats. Climate change also poses a threat due to changing precipitation levels and temperatures.

# Slender Lip Fern

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Cheilanthes feei*. However, further research is always needed because it allows us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect habitat from destruction caused by road developments and oil pad wells.
- Avoid noxious weed establishment.
- Management goals need to be based on the current conditions.
- Gaining knowledge of population locations, extent, demographic characteristics, and changes in populations characteristics over time.
- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With this information you can use population viability analysis to estimate the minimum population size to sustain the taxon which can help you establish management practices.
- Preserving habitat and restricting/limiting harvest would be beneficial while gathering population information.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Lunn, Cara Lynne. "Immunodetection of a Plasma Membrane Aquaporin-like Protein in Germinating Spores of the Xerophytic Fern *Cheilanthes lanosa*." Thesis. Southeast Missouri State, 2005. Print.
4. "Cheilanthes Feei." Washington Department of Natural Resources, 2005. Web. 19 July 2012. <<http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/chefee.pdf>>.
5. Palmieri, Maria. "Presence and Distribution of Fungal Symbiosis in *Cheilanthes feei* and *Cheilanthes lanosa* in Southeastern Missouri and Southern Illinois." Thesis. Southeast Missouri State, 2001. Print.
6. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Slender-lobed Clematis

Level II

**Scientific Name:** *Clematis columbiana* var. *tenuiloba*

**General Description:** Stems mainly subterranean, rhizomatous, aerial stems not viny, mostly less than 0.1m, tufted. Leaf blade mostly 3-ternate, leaflets or lobes 1.5 to 5 mm wide. Flowers: sepals violet-blue, 1.5-5cm.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5?T4? – Critically Imperiled/Secure Inexact Numeric Rank-Apparently Secure Intraspecific Taxon Inexact Numeric Rank

**Federal Status:** Not listed

**Range:** Occurring in North Dakota, South Dakota, Montana, Wyoming, Utah, and Colorado.

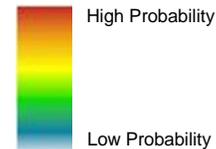
**Primary Habitat:** Typically occurs in open sites or open pine forests on cliffs or exposed rocky areas. Likes full to partial sunlight.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Slender-lobed Clematis occurs in a limited range on open sites on cliffs and exposed rocky areas or open pine forests at altitudes of 3300-9900ft (1000-3000m). Clematis likes to be in full sun to partial shade in calcareous soils that are well drained. The only document occurrences were in the Killdeer Mountains of Dunn County. The first was in 1981 and a few others in the early 1980's with the most recent in 2005.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- Minimally available habitat that is declining or threatened by human activities recreational or commercial is seen as the largest factor that could reduce or extirpate this species. Recent mining and oil exploration activity will be the largest threat. Any off trail recreation poses a threat as established plants could be disturbed or displaced by the activity. Invasive plant species that tend to be able to rapidly spread and utilize a wide variety of habitats could also encroach and out compete clematis for the available habitat.

# Slender-lobed Clematis

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Clematis columbiana*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Prevent overgrazing and trampling by livestock.
- Avoid disturbance to habitat especially oil and gas exploration activities.
- Practice best management strategies for woodlands.
- Avoid the use of herbicides that would damage this species.
- Management goals need to be based on the current conditions.
- Gaining knowledge of population locations, extent, demographic characteristics, and changes in populations characteristics over time.
- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With this information you can use population viability analysis to estimate the minimum population size to sustain the taxon which can help you establish management practices.
- Preserving habitat and restricting/limiting harvest would be beneficial while gathering population information.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Blue Lips

## Level II

**Scientific Name:** *Collinsia parviflora*

**General Description:** Ascending to erect annual herb. Stem is simple to branched. Leaves are opposite and cover the entire stem and are 1-3 cm long and 3-5 mm wide. Principal leaves generally have pointed end near the base and have a rounded or obtuse apex. Lower leaves almost circular and distinctly petiolate. The inflorescence is a raceme with foliaceous bracts, the flowers appear solitary in axils of leaves and sometimes in whorls in the upper axils. Fruit is a circular capsule 3-5 mm long and 2-3.5 mm wide.

[Plants.usda.gov](http://Plants.usda.gov)

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

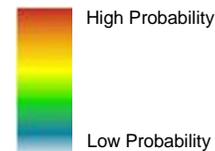
**Range:** Range extends from New Mexico, north to Colorado, Nebraska, South Dakota, North Dakota and includes all the states west of there. Blue Lips is also found in Michigan, Pennsylvania, Massachusetts, and Vermont.



**Primary Habitat:** Moderately moist slopes from sagebrush and pinyon-juniper foothills to subalpine sagebrush and conifer forests.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

### Key to the Habitat Distribution Map



**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, this taxon is located most frequently on mesic slopes of buttes. It has been documented in Dunn, Billings, and Slope Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Blue Lips

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Collinsia parviflora*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Additional Research or Surveys Needed

- Gain a better understanding of site requirements, demographic characteristics, population viability, pollination mechanisms, and ecology.

### MANAGEMENT RECOMMENDATION

- Management goals need to be based on the current conditions.
- Gaining knowledge of population locations, extent, demographic characteristics, and changes in populations characteristics over time.
- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With this information you can use population viability analysis to estimate the minimum population size to sustain the taxon which can help you establish management practices.
- Preserving habitat and restricting/limiting harvest would be beneficial while gathering population information.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. "Blue-Eyed Mary-*Collinsia parviflora*." *Montana Plant Life*. N.P., ND. Web. 23 July 2012. <[http://montana.plant-life.org/species/collin\\_parv.htm](http://montana.plant-life.org/species/collin_parv.htm)>.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Torrey's Cryptantha

## Level II

**Scientific Name:** *Cryptantha torreyana*

**General Description:** Annual standing 10-40 cm; Stems are simple or branched throughout; small to rough or bristly hairs ascending to spreading. Leaves are linear to oblanceolate with small hairs present. Inflorescence opens into a fruit that is smooth, black, and shiny and is ovate in shape.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

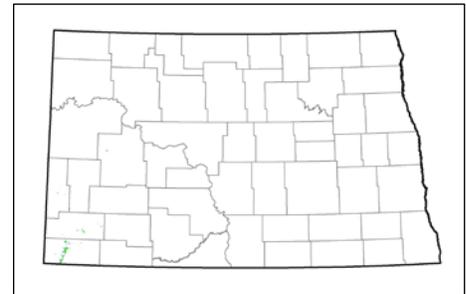
**Range:** Range includes Alaska, Washington, Oregon, California, Nevada, Utah, Idaho, Montana, Wyoming, and North Dakota.

**Primary Habitat:** Open areas, slopes, generally coniferous forest.

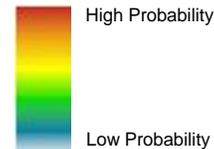
**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Calphotos.berkeley.edu Jean Pawek



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has been recorded once in Bowman County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Torrey's Cryptantha

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Cryptantha torreyana*. However, further research is always needed as it gives us a better understanding of a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. [http://ucjeps.berkeley.edu/interchange/l\\_treat\\_indexes.html](http://ucjeps.berkeley.edu/interchange/l_treat_indexes.html) Thu Jul 19 15:07:20 2012
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Brook Flatsedge

Level II

**Scientific Name:** *Cyperus bipartitus*

**General Description:** Tufted annual with slender stalks; Grows 2-8 inches tall with very few leaves. Leaves that do show are located near the base of the plant. Tiny clusters of spikelets are also present.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

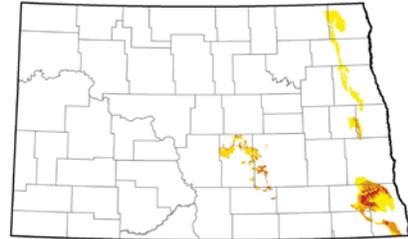
**Range:** Widespread over most of the United States. Also present in Quebec and Ontario. The only states where there is no documentation of this species is Nevada and Arizona.

**Primary Habitat:** This species is known for living in stream banks and other wet, low places in the valleys and lowlands. Vegetation where this plant species occurs is dense and tangled, forming a mat of vegetation often growing towards vegetated shorelines.

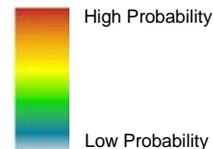
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Habitat for this plant in North Dakota includes moist, exposed sandy areas along stream banks. Habitat in the Sheyenne sand hills includes banks along spring-fed tributaries. Other habitat that is suitable for this plant is described as saturated loamy soils along margins of spring-fed creeks.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Invasive exotic species are also a major threat to sand plain communities where *Cyperus bipartitus* is found.

### Other Natural or Manmade Factors

- Changes in hydrologic regime
- Recreational trampling
- Cattle grazing

# Brook Flatsedge

Level II

## RESEARCH AND SURVEY EFFORTS

- Research is needed to better understand the natural erosion and deposition processes.
- Determine how these processes are affected by artificial and natural barriers.
- Determining the frequency of disturbances, the rate of movement of communities on the landscape, and the process of succession in plant communities is an important research tool.

## MANAGEMENT RECOMMENDATIONS

- Stabilizing the shoreline and maintaining its natural flow is vital in developing and conserving the sand plain habitat that *Cyperus bipartitus* prefers.
- Remove large obstructions to keep the natural flow of the river and its sediments.

## MONITORING PLANS

- Information about how the natural communities are affected by movement of substrate by wind, currents, storms, and by the changes in water levels over seasons and decades would be the best way to monitor this species.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Mcpherson, J. 2011. Pennsylvania Natural Heritage Program. Great Lakes Palustrine Sandplain Factsheet. Available from: <http://www.naturalheritage.state.pa.us/CommSummary.aspx?=16003> Date Accessed: July 19, 2012
4. "Cyperus Bipartitus." Washington Department of Natural Resources, 1999. Web. 19 July 2012. <<http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/cybi.pdf>>.
5. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

## Small Yellow Lady's-slipper Orchid

Level II

**Scientific Name:** *Cypripedium parviflorum*

**General Description:** Stands 6-16in (15-45cm) tall with the stem being slightly pubescent. Leaves are elliptic and broad 2.5-7in (6.3-17.75cm) long and 2.75in (6.5cm) wide also slightly pubescent; One flower present May-June that extends off a leaf like bract. Sepals and petals are purplish-brown and wavy or twisted in appearance and 1-1.66in (2.5-4cm) long. Labellum is presented in a pouch or "slipper" that is yellow and up to 1/75in (4.4cm) long.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

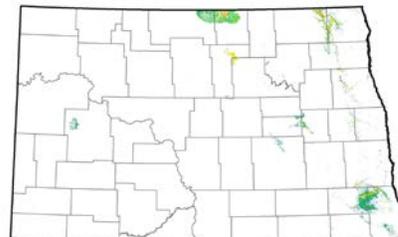
**Federal Status:** Not listed

**Range:** Range is very broad; covers the entire United States with the exception of Nevada, Louisiana, and Florida.

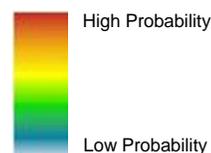
**Primary Habitat:** A variety of wet situations in neutral or slightly alkaline substrates; wet openings and borders in fens and swamp forest; wet prairies; arbor vitae thickets.

**Climate Index Rank:** Extremely Vulnerable (EV): Abundance and/or range extent within geographical area assessed extremely likely to substantially decrease or disappear by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- Bogs, fens, wet woods, and swampy areas or near the transition from wetland to upland ecosystems associated with the Glacial Lake Deltas, Glacial Lake Basins, End Moraine Complex, Glacial Outwash, Glacial Lake Agassiz Basin, and Sand Deltas and Beach Ridges eco-regions of the state. Prefers neutral to alkaline soils and will not be found in acidic sphagnum bogs.

# Small Yellow Lady's-slipper Orchid

Level II

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change is a threat due to the plants requirements for ample water. With climate change too much or too little water could occur. Habitat degradation through agricultural practices and development pose a significant risk. Small yellow lady's slipper is less tolerant of disturbance than other lady's slipper species. Over collecting of species and fire suppression or prescribed fires during the growing season also pose a threat.

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Cypripedium parviflorum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent overgrazing and trampling of this species during growing season.
- Avoid prescribed burning during the growing season.
- Avoid timber harvest in known habitat.
- Consider the timing of noxious weed spraying to avoid damage to the lady slipper.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Yellow Lady's-Slipper (*Cypripedium parviflorum*)." *Connecticut Botanical Society*. N.p., 13 Nov. 2005. Web. 30 July 2012. <<http://www.ct-botanical-society.org/galleries/cypripediumparv.html>>.
5. Cusick, Allison W. *Cypripedium parviflorum*. N.P.: Division of Natural Areas and Preserves/Ohio Department of Natural Resources, Feb. 1980. PDF.
6. *Cypripedium parviflorum*. N.P.: Washington Natural Heritage Program/ U.S.D.I Bureau of Land Management, 1999. PDF.

# Showy Lady's-slipper

Level II

**Scientific Name:** *Cypripedium reginae*

**General Description:** Stands 10-35in (25-90cm) tall. Leaves number 3-5 and are ovate in shape and 4-10in (10-25cm) long and pubescent. Flowers number 1 or 2 per plant presented on a lanceolate bract 2-5.5in (6-14cm) long. Petals are white about 1in (2-4cm) long and lanceolate in shape. A labellum is also presented in a pouch form and is magenta in color and 1-2in (2.5-5.5cm) long most often seen in June and July.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G4 – Imperiled/Apparently Secure

**Federal Status:** Not listed

**Range:** Range extends from Maine, south to North Carolina, west to Arkansas, and north to Minnesota and North Dakota.

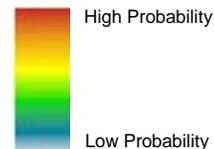
**Primary Habitat:** Requires constant moisture primarily located in bogs, fens and damp deciduous forests.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Showy lady's slipper is located in the eastern third of the state in the Glacial Lake Agassiz Basin, Sand Deltas Beach Ridges, Glacial Outwash, and End Moraine eco-regions. It requires constant moisture with some sunlight. The plant grows in neutral soils and roots will go deep enough to reach neutral soils in acidic bog settings. Plants not exposed to enough sunlight will not produce flowers.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations, loss, and climate change. Climate change threatens this species because of its need to have constant moisture but not saturation.
- Habitat alterations in the form of many land use practices could pose a significant threat. The removal of trees around the area the plant is growing might cause too much sunlight to penetrate. Certain agricultural practices such as tiling and uncontrolled grazing around wetlands could damage the habitat or take away the essential water necessary.

# Showy Lady's-slipper

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Cypripedium reginae*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Avoid unnecessary disturbances to woodlands and woodland margins.
- Prevent overgrazing.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "*Cypripedium reginae* (Showy Lady's-slipper)." *Department of Conservation -Bureau of Geology, Natural Areas, and Coastal Resources*. Maine Natural Areas Program, ND. Web. 30 July 2012. <<http://www.maine.gov/doc/nrimc/mnap/features/cyprreg.htm>>.
5. "*Cypripedium reginae*." University of Wisconsin-Madison Herbarium, ND Web. 30 July 2012.

# Leatherwood

## Level II

**Scientific Name:** *Dirca palustris*

**General Description:** Frequently branched shrub that reaches a height of 3-4 meters with a basal diameter of 5-10 cm. Flowering occurs in perfect and borne clusters of 2-7 flowers from each conical bud.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4 – Critically Imperiled/Apparently Secure

**Federal Status:** Not listed

**Range:** One of the most widely distributed American shrubs. *Dirca palustris* is native of Quebec south to the Appalachian River in Florida and west as far as Missouri and Oklahoma.

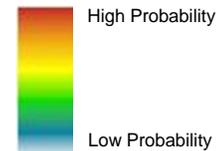
**Primary Habitat:** Exclusively found in relatively rich hardwood forests and mixed conifer forests. Moist, rich, wooded slopes and bottomlands.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Found in many mixed hardwood and coniferous forests across the United States. Can grow in a variety of different soils and is common near water. In North Dakota it could be found in many different regions including Devils Lake Hills, Pembina Gorge, Turtle Mountains, along the Missouri River, and the conifer forests in the southwestern part of the state.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations. Full sun can stress this shrub.

# Leatherwood

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Dirca palustris*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- “Reproductive Ecology of *Dirca palustris*”
- “Variation in development and response to root-zone pH Among seedlings of *Dirca palustris*”

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Anderson, Edgar. *Bulletin of Popular Information*. N.p.: Arnold Arboretum-Harvard University, 29 Apr. 1933. PDF.

# Round-leaved Sundew

Level II

**Scientific Name:** *Drosera rotundifolia*

**General Description:** Perennial insectivorous forb stemming 2-8in (5-20cm) from a basal rosette of leaves. Leaves are round in shape and more broad than long. Upper surface of leaves are covered with short red glandular hairs that secrete a sticky substance to aid in trapping insects. Flowers are presented June-September on a scape 2-10in (5-30cm) in length with flowers being arranged in a raceme number 2-15 in the colors of pink or white.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

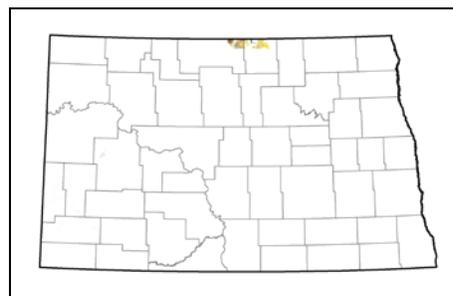
**Federal Status:** Not listed

**Range:** Range extends from Maine, south to Georgia and west to Mississippi, then north to Iowa, Minnesota, and North Dakota. Also occurs in Montana, Colorado, Idaho, Washington, Oregon, and California.

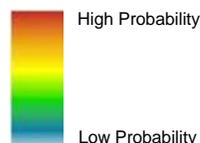
**Primary Habitat:** Most commonly found in peat bogs or swamps with exposure to ample sunlight.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Only two occurrences have been documented in the state located in the Turtle Mountains. The plant is most commonly located in sphagnum and peat bogs associated with the region. It can also occur if conditions are right in swamps, mossy rock crevices, and around water ways. Bogs typically are acidic and low in nutrient availability with high concentrations of water that is not physically visible. Round-leaved sundew can survive with the water table being within 1in (2cm) of the surface to 16in (40cm) below. The plant needs ample sunlight in order to thrive.

# Round-leaved Sundew

Level II

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because round-leaved sundew needs constant water. It can withstand flooding for several weeks but cannot withstand drought. With climate change precipitation occurrence and amount can be expected to change from what historically has occurred. If a drought occurs species that need drier conditions will encroach and take over the bog.
- Fire has proven to be vital tool in the suppression of shrub and woody species that encroach on a bog. Human activities in and around areas where the bogs are present also pose a threat. Diversion of ground water or surface water that flows into the bog can change the composition allowing other species to take over. Examples would include irrigation practices and impoundment creation.
- Other land practice such as logging, construction, and agriculture pose threats as well. Logging to close to a bog will allow sediments and nutrients into the ecosystem that are not normally present. Livestock allowed to travel through the bog could trample the habitat and deposit excrement high in nitrogen into the bog. Addition of fertilizers and other chemical could be carried by surface water into the bog; altering the composition and nutrient loads in the water.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Drosera rotundifolia*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Additional Research or Surveys Needed

- Remote sensing data, such as color infrared and natural color aerial photographs, in conjunction with existing land cover and vegetation data sets available on many national forest grounds, could be used to identify potential habitat.
- Comprehensive demographic surveys of known occurrences need to be conducted in order to better evaluate the current status of *Drosera rotundifolia*.
- More environmental data for fens that support occurrences of *Drosera rotundifolia*.
- Knowledge about wetland hydrology is essential part of evaluating implications for managing this particular species.
- Since this plant is vulnerable to heavy foot traffic, a long-term analysis is needed to determine the effects of trampling. This analysis includes annual census and an analysis of the soil seed bank. It is very important to understand the characteristics of *D. rotundifolia*'s seed production, dispersal, and storage in soils, and how trampling affects these processes.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Protect bogs and fens and other wetlands that support this plant.
- Avoid altering hydrologic regime that would change the water supplies to these wetlands.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Round-leaved Sundew

Level II

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Wolf, Evan, Edward Gage, and David J. Cooper. *Drosera Rotundifolia (roundleaf Sundew) A Technical Conservation Assessment*. Fort Collins, CO: Department of Forest, Rangeland, and Watershed Stewardship-Colorado State University, 29 June 2006. PDF.
5. "Species: *Drosera Rotundifolia*." U.S.D.A. Forest Service, n.d. Web. 30 July 2012. <<http://www.fs.fed.us/database/feis/plants/forb/drrot/all.html>>.

# Marsh Horsetail

## Level II

**Scientific Name:** *Equisetum palustre*

**General Description:** Perennial cryptophyte growing between 10 and 50 cm. Its fertile shoots, which carry ears, are evergreen and shaped like the sterile shoots. The stem is rough and is ribbed throughout; Most contain 8-10 ribs and in some cases 12. Branches are whorled and the tight fitting sheathes end in 4-12 teeth.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Widespread over all of Canada and Alaska. Range stretches down to Pennsylvania, Illinois, Nebraska, and California. Also present in northern Idaho, Washington, and Montana.

[www.flora.dempstercountry.org](http://www.flora.dempstercountry.org) Jeanne R. Janish

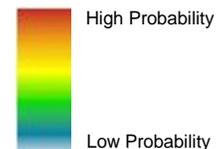
**Primary Habitat:** Includes marshes and swamps. In the Great Plains it is found in oxbow swamps and margins of fresh spring-fed streams. Other suitable habitat has been described as shaded boggy areas.

**Climate Index Range:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In southeastern North Dakota, Marsh Horsetail is found on moist sandy stream banks and boggy areas. It can also be found in willow thicket habitat.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations.

# Marsh Horsetail

## Level II

### Other Natural or Manmade Factors

- Trampling by humans during recreational activities poses a major threat. Also purple loosestrife, an invasive species, can be present near Marsh Horsetail habitat but it is not known if this is a major threat to the population or not.

### **RESEARCH AND SURVEY EFFORTS**

- Habitat preference of this species needs to be described since it occurs in small areas of larger wetland habitats. Other areas that need to be researched include the water pH and population augmentation.

### **MANAGEMENT RECOMMENDATIONS**

- Protect populations from direct contact with humans and the invasion of an invasive aquatic species such as Purple Loosestrife or Phragmites.
- Hydrology of the area should be maintained to protect the water levels of the wetlands.

### **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### **REFERENCES**

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Gleason, Henry A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. The New York Botanical Garden, Bronx, New York. 910 pp.
4. "Equisetum Palustre." Wikipedia, 15 July 2012. Web. 19 July 2012. <[http://en.wikipedia.org/wiki/Equisetum\\_palustre](http://en.wikipedia.org/wiki/Equisetum_palustre)>.
5. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. *Biodiversity Tracking and Conservation System (Biotics 4)*. Bismarck, North Dakota. Bismarck, ND.

## Meadow Horsetail

Level II

**Scientific Name:** *Equisetum pratense*

**General Description:** Green bottlebrush-like perennial with hollow and slender stems; 10-50 cm tall and 1-4 mm thick. Possess a dimorphic body plan; fertile and sterile stems. Fertile stems are unbranched at first, and then later develop whorls of branches. Sterile stems are mainly single branched with some whorls of branching; not as many as the fertile stem.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Circumboreal, south in North America to New Jersey, Iowa, South Dakota, and British Columbia. Restricted to eastern North Dakota.

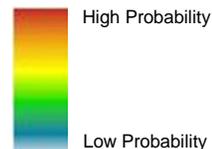
**Primary Habitat:** Stream banks, moist woods, thickets, and meadows in full to partial sun.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota, this species occurs along riverbanks, in wet woods associated with springs, and willow thickets.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Meadow Horsetail

## Level II

### Other Natural or Manmade Factors

- Other threats include trampling, erosion or high water in riverside habitats, logging and improper maintenance of roadsides; including allowing succession to crowd out plants.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently, more research is needed to determine habitat preference since it is not known why this species prefer certain areas of extensive wetland habitat.

## MANAGEMENT RECOMMENDATIONS

- Plants need to be protected from direct impact by humans using their shoreline habitat. Roadside maintenance should avoid impacting plants by using proper mowing schedules and equipment. Open wetland habitats where these plants occur should not be allowed to succeed to trees or shrubs.

## MONITORING PLANS

- Inventory abundance and distribution of invasive exotic plants to assess potential negative impacts on critical habitats and rare species and determine feasibility of control.
- Monitor existing populations of rare plants periodically to ensure habitat management is not deterring their long term viability.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Equisetum Pratense (Meadow Horsetail)." *Flora, Fauna, Earth, and Sky..the Natural History of the North Woods*. Valley Internet Company, 26 Feb. 2004. Web. 31 July 2012. <<http://www.rook.org/earl/bwca/nature/ferns/equisetumpra.html>>.
5. Oehler, Jim. *Management Plan for the Wilder Wildlife Management Area*. Concord, NH: New Hampshire Fish and Game Department, 28 Nov. 2005. PDF.

# Cushion Fleabane

Level II

**Scientific Name:** *Erigeron radicans*

**General Description:** Perennial herb that is 2-6 cm tall with a multi-branched, compact, woody rootstock. The stems are erect with sparse to dense strigose. Leaves are generally basal and persistent. Lower surface of the leaves is shiny and glabrous or become glabrous as they mature. The upper leaf surface is loosely strigose, lacking glands. Flowers are white to semi-purplish.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G3G4 – Critically Imperiled/Vulnerable-Apparently Secure

**Federal Status:** Not listed

**Range:** Known from western and central Montana, east-central Idaho, western Wyoming, and west-central North Dakota.

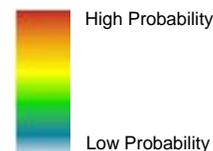
**Primary Habitat:** Rocky slopes, ridges, and summits, ledges and crevices, outcrops and talus, usually limestone, alpine tundra.

**Climate Index Range:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota there is only documentation of this species in Dunn County. Typically located at elevations from 1400-2600 meters.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threat to this species is habitat alteration and loss.

### Other Natural or Manmade Factors

- Land conversion and overgrazing.
- Agricultural activities, peat or marl mining, land drainage, and other human activities could have an effect on this species.

# Cushion Fleabane

Level II

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Erigeron radicans*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Additional Research or Surveys Needed

- Research regarding compatible development activities is a high priority.
- The role of fire as a management tool to minimize succession or the invasion of exotic species should also be investigated.
- Research on the breeding biology and genetic diversity of this species will provide a sounder basis for making management decisions.

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Prevention of hydrological changes and maintenance of fairly open condition are necessary for maintaining viable habitat.
- Careful fire management.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Arnett, Melanie, and Walter Fertig. State Species Abstract-Erigeron Radicans. N.p.: Wyoming Natural Diversity Database, 28 Mar. 2000. PDF.

# Nodding Buckwheat

Level II

**Scientific Name:** *Eriogonum cernuum*

**General Description:** An herb with a spreading to erect posture standing .5-6 dm tall and is glabrous, grayish, greenish, or reddish. Stems are not hollow and are glabrous. Leaves are basal or sheathing up the stems and are round-ovate to orbiculate.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Found in the western United States from the Dakotas and Nebraska west to California, Oregon, and Washington.

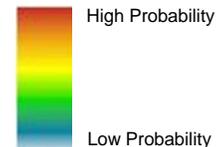
**Primary Habitat:** Frequently found on sandy to gravelly or clayey flats and slopes, mixed grassland, saltbush, sagebrush, and mountain mahogany communities, oak, pinyon-juniper, and conifer woodlands.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota there are two records of this species in Dunn and Slope Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Nodding Buckwheat

Level II

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Eriogonum Cernum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Previous Research or Surveys

- “Sensitive Plant Survey-Little Missouri National Grasslands”

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Protect habitat from development and conversion to cropland.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Slender Cottongrass

Level II

**Scientific Name:** *Eriophorum gracile*

**General Description:** Perennial, colonial graminoid with creeping rhizomes and slender erect stems that stand 20-60 cm high. The leaf blades are 1-2 mm wide and deeply channeled or triangular in cross-section, except near the stem. Flowers are borne in 2-5 spikelets on short, drooping stalks that often exceed the single green, leaf-like bract that is shorter than the inflorescence. Each flower consists of numerous long, shining white bristles, approximately 2 cm long at the base of the ovary.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Circumboreal species, south in North America to Pennsylvania, Indiana, Iowa, Nebraska, Colorado, Idaho, and California.

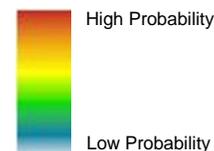
**Primary Habitat:** Habitat in the Great Plains includes fens and boggy meadows.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species is found in fen habitat dominated by *Carex aquatilis* and *Sparganium eurycarpum*. Two occurrences in Ransom County, in the southeastern part of the state, are the only documentation of its presence in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Slender Cottongrass

Level II

## Other Natural or Manmade Factors

- Hydrologic alterations, grazing, motorized vehicle use, peat mining, and invasive species.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Eriophorum gracile*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Additional Research or Surveys Needed

- Our current understanding of the distribution and abundance of *E.gracile* suggests that it should remain a species of concern, and that expanding our knowledge of its distribution and habitat is a high priority.

## MANAGEMENT RECOMMENDATION

- Any activities that maintain the hydrologic regime of these habitats will contribute to the persistence of *E.gracile*.
- These activities may include the regulation and monitoring of hydrological modifications, domestic grazing, and motorized vehicle use.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Decker, Karin, Denise R. Culver, and David G. Anderson. *Eriophorum Gracile: A Technical Conservation Assessment*. Fort Collins, CO: Colorado Natural Heritage Program-Colorado State University, 6 Feb. 2006. PDF.

## Wahoo Level II

**Scientific Name:** *Euonymus atropurpureus*

**General Description:** Large, clumping, deciduous shrub or occasionally a small tree with spreading, irregular crown and red or purple capsules. The twigs and leaves are lime-green, the twigs are bordered by corky lines, and the leaves turn red in the fall.

**Natural Heritage State Status/NatureServe Global Status:**  
S3/G5 – Vulnerable/Secure

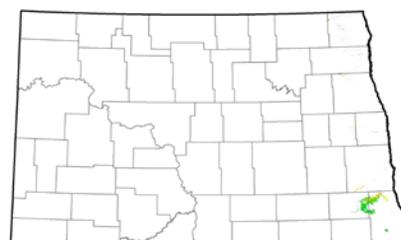
**Federal Status:** Not listed

**Range:** Found from Southern Ontario to North Dakota, south to Florida and Texas.

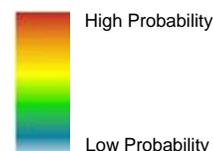
**Primary Habitat:** In the Great Plains, wahoo grows in wooded areas, along bluffs, stream banks, and thickets.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In southeastern North Dakota, habitat includes rich moist woods, oak woodlands, forest edges, and oak stands in sand hills.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

#### Other Natural or Manmade Factors

- Changes in land use, habitat fragmentation, forest management practices are all low-level threats to Wahoo.

# Wahoo

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Euonymus atropurpureus*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- This plant species is reported to have medicinal properties.
- Evaluation of populations shows that deer and livestock highly prefer Wahoo, which was proved by plants being browsed back to less than two-feet tall.

#### Additional Research or Surveys Needed

- Information regarding current populations and land conditions.

### MANAGEMENT RECOMMENDATIONS

- As with many special status species that are not federally listed, species-specific information for management is limited. The following points are ways to establish a successful management plan:
  1. Establish goals based on current conditions and land use.
  2. Gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.

### MONITORING PLANS

- With the information that you collect from the above points, you can use population viability analysis to estimate the minimum population size to sustain the taxon.
- While this information is being collected, preserving habitat and restricting impacts is beneficial.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Bog Bedstraw

## Level II

**Scientific Name:** *Galium labradoricum*

**General Description:** 4-16 inch tall perennial. Three stalked flowers, that are white in color, arise from the leaf axils near the top of the plant. Petals on the flower are blunt-tipped and are longer than they are wide. Leaves are all in whorls of 4, with blunt tips and a prominent center vein. There are short hairs around the leaf edges and sometimes along the central vein on the underside. Leaves also curve or bend downward soon after emerging. Stems are weak but mostly erect and smooth except for a tuft of short hairs around the leaf nodes. A fruit that is a pair of smooth round capsules is also present.

**Natural Heritage State Status/NatureServe Global Status:**

S3/G5 – Vulnerable/Secure

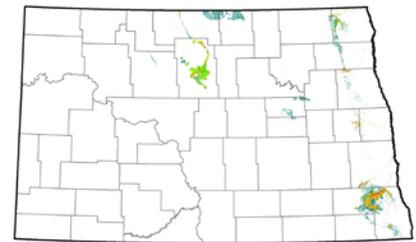
**Federal Status:** Not listed

**Range:** Found in Newfoundland, Labrador, and Manitoba, south to Maine, Minnesota, Illinois, and North Dakota.

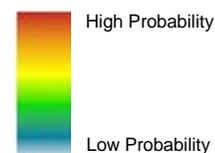
**Primary Habitat:** In the Great Plains, includes moist thickets and woods, usually swampy. Other habitat is reported as bogs, fens, and swamps.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota it occupies wet boggy ground or wetland thicket habitat dominated by alder and bog birch. Other habitat includes peat lands, fens, seeps, marshy lake borders, and oxbow wetlands. Prefers open areas within these habitat types.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threat to this species is habitat loss and modification.

# Bog Bedstraw

## Level II

### Other Natural or Manmade Factors

- Competition and shading from native and exotic plants, flooding due to beaver activity, and anthropogenic changes to water quality or hydrologic regime.

### **RESEARCH AND SURVEY EFFORTS**

- Currently there are no research or survey projects being conducted for *Galium labradoricum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### **MANAGEMENT RECOMMENDATIONS**

- If necessary, a plan for vegetation control should be constructed.
- Beaver activity should be noted and reported if habitat is in danger of being inundated.

### **MONITORING PLANS**

- Habitats should be monitored periodically for invasive plants and for competition or shading by competing plants.

### **REFERENCES**

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Galium Labradoricum (Labrador Bedstraw)." Minnesota Wildflowers. N.p., n.d. Web. 30 July 2012.
5. Labrador Bedstraw (*Galium Labradoricum*). Westborough, MA: Massachusetts Division of Fisheries & Wildlife, 1985-2010. PDF.

# Oakfern

## Level II

**Scientific Name:** *Gymnocarpium dryopteris*

**General Description:** A delicate, deciduous fern that grows to 12 inches tall. Leaves are lime-green and broadly triangular. Stalk is very slender, shiny, straw-colored and sparsely scaled at the base.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

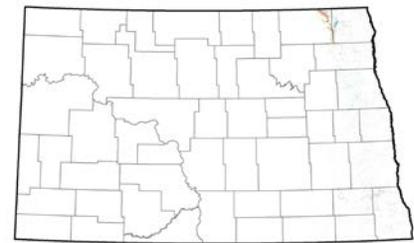
**Federal Status:** Not listed

**Range:** Circumboreal species; South in North America to Virginia, West Virginia, Iowa, South Dakota, Arizona, and Oregon.

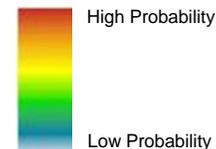
**Primary Habitat:** Habitat in the Great Plains includes damp, shaded granite rock ledges and crevices, and rocky wooded slopes. It also occurs on mesic to wet sites in mixed conifer and northern hardwood stands. Soils are moist to well-drained.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In the Sheyenne Sandhills, a single population of this fern has been discovered. It occurs within an enclosure in the Olson Allotment. It grows in mesic oak woodlands adjacent to a wetland margin. Other habitat in North Dakota includes moist birch or elm-ash forests on north-facing slopes with full shade in the Pembina Gorge.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

### Other Natural or Manmade Factors

- Potential threats also include grazing, hydrologic alteration, and recreational land use.

# Oakfern

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Gymnocarpium dryopteris*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species and their life cycle requirements necessary for survival.

#### Additional Research or Surveys Needed

- A monitoring system should be set up and further investigation done into its habitat specificity.

### MANAGEMENT RECOMMENDATIONS

- Fire can top kill oak fern and repeated burning can significantly reduce its frequency.
- Oak fern response to logging varies. If logging leads to decreases in site moisture, oak fern will decrease.
- In wet, high-elevation areas, logging can increase oak fern abundance.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Gymnocarpium Dryopteris (Oak Fern)." *Flora, Fauna, Earth, and Sky..the Natural History of the North Woods*. Valley Internet Company, 26 Feb. 2004. Web. 26 July 2012. <<http://www.rook.org/earl/bwca/nature/ferns/gymnodry.html>>.

# Woolly Beach-heather

Level II

**Scientific Name:** *Hudsonia tomentosa*

**General Description:** Low growing shrub usually about 3-8 inches tall and finely branched. Leaves are elongated and scale like, usually less than .125 inches long and coated with soft, white, wooly hair. Yellow flowers that are 5-petaled and about .25 inches across are present from May through July.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Occurs along the Atlantic Coast from Maine to North Carolina, along the Great Lakes from New York to Minnesota and North Dakota.

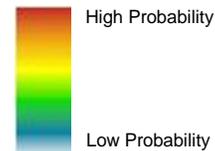
**Primary Habitat:** Sand dunes, sandy pine woods, pine-barrens, and sand hill clearings.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, habitat includes dunes and sand blowouts in the Sheyenne Sandhills.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Very sensitive to trampling, mechanical disturbances by off-road vehicles, and over shading by woody species.

# Woolly Beach-heather

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Hudsonia tomentosa*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATION

- Woolly Beach-heather is easily overtopped and eliminated if dunes stabilize.
- Protect sand dune habitats from Off-road vehicles.
- Avoid planting into the open sand dunes and blowouts.
- Since this plant is highly sensitive to trampling, management guidelines need to be developed to accommodate this.
- At this time there are not many management recommendations that are published for the Beach Heather.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Minnesota's Department of Natural Resources. 2012. Webpage. November 2012. <http://www.dnr.state.mn.us/rsg/profile.html>

## Stickseed

Level II

**Scientific Name:** *Lappula cenchrusoides*

**General Description:** Intricately bushy-branched species that is 2-4 cm tall. The stems and branches are slender with moderately harsh pubescence that is rather minute on shorter stems. Leaves are somewhat similar with scanty hairs on the upper face that are denser below with inordinately large pustulate bases. Leaves are also numerous, small, and oblong to ovate. The flowers are leafy-bracted spikes and are very minute.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G4 – Critically Imperiled/Apparently Secure

**Federal Status:** Not listed

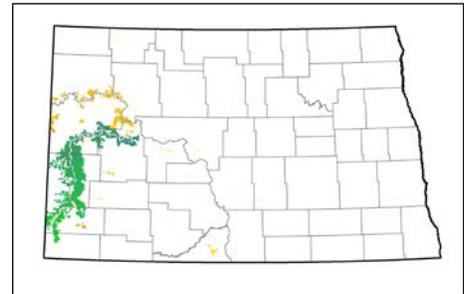
**Range:** Range includes Connecticut, Massachusetts, Nebraska, South Dakota, North Dakota, Utah, Wyoming, and Montana.

**Primary Habitat:** Found in dry soils in the open.

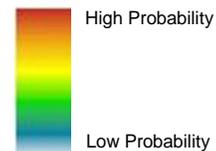
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

No picture available



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota this plant species has been documented in Billings, Dunn, McKenzie, Sioux Slope, and Williams Counties.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Stickseed

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Lappula cenchrusoides*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATION

- Management goals need to be based on the current conditions.
- Gaining knowledge of population locations, extent, demographic characteristics, and changes in populations characteristics over time.
- With this information you can use population viability analysis to estimate the minimum population size to sustain the taxon which can help establish management practices.
- Preserving habitat and restricting/limiting harvest would be beneficial while gathering population information.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Upright Pinweed

Level II

**Scientific Name:** *Lechea stricta*

**General Description:** Erect perennial standing about 4-16 inches tall. Pale grayish in color with very fine hairs on the spreading stems. Leaves are lance-like with the lower side more or less finely hairy. A three-parted, red flower is present. Stalks are very hairy and inflorescence is a 6 inch tall, branched, spike-like cluster.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G4? – Imperiled/Apparently Secure Inexact Numeric Rank

**Federal Status:** Not listed

**Range:** Range extends from New York and Ontario, west to North Dakota, south to Indiana, Illinois, and Nebraska.

Wisplants.uwsp.edu Kenneth J. Sytsma

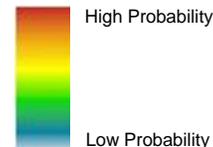
**Primary Habitat:** Dry sandy woods and prairies.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this plant is found in sandhills. The recent record of the Sheyenne National Grassland occurs on an open midslope with fine sands on very gentle slopes. The plant has been documented in both Richland and Bowman counties in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Upright Pinweed

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Lechea stricta*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATION

- Avoid placing new facilities, roads, trails, fences, salting and minerals and other developments in habitat.
- Identify habitats as priority areas for noxious weed control.
- Avoid the use of noxious weed and invasive plant control methods that may negatively impact populations.
- Design timing, intensity, and frequency of mowing, burning, and livestock grazing to maintain or increase populations.
- Ensure that management actions do not contribute to loss of population viability.
- Protect known populations from land use activities that cause trampling or increased soil compaction.
- Enhance and improve habitat for known populations through restoration programs.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. Welcome to the PLANTS Database | USDA PLANTS. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. *Lechea Stricta*: UW-Stevens Point Freckmann Herbarium: Plant Details Page. N.p., n.d. Web. 23 July 2012. <<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=LECSTR>>.

# Sand Lily

Level II

**Scientific Name:** *Leucocrinum montanum*

**General Description:** Stemless perennial about 5-10 cm tall, with a short, deeply buried rhizome and fibrous roots. Leaves are basal, tufted, linear, and grass like and can be up to 20 cm long and 2-8 mm broad. Flowers are few to several starting from the base of the plant. They are fragrant and white in color. The fruit is a capsule that is at or below ground level.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range includes Oregon, California, Nevada, Arizona, New Mexico, Utah, Colorado, Idaho, Montana, Wyoming, Nebraska, South Dakota, and North Dakota.

**Primary Habitat:** Sagebrush desert to open montane forest, in sandy to rocky areas or in fairly heavy soil.

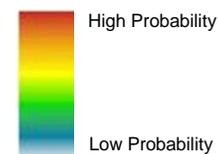
**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

[Plants.usda.gov](https://plants.usda.gov)



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, populations of the Sand Lily have only been found in Slope and Golden Valley Counties. This species likes sandy or gravelly shortgrass prairies and foothills that are moderately or heavily grazed.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations.

# Sand Lily

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Leucocrinum montanum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Star Lily (*Leucocrinum Montanum*)."  
*Montana Plant Life*. N.p., n.d. Web. 24 July 2012.  
<[http://montana.plant-life.org/species/leuco\\_monta.htm](http://montana.plant-life.org/species/leuco_monta.htm)>.
5. Native Wildflowers of North Dakota. Mountain Lily. USGS. Northern Prairie Wildlife Research Center. Web. August, 2006.  
<http://www.npwrc.usgs.gov/resource/plants/wildflwr/species/leucmont.htm>

# Loesel's Twayblade

Level II

**Scientific Name:** *Liparis loeselii*

**General Description:** Plant with two large basal leaves with parallel venation; Reaches 3-8 inches in height. White to yellowish-green flowers present.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range extends west from Nova Scotia and Quebec to Manitoba, south to New Jersey, Ohio, Alabama, and Nebraska. Abundance includes some of the states in the western United States like Washington and Montana.

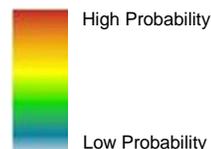
**Primary Habitat:** Occurs in full or partial sunlight in moist, sterile habitats such as bogs, wetlands, springs, and frequently where conifer forests are present. (Douglas fir stands)

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species occurs in fens, wetland swales in sand hills, and wetland thickets.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Other threats that could potentially affect this species are changes in the hydrologic regime, livestock grazing, and recreational activities.

# Loesel's Twayblade

Level II

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Research is currently underway on propagation of this species at the Royal Botanic Gardens.

### Previous Research or Surveys

- Research on the ecology and conservation of this species has been done and will continue further.

### Additional Research or Surveys Needed

- Additional inventory of wetlands, particularly bog and fen habitats, is needed.
- Practical ways to restore this species within wetland habitats should be considered.

## MANAGEMENT RECOMMENDATIONS

- This species reportedly prefers sparsely vegetated habitat.
- Studies of the dynamics of seed production, dispersal, and seed bank longevity, population viability studies, and studies of gene flow will help provide information that is necessary in the management of this species.
- It was noted in previous years that following a prescribed burn, *Liparis loeselii* was recorded in peak numbers. This indicates that a winter burning or light trampling is an appropriate conservation measure.

## MONITORING PLANS

- Population and habitat monitoring are used when trying to better understand a population. This helps determine what management strategies can be put into action to keep the population of a plant at an equilibrium and possibly boost its population numbers. Habitat monitoring can also be effective because it helps biologists fully understand what type of habitat any particular species prefers

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Rolfsmeier, Steven B. *Liparis Loeselii: A Technical Conservation Assessment*. Chadron, NE: High Plains Herbarium-Chadron State College, 30 Jan. 2007. PDF.
5. *Liparis Loeselli (Bog Twayblade)*. N.p.: Washington Natural Heritage Program/ U.S.D.I Bureau of Land Management, 1997. PDF.

# Small-flowered Lipocarpha

Level II

**Scientific Name:** *Lipocarpha micrantha*

**General Description:** Annual sedge that has stems 4in (10cm) long and leaves the same length. The flower is presented in oval spikes 2-6mm in length. Each stem contains 1-3 spikes.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

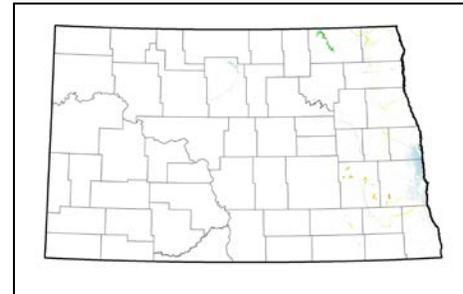
**Range:** Occurs throughout the United States except for Nevada, Utah, Colorado, Wyoming, Montana, South Dakota, West Virginia, and Vermont.

**Primary Habitat:** Primarily located on sandy beaches where the plant is protected from the heavy wave action. Soils must be sandy with minimal to no organic sediment.

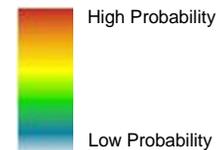
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu John Zaborsky



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Typically found on moist sandy shores immediately surrounding glacial lakes or areas that have seasonal flooding. Does not tolerate disturbances or competition from other species and is typically located in protected areas away from strong currents and heavy waves.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because of the possibility of changing precipitation and temperatures. Increased or decreased precipitation could cause the available habitat to become uninhabitable for the species. Invasive species encroachment taking up available resources will also pose a threat as they are aggressive and spread rapidly. The areas that small flowered lipocarpha is present is also highly sought after for shoreline development.

# Small-flowered Lipocarpha

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Lipocarpha micrantha*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- Protect shorelines through the use of conservation easements.
- Create possible wave breaks.
- Control invasive species.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Harris, A.G. R. F. Foster, G.W. Douglas and S.J. Smith. 2004. National recovery Strategy for small-flowered lipocarpha (*Lipocarpha micrantha*) in Canada. Report prepared for the Ontario Ministry of Natural Resources, Northwest Region, Thunder Bay and British Columbia Ministry of Water, Lands and Air Protection, Biodiversity Branch.
4. Cusick, Allison W., and James Burns. "Lipocarpha Micrantha." Ohio Division of Natural Areas and Preserves/ Ohio Department of Natural Resources, Nov. 1983. Web. 18 July 2012. [http://ohiodnr.com/Portals/3/Abstracts/Abstract\\_pdf/L/Lipocarpha\\_micrantha.pdf](http://ohiodnr.com/Portals/3/Abstracts/Abstract_pdf/L/Lipocarpha_micrantha.pdf)
5. Smith, Tyler W., and Al Harris. "COSEWIC Assessment and Update Status Report on the Small-Flowered Lipocarpha in Canada." The Committee on the Status of Endangered Wildlife In Canada (COSEWIC), 2003. Web. 18 July 2012. <<http://publications.gc.ca/collections/Collection/CW69-14-255-2003E.pdf>>.

# Buckbean

## Level II

**Scientific Name:** *Menyanthes trifoliata*

**General Description:** Smooth hardy lakeshore perennial that typically lives near shallow water. All leaves are basal hanging from a creeping stem that grows along the ground; Produces a fruit and a flower.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

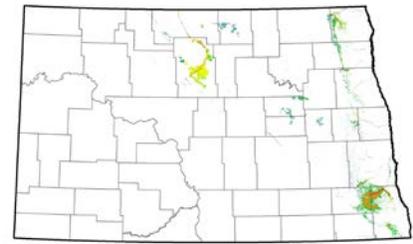
**Federal Status:** Not listed

**Range:** Circumboreal, south in North America to Delaware, Virginia, Ohio, Missouri, South Dakota, Colorado, and California.

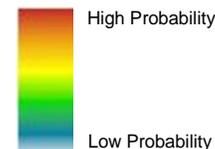
**Primary Habitat:** Fens and old bogs, edges of ponds and moist soils, shallow waters; Common in sunny shallows near portage landings.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, buckbean is found in sphagnum bogs, rich fens, bog birch fens, calcareous fens. Habitat in the Sheyenne Sand hills is the wettest peat wetland interiors. This species has been documented in three counties in southeast and north central North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

## Buckbean

### Level II

#### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Menyanthes trifoliata*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species and their life cycle requirements necessary for survival.

#### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

#### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

#### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Menyanthes Trifoliata (Buckbean)." *Flora, Fauna, Earth, and Sky..the Natural History of the North Woods*. Valley Internet Company, 24 Feb. 2004. Web. 26 July 2012. <<http://www.rook.org/earl/bwca/nature/aquatics/menyanthes.html>>.

## Stiff Sandwort

Level II

**Scientific Name:** *Minuartia dawsonensis*

**General Description:** Moss like perennial forb that is 4-16in (10-40cm) tall typically on the shorter side. Leaves are short and narrow bristle like in appearance. Flowers are white with five petals and 1/2in (1cm) wide.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

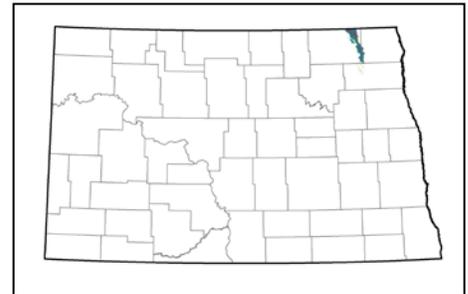
**Range:** Only occurs in North Dakota, Minnesota, and Wisconsin.

**Primary Habitat:** Typically located on bedrock outcrops or upland prairies with sandy soils derived from similar bedrock.

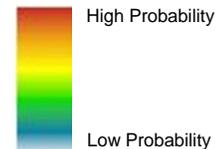
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as federal or endangered but is still designated for special management consideration.

Minnesotawildflowers.info



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- Primarily found on sandstone and limestone outcrops that are exposed. There is only one recorded occurrence in the state in Cavalier county located in the Pembina Escarpment. The plant grows in crevices and shallow soils over exposed bedrock. It will not grow on vertically exposed bed rock. It is also typically found in upland prairies with soils primarily sand or gravel derived from sandstone and limestone. Rock stitchwort is primarily found in areas that become very dry and warm mid and late summer. Plant thrives in areas with little competition and disturbance.

# Stiff Sandwort

Level II

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- With only one recorded occurrence for the species the greatest threat is population size and available habitat. The habitat that supports rock stitchwort does not tolerate disturbance and is very delicate. Human activities even those that are non-aggressive such as hiking can disturb a site enough to make it uninhabitable for rock stitchwort. Grazing practices in areas where viable habitat is present presents a large threat if the outcroppings are accessible to cattle. Climate change poses a significant threat because with the change in temperature and precipitation, certain requirements for the plant may become non-existent. Increased temperature and precipitation would lead to faster erosion of the outcroppings and a change in the soils chemistry. Invasive species and encroachment by woody species utilizing the same resources as rock stitchwort poses a threat.

## RESEARCH AND SURVEY EFFORTS

- Currently there is no research or survey projects being conducted for *Minuartia dawsonensis*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. "*Minuartia Dawsonensis*." *Species Profile: Minnesota DNR. Minnesota Department of Natural Resources*, 24 Mar. 2010. Web. 18 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDCAR0G070>>
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

## Sensitive Fern

Level II

**Scientific Name:** *Onoclea sensibilis*

**General Description:** Coarse-textured, medium to large-sized perennial fern with broad leaves and leaflets; Grows to 18"-24" tall.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range includes all of the eastern United States and Canada, stretching west to Colorado and Wyoming. In Canada the range extends to Manitoba.

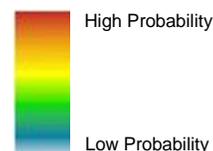
**Primary Habitat:** Dwells in a variety of wet swamp and wood habitats such as wet meadows, thickets, streams and riverbanks, and usually in slightly acidic soil.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant species, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In southeastern North Dakota this fern occupies wet woods and thickets. Other habitat in the state is described as alder thickets, wet hardwood forest, wetland thickets-forest ecotones, and seep and spring areas.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

#### Other Natural or Manmade Factors

- Disruptions to bedrock or glacial deposits such as mining or drilling
- Groundwater extraction
- Groundwater pollution
- Foot traffic and recreational activities

# Sensitive Fern

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Previous Research or Surveys

- Research has been done on spore germination, the effect of light on growth, and breeding systems.

#### Additional Research or Surveys Needed

- More site inventory and classification work is needed.
- Understanding the natural successional pathways and the historical frequency of disturbances such as fire and grazing would be important when managing these wetlands.

### MANAGEMENT RECOMMENDATIONS

- Mining, drilling or other disruptions to the bedrock or glacial deposits should not be undertaken within half a mile of seepage wetlands.
- Understanding of bedrock layers and groundwater flows is very beneficial.
- Since wetlands are sensitive to trampling and other disturbances due to foot traffic and other recreational activities, trails should be located away from the wetland or elevated structures should be employed to prevent direct traffic within the wetland.
- A natural buffer around the wetland should be maintained in order to minimize nutrient runoff, pollution, and sedimentation.

### MONITORING PLANS

- Soil texture, condition of the adjacent vegetation, and the topography of the surrounding area should be considered and monitored when establishing buffers around wetland habitat.
- Monitor wetland conditions these plants occur in.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Mcpherson, J. 2011. Pennsylvania Natural Heritage Program. Sedge – Mixed Forb Fen Factsheet. Available from: <http://www.naturalheritage.state.pa.us/CommSummary.aspx?=16009> Date Accessed: July 31, 2012
5. Rook, Earl J.S. "Onoclea Sensibilis." Valley Internet Company, 26 Feb. 2004. Web. 31 July 2012. <<http://www.rook.org/earl/bwca/nature/ferns/onoclea.html>>.
6. "Onoclea Sensibilis." Wikipedia-The Free Encyclopedia. N.p., 18 July 2012. Web. 31 July 2012. <[http://en.wikipedia.org/wiki/Onoclea\\_sensibilis](http://en.wikipedia.org/wiki/Onoclea_sensibilis)>.

## Adder's-tongue Fern

Level II

**Scientific Name:** *Ophioglossum pusillum*

**General Description:** Upright stem, 1/8 inch in diameter with one leaf. Trophophore stalk expands gradually into blade. Blade is erect or spreading, usually plane when alive. Pale green, dull, mostly oval shaped and narrow at the base. Sporangia clusters are present with each containing 10-40 pairs of sporangia.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range extends from New Brunswick to British Columbia and Alaska south to Virginia, Ohio, Illinois, North Dakota, Montana, and Washington.

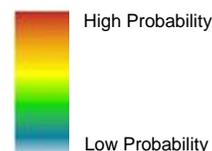
**Primary Habitat:** Terrestrial pastures, old fields, roadside ditches, and flood plain woods in seasonally wet, rather acidic soil.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota it is apparently limited to the Sheyenne Sandhills. It is found in wetland swales and has been documented in full sun and in shade of willows. It is often found in saturated soils.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Adder's-tongue Fern

## Level II

### Other Natural or Manmade Factors

- Potential threats also include grazing, trampling, logging, and any activities which would alter the hydrology of the sites.

## RESEARCH AND SURVEY EFFORTS

### Additional Research or Surveys Needed

- No systematic inventories have been undertaken for this species. Inventory efforts could be aided by training individuals to recognize the species and its habitat.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Ophioglossum Pusillum." *Flora, Fauna, Earth, and Sky..the Natural History of the North Woods*. Valley Internet Company, 26 Feb. 2004. Web. 26 July 2012. <<http://www.rook.org/earl/bwca/nature/ferns/ophioglossum.html>>.
5. *Ophioglossum Pusillum*. N.p.: Washington Natural Heritage Program/ U.S.D.I Bureau of Land Management, 1999. PDF.
6. McMaster, Robert T. "Vegetative Reproduction Observed in *Ophioglossum Pusillum*." *American Fern Journal* 86.2 (1996): 58-60. JSTOR. Web. 26 July 2012. <<http://www.jstor.org/stable/1547369>>.

# Alyssum-leaved Phlox

Level II

**Scientific Name:** *Phlox alyssifolia*

**General Description:** Tufted, much-branched, tap rooted perennial only about 2-4 inches tall. Leaves are mostly opposite and only about three quarters in length and an eighth inch wide. Lower branches are woody, with shreddy white bark. Flowers arise in clusters of two or three at the tips of about 5-10 of the largest branches.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

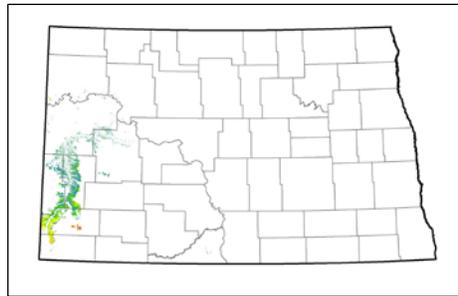
**Federal Status:** Not listed

**Range:** Small range that includes North and South Dakota, Montana, Wyoming, Nebraska, and parts of Saskatchewan and Alberta.

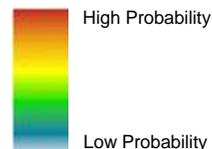
**Primary Habitat:** Dry sands, clays, or gravels on open prairie hilltops and benches.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Dry sands, clays, gravels of prairie hilltops, limestone cliffs, rock outcrops, as well as pasture land. This species is known from Billings, Golden Valley, and Williams counties in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations.

# Alyssum-leaved Phlox

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Phlox alyssifolia*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Management goals need to be based on the current conditions.
- Knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With this knowledge, population viability analysis can be used to estimate minimum population size to sustain the taxon.
- Protecting habitat and avoid converting to cropland.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Limber Pine

Level II

**Scientific Name:** *Pinus flexilis*

**General Description:** Trees 12-15 m tall and 60-90 cm in diameter; Straight to contorted; Bark light grey, nearly smooth and becoming dark brown and cross-checked in age into scaly plates and ridges. Branches spreading to ascending, often persistent to trunk base; Twigs are pale red-brown and are covered with dense small hairs; Needles five per fascicle, spreading to up curved and ascending. Staminate cones broadly ellipsoid-cylindrical and pale red or yellow in color.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range scatters widely; Extends from British Columbia south to California, Arizona, and New Mexico. It is scattered widely across the Great Basin into Utah, Nevada, Colorado, Wyoming, and Montana. Isolated populations occur in the Dakotas and Nebraska.

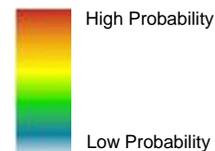
**Primary Habitat:** Occurs on dry to moderately moist sites in subalpine environments; often on rocky terrain penetrating the spaces between rocks.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has only been documented in Slope County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- White pine blister rust

# Limber Pine

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Pinus flexilis*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- Many studies have been done on *Pinus flexilis*'s response to drought at high elevations.
  - "Response of high-elevation timber pine to multi-year droughts and 20<sup>th</sup> century warming".

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Watershed protection and enhancement.
- Periodic fires to reduce undergrowth.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Earle, Christopher J. "Pinus Flexilis." The Gymnosperm Database. N.p., 14 Dec. 2011. Web. 25 July 2012. <[http://www.conifers.org/pi/Pinus\\_flexilis.php](http://www.conifers.org/pi/Pinus_flexilis.php)>.
5. "Species: Pinus Flexilis." U.S.D.A. Forest Service, n.d. Web. 25 July 2012. <<http://www.fs.fed.us/database/feis/plants/tree/pinfle/all.html>>.

## Rose Pogonia

Level II

**Scientific Name:** *Pogonia ophioglossoides*

**General Description:** Glabrous plant, 15-35 cm tall arising from a cluster of fibrous roots. One leaf located halfway up the stem, ovate to elliptical shape, 3-10 cm long and 1-2.5 cm wide. Leaf is somewhat fleshy in texture. Typically one pink flower terminating the stem, rarely two or three; Sepals and petals are pink. Labellum is spatulate and the margin is fringed with fleshy hairs. Center of labellum bears several rows of similar hairs that are typically pink with marginal hairs darker pink-purple or magenta and central hairs yellow, occasionally all pink or deep magenta.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

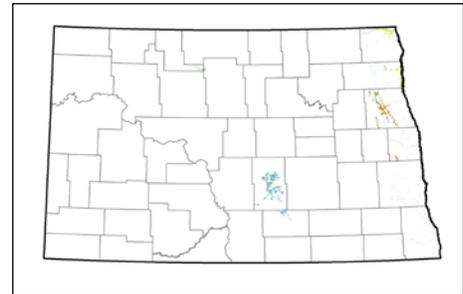
**Federal Status:** Not listed

**Range:** Range extends from Maine south to Florida, west to Texas and Oklahoma and north to Minnesota and North Dakota.

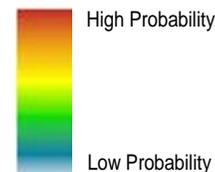
**Primary Habitat:** Almost always found in acidic, boggy conditions in marshy meadows or grassy seepage slopes.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota there is one record of this species being present in Grand Forks County.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Rose Pogonia

## Level II

### Other Natural or Manmade Factors

- Habitat destruction due to construction and herbicide treatment of ditches and waterways.
- Non-native invasive plants are also a threat to this species.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Pogonia ophioglossoides*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species, their populations, and their life cycle requirements necessary for survival.

### Previous Research or Surveys

- "Origin and Development of Shoots from the Tips of *Pogonia ophioglossoides*"

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Plant Collections-Pogonia Ophioglossoides." United States Botanic Garden, n.d. Web. 23 July 2012. <<http://www.usbg.gov/plant-collections/conservation/Pogonia-ophioglossoides>>.
4. Curtis, John T. "The Relation of Specificity of Orchid Mycorrhizal Fungi to the Problem of Symbiosis." *American Journal of Botany* 6th ser. 26 (1939): 390-99. JSTOR. Web. 23 July 2012. <<http://www.jstor.org/stable/10.2307/2436839>>.
5. Carlson, Margery C. "Origin and Development of Shoots from the Tips of Roots of *Pogonia Ophioglossoides*." *Chicago Journals* 100.1 (1938): 215-25. JSTOR. Web. 23 July 2012. <<http://www.jstor.org/stable/2471756>>.
6. "Pogonia Ophioglossoides." Department of Botany-University of Wisconsin Madison. N.p., n.d. Web. 23 July 2012. <<http://www.botany.wisc.edu/orchids/Pogonia.html>>.

# Swamp Smartweed

Level II

**Scientific Name:** *Polygonum hydropiperoides*

**General Description:** Erect perennial forb that stands up to 6-40in (15-101cm) stemming from a rhizome. Leaves are alternate and linear in shape. Flowers are white or pink on a thin inflorescence appearing from June-September. The fruit produced is a smooth, black, shiny seed.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

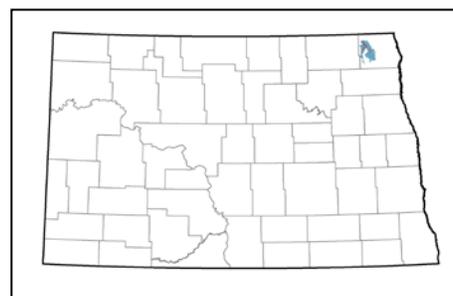
**Range:** Ranges all across the United States with the exception of Utah, Wyoming, and Colorado.

**Primary Habitat:** Lowland moist areas in woods, swamps and along shallow streams; requires an organic soil.

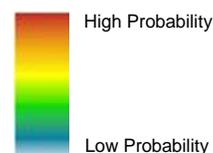
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as federal or endangered but is still designated for special management consideration.

[Plants.usda.gov](http://Plants.usda.gov)



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- One occurrence is documented in East central Pembina County. Swamp smartweed is predominantly located in low lying wooded areas, swamps, and areas with moist organic soils. Commonly found bordering ponds. Requires ample moisture and does not handle extended period of drought.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because swamp smartweed requires moisture and with the possible increase of decrease in temperature and precipitation biological requirements may not be maintained for a viable population. Human interaction and manipulation of water flow presents a threat to the species as well.

# Swamp Smartweed

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Polygonum hydropiperoides*. However, further research is always needed as this will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect wetland habitats.
- Avoid draining wetlands and altering natural hydrologic regimes.
- Use caution when applying pesticides.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <http://plants.usda.gov/java/>
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Freckmann, Robert W. *Polygonum Hydropiperoides: UW-Stevens Point Freckmann Herbarium: Plant Details Page*. University of Wisconsin-Stevens Point, 2012. Web. 18 July 2012. <<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=POLHYD1>>.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Lanceleaf Cottonwood

## Level II

**Scientific Name:** *Populus x acuminata*

**General Description:** Single-stemmed tree with branches horizontal to shallowly ascending, a narrowly-spreading flat-topped crown, resinous leaf buds, orange-tan twigs of the first year and furrowed bark. Angular lanceolate leaves are longer than they are wide.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/GNA – Imperiled/Not Ranked

**Federal Status:** Not listed

**Range:** As a hybrid it has not been assigned global distribution. *P.angustifolia*, one of the species that makes a hybrid with *Populus deltoids*, has a range from Montana, Wyoming, South Dakota, Nebraska, and New Mexico.

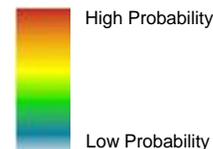
**Primary Habitat:** Grows best in loamy, sandy, pebbly, and clay soil that is moderately moist to wet.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Lance leaf cottonwood has been recorded in its primary habitat in Billings and Slope counties in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Populus x acuminata*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

# Lanceleaf Cottonwood

## Level II

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Populus X Acuminata." *Hortipedia*. N.p., n.d. Web. 26 July 2012. <[http://en.hortipedia.com/wiki/Populus\\_x\\_acuminata](http://en.hortipedia.com/wiki/Populus_x_acuminata)>.

# American Primrose

Level II

**Scientific Name:** *Primula incana*

**General Description:** Herbaceous plant with thin, short rhizomes. Plants are 2-46 cm tall with rosettes. Plants are usually whitish or yellowish farinose, sometimes farinose, especially in age. Leaves are thin and margins remotely denticulate. The leaf apex is acute to obtuse, and the surfaces glabrous. Inflorescences are 4-19 flowered. Pedicels are erect and thin about 3-9 mm long with involucral bracts. Flowers are homostylous with a green calyx that is broadly cylindrical. The corolla is lavender with a tube 4-10 mm, and about equal to the calyx. Capsules are cylindrical to ellipsoid, length 1.5-2 times the calyx.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G4G5 – Imperiled/Apparently Secure-Secure

**Federal Status:** Not listed

**Range:** Found throughout Canada and the western states of North Dakota, Montana, Idaho, Wyoming, Colorado, and Utah.

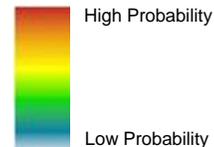
**Primary Habitat:** Most frequently found on alkaline clay soils in river floodplains and moist open meadows at elevations from 0 to 3500 meters.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota there have been two records of this species in Mountrail and Burke Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Water diversions that lower the water table.
- Livestock grazing

# American Primrose

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Primula incana*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Maintaining site quality in terms of hydrology and the effects of impacts to wet soils, along with woody species management

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Prickly Gooseberry

Level II

**Scientific Name:** *Ribes cynosbati*

**General Description:** 24-48 inch tall, erect, perennial shrub that rises on multiple stems from a branching, woody root system. The stems are ascending, arching, or prostrate on the ground and creeping. First year stems are green and hairy and become gray or brown and hairless by the third year. The leaves are alternate and occur singly or in small clusters of two or three. The inflorescence is a loose, unbranched cluster of one to three. The fruit is a globular berry with conspicuous prickles. Immature berries are shiny green with narrow, pale green, vertical stripes. When ripe they are dull red or dull purple. They are held well away from the stem.

**Natural Heritage State Status/NatureServe Global Status:**  
S3/G5 – Vulnerable/Secure

**Federal Status:** Not listed

**Range:** Range extends from New Brunswick to Manitoba, then south to Missouri and Georgia.

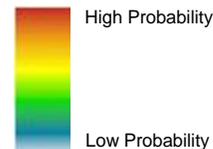
**Primary Habitat:** Habitat in the plains includes wooded hillsides and flat areas, usually with moist soil. Other habitat in the Great Plains includes rocky to loamy rich wooded hillsides.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species is found in rich forests. In the Shoyenne sandhills, a single population has been documented recently from a steep, wooded, north-facing slope.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Potential threats also include grazing, hydrologic alteration, and recreational land use.

# Prickly Gooseberry

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Ribes cynosbati*. However, further research is always helpful as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Limiting access of livestock to the steep wooded slope at the single population site on the Sheyenne National Grassland will help maintain the species.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Eastern Prickly Gooseberry (*Ribes Cynosbati*)."  
*Nature Tourism in Minnesota*. Minnesota Seasons, 21 July 2012. Web. 26 July 2012. <[http://minnesotaseasons.com/Plants/eastern\\_prickly\\_gooseberry.html](http://minnesotaseasons.com/Plants/eastern_prickly_gooseberry.html)>.
5. "Prickly Gooseberry (*Ribes Cynosbati*)."  
Illinois Wildflowers, n.d. Web. 26 July 2012. <[http://www.illinoiswildflowers.info/savanna/plants/pr\\_gooseberry.htm](http://www.illinoiswildflowers.info/savanna/plants/pr_gooseberry.htm)>.

# Hayden's Yellowcress

## Level II

**Scientific Name:** *Rorippa calycina*

**General Description:** Rhizomatous perennial with spreading or lax stems that are 1-4 dm long. The alternate leaves are 3-7 cm long and have coarsely toothed to shallowly lobed margins. Foliage is roughened or sparsely covered with stiff hairs. Several stalked flowers are borne on the ends of terminal branches that arise from the axils of upper leaves. Each flower has four separate sepals, four separate light yellow petals, and four long and two short stamens.

**Natural Heritage State Status/NatureServe Global Status:**  
SH/G3 – Possibly Extirpated/Vulnerable

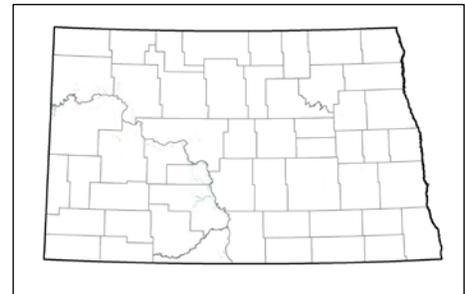
**Federal Status:** Not listed

**Range:** Very small range; Extant in North Dakota, Montana, Wyoming, and Idaho.

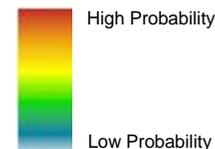
**Primary Habitat:** Sparsely vegetated, moist sandy to muddy banks of streams, stock ponds and man-made reservoirs near the high water line. Also present in high plain swales that evaporate, and along creeks.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as federal or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, this species was only documented one time in McKenzie County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Changes in water management that reduce the periodicity of flooding.
- Competition of exotic plants, herbicide spraying, trampling by livestock, recreational activities, and mining are other potential threats.

# Hayden's Yellowcress

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Rorippa calycina*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Setting aside protective areas for this species could be beneficial. Particularly man-made bodies of water since they are where this species occurs most often.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Persistent-sepal Yellow-cress — *Rorippa calycina*. Montana Field Guide. Montana Natural Heritage Program. Retrieved on July 18, 2012, from [http://FieldGuide.mt.gov/detail\\_PDBRA27040.aspx](http://FieldGuide.mt.gov/detail_PDBRA27040.aspx)
4. Fertig, Walter, and Laura Welp. "Status Report on Persistent Sepal Yellowcress in Wyoming." University of Wyoming, 31 Mar. 1998. Web. 18 July 2012. <[http://www.uwyo.edu/wyndd/\\_files/docs/reports/wynddreports/u98fer05wyus.pdf](http://www.uwyo.edu/wyndd/_files/docs/reports/wynddreports/u98fer05wyus.pdf)>.
5. Fertig, Walter. "Rorippa Calycina-Persistent Sepal Yellowcress." *State Species Abstract-Wyoming Natural Diversity Database*. N.p., 7 Aug. 2008. Web. 18 July 2012.<[http://www.uwyo.edu/wyndd/\\_files/docs/reports/speciesabstracts/rorippa\\_calycin a.pdf](http://www.uwyo.edu/wyndd/_files/docs/reports/speciesabstracts/rorippa_calycin a.pdf)>.
6. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Swamp Willow

## Level II

**Scientific Name:** *Salix maccalliana*

**General Description:** Shrub species that grows 6-13ft (2-4m) tall. Stems and branches are dark purple or red in color. Leaves are shiny and dark green in color with finely serrated edges 1.5-3in (4-8cm) long and less than 1in (2.5cm) wide. Flowers are in the form of catkins and yellowish brown in color and depending on sex vary from .5-2.5in (1.5-6cm) and are hairy at the base and develop along with leaves in May.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5? – Critically Imperiled/Secure Inexact Numeric Rank

**Federal Status:** Not listed

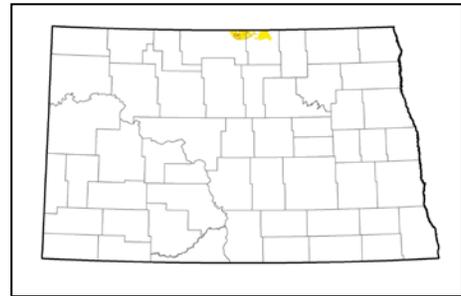
**Range:** Very small range including Washington, North Dakota, and Minnesota.

**Primary Habitat:** Low lying areas with ample moisture such as fens, swamps, and marshes.

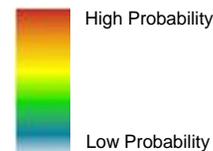
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as federal or endangered but is still designated for special management consideration.

Sheryl Pollock @ [www.discoverlife.org](http://www.discoverlife.org)



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- There is only one documented case occurring in northeast Bottineau County in the Turtle Mountains. Due to its need for moisture it is mostly located in or around fens, swamps, and marshes. The soil is usually peaty with a loamy or clayey-loam texture. It needs ample sunlight to grow so it is not found in heavily forested bogs and swamps. Swamp willow also is not tolerant of highly acidic soils so it is not commonly found in bogs where water tends to be more stagnant.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because of the possibility for increased precipitation could cause areas to become too wet to support the species or the inverse with too little precipitation. While increased temperature could cause the soil composition to change allowing other species to compete for the available resources. Altering water movement and disturbances also pose a threat. Allowing cattle or other activities that can destroy and change the habitat can also cause the decline of the species.

# Swamp Willow

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Salix maccalliana*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- Large habitats of this species may require little active management. Prescribed burning every 4-8 years is the only thing that is required to maintain the habitat requirements. This is assuming that natural drainage patterns have not been altered and invasive species are not established.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. *Salix Maccalliana (MacCall's Willow)*. Washington Department of Natural Resources, 2003. Web. 18 July 2012. <<http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/salmac.pdf>>.
4. "Salix Maccalliana." *Species Profile: Minnesota DNR*. Minnesota Department of Natural Resources, 2012. Web. 18 July 2012. <http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDSAL021T0>
5. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

## Bog Willow

Level II

**Scientific Name:** *Salix pedicellaris*

**General Description:** Slender shrub with sparse, ascending branches. Branches are yellowish to light brown or reddish brown in color. Leaves are alternate with long stalks. Stalks are green above and whitish with a waxy coating beneath. Flowers are yellowish brown to reddish and a brownish capsule like fruit is present; grows to be 1.5 meters tall and flowers in May and June.

**Natural Heritage State Status/NatureServe Global Status:**  
S3/G5 – Vulnerable/Secure

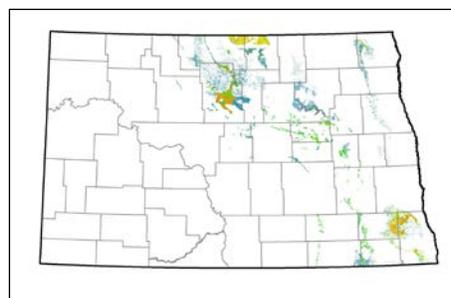
**Federal Status:** Not listed

**Range:** Range extends from Newfoundland to the Northwest Territories and British Columbia, South to New Jersey, Iowa, Idaho, and Oregon.

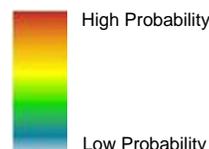
**Primary Habitat:** Habitat includes sphagnum swamps and bogs. Habitat in the Great Plains also includes fens.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota this species is found in sphagnum bogs, bog birch fens, sedge fens, and wetland thickets. There is a single known population located in the Sheyenne National Grassland.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

#### Other Natural or Manmade Factors

- Peat mining could be a threat to this plant since it appears to be restricted to peat substrates.

# Bog Willow

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Salix pedicellaris*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Salix Pedicellaris." *VPlants*. Institute of Library and Museum Services, n.d. Web. 26 July 2012. <<http://vplants.org/plants/species/species.jsp?gid=35820>>.

# Pod Grass

## Level II

**Scientific Name:** *Scheuchzeria palustris*

**General Description:** Erect rush that stands 9-18in (20-40cm) with a zig-zag stem and alternate leaves that are linear and 2-12in (5-30cm) in length. Flowers occur on racemes number 3-5 per plant and are yellow-green in color. Fruiting bodies are presented in pods and are present from early July to early September with each one containing one or two small black seeds.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

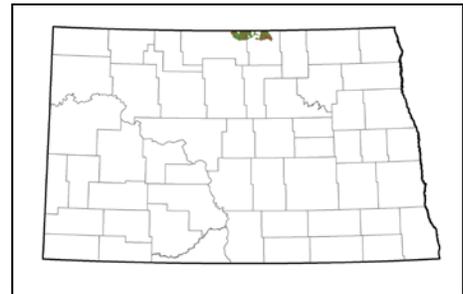
**Range:** Range includes all the New England and Great Lakes states; also includes Iowa, North Dakota, New Mexico, Wyoming, Montana, Idaho, Washington, Oregon, and California.

**Primary Habitat:** Predominantly found in open bogs.

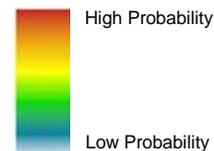
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Scott A. Milburn



### Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- The only documented occurrence of pod grass in the state was in Northeastern Bottineau County in the Turtle Mountains. Pod grass is primarily found in open peat bogs with high acidity and high water tables.

# Pod Grass

## Level II

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because of the possible change in temperature and precipitation. Alterations in precipitation may change the amount of water in an area making either too wet to support the species or too dry. Changes in water quality due to nutrient loads changing from livestock, fertilizers, or salt on roads could alter the water and soil chemistry. Changes in temperature could also pose a threat raising soil and water temperatures so that pod grass could not properly grow and allow other species to compete. Destruction of a bog through trampling and compaction is another threat that is posed to pod grass. This can be caused by cattle coming to get water or recreational use such as off road vehicles.

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Scheuchzeria palustris*. However, further research is always needed as it helps us better understand sensitive plant populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- Protecting habitat of this species requires maintaining high water quality and natural, stable water levels. This may involve restricting use of road salt and fertilizers in adjacent areas, and regulating water drawdown if the wetland has a dam or is used for irrigation.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Tallis, J.H., and H.J. B. Birks. "The Past and Present Distribution of *Scheuchzeria Palustris* in Europe." *British Ecological Society* 53.2 (1965): 287-98. JSTOR. Web. 23 July 2012. <http://www.jstor.org/stable/2257976>
4. "Pod Grass-*Scheuchzeria Palustris*." *Montana Field Guide*. N.p., n.d. Web. 23 July 2012. <[http://fieldguide.mt.gov/detail\\_PMSCH02010.aspx](http://fieldguide.mt.gov/detail_PMSCH02010.aspx)>.
5. Burns, James F. "*Scheuchzeria Palustris*." Ohio Division of Natural Areas and Preserves/ Ohio Department of Natural Resources, Nov. 1983. Web. 23 July 2012. <<http://ohiodnr.com/tabid/1557/Default.aspx>>.
6. "Pod-Grass *Scheuchzeria Palustris*." *Natural Heritage Endangered Species Program*. Massachusetts Division of Fisheries and Wildlife, June 2007. Web. 23 July 2012. <[http://www.mass.gov/dfwele/dfw/nhosp/species\\_info/nhfacts/scheuchzeria\\_palustris.pdf](http://www.mass.gov/dfwele/dfw/nhosp/species_info/nhfacts/scheuchzeria_palustris.pdf)>.
7. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Ledge Spike-moss

## Level II

**Scientific Name:** *Selaginella rupestris*

**General Description:** Creeping perennial moss that creates loose spreading mats. Stems are .5-1.5in (1-4cm) long. Leaves are lance in shape and are 2mm in length. Reproductive cones appear from April to October that stand upright 5-20mm tall and produce spores.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

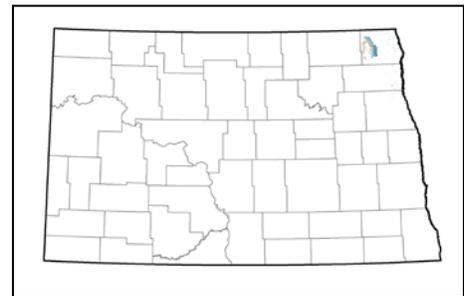
**Range:** Range extends from Maine, south to Georgia, and west to Oklahoma; north to Wyoming, South Dakota, and North Dakota.

**Primary Habitat:** Rocky outcrop and sandy gravelly soils in open areas.

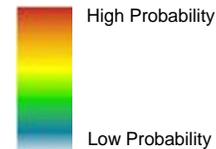
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Emmet. J. Judziewicz



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Only two documented occurrences in the sand deltas and beach ridges of Pembina County. The species grows in dry sandy soils or rock outcrops with little competition. Does well in open areas with a lot of sun light.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because the species thrives in a dry habitat and the possibility of increased precipitation could change the soil composition and make conditions unfavorable for ledge spike moss. Disturbances and alterations to habitat by livestock or recreational use also pose a threat.

# Ledge Spike-moss

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Selaginella rupestris*. However, further research is always needed as it allows us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect habitat from disturbances.
- Use care when applying pesticides near habitat.
- Avoid disturbances such as trampling or Off-highway vehicular use.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Fertig, Walter. "State Species Abstract-Selaginella Rupestris." Wyoming Natural Diversity Database, 24 Nov. 2000. Web. 24 July 2012. <[http://www.uwyo.edu/wyndd/\\_files/docs/reports/speciesabstracts/selaginella\\_rupestris.pdf](http://www.uwyo.edu/wyndd/_files/docs/reports/speciesabstracts/selaginella_rupestris.pdf)>.
4. Cusick, Allison W. "SELAGINELLA RUPESTRIS." Ohio Division of Natural Areas and Preserves/ Ohio Department of Natural Resources, Mar. 1982. Web. 24 July 2012. <<http://ohiodnr.com/dnap/Abstracts/s/selarupe/tabid/1579/Default.aspx>>.
5. *MICHIGAN FLORA ONLINE*. A. A. Reznicek, E. G. Voss, & B. S. Walters. February 2011. University of Michigan. Web. July 24, 2012. <http://michiganflora.net/species.aspx?id=2684>.
6. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Zigzag Goldenrod

## Level II

**Scientific Name:** *Solidago flexicaulis*

**General Description:** 2-3 foot tall perennial wildflower that is usually unbranched. The central stem is light green and glabrous to hairy. Leaves are alternate and are 2-5 inches long and 1-4 inches across, becoming shorter and narrower where flowers occur. Flowers are in a cluster form and consist of 3-4 yellow ray florets, 4-8 yellow disk florets, and several series of floral bracts at its base. Blooming period occurs from late summer to early fall and lasts about one month.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Very abundant throughout the United States. This species is present in 33 states including all of the East coast. Range stretches west to Nebraska, the Dakotas, Nebraska, and Kansas.

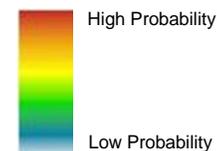
**Primary Habitat:** Rich deciduous woodlands, protected wooded slopes facing north or east, calcareous seeps in wooded areas, low areas along woodland streams, shaded limestone cliffs, and edges of limestone glades.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species is found in woodland areas in four counties. It has been documented in Cass, Ransom, Sargent, and Richland counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations.

### Other Natural or Manmade Factors

- Potential threats also include grazing, hydrologic alteration, and recreational land use.

# Zigzag Goldenrod

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Solidago flexicaulis*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Zigzag Goldenrod (Solidago Flexicaulis)." Illinois Wildflowers, n.d. Web. 26 July 2012. <[http://www.illinoiswildflowers.info/woodland/plants/zz\\_goldenrod.htm](http://www.illinoiswildflowers.info/woodland/plants/zz_goldenrod.htm)>.
5. "Zigzag Goldenrod: Midsummer's Sentinels Abuzz with Bees and Butterflies." HubPages. N.p., n.d. Web. 26 July 2012. <<http://derdriu.hubpages.com/hub/Midsummers-Sentinels>>.

# Round-leaved Sphagnum

Level II

**Scientific Name:** *Sphagnum teres*

**General Description:** Fairly slender to moderate sized plant. Pale green to yellowish in color, or reddish brown in sun-grown forms; Forms loose to dense carpets; Stems are pale green to red-brown. Branches are long-cylindrical and branch leaves are ovate to ovate-lanceolate and are gradually narrowed to an involute tip.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range includes Alaska, California, Colorado, Connecticut, Idaho, Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Minnesota, Montana, New Hampshire, New Jersey, New York, North Dakota, Ohio, Oregon, Vermont, Washington, Wisconsin, and Wyoming.

**Primary Habitat:** Minerotrophic habitats such as floating mats around lakes, carpets and lawns of rich fens, and marginal fen lags; sometimes intermixed with *S. angustifolium* in transitional fens.

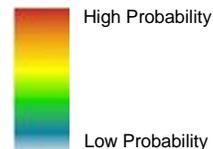
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Only one population of this species has been found in North Dakota. It was located in a bog in the Turtle Mountains of Bottineau County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Round-leaved Sphagnum

## Level II

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Sphagnum teres*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Sphagnum Teres." *PeatNet*. Southern Illinois University Carbondale, 16 Jan. 2008. Web. 24 July 2012. <<http://www.peatnet.siu.edu/PeatGuide%20pages/Sphagnum%20teres.html>>.
5. "Sphagnum Teres." *Flora of North America*. N.p., n.d. Web. 24 July 2012. <[http://www.efloras.org/florataxon.aspx?flora\\_id=1&taxon\\_id=200000836](http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200000836)>.

# Alkali Sacaton

## Level II

**Scientific Name:** *Sporobolus airoides*

**General Description:** Tough perennial that grows 2-3 feet in height. Grows in large bunches and contains culms, or large hollow stems. Blades are elongate, flat, and begin to grow “curly”; most distinctive in August.

**Natural Heritage State Status/NatureServe Global Status:**  
S3/G5 – Vulnerable/Secure

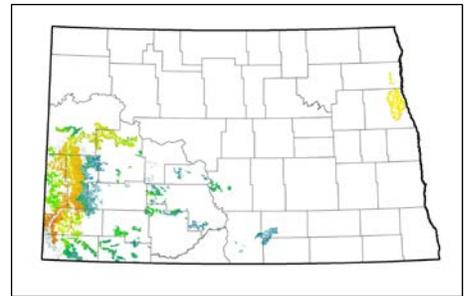
**Federal Status:** Not listed

**Range:** Ranges from South Dakota to Washington, south to Missouri, Kansas, Texas, and Mexico.

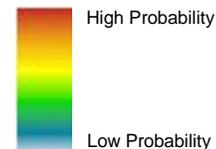
**Primary Habitat:** Grows on dry to moist sites with sand or gravelly soil. Often found growing on alkaline flats, prairies, and sandy plateaus; also common along drainage in desert and semi-desert areas.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Common records in North Dakota show that this species is present in the Badlands region and in Grand Forks County. Distribution of this species is confined to the southern unit of Theodore Roosevelt National Park and can be found in clay outcroppings and washouts. Highest densities occur along road cuts along a segment of I-94.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threat to this species is habitat alterations.

# Alkali Sacaton

Level II

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Sporobolus airoides*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- This plant is tolerant to moderate grazing and can produce abundant herbage utilized by livestock and wildlife
- Alkali sacaton is one of the most commonly used species for seeding and stabilizing disturbed lands.
- Notable for its tolerance to flood, drought, alkaline soil, moderate grazing, and mining. This plant is very durable and can be used in many conservation/ management projects.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Species: Sporobolus Airoides." U.S.D.A. Forest Service, n.d. Web. 30 July 2012. <<http://www.fs.fed.us/database/feis/plants/graminoid/spoair/all.html#REFERENCES>>.

# Prairie Fameflower

Level II

**Scientific Name:** *Talinum parviflorum*

**General Description:** Perennial plant that grows from fleshy roots. Stems are short or absent. The leaves are all basal, about 2 inches long, and are nearly round in cross-section. A striking feature of this plant is the six-inch flower stalk that overtops the leaves. Pink to purple flowers about ½ inch long and a capsule like fruit of smooth seeds is present.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5-Imperiled/Secure

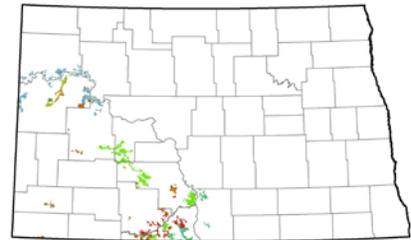
**Federal Status:** Not listed

**Range:** Fairly abundant in Alabama, Arizona, Arkansas, Colorado, Illinois, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming.

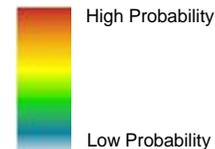
**Primary Habitat:** Shallow, often exposed soils. It shows tolerance to a broad array of substrates but is most often found on sandy, acidic soils and least often found on calcareous soils.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In the Dakota's this species tends to grow on sandstone outcrops of Sioux quartzite or on sparsely vegetated slick spots amidst fragile prickly pear cactus. It is drought and heat tolerant, flowering in late afternoon for many weeks during the height of the summer.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Prairie Fameflower

## Level II

### Other Natural or Manmade Factors

- Light grazing can be an issue but there are no adverse impacts from cattle grazing because the habitat that this species inhabits is very poorly vegetated. The only time cattle will appear in this habitat is when they are traversing to better forage.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Talinum parviflorum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Previous Research or Surveys

- Prairie Fameflower Survey- Cedar River National Grassland

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Prairie Fameflower (*Talinum Parviflorum*) Survey Cedar River National Grassland. N.p.: Yellowfield Biological Surveys, 20 Nov. 2008. PDF.
5. "Native Wildflowers of the North Dakota Grasslands-Prairie Fameflower (*Talinum Parviflorum*)." NPWRC. U.S. Geological Survey, 3 Aug. 2006. Web. 25 July 2012. <<http://www.npwrc.usgs.gov/resource/plants/wildflwr/species/taliparv.htm>>.
6. "Talinum Parviflorum." *Flora of North America*. N.p., n.d. Web. 25 July 2012. <[http://www.efloras.org/florataxon.aspx?flora\\_id=1&taxon\\_id=242415799](http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=242415799)>.

# Hooker's Townsendia

Level II

**Scientific Name:** *Townsendia hookeri*

**General Description:** Perennial herb from a taproot and few to many branched woody stem-base; stems sometimes inconspicuous or lacking; covered with old persistent leaf bases, 2-5 cm tall when developed. Flowers are white to pinkish; disk flowers are yellow and sometimes pinkish topped.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Small range that includes Idaho, Montana, North Dakota, South Dakota, Wyoming, Nebraska, Colorado, and Utah.

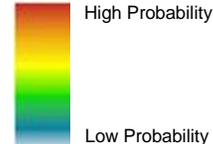
**Primary Habitat:** Dry grassy slopes and meadows in the grassland and lower mountain areas.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- There is an insufficient amount of data relating to this species whereabouts in North Dakota. One population has been documented in the Little Missouri Grasslands near Medora.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations. Conversion of grasslands to cropland pose a threat to this species. Oil and gas development also would negatively impact *Townsendia hookeri*.

# Hooker's Townsendia

## Level II

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Townsendia hookeri*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- Research has been done on the genetic structure and mating patterns of *Townsendia hookeri*.
  - "Genetic Structure and Mating Patterns of Diploid and Polyploid *Townsendia hookeri*"

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Klinkenberg, Brian. "Townsendia Hookeri." *E-Flora BC: Electronic Atlas of the Flora of British Columbia*. University of British Columbia, n.d. Web. 26 July 2012. <<http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Townsendia%20hookeri%20%20>>.
5. Schmoller, David. *Yellowfield Biological Surveys, LLC*. N.p., 7 Jan. 2012. Web. 1 Aug. 2012. <<http://biologicalsurveys.com/>>.

# Purple Sandgrass

Level II

**Scientific Name:** *Triplasis purpurea*

**General Description:** Delicate, tufted, summer annual in northern states to perennial in its southern range. Stems are simple, sometimes decumbent below. Stems ascend to widely spreading above rising to 30-100 cm tall. Internodes are glabrous and light green in color with longitudinal veins. Flowers are loosely bunched and partially included in the upper leaf sheath. Branches are few and with few flowers and are initially erect, but become ascending to spreading as plant matures. This plant can easily be identified by the purplish color of the stems and leaf sheaths that are conspicuous in late summer.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4G5 – Critically Imperiled/Apparently Secure-Secure

**Federal Status:** Not listed

**Range:** Widespread in the eastern two-thirds of the United States and is found along the Atlantic and Gulf Coasts, shorelines of the Great Lakes, and locally inland. North and South Dakota and Colorado, south to where it proliferates in disturbed areas, and Washington. It is somewhat common in the southeast and becomes rarer in the Midwest and Northeast.

**Primary Habitat:** Found in hot, arid, sandy areas with little competition. Generally confined to beaches, but has spread to disturbed areas inland where present sandy prairies and blowouts.

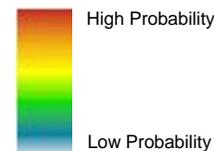
**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as threatened or endangered but is still designated for special management consideration.

[Floridagrasses.org](http://Floridagrasses.org)



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, purple sandgrass is found in dry sandy prairie and sandhills. This grass species is only known from the Shenyenne Sandhills. The most recent record of this species was found on a moderate slope, on the open, dry midslope.

# Purple Sandgrass

Level II

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations. The loss of native prairie poses the greatest threat to this species.

### Other Natural or Manmade Factors

- Off-road vehicles and grazing on beaches
- Conversion of prairie grasslands to cultivated agriculture

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- In North Dakota there is a limited amount of information on the habitat and other characteristics that are important to maintain this plant species. Further research is needed.

### Additional Research or Surveys Needed

- Information that is ecology specific to this plant is needed. While some general characteristics from other localities may apply, there is a need to describe the habitat(s) the taxon occupies, along with limitations and those characteristics that can enhance plant growth.
- The factors that limit, if not prevent, the establishment and preservation of populations also needs to be addressed.
- Other areas of study may include seed bank, genetics, the role of asexual reproduction, and more.

## MANAGEMENT RECOMMENDATIONS

- Establish goals based on current conditions and land use.
- Gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.

## MONITORING PLANS

- Population viability analysis can be used to estimate the minimum population size to sustain the taxon.
- While this information is being collected, preserving habitat and restricting impacts is very beneficial.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Drummond's Milkvetch

Level III

**Scientific Name:** *Astragalus drummondii*

**General Description:** Several stemmed perennial forb that stands 15.5-27.5in (40-70cm) tall. Leaves are alternate 2.5-5.5in (6-14cm) long with 13-31 leaflets that are hairy on the bottoms surface. Flowers are pale white on the terminate end of stems. Fruits are displayed as drooping pods <1-1.5in (2-4cm)

**Natural Heritage State Status/NatureServe Global Status:**

S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

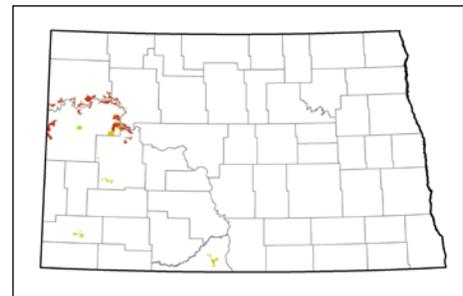
**Range:** Range includes Oregon, Idaho, Utah, Montana, Wyoming, Colorado, New Mexico, Nebraska, South Dakota, and North Dakota.

**Primary Habitat:** Dry hillsides and prairies, near or along rivers and riparian areas.

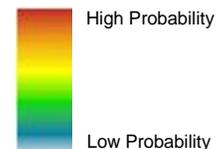
**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Drummond's Milk-vetch is primarily found in the dry uplands and hillsides referred to as the river breaks surrounding the Missouri River. Typically occurs on the south and west facing slopes of hills.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations. Habitat alterations through common land use practices and development poses a significant risk to the plant. Cattle could trample the plants and their surrounding habitat, compacting the soils rendering them unfit to support the plant. Oil and gas exploration in the western part of the plants range pose threats as well as invasive species.

# Drummond's Milkvetch

Level III

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Astragalus drummondii*. However, further research is always needed as it allows us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Drummond's Milk-Vetch (*Astragalus Drummondii*)."  
*Montana Plant Life*. N.p., 9 Feb. 2012. Web. 24 July 2012. <[http://montana.plant-life.org/species/astrag\\_drum.htm](http://montana.plant-life.org/species/astrag_drum.htm)>.
5. Fox, III, William E., Kelly W. Allred, and Eric H. Roalson. *A Guide to the Common Locoweeds and Milkvetches of New Mexico*. N.p.: New Mexico State University, n.d. PDF.
6. Hutton, Jr., Eugene E. "Four Western Plants New to West Virginia." *Southern Appalachian Botanical Society* 54.3 (1989): 203-07. JSTOR. Web. 24 July 2012. <<http://www.jstor.org/stable/4033377>>.
7. Karron, Jeffery D. "Breeding Systems and Levels of Inbreeding Depression in Geographically Restricted and Widespread Species of *Astragalus*." *American Journal of Botany* 76.3 (1989): 331-40. JSTOR. Web. 27 Jan. 2010. <<http://www.jstor.org/stable/2444601>>.

## Bent-flowered Milkvetch

Level III

**Scientific Name:** *Astragalus vexilliflexus*

**General Description:** Low, bushy, sprawling perennial with stems that are partially erect and stand 12in (30.5cm). Its leaves are 2in (5cm) long with 5-17 leaflets .5in (1.27cm) long and elliptical in shape. Flowers are pinkish purple and appear on a raceme. Fruits are displayed in a pod that is 3/8in (1cm) with smooth black seeds.

**Natural Heritage State Status/NatureServe Global Status:**

S3/G4 – Vulnerable/Apparently Secure

**Federal Status:** Not listed

**Range:** Small range that includes North Dakota, South Dakota, Wyoming, Montana, and Idaho.

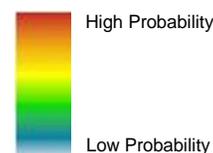
**Primary Habitat:** Rocky prairie knolls and ridges southwest of the Missouri River.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant species, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- The habitat that bent-flowered milk-vetch is associated with only occurs southwest of the Missouri River in the Missouri Plateau eco-region. It is primarily found on ridges, knolls and hills. Primarily found in well drained sandy or gravelly soils.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threat to this species is habitat loss through invasive species encroachment, land use practices, and climate change. Disturbances caused by oil and gas developments pose a significant risk to this species. Bent-flowered milk-vetch is highly vulnerable to climate change also. Changes in precipitation and temperature could negatively affect the growing seasons and conditions for the plant.

# Bent-flowered Milkvetch

Level III

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Astragalus vexilliflexus*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Native Wildflowers of the North Dakota Grasslands-Bent-Flowered Milk-Vetch." NPWRC. U.S. Geological Survey, n.d. Web. 25 July 2012. <<http://www.npwrc.usgs.gov/resource/plants/wildflwr/species/astrvexi.htm>>.
5. Mancuso, Michael, and Robert K. Moseley. Field Investigation of *Astragalus Vexilliflexus* on the Sawtooth National Forest. Boise, Idaho: Idaho Department of Fish and Game, 1990. PDF.
6. Moseley, Robert K. The Status and Distribution of Bent-Flowered Milkvetch in Idaho. Boise, Idaho: Idaho Department of Fish and Game, 1994. PDF.

# Chamomile Grapefern

## Level III

**Scientific Name:** *Botrychium matricariifolium*

**General Description:** Grow 4-6" (10-15cm) tall and has two fronds. One is sterile with a single leaf 1" (2.5cm) long and the fertile frond is taller than sterile frond with branched clusters on it. Stem is approximately 4" (10cm) long and pale green in color.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

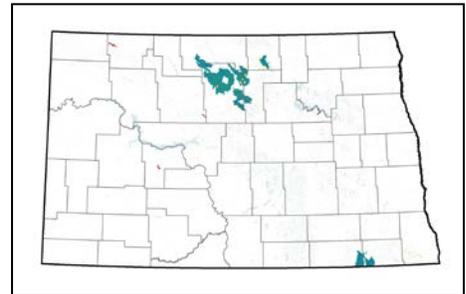
**Range:** Range includes all of the New England and Great Lake states, as well as South Dakota, North Dakota, Minnesota, and Iowa

**Primary Habitat:** Typically found in wide variety of habitats and variety of soils.

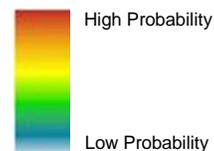
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Kitty Kohout



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Matricary grape fern is found in a wide array of habitats ranging from forests and woodlot edges to roadsides and borrow pits. It is also commonly found in both acidic and neutral soils. There are only four documented occurrences in the state with the most recent being in the Sheyenne Sandhills where it grows near the bottom of a wooded valley near seepage.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because despite having a wide array of habitat the plant could exist in it only is found in a small area in the state. Degradation and loss of this crucial habitat that exists within the state poses a large threat to the species because of the limited habitat it has been found in within the state.

# Chamomile Grapefern

## Level III

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects for *Botrychium matricariifolium*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Additional Research or Surveys Needed

- Monitoring study that compares reproductive and mortality rates of this species in burned vs. unburned, grazed vs. ungrazed, weedy vs. natural, and shaded vs. unshaded would answer many questions about this species and would be beneficial in determining management practices.
- Descriptive data for the habitat and community ecology of occurrences should be gathered whenever a new colony of this species is encountered.
- Research of the life history and demography is needed.
- Research is needed to determine the role of non-reproductive plants in the population biology of this species.

### MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. *Botrychium Matricariifolium*. Ames, IA: Iowa State University, n.d. PDF.
5. "Botrychium Matricariifolium." *Flora, Fauna, Earth, and Sky..the Natural History of the North Woods*. Valley Internet Company, 26 Feb. 2004. Web. 24 July 2012. <<http://www.rook.org/earl/bwca/nature/ferns/botrymat.html>>.
6. Gundale, Michael J. "Effects of Earthworms on Soil and B. Marmo." *Journal of Conservation Biology* 16.6 (2002): 1560. Michigan Tech. Web. 24 July 2012.

## Back's Sedge

Level III

**Scientific Name:** *Carex backii*

**General Description:** Densely clumped grass like plant that is often sprawled out or flattened along the ground. Leaves can be up to 14.5in (37cm) long and are yellow green in color. Back's sedge is most easily identified during the fruiting season from May-July. Flowers are presented as spikes and are .75-3in (1.9-7.2cm) long.

**Natural Heritage State Status/NatureServe Global Status:**  
S3/G4 – Vulnerable/Apparently Secure

**Federal Status:** Not listed

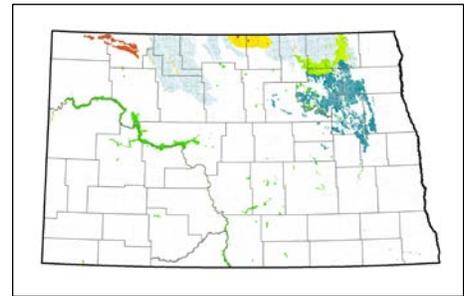
**Range:** Range includes all of the New England states; also includes Michigan, Wisconsin, Minnesota, Iowa, South Dakota, North Dakota, Montana, Wyoming, Colorado, Utah, Idaho, Washington, and Oregon.

**Primary Habitat:** Dry mixed or evergreen forests and mixed-grass prairies.

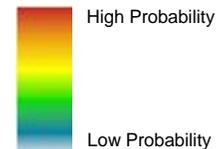
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Derek Anderson



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- Primarily located in the northern part of the state associated with the Turtle Mountains, Northern Black Prairie, and Northern Dark Brown Prairie eco-regions. Limestone soils on hills and on dry calcareous bluffs and ledges; also in open calcareous forests of mixed hardwoods or conifers are the typical areas that plant is found.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations. Human interaction with the landscape through recreation or land uses poses the largest threat. Activities such as logging and ATV use could diminish the quality of the habitat available for the species. Noxious weeds species also pose a threat, due to the fact that many can outcompete native species for resources.

## Back's Sedge

### Level III

#### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Carex backii*. However, further research is always needed as it allows us to better understand a multitude of sensitive plant species populations and their life cycle requirements that are necessary for survival.

#### MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

#### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

#### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Gleason, Henry A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. The New York Botanical Garden, Bronx, New York. 910 pp.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. *Biodiversity Tracking and Conservation System (Biotics 4)*. Bismarck, North Dakota. Bismarck, ND.

## Hair-like Sedge

Level III

**Scientific Name:** *Carex capillaris*

**General Description:** A densely tufted grass-like plant that produces seeded tops that are white or bronze in color and grows anywhere from 4-24 inches when mature. Leaves are .75-4 mm wide and slender stems are up to 60 cm long. The apex of the stem is terminated by a cluster of male flowers 4-10 mm long. Towards the apex of the stem 2-3 female flowers are present. These female flowers eventually turn into a fruit.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Quite abundant; Circumboreal species. Range extends throughout all of Canada. In the United States the range extends from Oregon and Washington to the south through Nevada, Utah, Colorado, and New Mexico. Also includes Idaho, Montana, Wyoming, North and South Dakota, extending further east to New York and north to Maine.

**Primary Habitat:** Stream banks, wet meadows, wet ledges, and marshy lake shores; can also be found in non-wetland areas.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

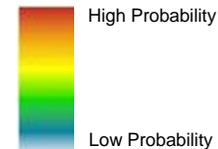
**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



©Jessie M. Harris. provided by BONAP



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota, this species has been documented in Bottineau and McHenry counties. It is known to grow in boggy areas along lake shores and in rocky crevices. The specific community of hair like sedge that was found in North Dakota was located in the Turtle Mountains and areas surrounding the Turtle Mountains in boggy meadows.

# Hair-like Sedge

Level III

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Other threats to the taxon include significant hydrologic change, timber harvesting, and recreation use.

## RESEARCH AND SURVEY EFFORTS

- Little is known about the threats that could potentially harm this species.

## MANAGEMENT RECOMMENDATIONS

- Reduce the amount of trampling and density of trails.
- Keep hikers and OHV users on designated trails.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. "Carex Capillaris." U.S.D.A. Forest Service, n.d. Web. 23 July 2012. <[http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5211722.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5211722.pdf)>.
4. *Carex Capillaris*. Washington Department of Natural Resources, 2000. Web. 23 July 2012. <<http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/caca.pdf>>.
5. "The Rare Ones." *Northern Prairie Wildlife Research Center*. U.S. Geological Survey, 3 Aug. 2006. Web. 23 July 2012. <<http://www.npwrc.usgs.gov/resource/wildlife/rareone/wetland.htm>>.
6. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Large Yellow Lady's-slipper

Level III

**Scientific Name:** *Cypripedium parviflorum* var. *pubescens*

**General Description:** Erect plant standing 70-700 cm tall; sparsely pubescent; Leafy throughout with sheathing, broadly elliptic to lanceolate-elliptic shaped leaves. Flowers have sepals that are greenish or yellowish.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5T5 – Imperiled/Secure-Secure Intraspecific Taxon

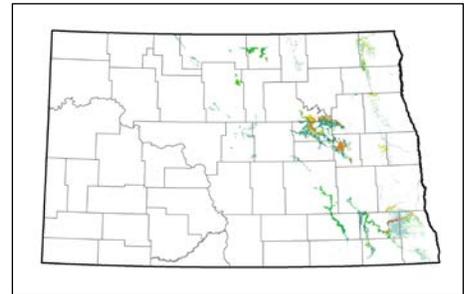
**Federal Status:** Not listed

**Range:** Range extends from British Columbia to Washington and Oregon, east of the Cascade crests to Idaho, Wyoming, Utah, Colorado, New York, and to much of eastern Canada and the United States.

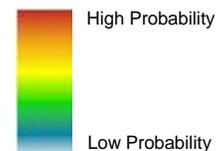
**Primary Habitat:** A variety of wet situations in neutral or slightly alkaline substrates; wet openings and borders in fens and swamp forest; wet prairies; arbor vitae thickets.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has been observed in Benson, Bottineau, Cavalier, Grand Forks, and Ransom Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Large Yellow Lady's-slipper

Level III

## Other Natural or Manmade Factors

- Alteration of hydrological setting.
- Timber harvest, development, grazing, plant collecting, fire suppression, and prescribed burns during the growing season are possible threats.
- Trampling and compression of soil; casual picking of flowers, digging by nurserymen and wildflower gardeners, and over-collecting.

## **RESEARCH AND SURVEY EFFORTS**

- Currently there are no research or survey projects being conducted for *Cypripedium parviflorum* var. *pubescens*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## **MANAGEMENT RECOMMENDATION**

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## **REFERENCES**

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Carlson, Margery C. "Formation of the Seed of *Cypripedium Parviflorum*." *Botanical Gazette* 102.2 (1940): 295-301. *JSTOR*. Web. 31 July 2012. <<http://www.jstor.org/stable/2472315>>.

## Nine-anthered Dalea

Level III

**Scientific Name:** *Dalea enneandra*

**General Description:** A perennial herb with a yellow taproot and a knobby to shortly branching caudex (stem). Each caudex has 1-3 erect, branched stems that are 5-10 dm tall. Leaves are sub sessile and pinnately divided into 2-6 pairs of 4-12 mm leaflets. Flowers appear white and pea-like and are well separated on the spike.

**Natural Heritage State Status/NatureServe Global Status:**  
S3/G5 – Vulnerable/Secure

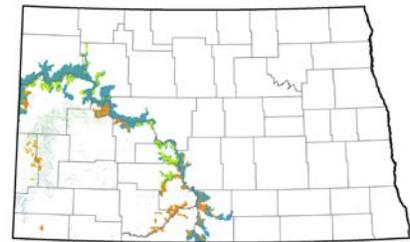
**Federal Status:** Not listed

**Range:** Distributed over most of the Midwestern United States. Range stretches from Montana to North Dakota and flows down to Texas and New Mexico, inhabiting many of the states in between these boundaries. Wyoming, South Dakota, Nebraska, Iowa, Colorado, Kansas, Missouri, Indiana, and Oklahoma have all documented *Dalea enneandra*.

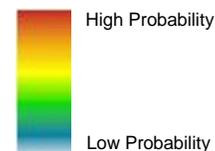
**Primary Habitat:** Primarily found on dry prairies and hillsides, remaining below 1220 meters (4,000 feet), along roads, and in stream valleys on rocky calcareous or silty soils.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota, this species can be found on sandy or open gravelly slopes, on a dry mixed grass prairie and on shale. The largest populations of this plant in North Dakota occur in Theodore Roosevelt National Park and some of the surrounding areas along the Missouri and Heart Rivers.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

#### Other Natural or Manmade Factors

- Heavy grazing has been known to be a main factor in the loss of this species. Most of the time it can tolerate moderate grazing, however when grazing is increased it cannot endure.

# Nine-anthered Dalea

## Level III

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Dalea enneandra*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- As with many other special status species that are not federally listed, it is often hard to find specific information regarding management because not a lot of research has been done to establish these plans.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Nineanthered Dalea (Dalea Enneandra)." *Northern Prairie Wildlife Research Center*. U.S. Geological Survey, 3 Apr. 2006. Web. 31 July 2012. <<http://www.npwrc.usgs.gov/resource/plants/wildflwr/species/daleenne.htm>>.

# Prairie Mimosa

## Level III

**Scientific Name:** *Desmanthus illinoensis*

**General Description:** Warm season, herbaceous, perennial leguminous forb. Multiple stems grow from a woody thick caudex. The erect stems are smooth, angular, and grooved and stand 1.5 to 4.25 feet tall when mature. It's doubly compound leaves are attached to the stems in alternate arrangement. The white flowers contain five sepals, petals and stamens and produce clustered flat scythe-shaped pods each about 1 to 1.5 inches long. These pods contain two to six seeds and usually split open when mature.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Ranges southward from South Dakota and Minnesota, through Colorado, New Mexico, and Texas, and eastward to Ohio, Kentucky, Tennessee, North Carolina, South Carolina, and into Florida.

**Primary Habitat:** Common along roadside ditches, at the margins of cultivated fields, in upland swales and on low, open ground, moist meadows, and woodland openings.

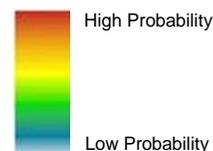
**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has been recorded in Ramsey, Emmons, and Sargent counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Rabbits, rodents, grasshoppers, and leafhoppers selectively attack legumes, especially at the seedling stage.
- Fungal leaf spot diseases and seed eating insects are a problem with this species.

# Prairie Mimosa

## Level III

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Desmanthus illinoensis*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- “The Biology of *Desmanthus Illinoensis*”

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. The Biology of *Desmanthus Illinoensis*  
June Latting *Ecology* Vol. 42, No. 3 (Jul., 1961), pp. 487-493 Published by: Ecological Society of America Stable URL: <http://www.jstor.org/stable/1932234>
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Dutchman's Breeches

Level III

**Scientific Name:** *Dicentra cucullaria*

**General Description:** Perennial plant standing 4-8" tall that consists of a rosette of basal leaves spanning about 6" across. Basal leaves are greyish green and hairless, and are divided into three primary leaflets. From the center of the rosette, drooping racemes of 2-6 pairs of white flowers develop. Blooming occurs from early to mid-spring and lasts about 2-3 weeks. The flowers will have no noticeable floral scent.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range includes all of the eastern United States and Canada, Oregon, Idaho, and Washington.

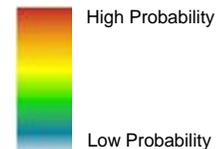
**Primary Habitat:** Includes deciduous mesic woodlands, especially along gentle slopes, ravines, or ledges along streams. Partial shade, moist conditions, and fertile soil are conditions in which this plant thrives.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- This plant has been documented in the southeastern part of North Dakota. More specifically it is known to be living in Ransom and Sargent Counties, just south of the Sheyenne National Grassland. In this area there are mesic woodland environments, slopes, and ravines along many lakes and small rivers all of which are suitable for this species.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations.

# Dutchman's Breeches

Level III

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Dicentra cucullaria*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Promote health of deciduous woods and the formation of rich forest soils.
- Prevent logging as much as possible. Partial removal of the canopy is less likely to affect this species than complete removal of the canopy.

## MONITORING PLAN

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Dutchman's Breeches (*Dicentra Cucullaria*)." Illinois Wildflowers, n.d. Web. 25 July 2012. <<http://www.illinoiswildflowers.info/woodland/plants/dutchman.htm>>.
5. Macior, Lazarus Walter. "The Pollination Ecology of *Dicentra Cucullaria*." *American Journal of Botany* 57.1 (1970): 6-11. JSTOR. Web. 6 Apr. 2010. <<http://www.jstor.org/stable/2440374>>.
6. Walton, Gary B., and Larry Hufford. "Shoot Architecture and Evolution of *Dicentra Cucullaria*." *International Journal of Plant Sciences* 155.5 (1994): 553-68. JSTOR. Web. 30 Apr. 2010. <<http://www.jstor.org/stable/2475029>>.

# Dwarf Spikerush

Level III

**Scientific Name:** *Eleocharis parvula*

**General Description:** grass-like perennials with oval shaped spikes at the tips of smooth and round stems that measure 1-10 cm tall. Most active growth is during the summer and fall.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

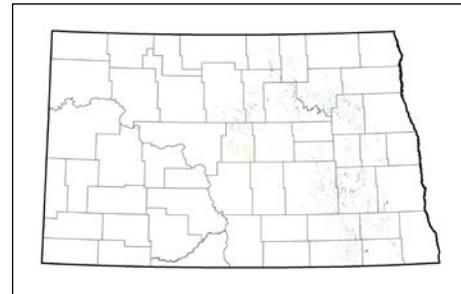
**Range:** Range extends throughout all of the contiguous 48 states; excluding Montana, Nevada, Nebraska, Indiana, Kentucky, West Virginia, and Vermont.

**Primary Habitat:** Adapted primarily to fluctuating water levels such as wet saline flats, marshes, and alkaline lakes.

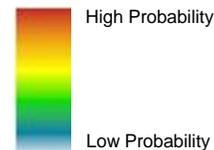
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- These spike-rush species grow in clumps or individual arrangements along shallow water shorelines or in shallow shore water itself. Dwarf spike rush in North Dakota is seen most commonly in Grand Forks and Burleigh counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Dwarf Spikerush

## Level III

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Elocharis parvula*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- Protect habitat and avoid altering natural hydrology.
- Prevent noxious weeds in or around habitat.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Shoreline Plants." *Department of Ecology*. State of Washington, n.d. Web. 24 July 2012. <<http://www.ecy.wa.gov/programs/wq/plants/plantid2/descriptions/ele.html>>.

# Wolf's Spikerush

## Level III

**Scientific Name:** *Eleocharis wolfii*

**General Description:** Perennial plant that may grow in circular clumps or often comes together to form large mats. Culms are erect (sometimes decumbent when dry), sides variably smooth or with 1 to few acute ridges. Leaf sheaths are persistent, dark red, brown, stramineous, or colorless and are ovate-lanceolate. Flowers are a fruit are present.

**Natural Heritage State Status/NatureServe Global Status:**  
SH/G3? – Possibly Extirpated/Vulnerable Inexact Numeric Rank

**Federal Status:** Not listed

**Range:** Since 2000, this species has been recorded in 15 states. These states include Arkansas, Georgia, Iowa, Illinois, Kansas, Louisiana, Minnesota, Missouri, Mississippi, Nebraska, Ohio, Oklahoma, Tennessee, Texas, and Wisconsin. Historically, Wolf's Spikerush was known from approximately 59 sites scattered across 43 counties of 20 states. These historical sites include most of the states listed above plus Alabama, Colorado, Indiana, New York, and North Dakota.

**Primary Habitat:** Wet depressions of bottomland and mesic upland prairies, wet open sites, wet river and lake margins, marshes and seeps, ephemeral pools in open grasslands, limestone barrens, oak flatwoods or woodlands on river terraces, wet depressions, pond and river margins, wet sand prairies, wet meadows and other moist areas.

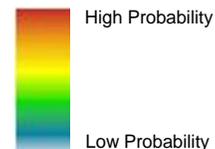
**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Theodore S. Cochran



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has been recorded from two different sites in Cass County. One site was from a roadside ditch and another site has since been destroyed by development.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Wolf's Spikerush

Level III

## Other Natural or Manmade Factors

- The conversion of habitat to agricultural lands or pastures.
- Over-utilization for commercial, recreational, scientific, or educational purposes.
- Disease or predation.
- The inadequacy of existing regulatory mechanisms.

## **RESEARCH AND SURVEY EFFORTS**

### Current Research or Surveys

- Based on recent discoveries, surveys should be conducted between March and May in the southern U.S and between May and June in the northern limits of the species range.

### Previous Research or Surveys

- Recent discoveries of *E. Wolfii* in previously unrecorded habitats suggest that the species occupies a broader range of habitats.

### Additional Research or Surveys Needed

- Research on life history and ecological requirements would be helpful in identifying areas where additional populations could be discovered.
- Further studies on the population dynamics and genetic diversity of this species would be useful in assessing the long-term persistence and conservation status of this species in the future.
- Research on seed viability, predation, population genetics, and germination requirements for the species is lacking.
- Studies should be conducted to further examine competition and responses by *E. Wolfii* to various levels of management and disturbance, especially grazing pressure from native and non-native herbivores.
- Analyses of land use changes would help to assess threats to species, especially related to the conversion of native habitat for agriculture and development.
- Further evaluations are needed to assess differences in habit, light requirements, and reproductive success of individuals in shaded sites vs. localities in full sunlight.

## **POPULATION ESTIMATES**

- Other than very rough estimates, there are limited detailed demographic data available on Wolf's Spikerush at most sites in North America.

## **MANAGEMENT RECOMMENDATION**

- Little information is known on management recommendations that benefit Wolf's Spikerush.
- It is suggested that the maintenance of openings in woodland habitats, the monitoring of potential impacts of exotic species, and the use of prescribed fire to prevent encroachment of woody vegetation were treatments that could be useful in maintaining populations.
- Advise against actions that would alter soils where *E. wolfii* occurs.

## **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## Wolf's Spikerush

Level III

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. McKenzie, Paul M., C. Theo Witsell, Loy R. Phillippe, Christopher S. Reid, Micheal A. Homoya, Steven B. Rolfsmeier, and Caleb A. Morse. "Status Assessment of Eleocharis Wolfii in the United States." *Journal of the Botanical Research Institute of Texas*, 2009. Web. 18 July 2012. <[http://www.naturalheritage.com!/userfiles/Assmt\\_of\\_Eleocharis\\_wolfii\\_McKenzie\\_Witsell\\_et\\_al.pdf](http://www.naturalheritage.com!/userfiles/Assmt_of_Eleocharis_wolfii_McKenzie_Witsell_et_al.pdf)>.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Wood Horsetail

Level III

**Scientific Name:** *Equisetum sylvaticum*

**General Description:** Perennial, deciduous, homosporous pteridophyte. Sterile stems are green with lacy branches and grow up to 28 inches tall. Fertile stems are at first unbranched and lack chlorophyll but become branched and green after spores are released. A cone that is ¾-1 inch is borne on short stalk at the tip of fertile stem.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

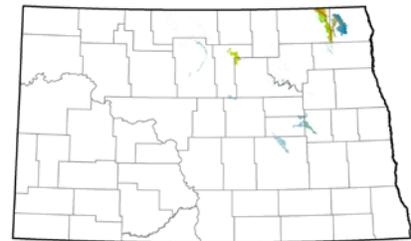
**Range:** Circumboreal species. In North America it is distributed throughout Alaska and Canada, south to the Pacific Northwest, the Great Lakes states, New England, and North Carolina.

**Primary Habitat:** Lowland wet conifer forests, also common in mixed upland, dry conifer, and deciduous forest habitats.

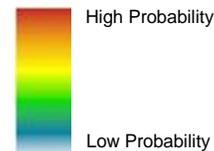
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota there are two records of this species being present in Pembina and Cavalier Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Wood Horsetail

Level III

## Other Natural or Manmade Factors

- Habitat loss can be the result of wetland draining, logging, or high recreation use.

## **RESEARCH AND SURVEY EFFORTS**

- Currently there are no research or survey projects being conducted for *Equisetum sylvaticum*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## **MANAGEMENT RECOMMENDATION**

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## **REFERENCES**

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Fertig, Walter. "State Species Abstract-Equisetum Sylvaticum." Wyoming Natural Diversity Database, 21 Aug. 2000. Web. 19 July 2012. <[http://www.uwyo.edu/wyndd/\\_files/docs/reports/speciesabstracts/equisetum\\_sylvaticum.pdf](http://www.uwyo.edu/wyndd/_files/docs/reports/speciesabstracts/equisetum_sylvaticum.pdf)>.
4. Matthews, Robin F. 1993. *Equisetum sylvaticum*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2012, July 19]
5. "Equisetum Sylvaticum-Wood Horsetail." Valley Internet Company, 26 Feb. 2004. Web. 19 July 2012. <<http://www.rook.org/earl/bwca/nature/ferns/equisetumsyl.html>>.
6. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Chamisson's Cottongrass

Level III

**Scientific Name:** *Eriophorum chamissonis*

**General Description:** Perennial, colonial graminoid with creeping rhizomes and non-tufted culms, 20-70 cm tall. Spikes are solitary and erect, without blade-bearing involucral bracts. The lower and basal leaves have a well-developed sheath and short, narrow triangular to channeled blades up to 2 mm wide. Uppermost leaves are bladeless and borne near the middle of the culm. Flowers have anthers more than 1 mm long, triangular achenes, and numerous cinnamon or reddish perianth bristles that elongate in fruit to form a "cotton-ball" head.

**Natural heritage State Status/NatureServe Global Status:**

S2/G5 – Imperiled/Secure

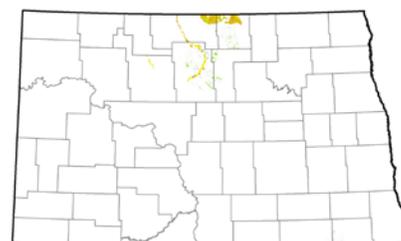
**Federal Status:** Not listed

**Range:** Circumpolar species that occurs in most of the northern tier of U.S. states west of the Great Lakes. (Alaska, Colorado, Idaho, Minnesota, Montana, North Dakota, Oregon, Washington, Wisconsin, and Wyoming, as well as in all of the Canadian provinces)

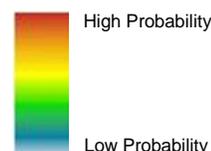
**Primary Habitat:** Cool temperate, alpine, and arctic regions, in wetlands with peat soils that are supported by groundwater discharge or snow melt. Other habitat includes fens and marshes.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, this species has been documented in only two places. These include the Turtle Mountains in Bottineau County and near glacial lake deltas in McHenry County.

# Chamisson's Cottongrass

Level III

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

### Other Natural or Manmade Factors

- Hydrologic alterations, grazing, motorized vehicle use, peat mining, fire, and global climate change.
- Trenching, ditching, logging, mining, and fire.
- Wetland draining.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Our current research indicates that this is a species of concern, and that the species would benefit from an expansion of our knowledge of its biology and habitat.

### Previous Research or Surveys

- There have been no studies on the effects of management activities, but based on our knowledge of this species preferred habitat, we can draw conclusions about what will have an effect on the habitat this species needs to survive.

### Additional Research or Surveys Needed

- Research is needed on the effects of management activities and natural disturbances on *Eriophorum chamissonis*.
- Information about distribution, life cycle, habitat, population trends, response to change, metapopulation dynamics, and demography are needed.
- Restoration methods.

## MANAGEMENT RECOMMENDATIONS

- Protection of wetland habitats.
- Any activity that maintains hydrologic regime in these habitats will contribute to the persistence of this species.

## MONITORING PLANS

- Regulation and monitoring of hydrological modifications, domestic grazing, and motorized vehicle use.
- Species and habitat inventory
- Population monitoring
- Habitat monitoring

# Chamisson's Cottongrass

## Level III

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Decker, Karin, Denise R. Culver, and David G. Anderson. *Eriophorum Chamissonis: A Technical Conservation Assessment*. Fort Collins, CO: Colorado Natural Heritage Program-Colorado State University, 25 Jan. 2006. PDF.

# Green Keeled Cottongrass

Level III

**Scientific Name:** *Eriophorum viridicarinatum*

**General Description:** Extensively colonial from creeping rhizomes. Stems are not completely cylindrical and are 8-24 inches tall. Leaves are basal and elongate and the blade is well developed. Leaves are also flat but become narrow and triangular or channeled towards the tip. Involucral bracts are present, the longest one matching or exceeding the length of the inflorescence. 2-8 spikelets are present on the stem. Scales are blackish-green and bristles are numerous. Small dry fruit that is blackish is also present.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

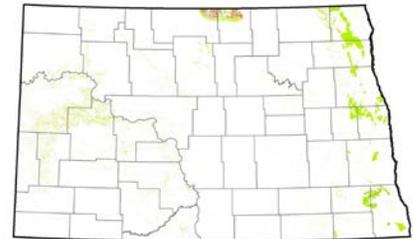
**Federal Status:** Not listed

**Range:** Occurs from Newfoundland to Alaska, south to New York, Michigan, Colorado, Washington and northern Idaho.

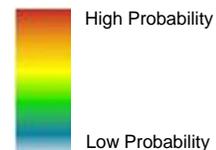
**Primary Habitat:** Cold, sometimes calcareous, swamps and bogs at moderate to high elevations. This species is also an obligate wetland species which means it is particularly restricted to wetland habitats.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, Green Keeled Cotton grass has been documented in the Turtle Mountains, and in sand hills and beach ridges in Pembina and Richland counties.

# Green Keeled Cottongrass

## Level III

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations.

#### Other Natural or Manmade Factors

- Hydrologic alteration and grazing are the greatest threats.

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Eriophorum viridicarinatum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- Particular habitats with this species should be protected from trampling to preserve the established population.

### MONITORING PLANS

- Maintenance of the hydrologic regime is important for the survival of this species.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. *Eriophorum Viridicarinatum (Green Keeled Cotton-grass)*. N.p.: Washington Natural Heritage Program/ U.S.D.I Bureau of Land Management, 2000. PDF.

# Wild Geranium

## Level III

**Scientific Name:** *Geranium maculatum*

**General Description:** Perennial herb 8-24 inches tall, that produces upright usually unbranched stems and flowers. Leaves are palmately lobed with five or seven deeply cut lobes. They are deeply parted into three or five divisions, each of which is again cleft and toothed. The flowers are 2.5-4 cm in diameter with five rose-purple, pale or violet-purple petals. They appear from April to June in loose clusters of two to five at the top of the stems. The fruit capsule, which springs open when ripe, consists of five cells each containing a seed joined to a long bean-like column 2-3 cm long.

**Natural Heritage State Status/NatureServe Global Status:**  
SH/G5 – Possibly Extirpated/Secure

**Federal Status:** Not listed

**Range:** Range extends throughout much of eastern North America. From southern Ontario it reaches south to Georgia, and west to eastern Oklahoma and eastern North and South Dakota.

**Primary Habitat:** Dry to moist woods; is a dominant understory species.

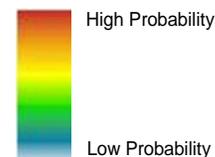
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



### Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Only one documented occurrence in Cass County in North Dakota. Most likely found in the dry to moist woods near the Red River.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Wild Geranium

## Level III

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Geranium maculatum*. However, further research is always needed as it will help us better understand a multitude of sensitive plant populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- Research has been done on the life cycle and reproduction of this species.

### MANAGEMENT RECOMMENDATIONS

- Keep habitat undisturbed as this species appears to be dependent on a constant, stable environment. It has not been found in disturbed areas of habitat.
- Maintaining acidity levels in soils is important because this species is particularly sensitive to changes in soil acidity.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. "Geranium Maculatum." Wikipedia, 10 June 2012. Web. 19 July 2012. <[http://en.wikipedia.org/wiki/Geranium\\_maculatum](http://en.wikipedia.org/wiki/Geranium_maculatum)>.
4. Sullivan, Janet. 1992. Geranium maculatum. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2012, July 19].
5. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Creeping Barberry

Level III

**Scientific Name:** *Mahonia repens*

**General Description:** Perennial evergreen ground cover plant with spreading rhizomes. Clustered flowers are yellow and produce edible purple fruits.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range stretches from British Columbia and Alberta in Canada, south through California, west to Texas and North Dakota.

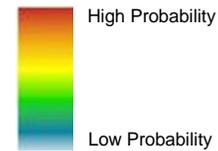
**Primary Habitat:** Most frequently seen in rocky or gravelly areas with low vegetative cover or under open conifer or hardwood stands with sparse understory vegetation.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- There is an insufficient amount of data relating to this species whereabouts in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and habitat loss.

# Creeping Barberry

## Level III

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Mahonia repens*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Francis, John K. *Mahonia Repens*. San Juan, PR: U.S. Dept. of Agriculture, Forest Service, International Institute of Tropical Forestry, n.d. PDF.

# Yellow Monkeyflower

Level III

**Scientific Name:** *Mimulus guttatus*

**General Description:** Variable plant that can be either an annual with fibrous roots or a perennial with stout stolons; can grow to as high as three feet. The leaves are opposite on the stem and the lower leaves are attached with a stalk to the stem while the upper leaves are stalk less. The leaves are usually coarse toothed on the margins. The yellow flowers have red or maroon spots on the wide, hairy throat of the lower lip petal; the flowers are arranged in a terminal raceme or arise singly from the upper leaf axils.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range extends from Alaska to California, east to New Mexico and then north to Colorado, Nebraska, South Dakota, and North Dakota. Also includes Michigan, Pennsylvania, New York, and Connecticut.

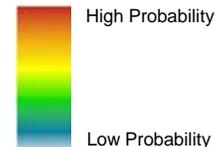
**Primary Habitat:** Wet places such as along creeks, seeps, beaver dams. Also in wet places from sea level to mid-elevations in the mountains.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has only been documented in Grand Forks County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs

# Yellow Monkeyflower

Level III

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Mimulus guttatus*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### Previous Research or Surveys

- "Seed dispersal in *Mimulus guttatus* by Wind and Deer"

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Vickory, Jr., Robert K., Dennis R. Phillips, and Paul R. Wonsavage. "Seed Dispersal in *Mimulus Guttatus* by Wind and Deer." *American Midland Naturalist* 116.1 (1986): 206-08. JSTOR. Web. 24 July 2012. <<http://www.jstor.org/stable/2425954>>.
5. "Seep Monkeyflower (*Guttatus*)." Garden Guides. N.p., n.d. Web. 24 July 2012. <<http://www.gardenguides.com/taxonomy/seep-monkeyflower-mimulus-guttatus/>>.
6. Lloyd, Kathy. *Mimulus Guttatus-Common Monkeyflower*. N.p.: Montana Native Plant Society, n.d. PDF.

# Naked Mitrewort

Level III

**Scientific Name:** *Mitella nuda*

**General Description:** Small rhizomatous and often stoloniferous perennial with pubescent stalks 0.7-2.5 dm tall. Leaves are basal with one sessile or short-petiole leaf below the middle of the stem. Blades are round to heart shaped and may be kidney shaped. Hair-like structures are present on the upper surface. Flowers are small, greenish, and in clusters of 3-12. Fruit capsules are 2-3 mm long and open widely into shallow cups; usually shiny and black in color.

**Natural Heritage State Status/NatureServe Global Status:**

S3/G5 – Vulnerable/Secure

**Federal Status:** Not listed

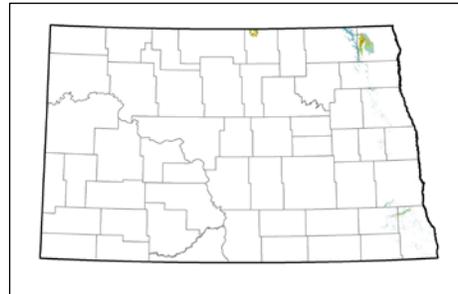
**Range:** Range includes Washington, Montana, North Dakota, Minnesota, Iowa, Wisconsin, Michigan, Pennsylvania, New York, Connecticut, Massachusetts, Vermont, New Hampshire, and Maine.

**Primary Habitat:** Bogs and swamps, often growing around mosses.

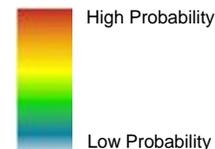
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Kitty Kohout



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has been recorded in Pembina, Bottineau, and Rolette Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Naked Mitrewort

Level III

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Mitella nuda*. However, further research is always needed as it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Mitella Nuda (Naked Mitrewort)." *Flora, Fauna, Earth, and Sky..the Natural History of the North Woods*. Valley Internet Company, 7 Nov. 2002. Web. 24 July 2012. <<http://www.rook.org/earl/bwca/nature/herbs/WIP/mitellanuda.html>>.

# Rhombic Evening-primrose

Level III

**Scientific Name:** *Oenothera rhombipetala*

**General Description:** Annual or biennial wildflower initially forms a low rosette of basal leaves spanning 3-6" across. It later develops little branched flowering stalks about 1-2' tall. Stems are light green and are densely covered with appressed white hairs. The leaves are alternate up to 2 ½ long and ½ across. Most leaves are sessile, although some of the lower ones have short petioles. Leaf blades are linear-lanceolate, lanceolate, or oblong in shape; Upper surface of leaves are medium green and sparsely covered with small white hairs; lower surfaces are pale green and more densely covered with white hairs. Stem terminates in a leafy spike of yellow flowers.

**Natural Heritage State Status/NatureServe Global Status:** S2/G4G5 – Imperiled/Apparently Secure-Secure

**Federal Status:** Not listed

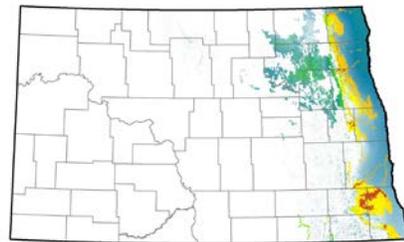
**Range:** Ranges from southern South Dakota, Nebraska, Kansas, western Missouri, Oklahoma, Texas, scattered areas in central Arkansas, and Lea County New Mexico; Other populations include eastern Minnesota, south-western Wisconsin, Illinois, and Michigan.

**Primary Habitat:** Upland sand prairies, sandy hill prairies, sand dunes, upland sandy savannas, abandoned sandy fields, areas along sandy paths, and areas along railroads.

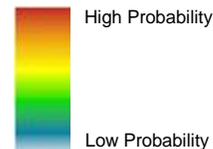
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

[Plants.usda.gov](http://Plants.usda.gov)



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota there has been two records from Richland and Grand Forks Counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Rhombic Evening-primrose

## Level III

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Oenothera rhombipetala*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.
- Occasional wildfires are beneficial in reducing the encroachment of woody vegetation.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Oenothera Rhombipetala." *Species Profile: Minnesota DNR*. Minnesota Department of Natural Resources, n.d. Web. 24 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDONA0C150>>.
5. "Cleland's Evening Primrose (*Oenothera Clelandii*)." Illinois Wildflowers, n.d. Web. 24 July 2012. <[http://www.illinoiswildflowers.info/prairie/plantx/cleland\\_primrose.htm](http://www.illinoiswildflowers.info/prairie/plantx/cleland_primrose.htm)>.

# One-flowered Broomrape

Level III

**Scientific Name:** *Orobanche uniflora*

**General Description:** Perennial wildflower producing 1-5 erect flowering stalks about 3-8" tall. Short scales present along the stem are highly modified leaves and are oval to ovate in shape and somewhat thick and succulent. The flowering stalks are usually pale gray or grayish tan, terete, and hairy. At the apex each stalk produces a single nodding flower about ¾-1" long. Flowers are white to lilac or a blending of these colors.

**Natural Heritage State Status/NatureServe Global Status:**  
SH/G5 – Possibly Extirpated/Secure

**Federal Status:** Not listed

**Range:** Range includes all of the contiguous 48 states and Alaska. Also includes much of Canada.

**Primary Habitat:** Upland woods, rocky cliffs where some seepage occurs, the base of bluffs, rocky glades, and thickets.

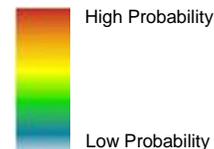
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has only been recorded in Cass County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# One-flowered Broomrape

Level III

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Orobancha uniflora*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "One-Flowered Broomrape (*Orobancha uniflora*).". Illinois Wildflowers, n.d. Web. 24 July 2012. <[http://www.illinoiswildflowers.info/woodland/plants/of\\_broomrape.htm](http://www.illinoiswildflowers.info/woodland/plants/of_broomrape.htm)>.

## Small-flowered Grass-of-Parnassus

Level III

**Scientific Name:** *Parnassia palustris* var. *parviflora*

**General Description:** Stems stand 1-4 dm in height. Except for a single stem leaf, the leaves are produced in a basal rosette. The basal leaves are long-petioled, with rounded, heart-shaped blades that are about 15-30 mm long and 11-25 mm broad, smooth-margined, and thin-textured. Upward, a single leaf is produced in the middle of the flowering stem; this stem leaf is stalk less and clasping. The flowering stem is terminated by a single, creamy white flower with 5 conspicuously veined petals 8-13 mm long.

**Natural Heritage State Status/NatureServe Global Status:**

S3/G4 – Vulnerable/Apparently Secure

**Federal Status:** Not listed

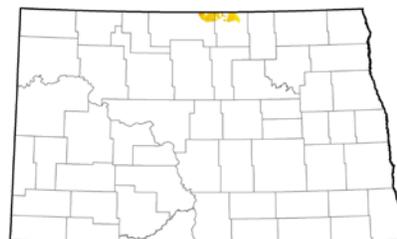
**Range:** Distributed from Alaska to Labrador, Newfoundland and Quebec, ranging south to Oregon, Wyoming, North and South Dakota, the Upper Great Lakes region, and New York.

**Primary Habitat:** Frequently occurs in more alkaline habitats, such as meadows and in damp calcareous sands on lakeshores.

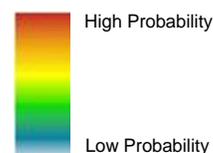
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota there is only one record of this species being present in Bottineau County.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Small-flowered Grass-of-Parnassus

## Level III

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Parnassia palustris*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Additional Research or Surveys Needed

- Inventory, particularly to determine the status of the mainland sites, as well as survey to discover new locations would be desirable, as would monitoring of any extant colonies for population trends and dynamics.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. Penskar, M.R., and P.J. Higman. *Parnassia Palustris*. Lansing, Michigan: Michigan Natural Features Inventory, 2002. PDF.

# Small-flowered Penstemon

Level III

**Scientific Name:** *Penstemon procerus*

**General Description:** Perennial herb with mat-forming stems at the base. Stems ascend, becoming erect; 10-40 cm tall, smooth, and slender.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

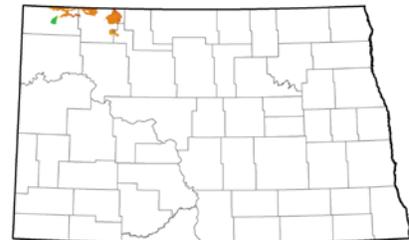
**Federal Status:** Not listed

**Range:** Range extends from Alaska south to California and Colorado and east as far as Manitoba.

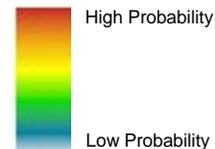
**Primary Habitat:** Dry meadows and on open forested slopes in the foothills up to alpine habitats.

**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota, this species prefers the dry meadows of Burke county in the northwest corner of the state.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Small-flowered Penstemon

## Level III

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Penstemon procerus*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Penstemon Procerus." Wikipedia. Wikimedia Foundation, 07 Jan. 2012. Web. 26 July 2012. <[http://en.wikipedia.org/wiki/Penstemon\\_procerus](http://en.wikipedia.org/wiki/Penstemon_procerus)>.
5. Slichter, Paul. *Penstemon Procerus Var. Procerus*. N.p.: Hart Mt. National Antelope Refuge, 1996. Word Document.

# Sweet Coltsfoot

## Level III

**Scientific Name:** *Petasites frigidus*

**General Description:** Perennial herb; 15-35 cm high with course flowers in several deep pink to pale pink heads; Large, triangular and coarsely toothed vegetative leaves.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

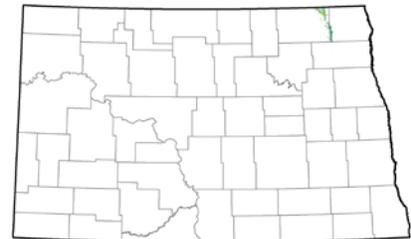
**Federal Status:** Not listed

**Range:** Present in most of Canada. In the United States the range includes; California, Oregon, Washington, Idaho, North Dakota, Minnesota, Wisconsin, Michigan, and most of the New England States.

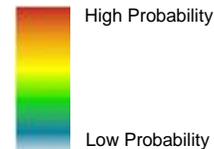
**Primary Habitat:** Substrates, along streams, river terraces, imperfectly drained moist areas, seepage slopes, gravel, sand, silt, moss, and other moist organic areas.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- This species has been documented in Bottineau, McHenry, Rolette, Benson, and Pembina Counties in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Sweet Coltsfoot

## Level III

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Petasites frigidus*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. *Petasites Frigidus Var. Palmatus*. N.p.: U.S.D.A Forest Service, n.d. PDF.
5. Aiken, S.G., M.J. Dallwitz, L.L. Consaul, C.L. McJannet, L.J. Gillespie, R.L. Boles, G.W. Argus, J.M. Gillett, P.J. Scott, R. Elven, M.C. LeBlanc, A.K. Brysting, and H. Solstad. "Petasites Frigidus." *Flora of the Canadian Arctic Archipelago*. N.p., n.d. Web. 24 July 2012.

# Downy Phlox

## Level III

**Scientific Name:** *Phlox pilosa*

**General Description:** Perennial plant that stands up to 2 feet tall and is unbranched. The stem is covered in fine white hairs. Opposite leaves are up to 3.5 inches long and ½ inch wide and are sparsely distributed along the stem. The lower leaves tend to turn yellow and drop off the stem when the plant becomes stressed out. There is a cluster of flowers at the apex of the plant on short hairy stalks. Each flower is about ½ inch across and has five lobes that flare abruptly outward from a long narrow tubular corolla. These lobes are rather angular and become considerably more narrow the closer to the base of the corolla they are. The flowers may be white, pink, or lavender and have a mild pleasant fragrance.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range extends from North Dakota, east to New York and south to Florida and Texas.

**Primary Habitat:** Moist to mesic black soil prairies, rocky open forests, bur oak savannas, sandy black oak savannas, limestone glades, thickets, abandoned fields, and prairie remnants along railroads.

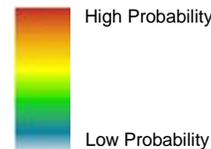
**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- This species has been documented as present in Cass and Richland counties of North Dakota, in the Red River Valley.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Downy Phlox

## Level III

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Phlox pilosa*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- Research has been done on the relationship between population size and reproductive characteristics.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Prairie Phlox (Phlox Pilosa)." Illinois Wildflowers, n.d. Web. 24 July 2012. <[http://www.illinoiswildflowers.info/prairie/plantx/pr\\_phloxx.htm](http://www.illinoiswildflowers.info/prairie/plantx/pr_phloxx.htm)>.
5. "Native Wildflowers of the North Dakota Grasslands-Prairie Phlox (Phlox Pilosa)." Northern Prairie Wildlife Research Center. U.S. Geological Survey, 3 Aug. 2006. Web. 24 July 2012. <<http://www.npwrc.usgs.gov/resource/plants/wildflwr/species/phlopilo.htm>>.

# Green Woodland Orchid

Level III

**Scientific Name:** *Platanthera clavellata*

**General Description:** Small, herbaceous, perennial plant with 3-15 yellow-green (or whitish-green in shade) flowers at the top of and angled from an erect stem.

**Natural Heritage State Status/NatureServe Global Status:**  
SH/G5 – Possibly Extirpated/Secure

**Federal Status:** Not listed

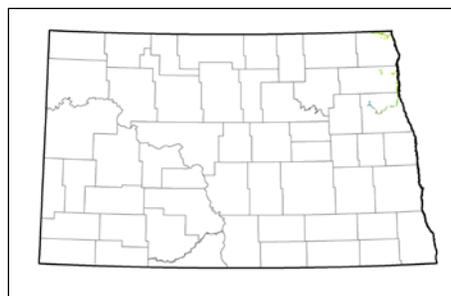
**Range:** Range extends from Maine to Florida, west to Texas and Oklahoma, and north to Minnesota and North Dakota.

**Primary Habitat:** Seepages, springs (usually wooded); shrub borders of acid bogs; swamp woods; creek floodplains; occasionally open fens; and in the northern or mountainous part of its range, seepage slopes or sunlit stream beds. This species may also thrive in disturbed sites, such as abandoned quarries, road banks, and ditches.

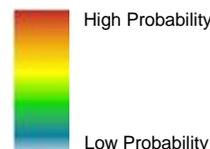
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has only been recorded once in Grand Forks County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Green Woodland Orchid

## Level III

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- There hasn't been a lot of studies on this particular species, however continued basic examination of the widely scattered herbarium specimens of this orchid determine its current and historic range throughout the Midwest region.

#### Previous Research or Surveys

- Some research on fungal symbionts and their relationship with young plants of this kind has been done but much of the relationship is still unknown.

#### Additional Research or Surveys Needed

- Fertility, the actual population sizes, dormancy periods, early establishment requirements, precise moisture needs, growth rates, and genetic health (including variability) are all areas where more data is needed. Field observations over a period of several years is needed to fully understand this species.
- Fire management needs to be experimented before put to use. Although it has showed to be beneficial, carefully controlled experiments are needed to solve the mystery of why it is actually beneficial to this species.
- Botanical surveys need to be conducted for this species.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.
- Periodic monitoring of the life history and potential threats should be evaluated.
- Population stability, reproduction, and vigor should all be monitored also.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Hill, Steven R. "Conservation Assessment for the Green Wood Orchid." (2007): 1-47. Print.
4. McCormick, Melissa, and Dennis Whigham. *Orchids and Their Mycorrhizal Fungi at Cove Point ( Calvert County, Maryland)*. Tech. N.p.: n.p., 2004. Print.

# Mountain Meadow Cinquefoil

Level III

**Scientific Name:** *Potentilla diversifolia*

**General Description:** Perennial that arises from woody persistent base, and short thick rootstocks. There are usually several spreading to erect stems that are 4 to 18 inches tall. Pinnate leaves appear greenish and are mainly basal and can be up to ½ inch broad. The leaflets are slightly to moderately covered in soft hairs, at least on the lower surface, and often become hairless. The many-flowered inflorescence has a flat top.

**Natural Heritage State Status/NatureServe Global Status:**

S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Fairly broad range includes Southeastern British Columbia, and Southeastern Alberta, Idaho, Montana, the Dakotas, Wyoming, Utah, and Washington.

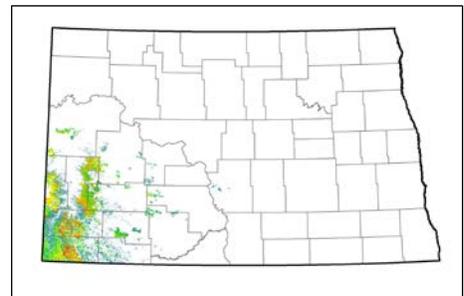
**Primary Habitat:** Gullies, glacial valleys, on ridge tops, in a moist meadow at the margin of a wetland and a coniferous forest from 5850 to 7380 feet elevation. It also favors moist, shady and open areas, gravelly soils of glacially carved areas, alpine to subalpine or montane areas, ledges and rocky slopes, as well as stream banks.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS):

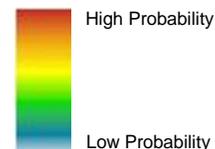
Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.

Easterncoloradowildflowers.com



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- This species has been documented in shady and open areas in Billings and Slope Counties in North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Mountain Meadow Cinquefoil

Level III

## Other Natural or Manmade Factors

- Potential threats also include grazing, hydrologic alteration, and recreational land use.

## **RESEARCH AND SURVEY EFFORTS**

- Currently there are no research or survey projects being conducted for *Potentilla diversifolia*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## **MANAGEMENT RECOMMENDATIONS**

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## **REFERENCES**

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. *Potentilla Diversifolia*. N.p.: Washington Natural Heritage Program/ U.S.D.I Bureau of Land Management, 2005. PDF.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Heart-leaved Buttercup

## Level III

**Scientific Name:** *Ranunculus cardiophyllus*

**General Description:** Fibrous-rooted perennial with erect, branched stems that are 15-40 cm high. The basal leaves have spade-shaped blades that are 2-6 cm long and toothed margins and petioles that are 2-12 cm long. The few, alternate stem leaves are deeply divided like fingers on a hand. The foliage is covered with straight, spreading hairs. Stalked flowers arise from the axils of the uppermost leaves, or bracts, forming an open, few-flowered inflorescence. Each saucer-shaped flower has five yellowish sepals that fall off shortly after opening, five yellow petals that are 8-15 mm long, each with a small basal pocket with long hairs at the top. The cylindrical fruiting heads bear 20-100 flattened, egg-shaped, hairy fruits that are 1-2 mm long; each has a short, straight beak on top.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G4G5 – Critically Imperiled/Apparently Secure-Secure

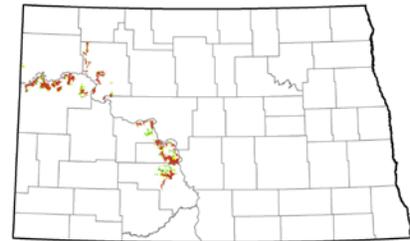
**Federal Status:** Not listed

**Range:** Currently identified as present in Arizona, Colorado, Montana, North Dakota, New Mexico, South Dakota, Utah, Washington, and Wyoming.

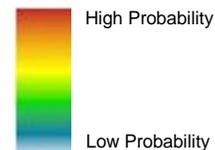
**Primary Habitat:** Moist meadows and grasslands often associated with wetlands in the foothill zone.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota there is only one record of this species in McKenzie County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Heart-leaved Buttercup

## Level III

### Other Natural or Manmade Factors

- Grazing/trampling
- Introduction of invasive species.
- Changes to hydrology.

### **RESEARCH AND SURVEY EFFORTS**

- Currently there are no research or survey projects being conducted for *Ranunculus cardiophyllus*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

### **MANAGEMENT RECOMMENDATION**

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### **MONITORING PLANS**

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### **REFERENCES**

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

## Hair Beakrush

Level III

**Scientific Name:** *Rhynchospora capillacea*

**General Description:** Perennial herb which may grow up to .9-4 dm in height. It has a capillary, flexuous-erect stem and thread-like leaves. Inflorescence is an axillary spikelet with imbricate scales. Each stem bears a single, long-peduncled, ovoid cluster of 1-10 fusiform spikelets. Each floret is subtended by papery, light or dark brown scale, and bears a perianth of 6 bent barbed or smooth bristles. The fruit is fusiform, lenticular, oblong-elliptic, and quite narrowed towards the base.

**Natural Heritage State Status/NatureServe Global Status:**

S2/G4 – Imperiled/Apparently Secure

**Federal Status:** Not listed

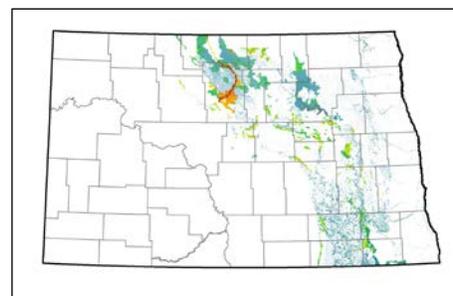
**Range:** Range extends from Newfoundland to Saskatchewan, south to Virginia, Tennessee, and Missouri.

**Primary Habitat:** Calcareous swamps, bogs, fens and shores; Open non-forested wetland.

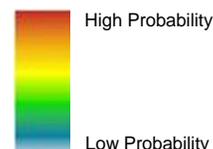
**Climate Index Rank:** Moderately Vulnerable (MV): Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Wisplants.uwsp.edu Derek Anderson



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In the Midwest habitat includes calcareous fens, marl fens, fen-like seepage communities, sedge meadows, calcareous lakeshores (cobble beaches, wet sandy or stony shores, boggy beach pools); shoreline meadows, interdunal meadow depressions; limy seeps, seepages of limestone and dolomite cliffs; seepy, shelving rock ledges, moist areas of calcareous quarries and gravel pits.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

## Hair Beakrush

Level III

### Other Natural or Manmade Factors

- Alteration to hydrology, loss of natural disturbance regime, habitat destruction or conversion, grazing, and subsequent competition from invasive exotic species.

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Seeds have been collected from four of the New England populations through the NEPCoP Seed Bank Program. The purpose of the program is to collect and store seeds of New England populations of regionally and globally rare species in order to increase the knowledge of species habitat and cultural requirements, scientific research, augmentation, reintroduction, or introduction into the wild.

### Previous Research or Surveys

- Although there hasn't been any species-specific research done, research into the general community types that support this species have been conducted. Study topics have included the effects of dam impoundment on flooding regimes along river shore communities, effects of road salt and invasive species on a fen community, and the influence of beaver flooding on species composition and diversity of a fen community.

## MANAGEMENT RECOMMENDATIONS

- Protect or create large tracts of grassland, particularly native prairie.
- Prevent encroachment of woody vegetation in grasslands.
- Encourage vegetative diversity.
- Practice rotational burning: intervals of 3-4 years in tallgrass prairie, 6 years in mixed-grass prairie, and 5-10 years in shortgrass prairie.
- Delay mowing until July 15.
- Prevent overgrazing.
- Use native grasses when replanting grassland.

## MONITORING PLANS

- Semi-regular monitoring of several sites has occurred for most of the current New England populations.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. *Rhynchospora Capillacea (Horned Beak-rush)*. Augusta, ME: Maine Department of Conservation Natural Areas Program, n.d. PDF.
5. "Rhynchospora Capillacea." Species Profile: Minnesota DNR. Minnesota Department of Natural Resources, n.d. Web. 25 July 2012. <<http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail>>.
6. Cullina, Melissa Dow. *Rhynchospora Capillacea-Conservation and Research Plan for New England*. N.p.: Massachusetts Natural Heritage and Endangered Species Program, 2002. PDF.

# Nodding Ladies'-tresses

Level III

**Scientific Name:** *Spiranthes cernua*

**General Description:** Plant pubescent above the leaves, 10-40 cm tall (including inflorescence). Leaves are mostly basal, oblanceolate to linear-lanceolate, 10-20 cm long and .5-1 cm wide. Inflorescence is a downy, spicate raceme of 20-40 white flowers, 10-40 cm tall; dense and multi-ranked, each flower subtended by an elongate, ovate-lanceolate bract.

**Natural Heritage State Status/NatureServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

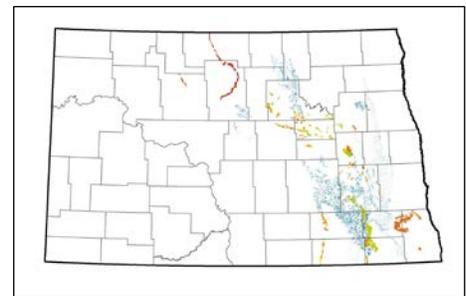
**Federal Status:** Not listed

**Range:** Range extends along most of the eastern United States from Georgia to Maine and covers all the states to the west until you reach Texas, Oklahoma, Kansas, and Nebraska.

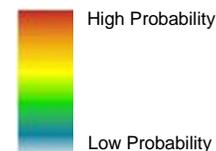
**Primary Habitat:** Commonly found in moist, sandy, acidic or basic soils. Other possible habitat includes moist meadows, lakeshores, and roadside ditches.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



**Key to the Habitat Distribution Map**



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- This species is present in the southern portion of North Dakota.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

# Nodding Ladies'-tresses

## Level III

### RESEARCH AND SURVEY EFFORTS

#### Current Research or Surveys

- Currently there are no research or survey projects being conducted on *Spiranthes cernua*. However, further research is always needed because it helps us better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

#### Previous Research or Surveys

- Research has been performed on reproductive and photosynthetic aspects.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. "Spiranthes Cernua." *Department of Botany-University of Wisconsin Madison*. N.p., n.d. Web. 23 July 2012. <<http://www.botany.wisc.edu/orchids/cernua.html>>.
4. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Hooded Ladies'-tresses

Level III

**Scientific Name:** *Spiranthes romanzoffiana*

**General Description:** Erect perennial that is hairless and stands about 10-40 cm tall. Leaves are alternate and there are several of them towards the base of the plant. They are linear to narrowly oblong.

**Natural Heritage State Status/NaturServe Global Status:**  
S1/G5 – Critically Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range extends from Newfoundland to Alaska, south to California, Arizona, New Mexico, Montana, Nebraska, Iowa and New York.

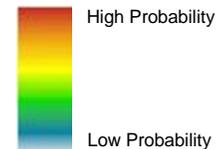
**Primary Habitat:** Damp meadows, on lakeshores, in seasonally flooded pastures, and in valley bogs.

**Climate Index Rank:** Moderately Vulnerable (MV):  
Abundance and/or range extent within geographical area assessed likely to decrease by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has been documented in Burke and Benson Counties. In these counties there is potential habitat near the lakes that are in the area.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs. The largest threat is habitat loss and alterations through previously undisturbed prairie being broken to produce crops.

### Other Natural or Manmade Factors

- Grazing; too much or too little can be a negative impact depending on where the population is located.
- Disturbance on lakeshores through trampling, and development of recreational facilities.
- Fertilizer and herbicide use.
- Altered hydrological regimes.

# Hooded Ladies'-tresses

Level III

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are two research projects being conducted by the NPWS. The first project is investigating the ecology, distribution, and reproductive biology of populations of *Spiranthes romanzoffiana* in Ireland. This study will assess the extent of genetic variation between and among Irish, British, and North American populations. These data will assist in the production of scientifically based management plans for the species and the site in which it occurs. The second project will look more closely at the pollination biology. This research will examine the idea that due to the rarity of this species, insufficient pollinators are attracted to it, which results in seed production and increased rarity.

### Previous Research or Surveys

- Site monitoring occurs every 3 years in Ireland. This site monitoring surveys designated sites for any changes to the habitats and the species itself. It also reports all activities that may have an impact on the habitats and species and in doing so monitors any effects to the protected species present.

### Additional Research or Surveys Needed

- Details regarding this species ecological requirement are lacking.

## MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

# Hooded Ladies'-tresses

Level III

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. *All Ireland Species Action Plan-Irish Lady's-tresses*. Dublin, Ireland: National Botanic Gardens of Ireland, Feb. 2005. PDF.
5. Sipes, Sedonia D., and Vincent J. Tepedino. "Reproductive Biology of the Rare Orchid, *Spiranthes Dilvialis*: Breeding System, Pollination, and Implications for Conservation." *Conservation Biology* 9.4 (1995): 929-38. *JSTOR*. Web. 25 July 2012. <<http://www.jstor.org/stable/2387001>>.
6. "Hooded Ladies' Tresses (*Spiranthes Romanzoffiana*)." Montana Plant Life. N.p., n.d. Web. 25 July 2012. <[http://montana.plant-life.org/species/spir\\_roma.htm](http://montana.plant-life.org/species/spir_roma.htm)>.

# Flat-leaved Bladderwort

Level III

**Scientific Name:** *Utricularia intermedia*

**General Description:** Submersed plant with slender stems, commonly creeping along the bottom. Numerous, alternate leaves parted at the base and 1-3 times dichotomous. Segments are often unequal, slender, and flat. Contains 2-4 flowers that are corolla yellow and with a very short proper tube.



**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

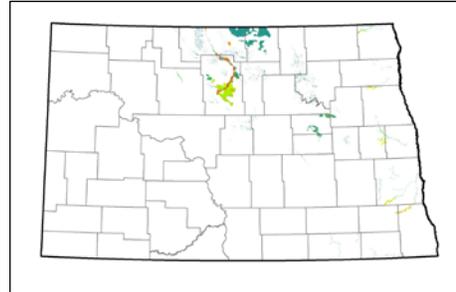
**Federal Status:** Not listed

**Range:** Circumboreal in North America, extending south to California, northern Nevada, southeast Idaho, northern Utah, Montana, Indiana, and Delaware.

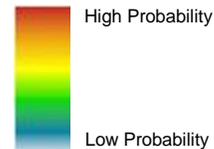
**Primary Habitat:** Shallow ponds, slow-moving streams, and wet sedge or rush meadows.

**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- Species has been documented in Bottineau, Cavalier, McHenry, and Pembina counties.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

### Other Natural or Manmade Factors

- Invasion of aquatic weeds
- Draining wetlands
- Herbicide applications

# Flat-leaved Bladderwort

Level III

## RESEARCH AND SURVEY EFFORTS

### Current Research or Surveys

- Currently there are no research or survey projects being conducted for *Utricularia intermedia*. However, further research is always needed as it allows us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- Preserving the natural wetland habitat.
- Prevent the invasion of aquatic weeds.

## MONITORING PLANS

- Suitable habitat throughout the range of the species should be systematically inventoried.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Williams, Tara Y. 1990. *Utricularia intermedia*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/> [2012, July 23].
4. "Utricularia Intermedia." *Flora, Fauna, Earth, and Sky..the Natural History of the North Woods*. Valley Internet Company, 26 Feb. 2004. Web. 23 July 2012. <<http://www.rook.org/earl/bwca/nature/aquatics/utriculariain.html>>.
5. "Utricularia Intermedia." Washington Department of Natural Resources, 1999. Web. 23 July 2012. <<http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/utin.pdf>>.
6. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

# Culver's-root

Level III

**Scientific Name:** *Veronicastrum virginicum*

**General Description:** Perennial plant that is up to 5 feet tall and unbranched. Central stem is round and smooth. Scattered along the stem are 3-7 whorled leaves that can be up to 6 inches long and 1.5 inches across. At the apex of the plant are several slender spikes of white flowers up to 8 inches long. The narrow tubular flowers are about ¼ inches long from which two yellow or brown stamens are exerted. The flowers have no scent and they bloom early to mid-summer.

**Natural Heritage State Status/NatureServe Global Status:**  
SH/G4 – Possibly Extirpated/Apparently Secure

**Federal Status:** Not listed

**Range:** Range includes all of the eastern and mid-western United States. The range ends at North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas.

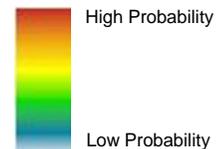
**Primary Habitat:** Occurs in moist to mesic black soil prairies, sand prairies, openings and edges of woodlands, thickets, savannas, and swampy meadows along rivers and ditches.

**Climate Index Rank:** Not Vulnerable/Presumed Stable (PS): Available evidence does not suggest that abundance and/or range extent within the geographical area assessed will change (increase/decrease) substantially by 2050. Actual range boundaries may change.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.



Key to the Habitat Distribution Map



## LOCATIONS AND CONDITIONS OF KEY HABITAT

### Preferred Habitat

- In North Dakota this species has only been documented in Pembina County.

## PROBLEMS WHICH MAY AFFECT THIS SPECIES

### Habitat

- The greatest threats to this species is habitat alteration and loss.

### Other Natural or Manmade Factors

- Potential threats also include grazing, hydrologic alteration, and recreational land use.

# Culver's-root

Level III

## RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Veronicastrum virginicum*. However, further research is always needed as it helps us to better understand a multitude of sensitive plant species populations and their life cycle requirements necessary for survival.

## MANAGEMENT RECOMMENDATIONS

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

## MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

## REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.
4. "Culver's Root (*Veronicastrum Virginicum*).". Illinois Wildflowers, n.d. Web. 26 July 2012. <<http://www.illinoiswildflowers.info/prairie/plantx/culverx.htm>>.

## Bog Violet

Level III

**Scientific Name:** *Viola conspersa*

**General Description:** Perennial wildflower standing 4-8" tall; Consists of leafy stems that are light green and glabrous. The blades of the alternate leaves are 1-2.5" long and ¾-1.5" across; they are oval-cordate in shape and serrate-crenate along their margins. The base of each leaf blade is indented, while its tip is well-rounded to somewhat pointed; upper blade surface is medium to dark green and glabrous, while the lower surface is light to medium green and glabrous. Individual flowers develop from the axils of the leaves on pedicels about 1.5-3" long. They are ½-¾" across, consisting of five pale blue-violet petals. Dark blue-violet veins radiate away from the throat of each flower across the petals. Fertilized flowers produce an ovoid-oblongoid seed capsule about 1/3" long; this capsule splits into three parts to fling the seeds from the mother plant.

**Natural Heritage State Status/NatureServe Global Status:**  
S2/G5 – Imperiled/Secure

**Federal Status:** Not listed

**Range:** Range extends from Maine, south to Florida and west to Alabama, Tennessee, Kentucky, Illinois, Wisconsin, Minnesota, and North Dakota. Also includes Colorado, and much of Canada.

**Primary Habitat:** Moist rich woodlands, swampy woodlands, and moist meadows in wooded areas.

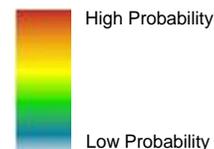
**Climate Index Rank:** Highly Vulnerable (HV): Abundance and/or range extent within geographical area assessed likely to decrease significantly by 2050.

**Reason for Designation:** This species is considered a sensitive plant, which means that it is not listed as threatened or endangered but is still designated for special management consideration.

Plants.usda.gov



Key to the Habitat Distribution Map



### LOCATIONS AND CONDITIONS OF KEY HABITAT

#### Preferred Habitat

- In North Dakota this species has been recorded once in Richland County, in the southeastern part of the state.

### PROBLEMS WHICH MAY AFFECT THIS SPECIES

#### Habitat

- The greatest threats to this species are habitat alterations and climate change. Climate change poses a threat because it could change the amount of precipitation and temperature in the region altering soil chemistry that the plant needs.

# Bog Violet

## Level III

### RESEARCH AND SURVEY EFFORTS

- Currently there are no research or survey projects being conducted for *Viola conspersa*. However, further research is always needed as it will help us better understand a multitude of sensitive plant species populations and their life cycle requirements that are necessary for survival.

### MANAGEMENT RECOMMENDATION

- To establish management plans, the first step is to gain knowledge of population locations, extent, demographic characteristics, and changes in population characteristics over time.
- With the above knowledge gained, population viability analysis can be used to estimate the minimum population size to sustain the taxon. While this information is being collected, preserving habitat and restricting/limiting harvest would be beneficial.

### MONITORING PLANS

- Monitor all populations in sufficient detail to determine whether viable populations are being maintained, assess the factors causing population fluctuations, and determine the conservation status of the populations.
- Monitor habitat condition and management on a periodic basis to ensure that optimal site management is being achieved.

### REFERENCES

1. *Welcome to the PLANTS Database | USDA PLANTS*. United States Department of Agriculture, 7 July 2012. Web. 18 July 2012. <<http://plants.usda.gov/java/>>.
2. NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <<http://www.natureserve.org/>>.
3. Stevens, O. A. "The Geographical Distribution of North Dakota Plants." *American Journal of Botany* 7.6 (1920): 231-42. *JSTOR*. Web. 10 June 2010. <<http://www.jstor.org/stable/10.2307/2435172>>.
4. *Dog Violet*. Illinois Wildflowers, 6 Oct. 2010. Web. 19 July 2012. <[http://www.illinoiswildflowers.info/woodland/plants/dog\\_violet.htm](http://www.illinoiswildflowers.info/woodland/plants/dog_violet.htm)>.
5. North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. 2012. Biodiversity Tracking and Conservation System (Biotics 4). Bismarck, North Dakota. Bismarck, ND.

## **APPENDIX B**

### **Plant Species of Conservation Priority Matrix**

State Scientific Name	State Common Name	State Rank	Global Rank	USFWS Status	Climate Index Rank	Confidence	Level	NDCWCS Focus Area	NDCWCS Landscape Components	Ecoregion -EPA Level IV	Habitat
<i>Cypripedium parviflorum</i>	Small Yellow Lady's-slipper Orchid	S2	G5		EV	VH	II	Glacial Lake Deltas, Killdeer Mountains, Pembina Hills, Sand Deltas and Beach Ridges, Sheyenne River, Turtle Mountains	Eastern-Mixed-grass Prairie, Rivers, Streams, and Riparian, Tallgrass Prairie, Upland Deciduous Forest	Glacial Lake Deltas, Glacial Outwash, End Moraine Complex, Sand Deltas and Beach Ridges, Glacial Lake Basins, Glacial Lake Agassiz Basin	Damp woods, fens, stream banks; Bogs and wet forests; It occurs in undisturbed bogs, seepage areas, damp and mossy woods, and moist forest-meadow borders. It is usually associated with old growth spruce and fir forests. Distribution, it is a widespread, but sparsely distributed species. Occurs in North America from BC to WA and OR and east to eastern US.
<i>Platanthera praeclara</i>	Western Prairie Fringed Orchid	S2	G3	LT	EV	VH	I	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Sand Deltas and Beach Ridges, Glacial Lake Agassiz Basin, Drift Plains, Tewauckon Dead Ice Moraine, Glacial Outwash	Western portions of the North American tallgrass prairie. Most commonly on moist, calcareous or subsaline prairies and sedge meadows; Red River Valley of northern Minnesota, south in the Great Plains through the eastern Dakotas, central Nebraska, eastern Kansas, and northeastern Oklahoma; Occurs in mesic upland tallgrass prairie in the southern part of its range, often in swales, and wet-mesic tallgrass prairie and sedge meadows in the northern part of its range. Also known from prairies and swales in sand dune complexes that are fed by shallow underground water; It often occurs in Woolly sedge, northern reed grass, and Baltic rush habitats. Most often found at the bases of sandhills, but it has been found in prairie swales and in the uplands; In ND occurs in the Sheyenne National Grassland portion of the Custer National Forest;
<i>Triantha glutinosa</i>	Sticky False-asphodel	S1	G5		EV	VH	I	Devils Lake Mountains	Eastern Mixed-Grass Prairie, Rivers, Streams, and Riparian	Drift Plains	Fens, wet meadows, marshes, sphagnum bogs and mossy seeps, calcareous soils, usually in stands of subalpine fir and western hemlock with elevations from 5,000-6360 ft; Restricted to wet, open marly soil: fens, calcareous ledges, and shores; Nfld. to MN, s. to NY, OH, and IN; in mts. to WV and NC; also Alta. to B.C.
<i>Allium canadense</i>	Meadow Onion	S1	G5		HV	VH	I	Sand Deltas and Beach Ridges	Eastern-Mixed Grass Prairie, Tallgrass Prairie, Rivers, Streams, and Riparian, Upland Deciduous Forest	Tewauckon Dead Ice Moraine, Prairie Coteau Escarpment	
<i>Asclepias lanuginosa</i>	Woolly Milkweed	S1	G4?		HV	Mod	I	Sand Deltas and Beach Ridges, Cannonball River, Heart River, Knife River, Killdeer Mountains, James River, Souris River	Western-Mixed Grass/Shortgrass Prairie, Mixed-Grass Prairie, Eastern-Mixed Grass Prairie, Tallgrass Prairie, Rivers, Streams, and Riparian	Glacial Dark Brown Prairie, Missouri Coteau, Drift Plains, Sand Deltas and Beach Ridges, Glacial Lake Agassiz Basin, End Moraine Complex, Missouri Plateau, River Breaks, Little Missouri Badlands, Pembina Escarpment	Sandy or rocky calcareous prairie, dry upland woods, gravelly hillside praires
<i>Astragalus neglectus</i>	Cooper's Milkvetch	S1	G4		HV	VH	I	Sand Deltas and Beach Ridges	Tallgrass Prairie	Sand Deltas and Beach Ridges, Pembina Escarpment, Glacial Lake Agassiz Basin	Sandy, gravelly shores, mesic gravelly prairies, occurs primarily on sites with a periodic disturbance regime; Sometimes occurs in rocky clearings and shores, sandy oak openings, and alvar; occurs on calcareous gravels, talus, and cliffs ranging from MN to Ontario, WI, SD, and IA.
<i>Astragalus vexilliflexus</i>	Bent-flowered Milkvetch	S3	G4		HV	Low	III	Killdeer Mountains	Upland Deciduous Forest	Missouri Plateau	Rare but locally common in rocky prairie knolls, ridges, badlands, and open wooded hillsides; ND: Dunn, Slope, Stark
<i>Carex capillaris</i>	Hair-like Sedge	S2	G5		HV	Low	III	Glacial Lake Deltas	Eastern-Mixed-grass Prairie	Glacial Lake Deltas	Mesic to moist tundra, seeps on cliffs, rocks, and slopes, fens, meadows, shores, prairie sloughs, edges of sphagnum mats, moist woods; 0-3500 m; Greenland; In North America, it is known from Alaska east to Nunavut and Greenland south to New Hampshire, New York, Michigan, Minnesota, South Dakota, New Mexico, Utah, Nevada, and California. In the west it is mostly in the mountains
<i>Carex echinata</i> ssp. <i>echinata</i>	Spiny Sedge	S1	G5T5		HV	Mod	II	Turtle Mountains	Upland Deciduous Forest	Turtle Mountains	Bogs, swamps, peaty or sandy shores of streams or lakes, wet meadows, usually in acidic soils
<i>Cheilanthes feei</i>	Slender Lip Fern	S1	G5		HV	VH	II	Killdeer Mountains	Upland Deciduous Forest	Missouri Plateau	Dry, rocky slopes or crevices of boulders and cliffs, limestone or sandstone; Calcareous cliffs and ledges; This species has a widespread range from British Columbia and Alberta, south to Texas and adjacent Mexico, north to Wisconsin and East in Kentucky and Virginia.
<i>Chenopodium subglabrum</i>	Smooth Goosefoot	S1	G3G4		HV	Mod	I	Little Missouri River, Ponderosa Pine Area, Big Sagebrush Shrub-Steppe	Rivers, Streams, Riparian, Western Mixed-grass/Shortgrass Prairie, Badlands	Little Missouri Badlands	Sandy areas, particularly sand bars in rivers and in sandy blowouts near river banks; Great Plains, west to Washington and Oregon, north into Canada and east to Great Lakes according to Kartesz. The distribution reported by Flora of North America (2003) is somewhat narrower than that shown by Kartesz (1999); FNA excludes Ohio, Kansas, Idaho, and Oregon from its distribution, and also excludes Delaware and Maryland (added by Kartesz after 1999). However, FNA does report this species from Iowa, whereas Kartesz does not.
<i>Clematis columbiana</i> var. <i>tenuiloba</i>	Slender-lobed Clematis	S1	G5?T4?		HV	VH	II	Killdeer Mountains	Upland Deciduous Forest	Missouri Plateau	Open woods and prairies, usually in rocky ( limestone) soil, relatively common in the BH of SD; Cliffs, rocky summits, usually in open sites or open pine forest; 1000-3000 m; Colo., Mont., N.Dak., S.Dak., Utah, Wyo.
<i>Cyperus bipartitus</i>	Brook Flatsedge	S2	G5		HV	Low	II	Missouri Coteau Breaks, Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Mixed-grass Prairie, Rivers, Streams, and Riparian	Missouri Coteau, Sand Deltas and Beach Ridges	Wet ground, especially along shores, margins of streams, marshes, shores of ponds, lakes, bogs, low fields, ditches; Emergent shorelines; Maine to North Dakota, south to Georgia and Texas, with disjunct populations in California and Mexico; Sandy or muddy shores and streambanks. Habitat in ND includes moist, exposed sandy areas along streambanks; other habitat is described as saturated loamy soils along margins of spring-fed creeks.
<i>Cypripedium candidum</i>	White Lady's-slipper	S2	G4		HV	VH	I	Glacial Lake Deltas, Saline Areas, Sand Deltas and Beach Ridges, Sheyenne River, Devils Lake Basin	Eastern-Mixed-grass Prairie, Rivers, Streams, and Riparian, Tallgrass Prairie	Glacial Lake Deltas, Glacial Outwash, End Moraine Complex, Glacial Lake Basin, Glacial Lake Agassiz Basin, Saline Area, Drift plains, Sand Deltas and Beach Ridges, Tewauckon Dead Ice Moraine	Low prairie, wet meadows; Mesic to wet prairies and fen meadows, very rarely open wooded slopes; prairies where there is moisture but full sunlight. It can be found in limestone barrens and on forest edges; Distributed more commonly to the east of our region, from Newfoundland to SE SAK, South to ND and East to Connecticut. found on the Sheyenne National Grassland portion of the Custer National Forest.
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Large Yellow Lady's-slipper	S2	G5T5		HV	Low	III	Glacial Lake Deltas, Sand Deltas and Beach Ridges, Sheyenne River, Turtle Mountains, Devils Lake Basin	Eastern-Mixed-grass Prairie, Rivers, Streams, and Riparian, Tallgrass Prairie, Upland Deciduous Forest	Glacial Lake Deltas, Glacial Lake Basin, Sand Deltas and Beach Ridges, Turtle Mountains, Missouri Coteau, Pembina Escarpment, Drift Plains	Boggy areas, wet prairies; Mesic deciduous and coniferous forest, openings, thickets, prairies, meadows, fens; usually associated with old growth spruce and fir forests. It is widespread, but sparsely distributed. It occurs in North America from British Columbia to Washington and Oregon, and east to the eastern US. In the Northern region it is located in the western mountains of Montana.



Minuartia dawsonensis	Stiff Sandwort	S1	G5		HV	Mod	II	Pembina Hills	Upland Deciduous Forest	Pembina Escarpment	Open rocky or gravelly areas, on shale; Moist, calcareous ledges and gravelly areas (dry, open, and sometimes disturbed slopes, calcareous-gravel raised beach ridges, thin soil over limestone) in mesic forest openings and meadows in montane and subalpine areas and boreal plains, dry, open outcrops in oak or juniper savannas or prairies; 0-900 m; Alta., B.C., Man., Nfld. and Labr., N.W.T., Nunavut, Ont., Que., Sask., Yukon; Alaska, Mich., Minn., N.Dak., Wis.
Mitella nuda	Naked Mitrewort	S3	G5		HV	Low	III	Pembina Hills, Sand Deltas and Beach Ridges, Turtle Mountains	Tallgrass Prairie, Upland Deciduous Forest	Turtle Mountains, Pembina Escarpment, Sand Deltas and BeachRidges	Moist woods and along streambanks; Swampy lowland woods and thickets; wet; forests, bogs, often in moss; Global Range Comments: Widespread in northeastern North America and Asia, spotty distribution in northwestern North America; MN, ND, (across Canada, s to n U.S.)
Onoclea sensibilis	Sensitive Fern	S2	G5		HV	LOW	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Prairie Coteau Escarpment, Sand Deltas and Beach Ridges	
Orobanche uniflora	One-flowered Broomrape	SH	G5		HV	VH	III	Sand Deltas and Beach Ridges, Red River, Sheyenne River	Tallgrass Prairie	Sand Deltas and Beach Ridges, Glacial Lake Agassiz Basin, Drift Plains	Damp woods, streambanks, sandy prairies, and thickets; Habitats include upland woodlands, rocky cliffs where some seepage occurs, the base of bluffs, rocky glades, and thickets. This species is usually found in high quality natural areas; Distribution: Occurring on both sides of the Cascades in Washington; ranging throughout much of North America. Habitat: Mostly in open, moist or dry places, from open woods, prairies, balds, and grasslands in the lowlands to moderate elevations in the mountains.
Petasites frigidus	Sweet Coltsfoot	S2	G5		HV	Low	III	Pembina Hills	Upland Deciduous Forest	Pembina Escarpment	Moist areas in wooded places; ND: Bottineau ( turtle Mts.); Damp meadows and woods; moist organic sand over gravel, steep talus slopes; Distribution: Circumboreal across NA, s to MA and mts. of CA; in and west of the Cascades in Washington and Oregon; Habitat: Wet meadows and damp woods
Platanthera clavellata	Green Woodland Orchid	SH	G5		HV	VH	III	Sand Deltas and Beach Ridges, Saline Area, Red River	Tallgrass Prairie, Rivers, Streams, and Riparian	Saline Areas, Sand Deltas and Beach Ridges, Glacial Lake Agassiz Basin, Drift Plains	Swampy woods, bogs; Sphagnum bogs, sphagnum seeps and meadows, wet sandy and peaty meadows, marshes, low woods, wet prairies, and roadsides; seepages, springs (usually wooded); shrub borders of acid bogs; swamp woods; creek floodplains; occasionally open fens; and in the northern or mountainous part of its range, seepage slopes or sunlit stream beds. This species may also thrive in disturbed sites, such as abandoned quarries, roadbanks, ditches, and sandy-acid mine tailings; occurs from Newfoundland west to Ontario and Minnesota and south to Florida and Texas.
Pogonia ophioglossoides	Rose Pogonia	S1	G5		HV	VH	II	Sand Deltas and Beach Ridges, Saline Area, Red River	Tallgrass Prairie, Rivers, Streams, and Riparian	Saline Areas, Sand Deltas and Beach Ridges, Glacial Lake Agassiz Basin, Drift Plains	Bogs, swampy woods; Sphagnum bogs, poor fens, moist acidic sandy meadows and prairies, open wet woods, wet pine flatwoods, pine savannas, cypress swamps, sandy-peaty stream banks, seepage slopes, ditches, roadcuts, rarely calcareous fens; E ND Grand Forks to Newfoundland, S to FL and East Texas, MO
Polygonum hydropiperoides	Swamp Smartweed	S1	G5		HV	VH	II	Sand Deltas and Beach Ridges	Tallgrass Prairie	Sand Deltas and Beach Ridges	Rooted in or near water; Wet banks and clearings, shallow water, marshes, moist prairies, ditches; along the margins of lakes, ponds, and streams; Found from Nova Scotia to Minnesota and from Florida to Texas; most of North America, widely distributed.
Polygonum leptocarpum	Thin-fruited Knotweed	S1	G2G4Q		HV	Mod	I	Cannonball River, Heart River	Western Mixed-grass/Shortgrass Prairie, Rivers, Streams, Riparian	Missouri Plateau	Damp or dry soils, on clay; sandy prairie; Often brackish soils and shores; Great Plains; (B.C. to Newfoundland s to VA and w to CA). Global Range Comments: Kartesz (unpublished data 1995) lists Kansas, South Dakota, North Dakota and Montana.
Rorippa calycina	Hayden's Yellowcress	SH	G3		HV	VH	II	Missouri River Breaks, Missouri River System	Rivers, Streams, and Riparian	River Breaks	Riverbanks, shores, moist sandy soil; Disturbed (but not recently) sandy shores of lakes and streams; inhabits sparsely vegetated, moist sandy to muddy banks of streams, stock ponds and man-made reservoirs near the high water line. Topographic features and water levels appear to be more important than geologic substrates in determining where this species grows (Fertig and Welp 1998). Its habitat is usually sparsely vegetated with bunchgrasses, early successional or weedy forbs, and scattered shrubs. In Wyoming, it occurs mostly on semi-disturbed or recently flooded openings in small inlets or bays with scattered clumps of Hordeum jubatum, Poa secunda, Elymus smithii and a variety of native and exotic early successional forbs. Occasional populations can also be found in openings in grassy streambanks, in barren patches among thickets of Salix exigua or Tamarix chinensis (salt cedar), and on the banks of small playa lakes (Fertig and Welp 1998). Known originally from only a few sites in Montana and Wyoming, and adjacent western Nebraska and North Dakota; only known to be extant and persisting in Wyoming where in recent decades (especially since 1980) this species may have become more abundant, due to its ability to colonize banks of artificial reservoirs in this region. Altogether, a few dozen occurrences are now known (1997). Reports under this name from California, Oregon, and Washington are instead a different species, Rorippa columbiana; Rorippa calycina is a regional endemic of south-central Montana, western North Dakota, and central Wyoming, with a disjunct population 2,500 miles to the north on the Arctic coast of Canada's Northwest Territories
Salix maccalliana	Swamp Willow	S1	G5?		HV	Mod	II	Turtle Mountains	Upland Deciduous Forest	Turtle Mountains	Bogs, swamps; woodland peat bog; fens, and marshes in open, low-lying sites, stream banks and lake shores, wet meadows; abundant in western Canada, dispersed throughout the rest of its range. This species is widely scattered from the Pacific Northwest Coast and Cascade Ranges eastward across Canada to Quebec and in the Yukon Territory.

Scheuchzeria palustris	Pod Grass	S1	G5		HV	Mod	II	Turtle Mountains	Upland Deciduous Forest	Turtle Mountains	Global Range: Newfoundland to the NW territories and B.C. s to NJ, IA, ID, and OR; Sphagnum bogs, and fens in the Great Plains; ND it occurs in bog birch fens, sph. bogs, sedge fens, and wetland thickets. Specifically in E and N central part of the state, Benson, Bottineau, McHenry, Ransom, and Rolette. Other habitats include areas of permanent standing water or high water tables in peatlands. Typically it occurs as a constitute of wet sphagnum-carpet communities fringing open water, of waterlogged mud-bottom communities, and of flarks in raised bogs,a and other poor fen communities. NS: This is a circumboreal species that ranges south to northern New Jersey, northern Pennsylvania, Wisconsin, Minnesota, northern Idaho, and along the coast to northern California.
Selaginella rupestris	Ledge Spike-moss	S1	G5		HV	VH	II	Sand Deltas and Beach Ridges	Tallgrass Prairie	Sand Deltas and Beach Ridges	Shaded or exposed sandy soils, sandstone, or granite outcrops; scattered e GP, also w SD, ne WY, and w OK; near oak woods; Dry ledges, limestone, open fire-barrens, rock crevices, sandy or gravelly soil or grassy meadows; Global Range Comments: Nova Scotia to Alberta, south to Minnesota, Oklahoma, and Georgia, with disjunct populations in the Black Hills of Wyoming (Crook and Weston counties) and South Dakota.
Sphagnum teres	Round-leaved Sphagnum	S1	G5		HV	VH	II	Turtle Mountains	Upland Deciduous Forest	Turtle Mountains	Bogs, mostly poor but also some rich fens, forests, near wetlands
Utricularia intermedia	Flat-leaved Bladderwort	S2	G5		HV	Low	III	Glacial Lake Deltas, Sand Deltas and Beach Ridges, Souris River, Turtle Mountains	Eastern-Mixed-grass Prairie, Tallgrass Prairie, Rivers, Streams, and Riparian, Upland Deciduous Forest	Glacial Lake Deltas, Glacial Lake Basins, Glacial Lake Agassiz Basin, Turtle Mountains	Calcareous fens, seepage peatlands; shallow, standing or slowly moving water, including ponds, bogs, swamps, and lakeshores ; Global Range Comments: Circumboreal; in North America occurs from Alaska to eastern Canada and south to California, northwestern Wyoming, North Dakota, Illinois, and Pennsylvania.
Viola conspersa	Bog Violet	S2	G5		HV	Mod	III	Saline Areas, Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Saline Area, Missouri Plateau, Sand Deltas and Beach Ridges	Moist woods, stream banks; dry to moderate moisture; woods, meadows; in sandy, loamy soil; thickets; full sun to shade; Distribution: Eastern ND.
Botrychium campestre	Prairie Grapefern	S1	G3G4		MV	VH	I	Glacial Lake Deltas, Souris River	Eastern-Mixed-grass Prairie, Rivers, Streams, and Riparian	Missouri Plateau	well-drained dry-to-mesic soils in sunlit, non-forested habitats at low elevations, lightly vegetated Great Lakes sand dunes, often under shrubs of Juniperus communis; short- to mid-grass prairies and fields on limestone (often shallow-soil glades), glacial moraines, glacial till, and hills of glacial loess, either in the open prairie or under native shrubs such as Cornus around the margin; moist meadows in the valley zones of the Northwest
Botrychium matricariifolium	Chamomile Grapefern	S1	G5		MV	VH	III	Glacial Lake Deltas, Missouri Coteau Breaks	Eastern-Mixed-grass Prairie, and Mixed-grass Prairie	Glacial Lake Basin	Moist woods, Woodlands,Prairies, Meadows/Fields; circumboreal, in NA from newf. W to Alta; from New England to eastern Minnesota in the Great Lakes region. In the east, it becomes less common northward to Newfoundland and southward along the Appalachian Mts. to North Carolina and Tennessee. In the western part of its range it has been documented as far south as northeastern Iowa and recently has been recorded from the Black Hills in western South Dakota; occurring in deep forests, forest edges, grassy meadows and roadsides, stabilized but sparsely vegetated sand dunes, mine tailings and borrow pits. It is unusual among moonworts in its common occurrence in acidic as well as neutral soils. In its woodland habitats it is often most common in abandoned road beds and adjacent to active roads. It can also become abundant in recently harvested forests and in utility corridors. In the southern Appalachian Mts. it is more restricted to mature hardwood forests at high elevations. Its currently known occurrence in the Black Hills is above 4000 ft.
Botrychium minganense	Moonwort	S1	G4		MV	VH	II	Pembina Hills, Sand Deltas and Beach Ridges, Sheyenne River, Turtle Mountains	Tallgrass Prairie, Rivers, Streams, and Riparian, Upland Deciduous Forest	Northern Dark Brown Prairie, Turtle Mountains, Pembina Escarpment, Sand Deltas and Beach Ridges	A wide variety of habitats including meadows, prairies, woods, sand dunes and riverbanks; sandy prairies, ND- Burke, McHenry; moist, dense mature forests; distribution: circumboreal distribution, extends south into northeastern US and adjacent to Canada.
Botrychium multifidum	Leathery Grapefern	S1	G5		MV	Low	II	Pembina Hills, Sand Deltas and Beach Ridges	Tallgrass Prairie, Upland Deciduous Forest	Pembina Escarpment, Sand Deltas and Beach Ridges	Moist meadows and rich woods, circumboreal, s in NA; meadows, woodland margins, riverbanks, and bottomlands in subacid soil; distributed in northern, central and eastern Europe and North America, but also extending into western and southern Siberia, the Himalaya, eastern Asia and southern Greenland
Campanula aparinoides	Marsh Bellflower	S2S3	G5		MV	LOW	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Sand Deltas and Beach Ridges	
Carex alopecoidea	Foxtail Sedge	S2	G5		MV	LOW	II	Sand Deltas and Beach Ridges, Sheyenne River, Turtle Mountains	Tallgrass Prairie, Rivers, Streams, and Riparian, Upland Deciduous Forest	Turtle Mountains, Sand Deltas and Beach Ridges, Drift Plains, Glacial Lake Agassiz Basin	Damp, rich, wooded areas
Carex backii	Back's Sedge	S3	G4		MV	Mod	III	Missouri Coteau Breaks, Turtle Mountains	Mixed-grass Prairie, Upland Deciduous Forest	Turtle Mountains, Northern Black Prairie, Northern Dark Brown Prairie	Limestone soils on hills and on dry calcareous bluffs and ledges; also in open calcareous forests representing relatively sparse canopy or early successional stage; Dry, rocky, open, or shaded slopes, ridges, and barrens, in hardwood, mixed, or coniferous forests, including pine plantations, on acidic and calcareous substrates
Carex formosa	Handsome Sedge	S1	G4		MV	VH	I	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Sand Deltas and Beach Ridges	At the edge of limey swamps, seeps, or bottomland forests, but known to occur in moist, rich upland forests. Can also occur in disturbed habitats such as road edges and disturbed prairies
Carex leptalea	Delicate Sedge	S3	G5		MV	LOW	II	Glacial Lake Deltas, Sand Deltas and Beach Ridges, Sheyenne River, Souris River	Eastern-Mixed-grass Prairie, Rivers, Streams, and Riparian, Tallgrass Prairie	Glacial Lake Basin, Glacial Lake Agassiz Basin, Sand Deltas and Beach Ridges	
Carex sterilis	Sterile Sedge	S1	G4		MV	VH	II	Glacial Lake Deltas, Souris River	Eastern-Mixed-grass Prairie, Rivers, Streams, and Riparian	Glacial Lake Basins, Glacial Lake Deltas	Swampy meadows, ND, calcareous Fens, openings in white-cedar swamps, wet calcareous prairies, fresh interdunal meadows, calcareous seeps, lake and river shores, wet sunny limestone outcrops

Caulophyllum thalictroides	Blue Cohosh	S1	G4G5		MV	Mod	II	Red River, Sheyenne River, Turtle Mountains	Rivers, Streams, and Riparian, Upland Dicluous Forest	Glacial Lake Agassiz Basin, Drift Plains, Turtle Mountains	Variable habitat conditions, most frequently in rich, calcareous forests and woodlands with deciduous mixed oak-hickory to birch-beech-basswood, cove forests and rich northern-hardwoods; occasionally in circumneutral to basic montane oak-hickory forests, rarely along ridgetops, infrequent in clearings within acid cove forests; In the Midwest it is associated with upland woods and woodlands with maple/basswood and occasionally with mixed oak woodlands; Eastern North America, from New Brunswick and Nova Scotia and southernmost Quebec; west to southeastern Manitoba and eastern South Dakota, south to Oklahoma, Arkansas, northern Alabama, east to the mountains of the Carolinas. Primarily in the ridge and valley and Blue Ridge sections of the Mid-Atlantic States, not found in piedmont or coastal plain.
Cryptantha torreyana	Torrey's Cryptantha	S1	G5		MV	Low	II	Big Sagebrush Shrub-Steppe, Little Missouri River, Heart River, Knife River	Western-Mixed Grass/Shortgrass Prairie, Badlands	Little Missouri Badlands, Missouri Plateau	Butte slopes, on scoria; Dry plains, pine slopes, ND: Bowman; Distribution: Widely distributed east of the Cascades in Washington; British Columbia to Oregon, east to Montana. Habitat: Open areas, low to mid-elevations in the mountains.
Dalea enneandra	Nine-anthered Dalea	S3	G5		MV	Mod	III	Heart River, Little Missouri River, Missouri River Breaks, Missouri River System	Rivers, Streams, and Riparian	Little Missouri Badlands, Missouri Plateau, River Breaks	Sandy or gravelly slopes, dry mixed grass prairie; in ND it is ranked as imperiled. It occurs in the TRNP. It's state center of distribution appears to be along the Missouri and Heart River; It is secure globally, ranging across the Great Plains from ND to Missouri, Texas, and New Mexico; in TRNP it occurs on south-facing rims of plateau tops capped by unconsolidated alluvial gravel deposits.
Dicentra cucullaria	Dutchman's Breeches	S1	G5		MV	Low	III	Sand Deltas and Beach Ridges, Sheyenne River	Eastern-Mixed Grass Prairie, Rivers, Streams, and Riparian	Prairie Coteau Escarpment, Glacial Lake Agassiz Basin	Rich eastern woodlands; Deciduous moist woods and clearings, in rich loam soils; deciduous mesic woodlands, especially along gentle slopes, ravines, or ledges along streams. This species occurs in original woodland that has never been plowed under or bulldozed over. It's abundance in such woodlands can be highly variable – from uncommon to common; Exposed, rocky sites and dry to mesic, well-drained soils.
Dirca palustris	Leatherwood	S1	G4		MV	VH	II	Pembina Hills	Upland Deciduous Forest	Pembina Escarpment	Shady, damp woodland slopes; Low wet woods, streambanks; native from the Province of Quebec south to the Appalachicola River in Florida and west as far as Missouri and Oklahoma. It grows in a variety of soils and under a diversity of conditions, though usually it avoids limestone.
Eleocharis wolfii	Wolf's Spikerush	SH	G3?		MV	VH	III	Sand Deltas and Beach Ridges, Red River	Tallgrass Prairie, Rivers, Streams, and Riparian	Glacial Lake Agassiz Basin	Shores, low, wet prairie; Ephemeral pools in open grasslands, oak woodlands on river terraces, limestone barrens; Eleocharis wolfii occurs in marshes, wet to wet-mesic prairies, wet margins of lakes, rivers, ponds and creeks, wet ditches, sandy roadsides, mud flats and ephemerally wet flatwood; Individuals grow best and reproduce only in relatively open, sunlit habitats that retain moisture throughout the growing season; Wet river and lake margins; MN, ND, NE, KS, (Alta. To IA, s to LA, MO, KS, and w to CO; A broad distribution throughout the central and eastern United States. The range of the species includes the following states: Arkansas, Colorado, Georgia, Illinois, Indiana, Iowa, Kansas, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, Tennessee, Texas, and Wisconsin. Alabama, Alberta, southern California, northern Mexico, Saskatchewan and South Dakota
Equisetum palustre	Marsh Horsetail	S2	G5		MV	VH	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Sand Deltas and Beach Ridges	
Equisetum pratense	Meadow Horsetail	S2	G5		MV	VH	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Sand Deltas and Beach Ridges, Glacial Lake Agassiz Basin	
Eriogonum cernuum	Nodding Buckwheat	S1	G5		MV	VH	II	Killdeer Mountains	Upland Deciduous Forest	Missouri Plateau	Open sandy grasslands and hillsides; e WY, w SD, w NE, s OR to w SD s to NM and CA; Buttes on scoria or limestone; Sandy to gravelly or clayey flats and slopes, mixed grassland, saltbush, sagebrush, and mountain mahogany communities, oak, pinyon-juniper, and conifer woodlands
Eriogonum visherii	Dakota Buckwheat	S2	G3		MV	Low	I	Cannonball River, Little Missouri River, Missouri River Breaks, Big Sagebrush Shrub-Steppe	Western Mixed-grass/Shortgrass Prairie, Rivers, Steams, Riparian	Missouri Plateau, Little Missouri Badlands, River Breaks	Clayey badland buttes and slopes, sandy-clay outwash areas; mixed grassland and saltbush communities; dry, saline, or alkaline soils; The only known populations of Eriogonum are located in the western Great Plains of North America, in western South Dakota, western North Dakota, and southeastern Montana. One population has been located in Montana, 14 populations have been located in 7 counties in North Dakota (Billings, Golden Valley, Grant, McKenzie, Mountrail, Sioux, and Slope counties), and at least 79 populations have been located in 8 counties in South Dakota; It inhabits harsh and erosive environments where competition and succession are limited; in ND populations are associated with outcrops of the geologic formation Bullion Creek on barren, small scale badland formations, low relief eroding badland buttes, clay pans, and smaller erosional features in mixed grass prairie where the substrate is exposed.
Eriophorum gracile	Slender Cottongrass	S1	G5		MV	VH	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Sand Deltas and Beach Ridges	Great Plains- fens and boggy meadows; In ND it's found in fen habitats dominated by carex aquatilis and Sparganium eurycarpum; Seepage fens; Meadows, bogs, shores, usually peaty, acidic substrates; circumboreal, south in NA to Pennsylvania, Indiana, IA, NE, CO, ID, CA; ND it is found on the Sheyenne National Grassland portion of the Custer National Forest.
Euonymus atropurpureus	Wahoo	S3	G5		MV	MOD	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Glacial Lake Agassiz Basin, Sand Delta and Beach Ridges	
Gymnocarpium dryopteris	Oakfern	S2	G5		MV	MOD	II	Pembina Hills, Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian, Upland Deciduous Forest	Pembina Escarpment, Sand Deltas and Beach Ridges	

Hudsonia tomentosa	Woolly Beach-heather	S1	G5		MV	Mod	II	Sand Deltas and Beach Ridges	Tallgrass Prairie	Sand Deltas and Beach Ridges	Global range: Quebec to NC, west to Alberta, ID, IL, MN, and ND; In ND it is documented only from Ransom County in se ND; In ND habitat includes dunes and sand blowouts in the Sheyenne Sandhills. also sandy soils, and can be found on the margins of activ dunes. Sand prairies; Sandy soils, esp. dunes, blowout slopes, and sandy barrens; also on thin sandy soils of exposed sandstone or quartzite.
Lappula cenchrusoides	Stickseed	S1	G4		MV	VH	II	Missouri River System, Missouri River Breaks, Little Missouri River, Knife River, Heart River, Cannonball River, Big Sagebrush Shrub-Steppe, Ponderosa Pine, Killdeer Mountains	Western Mixed-Grass/Shortgrass Prairie, Mixed-Grass Prairie, Badlands, Rivers, Streams, and Riparian	Little Missouri Badlands, Missouri Coteau, River Breaks, Glaciated Dark Brown Prairie, Collapsed Glacial Outwash, Moreau Prairie	FGP: Dry soils in the open; Global Range Comments: Restricted to ND and SD west of the MO River, east MT and extreme west NE.
Lechea stricta	Upright Pinweed	S2	G4?		MV	Mod	II	Sand Deltas and Beach Ridges	Tallgrass Prairie	Sand Deltas and Beach Ridges	Global range: NY and Ontario west to ND, South to ID, IL, and NE; Habitat in ND includes sandhills, dry sandy woods and prairies, sandy soils; the record on the Sheyenne National Grassland occurs on an open midslope with fine sands on a very gentle slope; other habitat includes dry, sandy woods and prairie; Oak Barrens and dry savannas.
Menyanthes trifoliata	Buckbean	S2	G5		MV	LOW	II	Glacial Lake Deltas, Sand Deltas and Beach Ridges, Sheyenne River, Souris River, Turtle Mountains	Eastern-Mixed-grass Prairie, Tallgrass Prairie, Rivers, Streams, and Riparian, Upland Deciduous Forest	Glacial Lake Deltas, Glacial Lake Basins, Turtle Mountains, Drift Plains, Sand Deltas and Beach Ridges	
Mimulus guttatus	Yellow Monkeyflower	S1	G5		MV	Low	III	Sand Deltas and Beach Ridges	Tallgrass Prairie	Sand Deltas and Beach Ridges	Wet marshes, often emergent along streams and shores, scattered localities in ND and SD; Widespread throughout western United States and Canada, Mimulus guttatus is known from wet marshy places; many plant communities, wetland-riparian; usually occurs in wetlands, but occasionally found in non wetlands
Oenothera rhombipetala	Rhombic Evening-primrose	S2	G4G5		MV	VH	III	Saline Areas, Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Drift Plains, Sand Deltas and Beach Ridges, Glacial Lake Agassiz Basin	Sandy prairies; dry; fields; in sandy soil; Habitats include upland sand prairies, sandy hill prairies, sand dunes, upland sandy savannas, abandoned sandy fields, areas along sandy paths, and areas along railroads. Slightly disturbed areas are preferred; occasional wildfires are beneficial in reducing the encroachment of woody vegetation.
Ophioglossum pusillum	Adder's-tongue Fern	S2	G5		MV	VH	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Sand Deltas and Beach Ridges	
Parnassia palustris var. parviflora	Small-flowered Grass-of-Parnassus	S3	G4		MV	Mod	III	Glacial Lake Deltas, Sheyenne River	Eastern Mixed-Grass Prairie, Rivers, Streams, and Riparian	Northern Black Prairie, Turtle Mountains, Glacial Lake Deltas, Glacial Lake Basins	Along streams and in moist rock crevices in the BH; (across Canada, n US, especially mountainous regions, s to NM); Calcareous fens or bogs; wet meadows and limy soil; in crevices in wet dolomite pavement, or moist, open sandy beaches and dunes SOIL: Moist to wet, sandy or calcareous soils.
Penstemon procerus	Small-flowered Penstemon	S1	G5		MV	VH	III	Missouri Coteau Breaks	Eastern Mixed-Grass Prairie, Rivers, Streams, and Riparian	Northern Dark Brown Prairie	Loamy to rocky loam soil in meadows, brushy slopes, and open forests in the mountains; ( nw ND w to WA and OR, s AK s to S CO); Northern prairie slopes; Distribution: Alaska to California, east to North Dakota, Wyoming and Colorado
Phlox pilosa	Downy Phlox	S1	G5		MV	Low	III	Red River	Rivers, Streams, and Riparian	Glacial Lake Agassiz Basin	Mesic prairies of open woods, rocky or sandy prairies and open oak savannas throughout the tallgrass region; moist to mesic black soil prairies, rocky open forests, Bur Oak savannas, sandy Black Oak savannas, limestone glades, thickets, abandoned fields, and prairie remnants along railroads; Barely entering North Dakota from the southeast, prairie phlox ranges east to New York and south to Florida and Texas. However, botanists have found 9 well-defined subspecies within this region, and the plant described here has not been found east of Minnesota and Iowa. Prairie phlox seems to have largely disappeared from North Dakota since European man destroyed the prairie sod of the Red River Valley.
Pinus flexilis	Limber Pine	S1	G5		MV	Mod	II	Little Missouri River, Big Sagebrush Shrub-Steppe	Western Mixed-grass/Shortgrass Prairie, Rivers, Streams, Riparian	Little Missouri Badlands	Exposed scoria ridge, harsh and somewhat dry conditions; subalpine, or alpine zones; exposed ridges of foothills; dominates on dry rocky sites at many elevations (1500-3600m) within its range. It can occur scattered throughout forested regions on more mesic sites, especially in low density, open areas. At higher elevations, Pinus flexilis can define the boundary of the treeline; Limber pine occurs from Alberta and British Columbia south to California, Arizona, and New Mexico. It is scattered widely across the Great Basin in Utah, Nevada, and into Colorado, Wyoming, and Montana. Isolated populations occur in the Dakotas, and Nebraska; Little Missouri Grasslands of the Custer National Forest.
Populus x acuminata	Lanceleaf Cottonwood	S2	GNA		MV	MOD	II	Big Sagebrush Shrub-Steppe	Western Mixed-grass/Shortgrass Prairie	Little Missouri Badlands, Missouri Plateau	Riparian areas and slopes
Primula incana	American Primrose	S2	G4G5		MV	VH	II	Missouri Coteau Breaks	Mixed-grass Prairie	Northern Missouri Coteau	Alkali wet meadows, fens; seral herb communities with alkaline clay soil in river flood plains and in open meadows; Meadows, bogs, and damp places, sometimes alkaline soils; ND- Burke; Global Range Comments: From Utah and Colorado north to Alaska and east to Quebec. Rare in southern Utah, Colorado, Wyoming, North Dakota, and Montana, more common in Canada from British Columbia east to western Manitoba, rare in the Yukon and Alaska (where it is limited to stable flood plains along rivers).
Rhynchospora capillacea	Hair Beakrush	S2	G4		MV	Mod	III	Glacial Lake Deltas, James River, Souris River	Eastern-Mixed-grass Prairie, Rivers, Streams, and Riparian	Glacial Lake Deltas, Glacial Lake Basins, Drift Plains	Most sandy soils; seeps; Moist to wet calcareous fens, seeps over limestones or calcareous rock, marsh meadows; marl flats; SD, IA; (Newfoundland to Sask. S to VA, MO, and SD).
Ribes cynosbati	Prickly Gooseberry	S3	G5		MV	VH	II	Sand Deltas and Beach Ridges, Sheyenne River	Tallgrass Prairie, Rivers, Streams, and Riparian	Drift Prairie	Moist, rich woods
Salix pedicellaris	Bog Willow	S3	G5		MV	VH	II	Glacial Lake Deltas, Sand Deltas and Beach Ridges, Sheyenne River, Souris River, Turtle Mountains	Eastern-Mixed-grass Prairie, Tallgrass Prairie, Rivers, Streams, and Riparian, Upland Deciduous Forest	Turtle Mountains, Glacial Lake Deltas, Glacial Lake Basins	Sphagnum bogs and fens
Spiranthes cernua	Nodding Ladies'-tresses	S1	G5		MV	VH	III	Glacial Lake Deltas, James River, Sand Deltas and Beach Ridges, Souris River	Eastern-Mixed-grass Prairie, Tallgrass Prairie, Rivers, Streams, and Riparian	Glacial Lake Deltas, Glacial Lake Basins, Drift Plains, Sand Deltas and Beach Ridges	Fens, low prairies; wet or dry prairies, occasionally in open woodlands; se ND and w MN, e SD, etc; sun; moist; bogs, prairies, fields, ditches; in slightly acidic, sandy soil; Wet to dry open sites in fens, marshes, meadows, swales, dunes, prairies, open woodlands, riverbanks, shores, ditches, roadsides, old fields, cemeteries, lawns



Townsendia hookeri	Hooker's Townsendia	S1	G5		PS	VH	II	Missouri River System, Missouri River Breaks, Little Missouri River, Knife River, Heart River, Badlands	Western Mixed-grass/Shortgrass Prairie, Rivers, Streams, Riparian	Little Missouri Badlands	Butte summits; dry barren plains and hillsides; Gravelly benches, sandy slopes; Nw GP, e MT, BH, ne WY, and s along the e edge of the rocky mountains in CO.; native to western North America, ranging from the Yukon south to central Mexico, and west of the Mississippi River.
Triplasis purpurea	Purple Sandgrass	S1	G4G5		PS	Mod	II	Sand Deltas and Beach Ridges	Tallgrass Prairie	Sand Deltas and Beach Ridges	Sandy prairies, blowouts; In North Dakota it is found on dry sandy prairie and sandhills; open dry midslopes; Ecology Comments: Inhabits hot, dry, sandy areas where competition is light. Naturally confined to beaches but spreading to disturbed areas inland. Habitat Comments: Dry, sandy beaches and dunes; Widespread in the eastern two-thirds of the United States along the Atlantic and Gulf coasts and the shores of the Great Lakes, and locally inland where it spreads to disturbed areas. It is common to occasional in most of the southeast (Wunderlin 1998, Weakley 2000) and rare in most of the midwest and northeast
Veronicastrum virginicum	Culver's-root	SH	G4		PS	VH	III	Sand Deltas and Beach Ridges	Tallgrass Prairie	Glacial Lake Agassiz Basin, Sand Deltas and Beach Ridges	Low prairie, rich woods; Species is common, abundant, and widespread in parts of its range in the U.S. In other parts of its range, however, populations are very low. It is found in moist tallgrass prairie and prairie remnants, moist woods, woodland borders, thickets, fields and meadows, stream banks and terraces. It also occurs in secondary habitat on roadsides, road allowances, and railway right-of-ways. In the north-westernmost part of its range, it occurs in the ecotone between tall grass plant communities and adjoining open to closed deciduous forest, on strongly calcareous, well to imperfectly drained, Dark Grey Chernozemic sandy loam soils. It is found in open oak woodlands in North Dakota.

## **APPENDIX C**

Maxent

## **Introduction**

Maximum Entropy Modeling of Species Geographic Distributions (Maxent version 3.3.3e Schapire 2011) is software used for species habitat modeling. To better understand the spatial distributions of plant species in North Dakota, Maxent and Arcview (a geographic information systems software) were used to create habitat modeling maps for the 100 Plant Species of Conservation Priority. Maxent compares a set of known occurrences to a set of environmental variables of the same defined space to estimate a target probability distribution of maximum entropy. Maxent can produce valid output with a small set of observations but is typically more accurate when using a larger set of observations.

## **Maxent Challenges**

There were several challenges we encountered using Maxent. First of all, it was new to us. Learning to use any new software always presents a challenge. A good deal of time was spent researching how others had used Maxent and finding tutorials to help us understand how to use the software properly.

The next challenge was deciding which and how many inputs (environmental layers and the sample file) to use. We wanted to make sure to use enough environmental layers to narrow the areas the plants may occur but not so many that the software would eliminate too much potential habitat. Another issue with using too many layers was the amount of computer memory it takes to run the software process. Our project area was large so we had to make sure that the layers we used wouldn't be so big as to crash our computers during the process.

This leads to another challenge related to computer memory. Maxent requires that all the layers be in a particular format before they can be run through the software. It took some considerable time to convert all the layers to the necessary format, projection, cell size, and extent. It also took time to then convert the data created by Maxent into a format that could be utilized by Arcview software.

## **APPENDIX D**

### Biotics

## **Introduction**

Biotics is a biodiversity data management software developed by NatureServe. It is built on a sophisticated data model implemented in an Oracle database. The system incorporates custom applications for spatial data management, tabular data management, data import/export and reconciliation, and reporting. The spatial component of the system is a custom geographic information system (GIS) application that supports basic digital mapping, spatial analyses, and data visualization.

This database contains taxonomic information, global and state ranks (based on degree of endangerment), and special protection designations for over 5,000 plant and animal species and significant ecological communities found in North Dakota.

Biotics is used to manage location information on plant and animal species, significant ecological communities, and other biological features of special concern. It includes site-specific data on population size, associated species, observation dates, geographic locators (such as township-range, latitude-longitude, county, watershed), land management status, and the best source for additional information. Records are based on published and unpublished reports, field surveys and collection records.

## **North Dakota Natural Heritage Inventory Methodology**

The North Dakota Natural Heritage Inventory provides a comprehensive system (Heritage System) for identifying and prioritizing ecologically significant natural features in the state. Based on methodology developed by The Nature Conservancy and NatureServe, the Heritage System emphasizes features that are exemplary, unique, or endangered on a statewide or national level. In North Dakota this includes natural communities such as tall grass prairie and species such as the least tern and prairie fringed orchid.

The Heritage System approach marks an advance in the effort to ensure an objective, thorough assessment of a state's ecological diversity. Unlike previous inventories, which focused on sites rather than individual elements, the Heritage System identifies important but little known areas and clarifies the significance of better known sites. Whereas site-by-site inventories are conducted over a set time period and are quickly outdated, the Heritage System is ongoing with an information base that can be readily updated.

The Heritage System has three main facets for identifying the portions of the landscape that best represent the full range of North Dakota's natural diversity: classification, inventory, and data analysis.

## **Inventory and Data Analysis**

The inventory and data analysis phase of the Heritage System are cyclical and therefore, integral.

The inventory phase of the Heritage System is a continuing process in which data is collected and compiled into a usable form. The basic unit of collection is the occurrence of a natural community of species of concern, that is, a natural feature. The Heritage System collects information on a site where a natural feature has been observed, collected, and/or reported.

## **Data Management**

The data bank is the center of all Natural Heritage Inventory operations. Efficient storage of the data compiled is necessary for retrieval and analysis, and is a critical aspect of the Natural Heritage Inventory. The Natural Heritage Inventory data bank consists of a mapper and element tracker components. Both components are integrated to allow information retrieval in numerous ways.

The data bank centers around occurrences of natural communities and rare species. This information is stored in the data bank under numerous geographic fields such as township-range-section, watershed, latitude-longitude, physiographic province, county, and others. Thus, the data can be sorted, retrieved, and analyzed in numerous ways. The utility of this type of system is far reaching.

## **Summary**

The Heritage System for identification of significant natural areas centers around the occurrences of special natural heritage elements. These natural elements are classified into natural communities, and species of concern. The Natural Heritage Inventory is responsible for classifying, ranking, and inventorying these features. The information obtained is analyzed to determine field work needs, gaps in our knowledge, and ultimately to determine protection priorities. This process is ongoing as new information becomes available, as the landscape changes, and as we begin to fill in gaps in our knowledge of North Dakota's natural heritage.

## **Natural Heritage Ranks (Global and State Status)**

Each element is ranked on the basis of its global (range-wide) and state rarity. These ranks are assigned according to a standardized procedure used by the Natural Heritage Program.

These ranks are necessary to set priorities for both inventory and protection efforts. High ranking elements receive attention before low ranking elements. To rank elements in the relative order of importance, NaturesServe developed a ranking system that assigns each community or species a statewide and a global rank. These ranks are defined as follows:

## Natural Heritage Global Ranks

- G1** Critically Imperiled – Critically imperiled globally because of extreme rarity or because of some factor of its biology making it especially vulnerable to extinction. Typically 5 or fewer occurrences or very few remaining individuals (<1,000) or acres (<2,000) or stream miles (<10). [Critically endangered throughout its range.]
- G2** Imperiled - Imperiled globally because of rarity or because of other factors demonstrably making it very vulnerable to extinction or elimination throughout its range. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000) or acres (2,000 to 10,000) or stream miles (10 to 50). [Endangered throughout its range.]
- G3** Vulnerable – Vulnerable globally either because very rare and local throughout its range, found only in a restricted range (even if abundant at some locations) or because of other factors making it vulnerable to extinction or elimination throughout its range. Typically of 21 to 100 occurrences or between 3,000 and 10,000 individuals. [Threatened throughout its range.]
- G4** Apparently Secure – Uncommon but not rare (although it may be quite rare in parts of its range, especially at the periphery), and usually widespread. Apparently not vulnerable in most of its range, but possibly cause for long-term concern. Typically more than 100 occurrences and more than 10,000 individuals.
- G5** Secure – Common, widespread, and abundant (although it may be quite rare in parts of its range, especially on the periphery). Not vulnerable in most of its range. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
- GX** Presumed Extinct (species elements) - Believed to be extinct throughout its range (e.g., passenger pigeon), virtually no likelihood that it will be rediscovered.
- Eliminated (community elements) – Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic species.
- GH** Possibly Extinct (species elements) – Known from only historical occurrences, but may nevertheless still be extant, further searching is needed.
- Presumed Eliminated (Historical) (community elements) – Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration.
- G#G#** Range Rank – A numeric range rank (e.g., G2G3) is used to indicate uncertainty about the exact status of a taxon. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4).

- GU** Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- GNR** Unranked – Global rank not yet assessed.
- GNA** A conservation status rank is not applicable because the Element is not a suitable target for conservation activities for one of the following reasons:
- Hybrid – Element not ranked because it represents an interspecific hybrid judged to be without conservation value.
- Domestic Origin – The Element is a product of domestication or cultivation.
- Ruderal, Invasive, Managed/Modified, or Cultural – Communities in one of these categories are not judged to have conservation value.
- ?** Inexact Numeric Rank – Denotes inexact numeric rank.
- Q** Questionable Taxonomy – Distinctiveness of this entity as a taxon or community at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, inclusion of this taxon in another taxon, or inclusion of this community within another community with the resulting Element having a lower-priority (numerically higher) conservation status rank.
- C** Captive or Cultivated Only – Taxon at present is extant only in captivity or cultivation, or as a reintroduced population not yet established.
- T#** Intraspecific Taxon (trinomial) – The status of intraspecific taxa (subspecies or varieties) are indicated by a “T-rank” following the species’ basic global rank. A T subrank cannot imply the subspecies or variety is more abundant than the species’ basic global rank (i.e., a G1T2 subrank should not occur).

#### Natural Heritage State Ranks

- S1** Critically Imperiled – Critically imperiled in the state because of extreme rarity or because of some factor of its biology making it especially vulnerable to extirpation from the state. Typically 5 or fewer occurrences or very few remaining individuals (<1,000). [Critically endangered in state.]
- S2** Imperiled – Imperiled in the state because of rarity or because of other factors making it very vulnerable to extirpation from the state. Typically 6 to 20 occurrences or few remaining individuals (1,000 to 3,000). [Endangered in the state.]
- S3** Vulnerable – Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it

vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 to 10,000 individuals. [Threatened in the state.]

- S4** Apparently Secure – Uncommon but not rare, and usually widespread in the state. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals
- S5** Secure – Common, widespread, and abundant in the state. Essentially ineradicable under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
- SX** Presumed Extirpated – Element is believed to be extirpated from the state. Virtually no likelihood that it will be rediscovered.
- SH** Possibly Extirpated (Historical) – Elements occurred historically in the state, and there is some expectation that it may be rediscovered. Its presence may not have been verified in the past 20 years. An Element would become SH without such a 20-year delay if the only known occurrences in a state were destroyed or if it had been extensively and unsuccessfully looked for.
- SNR** Unranked – State rank not yet assessed.
- SU** Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- S#S#** Range Rank – A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status of the element. Ranges cannot skip more than one rank (e.g., SU should be used rather than S1S4).
- SNA** A conservation status rank is not applicable because the Element is not a suitable target for conservation activities for one of the following reasons:
- Hybrid – Element not ranked because it represents an interspecific hybrid judged to be without conservation value.
- Exotic Origin – The Element is not native to the state.
- Accidental/Nonregular – Element is not regularly found in the state, in other words, infrequent and outside usual range.
- Not Confidently Present – Element’s presence in the state has been reported, but the report is unconfirmed or doubtful; Element has been falsely reported, and may or may not potentially occur; Element may potentially occur (e.g. habitat is suitable); Element was never present in the state despite presence in surrounding areas.

No Definable Occurrences – Element is native and appears regularly but lacks practical conservation concern in the state because it is transient or occurs in a dispersed, unpredictable manner.

Synonym – Element reported as occurring in the state, but the state data center does not recognize the taxon; therefore the Element is not assigned a state rank.

? Inexact Numeric Rank – Denotes inexact numeric rank.

**B** Breeding – Basic rank refers to the breeding population of the Element in the state.

**N** Non-breeding – Basic rank refers to the non-breeding population of the Element in the state.

**M** Migrant – Basic rank refers to the transient/migrant population of the Element in the state.

### **References**

NatureServe Homepage: A Network Connecting Science with Conservation. 2012. Web. 18 July 2012. <http://www.natureserve.org/>.

Montana Natural Heritage Program. 2013. Web. 14 May 2013. <http://mtnhp.org/>

## North Dakota Plant Species of Concern 2013

### North Dakota Natural Heritage Inventory

Scientific Name	Common Name	Heritage		USFWS Federal Status	NDNHI Occurrence Distribution	Habitat
		State Rank	Global Rank			
<i>Acorus americanus</i>	Sweetflag	S4	G5	-	Bott, McHe, Rans	Peatlands, fens, and seeps.
<i>Allium canadense</i> L.	Meadow onion	S1	G5	-	Sarg	Prairies, open woods.
<i>Allium tricoccum</i> Ait.	Wild garlic	S3	G5	-	Rich	Rich undisturbed woods.
<i>Apios americana</i> Medik.	American groundnut	SH	G5	-	Rans	Moist woods, thickets, banks.
<i>Arabis canadensis</i> L.	Sicklepod	S1	G5	-	Sarg	Mesic woodlands.
<i>Arnica cordifolia</i> Hook.	Heart-leaved arnica	S3	G5	-	Loga	Open woodlands.
<i>Asclepias lanuginosa</i>	Woolly milkweed	S1	G4?	-	Dunn, Grnt, McHe, Star, Stut	Sandy or rocky calcareous prairie.
<i>Asclepias sullivantii</i> Engelm. ex Gray	Sullivant's milkweed	S2	G5	-	Cass, Rich	Mesic tallgrass prairies.
<i>Astragalus drummondii</i> Dougl. ex Hook.	Drummond's milkvetch	S1	G5	-	Gfor, Will	Open or wooded hillsides, ravines.
<i>Astragalus neglectus</i> (Torr. and Gray) Sheldon	Cooper's milkvetch	S1	G4	-	Pemb	Sandy, gravelly shores, mesic gravelly prairies.
<i>Astragalus vexilliflexus</i> Sheldon	Bent-flowered milkvetch	S3	G4	-	Dunn, Slop, Star	Barren badland slopes and buttes.
<i>Athyrium filix-femina</i> Roth	Northern lady-fern	S3	G5	-	Cava, Gfor, Pemb, Rans, Rich	Moist woods, thickets, bogs, along streams.

<i>Botrychium campestre</i> W.H. Wagner & Farrar ex. W.H. & F.Wagner	Prairie grapefern	S1	G3G4	-	McHe	Dry, gravelly or sandy prairie.
<i>Botrychium matricariifolium</i> (A. Braun ex Dowell)A. Braun ex Koch	Chamomile grapefern	S1	G5	-	McHe, Ward	Moist woodlands.
<i>Botrychium minganense</i> Victorin	Moonwort	S1	G4	-	Bott, Burk, Cava, Rans	Wooded, often north-facing slopes, meadows.
<i>Botrychium multifidum</i> (Gmel.) Trev.	Leathery grapefern	S1	G5	-	Cava	Wet meadows, rich woodlands.
<i>Botrychium simplex</i> E. Hitchc.	Least grapefern	S2	G5	-	Rans	Meadows, barrens, and woods; subacid soils.
<i>Bromus kalmii</i> Gray	Kalm's brome	S3	G5	-	Cava, Pemb	Open oak woods, sandy soils.
<i>Calla palustris</i> L.	Water arum	S2	G5	-	Pemb, Role	Northern marshes and swamps.
<i>Campanula aparinoides</i> Pursh	Marsh bellflower	S2S3	G5	-	Pemb, Rans, Rich	Wetland thickets, seepage peatlands.
<i>Cardamine bulbosa</i> (Schreb. ex Muhl.) B.S.P.	Spring cress	S1	G5	-	Rans	Wet meadows and woods, springs.
<i>Carex alopecoidea</i> Tuckerman	Foxtail sedge	S2	G5	-	Barn, Bott, Pemb, Rans Rich, Role	Damp, rich, wooded areas.
<i>Carex athrostachya</i> Olney	Jointed-spike sedge	S3	G5	-	Bens, Divi, Moun, Will	Low prairie, marsh margins.
<i>Carex backii</i> Boott	Back's sedge	S3	G4	-	Bott, Burk, Cava	Damp, wooded areas.
<i>Carex brunnescens</i> (Pers.) Poir.	Brown sedge	S1	G5	-	McHe	Fens, wet wooded areas.
<i>Carex buxbaumii</i> Wahlenb.	Buxbaum's sedge	S2	G5	-	Barn, Stut	Wet meadows, fens.
<i>Carex capillaris</i> L.	Hair-like sedge	S2	G5	-	Bott, McHe	Wet meadows, fens.
<i>Carex chordorrhiza</i> Ehrh. ex L. F.	Creeping sedge	S1	G5	-	Bott	Sphagnum bogs, poor fens.
<i>Carex convoluta</i> Mackenzie	Spiral sedge	S2	G5	-	Sarg	Rich, deciduous woodlands.

<i>Carex diandra</i> Schrack	Lesser-panicled sedge	S3	G5	-	Bott, Burk, Gfor, Role	Swamps, meadows, shores.
<i>Carex echinata ssp echinata</i>	Spiny sedge	S1	G5T5	-	Bott	Sphagnum bogs.
<i>Carex festucacea</i> Schkuhr ex Willd.	Fescue sedge	S2	G5	-	Cass	Wooded area.
<i>Carex foenea</i> Willd.	Dry-spiked sedge	S3	G5	-	Bott, Dunn	Aspen woods, ravines.
<i>Carex formosa</i> Dewey	Handsome sedge	S1	G4	-	Rich	Low, moist, eastern woodlands.
<i>Carex garberi</i> Fern.	Elk sedge	S1	G5	-	Bens, Burk, McHe	Fens, swamps, pond margins.
<i>Carex gracillima</i> Schwein.	Graceful sedge	S1	G5	-	Pemb	Moist swampy woods.
<i>Carex gynocrates</i> Wormskj. ex Drej.	Pistillate sedge	S1	G5	-	McHe	Peaty fens.
<i>Carex haydenii</i> Dewey	Hayden's sedge	S1	G5	-	Dunn	Wet meadows, sloughs.
<i>Carex lasiocarpa</i> Ehrh.	Wiregrass sedge	S3	G5	-	Bott, Gfor, McHe, Rans, Rich	Sphagnum bogs, seepage-fed peatlands, lake borders.
<i>Carex leptalea</i> Wahlenb.	Delicate sedge	S3	G5	-	Cava, McHe, Pemb, Rans, Rich	Shrubby peatland fens, swampy woods and thickets.
<i>Carex limosa</i> L.	Mud sedge	S2	G5	-	Bott, Mche	Sphagnum bogs, fens.
<i>Carex nebrascensis</i> Dewey	Nebraska sedge	S2	G5	-	Emmo, Lamo, Slop	Wet meadows, stream margins.
<i>Carex pedunculata</i> Muhl. ex Willd.	Peduncled sedge	S2	G5	-	Cava	Moist oak or birch woodlands.
<i>Carex richardsonii</i> R. Br.	Richardson's sedge	S1	G5	-	Cass, McHe, Rich	Low, usually sandy, prairie.
<i>Carex scirpoidea</i> Michx.	Spikerush sedge	S2	G5	-	Dunn, McHe, Role	Rocky slopes, wet meadows.
<i>Carex scoparia</i> Schkuhr ex Willd.	Pointed broom sedge	SH	G5	-	Bens, Gfor, Stut, Wals	Damp woods, low prairie, lakeshores.
<i>Carex simulata</i> Mackenzie	Copycat sedge	S2	G5	-	Burk, Divi, McHe	Calcareous fens, wet meadow.

<i>Carex sterilis</i> Willd.	Sterile sedge	S1	G4	-	McHe	Seepage peatland fens, wet meadows.
<i>Caulophyllum thalictroides</i> (L.) Michx.	Blue cohosh	S1	G4G5	-	Cass, Rans Rich, Role	Moist rich woods.
<i>Chaenactis douglasii</i> (Hook.) Hook. & Arn.	Douglas' dusty-maiden	S2	G5	-	Bill, Gold	Scoria slopes and buttes.
<i>Cheilanthes feei</i> T. Moore	Slender lip fern	S1	G5	-	Dunn	Dry rocky slopes, on sandstone or limestone.
<i>Chenopodium subglabrum</i> (S. Wats.) A. Nels.	Smooth goosefoot	S1	G3G4	-	Bill, Slop	Sandy river banks and terraces.
<i>Clematis columbiana</i> var <i>tenuiloba</i> (Gray) J. Pringle	Slender-lobed clematis	S1	G5?T4?	-	Dunn	Rocky slopes, limestone soil.
<i>Collinsia parviflora</i> Lindl.	Blue lips	S2	G5	-	Bill, Dunn, Slop	Mesic slopes of buttes.
<i>Crataegus mollis</i> Scheele	Downy hawthorn	S1	G5	-	Cass, Gfor, Rans	Open mesic woods.
<i>Cryptantha torreyana</i> (Gray) Greene	Torrey's cryptantha	S1	G5	-	Bill, Bowm	Butte slopes, on scoria.
<i>Cyperus bipartitus</i> Torr.	Brook flatsedge	S2	G5	-	Cass, Rans, Rich, Stut	Cool, spring-fed streams.
<i>Cyperus diandrus</i> Torr.	Low flatsedge	S2	G5	-	Rans, Rich	Sandy or muddy shores, stream margins.
<i>Cypripedium candidum</i> Muhl. ex Willd.	White lady's-slipper	S2	G4	-	Bens, Cass, Eddy, Gfor, Grig, Nels, Rans Rich, Role, Sarg, Wals	Low prairie, wet meadows.
<i>Cypripedium parviflorum</i> Salisb.	Small yellow lady's-slipper orchid	S2	G5	-	Bens, Bott, Cava, Dunn, Gfor, McHe, Pemb, Rans, Role, Sarg, Wals	Damp woods, fens, stream banks.
<i>Cypripedium parviflorum</i> var. <i>pubescens</i> (Willd.) Knight	Large yellow lady's-slipper	S2	G5T5	-	Bens, Eddy, Rans, Role	Boggy areas, wet prairies.
<i>Cypripedium reginae</i> Walt.	Showy lady's-slipper	S2	G4	-	Bens, Cava, Eddy, Pemb, Rans, Rich	Swampy woodlands and thickets, fens.

<i>Dalea enneandra</i> Nutt.	Nine-anthered dalea	S3	G5	-	Bill, Grnt, Merc, Mort, Siou	Sandy or gravelly slopes, dry mixed grass prairie.
<i>Desmanthus illinoensis</i> (Michx.) Macm. ex B. L. Robins. & Fern	Prairie mimosa	S1	G5	-	Emmo, Sarg	Prairies with rocky or sandy soil.
<i>Dicentra cucullaria</i> (L.) Bernh.	Dutchman's breeches	S1	G5	-	Gfor, Rans, Sarg	Rich eastern woodlands.
<i>Diervilla lonicera</i> P. Mill.	Dwarf honeysuckle	S3	G5	-	Cava	Shady woods, usually aspen.
<i>Dirca palustris</i> L.	Leatherwood	S1	G4	-	Cava	Shady, damp woodland slopes.
<i>Drosera rotundifolia</i> L.	Round-leaved sundew	S1	G5	-	Bott	Acid bogs, swamps.
<i>Dryopteris carthusiana</i> (Vill.) H.P. Fuchs	Spinulose woodfern	S3	G5	-	Cava, Pemb, Rans, Rich	Rich, moist woods, ravines, boggy areas, alder thickets.
<i>Dryopteris cristata</i> (L.) Gray	Crested woodfern	S3	G5	-	Bott, Cass, Cava, Pemb, Rans, Rich	Swampy woods and thickets, seeps.
<i>Eleocharis parvula</i> (Roemer & J.A. Schultes) Link ex Bluff., Nees & Schauer	Dwarf spikerush	S2	G5	-	Burl, Gfor, Nels, Sarg	Brackish or alkaline shores.
<i>Eleocharis pauciflora</i> (Lightf.) Link	Few-flowered spikerush	S3	G5	-	Bens, Burk, Kidd, McHe, Role, Stut, Well	Calcareous fens and seeps.
<i>Eleocharis wolfii</i> (Gray) Gray ex Britt.	Wolf's spikerush	SH	G3?	-	Cass	Shores, low, wet prairie.
<i>Elymus glaucus</i> Buckl.	Blue wildrye	S2	G5	-	Bott, McHe	Open woods, prairie slopes.
<i>Epilobium coloratum</i> Biehler	Purple-leaved willowherb	S3	G5	-	Rans, Rich, Stut	Marshes, seeps, shores.
<i>Epilobium pygmaeum</i> (Speg.) P. Hoch & Raven	Smooth-spike primrose	S2	G5	-	Bill, Hett	Along streams and early- drying vernal pools.
<i>Equisetum palustre</i> L.	Marsh horsetail	S2	G5	-	Rans, Rich	Willow or alder thickets, swampy woods, stream banks.
<i>Equisetum pratense</i> Ehrh.	Meadow horsetail	S2	G5	-	Barn, Cass, Pemb, Rans, Rich	Moist boggy woods, shady river banks and shores.

<i>Equisetum sylvaticum</i> L.	Wood horsetail	S2	G5	-	Bens, Cava, Pemb	Moist aspen or lowland woods, seeps.
<i>Equisetum variegatum</i> Schleich. ex F. Weber & D.M.H. Mohr	Variegated horsetail	S1	G5	-	McHe	Marl pools of calcareous fens.
<i>Erigeron divergens</i> Torr. & Gray	Spreading fleabane	S1	G5	-	Gold, Nels	Dry, open rocky or sandy sites, buttes.
<i>Erigeron radicans</i> Hook.	Cushion fleabane	S1	G3G4	-	Dunn	Dry, exposed hillsides, buttes at higher elevations.
<i>Eriogonum cernuum</i> Nutt.	Nodding buckwheat	S1	G5	-	Dunn, Slop	Buttes on scoria or limestone.
<i>Eriogonum visherii</i> A. Nels.	Dakota buckwheat	S2	G3	-	Bill, Gold, Grnt, McKe, Moun, Siou, Slop	Clayey badland buttes and slopes, sandy-clay outwash areas.
<i>Eriophorum chamissonis</i> C.A. Mey.	Chamisson's cottongrass	S2	G5	-	Barn, Bott, Lamo, McHe, Role	Bogs, marshes, peaty fens.
<i>Eriophorum gracile</i> W.D.J. Koth	Slender cottongrass	S1	G5	-	Rans	Seepage fens.
<i>Eriophorum viridicarinatum</i> (Engelm.) Fern.	Green keeled cottongrass	S2	G5	-	Bott, Pemb, Rans	Sphagnum bogs, peaty fens.
<i>Euonymus atropurpureus</i> Jacq.	Wahoo	S3	G5	-	Rans, Rich	Rich deciduous woods, woodland edges, river banks.
<i>Euphorbia robusta</i> (Engelm.)	Rocky mountain spurge	S3	G5	-	Bill	Dry, sandy or gravelly prairie slopes.
<i>Fraxinus nigra</i> Marsh.	Black ash	S2	G5	-	Cava, Pemb	Swampy or wet lowland woods.
<i>Fritillaria pudica</i> (Pursh) Spreng.	Yellow fritillary	S3	G5	-	Bill, Mort	Ephemerally moist areas of buttes.
<i>Galium labradoricum</i> (Wieg.) Wieg.	Bog bedstraw	S3	G5	-	Bott, McHe, Rans, Rich	Wetland thickets, fens, swampy woods.
<i>Gentianopsis crinita</i> (Froel.) Ma	Fringed gentian	S2	G5	-	Burk, Eddy, Kidd, Pemb, Town	Low wet prairies, stream banks.
<i>Geranium maculatum</i> L.	Wild geranium	SH	G5	-	Cass	Rich, eastern, deciduous woods.
<i>Geum rivale</i> L.	Water avens	S2	G5	-	Pemb	Marshes, wet meadows, river banks.

<i>Gymnocarpium dryopteris</i> (L.) Newman	Oakfern	S2	G5	-	Cava, Rans	North-facing or shady wooded slopes.
<i>Halenia deflexa</i> (Sm.) Griseb.	Spurred gentian	S3	G5	-	Cava, Pemb	Wetland thickets, damp shady woods.
<i>Helianthemum bicknellii</i> Fern.	Bicknell's sunrose	S1	G5	-	Pemb, Rans	Open woods, prairies, usually dry sandy soil.
<i>Hudsonia tomentosa</i> Nutt.	Woolly beach-heather	S1	G5	-	Rans	Sand prairies and dunes.
<i>Iris missouriensis</i> Nutt.	Rocky mountain iris	S2	G5	-	Burl, Emmo, Kidd, Loga	Mesic areas within mixed grass prairie.
<i>Juncus brevicaudatus</i> (Engelm.) Fern.	Short-tailed rush	S2	G5	-	Bott, McHe	Wet meadows, fens, marshes.
<i>Juncus vaseyi</i> Engelm.	Vasey's rush	S2	G5?	-	Bott	Wet meadows, shores.
<i>Lappula cenchrusoides</i>	Stickseed	S1	G4	-	Bill, Dunn, McKe, Siou, Slop, Will	Dry soils in the open.
<i>Lechea stricta</i> Leggett ex Gray	Upright pinweed	S2	G4?	-	Bowm, Rans, Rich	Dry, sandy woods and prairie.
<i>Leersia virginica</i> Eilld.	Whitegrass	S3	G5	-	Rich	Moist woods, stream banks.
<i>Leucocrium montanum</i> Nutt. ex Gray	Sand lily	S2	G5	-	Bill, Bowm, Gold, Slop	Dry prairie, sandy or clay soils.
<i>Linnaea borealis</i> L.	Twinflower	S4	G5	-	Bott, Cava, Dunn	Moist, wooded, (north-facing) slopes.
<i>Liparis loeselii</i> (L.) L. C. Rich.	Loesel's twayblade	S2	G5	-	Bens, Kidd, Pemb, Rans, Stut	Damp woods, prairie swales, fens.
<i>Lipocarpa micrantha</i> (Vahl) G. Tucker	Small-flowered lipocarpa	S1	G5	-	Cass	Wet sandy areas, sandbars.
<i>Mehonia repens</i> (Lindl.) G. D	Creeping barberry	S2	G5	-	Bill, Bowm	Coulees, slopes of high plains.
<i>Mentzelia pumila</i> Nutt. ex Torr. & Gray	Dwarf mentzelia	S1	G4	-	Slop	Dry sandy or clayey soils.
<i>Menyanthes trifoliata</i> L.	Buckbean	S2	G5	-	Bott, McHe, Rans	Sphagnum bogs, fen peatlands.
<i>Mimulus guttatus</i> DC.	Yellow monkeyflower	S1	G5	-	Gfor	Marshes, along streams and lake shores.

<i>Minuartia dawsonensis</i> (Britt.) House	Stiff sandwort	S1	G5	-	Cava	Open rocky or gravelly areas, on shale.
<i>Mitella nuda</i> L.	Naked mitrewort	S3	G5	-	Cava, Pemb, Role	Swampy lowland woods and thickets.
<i>Monotropa uniflora</i> L.	Indianpipe	S3	G5	-	Bott, Cava, Dunn, Rans, Role	Rich shady woods.
<i>Muhlenbergia filiformis</i> (Thurb. ex S.Wats.) Rydb.	Pull-up muhly	S1	G5	-	Burk	Marl pools of calcareous fens.
<i>Myosurus aristatus</i> Benth	Sedge mousetail	S2	G5	-	Slop, Ward, Will	Moist areas, vernal wetlands of mixed grass prairies.
<i>Myriophyllum pinnatum</i> (Walt.) B.S.P.	Cutleaf watermilfoil	S2	G5	-	Barn, Lamo, Loga, Stut	Shallows of marshes and shores.
<i>Najas guadalupensis</i> (Spreng.) Magnus	Southern naiad	S1	G5	-	Emmo	Lakes or streams.
<i>Najas marina</i> L.	Spiny naiad	S1	G5	-	Emmo, Rich	Alkaline lakes, ponds.
<i>Oenothera rhombipetala</i> Nut. ex Torr. & Gray	Rhombic evening- primrose	S2	G4G5	-	Gfor, Rich	Sandy prairies.
<i>Onoclea sensibilis</i> L.	Sensitive fern	S2	G5	-	Pemb, Rans, Rich, Sarg	Wetland thickets, fen peatlands, damp, shady woodlands.
<i>Ophioglossum pusillum</i> Raf.	Adder's-tongue fern	S2	G5	-	Rans, Rich	Low prairie swales.
<i>Orobanche uniflora</i> L.	One-flowered broom-rape	SH	G5	-	Cass	Damp woods and thickets.
<i>Oxytropis deflexa</i> (Pallas) DC	Drooping locoweed	S2	G5	-	Bott, Cava, Pemb, Role	Sandy lake shores, low meadows, aspen woodland clearings.
<i>Oxytropis sericea</i> Nutt.	White locoweed	S1	G5	-	Bens, Bill, Slop	Mixed grass prairie on slopes or buttes.
<i>Parnassia palustris</i> var. <i>parviflora</i> (DC) Boivin	Small-flowered grass-of-Parnassus	S3	G4	-	Bott	Calcareous fens or bogs.
<i>Pellaea glabella</i> Mett. ex Kuhn	Smooth cliffbrake	S3	G5	-	Adam, Bowm, Dunn, Gold, Grnt, Hett, McKe, Mort, Oliv	Sandstone caprock of buttes and ledges.

<i>Penstemon procerus</i> Dougl. ex Graham	Small-flowered penstemon	S1	G5	-	Burk	Northern prairie slopes.
<i>Petasites frigidus</i> (L.) Fries	Sweet coltsfoot	S2	G5	-	Bott, Cava	Damp meadows and woods.
<i>Phlox alyssifolia</i> Greene	Alyssum-leaved phlox	S2	G5	-	Bill, Gold, Will	Sandy, gravelly, or clayey slopes and ridges, buttes.
<i>Phlox pilosa</i> L.	Downy phlox	S1	G5	-	Cass, Rich	Mesic prairies of open woods.
<i>Pinus flexilis</i> James	Limber pine	S1	G5	-	Bill, Slop	Exposed scoria ridge.
<i>Piptatherum pungens</i> (Torr. ex Spreng.) Dorn	Slender mountain- ricegrass	S2	G5	-	Cava	Xeric slopes, usually shale.
<i>Platanthera clavellata</i> (Michx.) Luer	Green woodland orchid	SH	G5	-	Gfor	Swampy woods, bogs.
<i>Platanthera praeclara</i> Sheviak & Bowles	Western prairie fringed orchid	S2	G3	LT	Rans, Rich	Moist prairie swales of sandhills.
<i>Pogonia ophioglossoides</i> (L.) Ker-Gawl	Rose pogonia	S1	G5	-	Gfor	Bogs, swampy woods.
<i>Polygonum hydropiperoides</i> Michx.	Swamp smartweed	S1	G5	-	Pemb	Rooted in or near water.
<i>Polygonum leptocarpum</i> B. L. Robins.	Thin-fruited knotweed	S1	G2G4Q	-	Grnt	Damp or dry soils, on clay.
<i>Polygonum punctatum</i> Ell.	Dotted smartweed	S3	G5	-	Cava, Emmo, Gfor, Rich	Swampy thickets, river banks, wet meadows.
<i>Polygonum sagittatum</i> L.	Arrow-leaved tearthumb	S2	G5	-	Bott	Marshes, wet meadows.
<i>Populus x acuminata</i> Rydb.	Lanceleaf cottonwood	S2	GNA	-	Bill, Slop	Riparian areas, slopes.
<i>Potamogeton diversifolius</i> Raf.	Water-thread pondweed	S3	G5	-	Bill, Emmo, Slop, Stut	Shallow ponds, marshes.
<i>Potamogeton filiformis</i> Pers.	Slender pondweed	S3	G5	-	Barn, Divi, Rams	Shallow lakes, ponds, and streams.
<i>Potamogeton natans</i> L.	Floating pondweed	S2	G5	-	Bott, Bruk, Role	Cold, shallow to deep lakes and streams.
<i>Potamogeton praelongus</i> Wulfen	White-stemmed pondweed	S1	G5	-	Bott, Ward	Usually cool, deep water of lakes.

<i>Potamogeton strictifolius</i> Benn.	Narrow-leaved pondweed	S1	G5	-	Bott, McHe	Shallow lakes, streams.
<i>Potamogeton vaginatus</i> Turcz.	Sheathed pondweed	S3	G5	-	Bott, Gfor, Kidd, Oliv, Role, Stut	Usually deep cold lakes, ponds.
<i>Potentilla diversifolia</i> Lehm.	Mountain meadow cinquefoil	S1	G5	-	Bill, Slop, Star	Along drainages, meadows.
<i>Potentilla palustris</i> (L.) Scop.	Purple cinquefoil	S2	G5	-	Bott, Gfor, McHe	Fens, wet meadows, bogs.
<i>Potentilla tridentata</i> Ait.	Three-toothed cinquefoil	S1	G5	-	Bill, Cava	Open dry, outcrops, on shale or scoria.
<i>Primula incana</i> M. E. Jones	American primrose	S2	G4G5	-	Burk, Divi, Moun	Alkali wet meadows, fens.
<i>Psoralea tenuiflora</i> Pursh	Slim-flowered scurfpea	SH	G5	-	Bowm	Dry prairie, high plains.
<i>Ranunculus cardiophyllus</i> Hook.	Heart-leaved buttercup	S1	G4G5	-	McKe, Will	Wet meadows, seeps.
<i>Ranunculus flammula</i> L.	Acrid spearwort	S1	G5	-	Burk	Marshes, damp shores.
<i>Ranunculus recurvatus</i> Poir.	Hooked crowfoot	S1	G5	-	Gfor, Rich	Wooded ravines, swampy woods.
<i>Rhynchospora capillacea</i> Torr.	Hair beakrush	S2	G4	-	Bens, Bott, McHe, Stut, Well	Calcareous fens, seeps.
<i>Ribes cynosbati</i> L.	Prickly gooseberry	S3	G5	-	Barn, Cass, Gfor, Rans, Rich	Moist rich woods.
<i>Rorippa calycina</i> (Engelm.) Rydb.	Hayden's yellowcress	SH	G3	-	McKe	Riverbanks, shores.
<i>Salix maccalliana</i> Rowlee	Swamp willow	S1	G5?	-	Bott	Bogs, swamps.
<i>Salix pedicellaris</i> Pursh	Bog willow	S3	G5	-	Bens, Bott, McHe, Rans, Role	Sphagnum bogs, fens.
<i>Sanicula gregaria</i> Bickn.	Cluster sanicle	SH	G4Q	-	Rich	Rich, moist woodlands.
<i>Scheuchzeria palustris</i> L.	Scheuchzeria	S1	G5	-	Bott	Sphagnum bogs.
<i>Scirpus cyperinus</i> (L.) Kunth	Cottongrass bulrush	SNR	GNR	-	Pemb	Wet meadows, fresh marshes, boggy areas, fen wetlands.

<i>Selaginella rupestris</i> (L.) Spring	Ledge spike-moss	S1	G5	-	Pemb	Sandy soils, near oak woods.
<i>Senecio eremophilus</i> Richards.	Northern ragwort	S2	G5	-	Bott, Role	Open sites in aspen woodlands.
<i>Smilax ecirrhata</i> (Engelm. S. Wats. ex Kunth)	Upright greenbrier	S2	G5?	-	Bott, Gold	Rich woods, thickets.
<i>Solidago flexicaulis</i> L	Zigzag goldenrod	S2	G5	-	Cass, Rans, Rich, Sarg	Rich deciduous woods.
<i>Solidago riddellii</i> Frank ex Riddell	Riddell's goldenrod	SH	G5	-	Rich	Low prairies, wet meadows.
<i>Sphagnum recurvum</i> P. Beauv.	Recurved sphagnum	S1	G5	-		Bogs, fens, forests, near wetlands
<i>Sphagnum teres</i> (Schimp.) Angstr. In Hartm.	Round-leaved sphagnum	S1	G5	-	Bott	Bogs, fens, forests, near wetlands
<i>Spiranthes cernua</i> (L.) L.C. Rich.	Nodding ladies'-tresses	S1	G5	-	Bens, McHe, Rich, Stut	Fens, low prairies.
<i>Spiranthes romanzoffiana</i> Cham.	Hooded ladies'-tresses	S1	G5	-	Bens, Burk, McHe	Fens, wet meadows.
<i>Sporobolus airoides</i> (Torr.) Torr.	Alkaki sacaton	S3	G5	-	Bill, Bowm, Gfor, Slop	Moist or drying soil, alkali seeps.
<i>Stephanomeria minor</i> (Hook.) Nutt.	Narrow-leaved wirelettuce	S3	G5	-	Bill, Slop	Dry, clay outcrops.
<i>Talinum parviflorum</i> Nutt.	Prairie fameflower	S2	G5	-	Grnt, Mort, Siou, Slop	Sandy outcrops, butte slopes.
<i>Thelesperma subnudum</i> var. <i>marginatum</i> (Rydb.) T.E. Melchert ex Cronq.	Greenthread	S2	G5T5	-	Divi, Will	Sandy prairie, open plains.
<i>Thelypteris palustris</i> Schott	Marsh fern	S3	G5	-	Kidd, McHe, Pemb, Rans, Rich	Wetland thickets, shrubby fens.
<i>Townsendia hookeri</i> Beaman	Hooker's townsendia	S1	G5	-	Bill	Butte summits.
<i>Triantha glutinosa</i> (Michx.) Pers.	Sticky false-asphodel	S1	G5	-	Bens	Fens, wet meadows.
<i>Triplasis purpurpea</i> (Walt.) Chapman	Purple sandgrass	S1	G4G5	-	Rans, Rich	Sandy prairies, blowouts.

<i>Utricularia intermedia</i> Hayne	Flat-leaved bladderwort	S2	G5	-	Bott, McHe, Pemb	Calcareous fens, seepage peatlands.
<i>Utricularia minor</i> L.	Lesser bladderwort	S2	G5	-	Bens, Burk, Eddy, Kidd, McHe, Pemb, Stut	Calcareous fens, seeps.
<i>Uvularia sessilifolia</i> L.	Sessile-leaved bellwort	S2	G5	-	Cass, Cava	Rich deciduous woods.
<i>Veronicastrum virginicum</i> (L.) Farw.	Culver's-root	SH	G4	-	Pemb	Low prairie, rich woods.
<i>Viola conspersa</i> Reichenb.	Bog violet	S2	G5	-	Bill, Cass, Dunn, Gfor, Rans, Rich	Moist woods, stream banks.
<i>Viola incognita</i> Brainerd	Large-leaved white violet	SH	G4G5T4T5	-	Pemb	Moist woods.
<i>Wolffia columbiana</i> Karst.	Southern watermeal	S2	G5	-	Cava, Pemb, Rich, Ward	Aquatic in quiet water.

# **APPENDIX E**

## Rank Calculator

## **Introduction**

North Dakota's plant species of conservation priority status ranks were assessed using NatureServe's rank calculator, version 2.0. This calculator facilitates the process of assigning status ranks through automation.

The protocol for assigning a status rank is based on ten conservation status factors. These factors are grouped based on: rarity, trends, and threats. Scores for the individual factors within these categories result into a calculated state rank. This calculated rank is reviewed, adjusted, and recorded as the final assigned conservation status rank using a S1-S5 scale for North Dakota, where S1 is the rarest and S5 most common.

The set of factors used to assess conservation status are:

- **Rarity:** Population Size, Range Extent, Area of Occupancy, Number of Occurrences, Number of Occurrences or Percent Area with Good Viability/Ecological Integrity, and Environmental Specificity;
- **Trends:** Long-term and Short-term trend in population size or area;
- **Threats:** Threat impact and Intrinsic Vulnerability.

## **Rank Calculator Version 2.0**

NatureServe has developed a rank calculator to facilitate through automation the process of assigning conservation status ranks. The calculator works in combination with NatureServe's data management system (Biotics 4) which contains the element database, including the rank factor information and assigned conservation status ranks for all elements.

The approach begins with the initial completion of an Element Ranking file within Biotics, which stores the summary data for the ten primary status factors which have been determined to be relevant for assessing extinction or extirpation risk of species and ecosystems. The ratings values for these factors can then be exported to this rank calculator. The rank calculator contains a series of procedures (points and rules) for using the factor ratings to generate a calculated status rank, which is reviewed, adjusted if deemed appropriate (with reasons documented), and finalized. For programs without Biotics, the calculator may be used as a stand-alone application.

With the new rank calculator tool, NatureServe's ability to upgrade its status ranks will be improved based on an accurate, consistent, repeatable, and transparent method. There will be continued emphasis on data accuracy by using the strength and expertise of the NatureServe network through ongoing peer review of new information collected by biologists throughout the network(NatureServe, 2013).

## **Ranking Guidelines**

Natureserves Conservation Status Assessments Methodology for assigning ranks was utilized when assigning state ranks. However, in some cases there was limited information available to populate the rank calculator. In these cases, the calculator was utilized as much as possible then professional judgments along with other survey data were used to assign the final rank.

If the rank calculator receives limited data inputs, it automatically ranks each species as S1 or S2, which is not always accurate. Some rare species have more documented occurrences than those more common in our state. These rare species are targeted and are more likely to get entered into the database. Those species with limited data available in the database were ranked based on habitat requirements\availability, other database searches, journal findings, web searches, and professional sources such as Flora of the Great Plains and the Handbook of North Dakota Plants.

Habitat requirements and availability in North Dakota was a common factor used to help guide the state ranks. Since North Dakota's landscape has been highly altered due to agriculture, the available habitat has been greatly reduced and fragmented across many landscapes. This type of knowledge was utilized when assigning each rank.

The threat levels to each species vary depending on where the plant occurs in North Dakota and the habitat requirements needed to survive and reproduce. The threat levels varied for each habitat type in North Dakota.

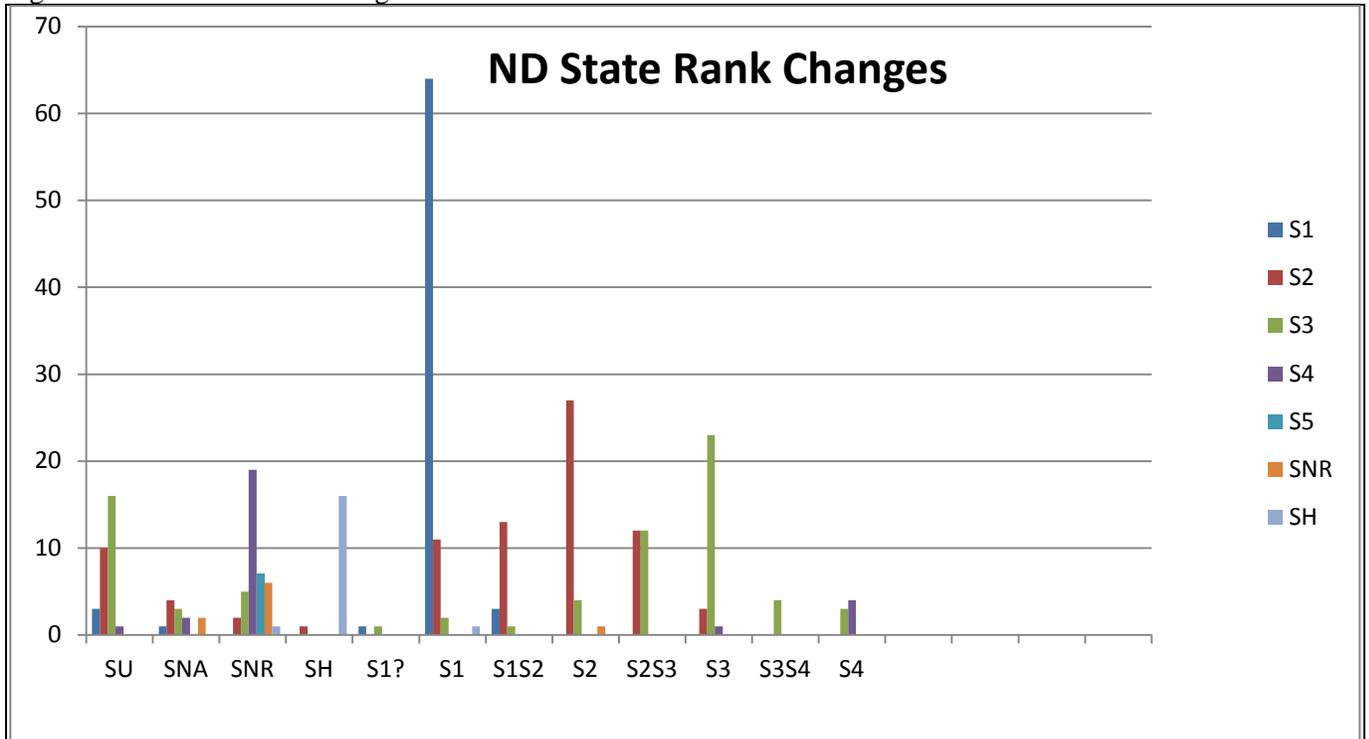
Some species only occurred in one or two counties while other ranged statewide. To make a final rank, the distribution data was based on the size and number of counties and the likelihood the species may occur in adjacent counties. Also, different sources had different distribution data and this data from multiple sources was always combined to make the final rank.

Generally, the S1 species occurred in just one or two counties, had the greatest threats, required habitat which is rare in ND, occurred at the edge of the range, had a high environmental specificity, and had the fewest number of occurrences in our database. The S4 and S5 species were just the opposite while the S2/S3 species fell somewhere in between.

### **Analysis**

A total of 290 plant species were ranked. The graph below represents the total number of plants and their updated S-ranks. The ranks listed along the x-axis represent the old state ranks. The updated S-ranks are represented by the bars within the graph.

Figure 1. ND State Ranks Changes



The following table is a summary of all the updated S-ranks. The updated ranks are represented in the yellow blocks. The old ranks with plant numbers are those in the orange blocks.

Table 1. Ranking Matrix.

New Ranks	S1	S2	S3	S4	S5	SNR	SH
Old Ranks							
SU (30)	3	10	16	1	0	0	0
SNA (12)	1	4	3	2	0	2	0
SNR (40)	0	3	4	19	7	6	1
SH (17)	0	1	0	0	0	0	16
S1? (2)	1	0	1	0	0	0	0
S1 (78)	64	11	2	0	0	0	1
S1S2 (17)	3	13	1	0	0	0	0
S2 (32)	0	27	4	0	0	1	0
S2S3 (24)	0	12	12	0	0	0	0
S3 (27)	0	2	24	1	0	0	0
S3S4 (4)	0	0	4	0	0	0	0
S4 (7)	0	0	3	4	0	0	0
<b>Totals</b>	<b>72</b>	<b>83</b>	<b>74</b>	<b>27</b>	<b>7</b>	<b>9</b>	<b>18</b>

Table 2. List of plant species and their ranks.

<b>Name</b>	<b>Old S-Rank</b>	<b>New S-Rank</b>
Allium tricoccum	SU	S3
Arnica cordifolia	SU	S3
Asclepias sullivantii	SU	S2
Botrychium simplex	SU	S2
Bromus kalmii	SU	S3
Carex festucacea	SU	S2
Epilobium coloratum	SU	S3
Fritillaria pudica	SU	S3
Geum rivale	SU	S2
Juncus vaseyi	SU	S2
Leersia virginica	SU	S3
Parnassia palustris var. parviflora	SU	S3
Phlox pilosa	SU	S1
Pogonia ophioglossoides	SU	S1
Stephanomeria tenuifolia	SU	S3
Carex deflexa	SU	S3
Carex umbellata	SU	S2
Cuscuta cuspidata	SU	S1
Cuscuta glomerata	SU	S3
Cuscuta umbrosa	SU	S2
Cyperus engelmannii	SU	S3
Erigeron ochroleucus var. scribneri	SU	S3
Festuca rubra	SU	S4
Juncus brachycephalus	SU	S2
Madia glomerata	SU	S3
Myriophyllum heterophyllum	SU	S3
Pilea fontana	SU	S3
Thelesperma subnudum	SU	S2
Verbesina encelioides	SU	S3
Viola missouriensis	SU	S2
Oenothera rhombipetala	SNA	S2
Juncus gerardii	SNA	Exotic (SNR)
Acorus calamus	SNA	S2
Ambrosia acanthicarpa	SNA	S3
Bromus japonicus	SNA (Exotic)	Exotic (SNR)
Erigeron annuus	SNA	S2

<i>Hypericum boreale</i>	SNA	S1
<i>Iva annua</i>	SNA	S4
<i>Oenothera laciniata</i>	SNA	S3
<i>Orobanche multiflora</i>	SNA	S3
<i>Sicyos angulatus</i>	SNA	S4
<i>Suckleya suckleyana</i>	SNA	S2
<i>Achillea millefolium</i>	SNR	S5
<i>Artemisia cana</i>	SNR	S5
<i>Artemisia tridentata</i>	SNR	S4
<i>Artemisia tridentata ssp. Wyomingensis</i>	SNR	S4
<i>Atriplex confertifolia</i>	SNR	S4
<i>Bouteloua gracilis</i>	SNR	S5
<i>Calamovilfa longifolia</i>	SNR	S4
<i>Carex echinata</i>	SNR	S2
<i>Clematis columbiana</i>	SNR	S3
<i>Cuscuta gronovii</i>	SNR	S4
<i>Cypripedium X 2</i>	SNR	SNR
<i>Cypripedium x andrewsii</i>	SNR	SNR
<i>Erigeron ochroleucus</i>	SNR	S3
<i>Gaura coccinea</i>	SNR	S4
<i>Gutierrezia sarothrae</i>	SNR	S4
<i>Hypericum mutilum</i>	SNR	SNR
<i>Krascheninnikovia lanata</i>	SNR	S4
<i>Lactuca tatarica var. pulchella</i>	SNR	S5
<i>Nassella viridula</i>	SNR	S4
<i>Pascopyrum smithii</i>	SNR	S4
<i>Physaria brassicoides</i>	SNR	S3
<i>Populus balsamifera</i>	SNR	S4
<i>Ribes cereum</i>	SNR	S3
<i>Rosa woodsii</i>	SNR	S4
<i>Salix X 2</i>	SNR	SNR
<i>Sarcobatus vermiculatus</i>	SNR	S4
<i>Schizachyrium scoparium</i>	SNR	S4
<i>Sphaeralcea coccinea</i>	SNR	S4
<i>Stipa comata</i>	SNR	S5
<i>Symphoricarpos occidentalis</i>	SNR	S5
<i>Viola blanda</i>	SNR	S2
<i>Coryphantha missouriensis</i>	SNR	S4
<i>Helianthus grosseserratus</i>	SNR	S4

<i>Juglans cinerea</i>	SNR	SH
<i>Lactuca tatarica</i>	SNR	S5
<i>Parnassia palustris</i>	SNR	S4
<i>Populus X jackii</i>	SNR	SNR
<i>Sitanion hystrix</i>	SNR	S4
<i>Solanum cornutum</i>	SNR	SNR
<i>Stephanomeria runcinata</i>	SNR	S2
<i>Apios americana</i>	SH	SH
<i>Carex scoparia</i>	SH	SH
<i>Eleocharis wolfii</i>	SH	SH
<i>Geranium maculatum</i>	SH	SH
<i>Orobanche uniflora</i>	SH	SH
<i>Platanthera clavellata</i>	SH	SH
<i>Polygonum sagittatum</i>	SH	S2
<i>Psoralea tenuiflora</i>	SH	SH
<i>Rorippa calycina</i>	SH	SH
<i>Sanicula gregaria</i>	SH	SH
<i>Solidago riddellii</i>	SH	SH
<i>Veronicastrum virginicum</i>	SH	SH
<i>Viola incognita</i>	SH	SH
<i>Acer saccharum</i>	SH	SH
<i>Cuscuta polygonorum</i>	SH	SH
<i>Lycopodium complanatum</i>	SH	SH
<i>Quercus ellipsoidalis</i>	SH	SH
<i>Lipocarpha micrantha</i>	S1?	S1
<i>Machaeranthera grindelioides</i>	S1?	S3
<i>Allium canadense</i>	S1	S1
<i>Arabis canadensis</i>	S1	S1
<i>Asclepias lanuginosa</i>	S1	S1
<i>Astragalus drummondii</i>	S1	S1
<i>Astragalus neglectus</i>	S1	S1
<i>Botrychium campestre</i>	S1	S1
<i>Botrychium minganense</i>	S1	S1
<i>Botrychium multifidum</i>	S1	S1
<i>Cardamine bulbosa</i>	S1	S1
<i>Carex brunnescens</i>	S1	S1
<i>Carex chordorrhiza</i>	S1	S1

Carex convoluta	S1	S1
Carex echinata ssp. echinata	S1	S1
Carex formosa	S1	S1
Carex gracillima	S1	S1
Carex gynocrates	S1	S1
Carex haydenii	S1	S1
Carex richardsonii	S1	S1
Caulophyllum thalictroides	S1	S1
Cheilanthes feei	S1	S1
Chenopodium subglabrum	S1	S1
Clematis columbiana var. tenuiloba	S1	S1
Crataegus mollis	S1	S1
Cryptantha torreyana	S1	S1
Desmanthus illinoensis	S1	S1
Dicentra cucullaria	S1	S1
Diervilla lonicera	S1	S3
Dirca palustris	S1	S1
Drosera rotundifolia	S1	S1
Elymus glaucus	S1	S2
Equisetum variegatum	S1	S1
Erigeron divergens	S1	S1
Erigeron radicans	S1	S1
Eriogonum cernuum	S1	S1
Eriophorum chamissonis	S1	S2
Eriophorum gracile	S1	S1
Eriophorum viridicarinatum	S1	S2
Euphorbia robusta	S1	S3
Gentianopsis crinita	S1	S2
Gymnocarpium dryopteris	S1	S2
Helianthemum bicknellii	S1	S1
Hudsonia tomentosa	S1	S1
Lappula cenchrusoides	S1	S1
Lechea stricta	S1	S2
Mentzelia pumila	S1	S1
Mimulus guttatus	S1	S1
Minuartia dawsonensis	S1	S1
Muhlenbergia filiformis	S1	S1
Myosurus aristatus	S1	S2
Najas guadalupensis	S1	S1
Najas marina	S1	S1

<i>Oryzopsis pungens</i>	S1	S2
<i>Oxytropis sericea</i>	S1	S1
<i>Penstemon procerus</i>	S1	S1
<i>Pinus flexilis</i>	S1	S1
<i>Polygonum hydropiperoides</i>	S1	S1
<i>Polygonum leptocarpum</i>	S1	S1
<i>Potamogeton praelongus</i>	S1	S1
<i>Potamogeton strictifolius</i>	S1	S1
<i>Potentilla diversifolia</i>	S1	S2
<i>Potentilla tridentata</i>	S1	S1
<i>Ranunculus cardiophyllus</i>	S1	S1
<i>Ranunculus flammula</i>	S1	S1
<i>Ranunculus recurvatus</i>	S1	S1
<i>Salix maccalliana</i>	S1	S1
<i>Scheuchzeria palustris</i>	S1	S1
<i>Selaginella rupestris</i>	S1	S1
<i>Sphagnum recurvum</i>	S1	S1
<i>Sphagnum teres</i>	S1	S1
<i>Spiranthes cernua</i>	S1	S1
<i>Spiranthes romanzoffiana</i>	S1	S1
<i>Tofieldia glutinosa</i>	S1	S1
<i>Townsendia hookeri</i>	S1	S1
<i>Triplasis purpurea</i>	S1	S1
<i>Uvularia sessilifolia</i>	S1	S2
<i>Agrostis exarata</i>	S1	S1
<i>Bromus carinatus</i>	S1	SH
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	S1	S1
<i>Boisduvalia glabella</i>	S1S2	S2
<i>Botrychium matricariifolium</i>	S1S2	S1
<i>Carex buxbaumii</i>	S1S2	S2
<i>Carex capillaris</i>	S1S2	S2
<i>Carex foenea</i>	S1S2	S3
<i>Carex garberi</i>	S1S2	S1
<i>Carex pedunculata</i>	S1S2	S2
<i>Carex scirpoidea</i>	S1S2	S2
<i>Carex sterilis</i>	S1S2	S1
<i>Cyperus bipartitus</i>	S1S2	S2
<i>Eleocharis parvula</i>	S1S2	S2
<i>Oxytropis deflexa</i>	S1S2	S2

Phlox alyssifolia	S1S2	S2
Primula incana	S1S2	S2
Smilax ecirrhata	S1S2	S2
Solidago flexicaulis	S1S2	S2
Elatine triandra	S1S2	S2
Calla palustris	S2	S2
Carex alopecoidea	S2	S2
Carex limosa	S2	S2
Carex nebrascensis	S2	S2
Carex simulata	S2	S2
Chaenactis douglasii	S2	S2
Collinsia parviflora	S2	S2
Cypripedium parviflorum var. pubescens	S2	S2
Equisetum palustre	S2	S2
Equisetum pratense	S2	S3
Equisetum sylvaticum	S2	S2
Euonymus atropurpureus	S2	S3
Fraxinus nigra	S2	S2
Iris missouriensis	S2	S2
Juncus brevicaudatus	S2	S2
Leucocrinum montanum	S2	S2
Liparis loeselii	S2	S2
Mahonia repens	S2	S2
Ophioglossum pusillum	S2	S2
Petasites frigidus	S2	S2
Platanthera praeclara	S2	S2
Populus x acuminata	S2	SNR
Potamogeton natans	S2	S2
Potentilla palustris	S2	S2
Rhynchospora capillacea	S2	S2
Senecio eremophilus	S2	S2
Sporobolus airoides	S2	S3
Talinum parviflorum	S2	S2
Utricularia intermedia	S2	S2
Wolffia columbiana	S2	S2
Cirsium muticum	S2	S3
Panicum praecocius	S2	S2
Campanula aparinoides	S2S3	S3

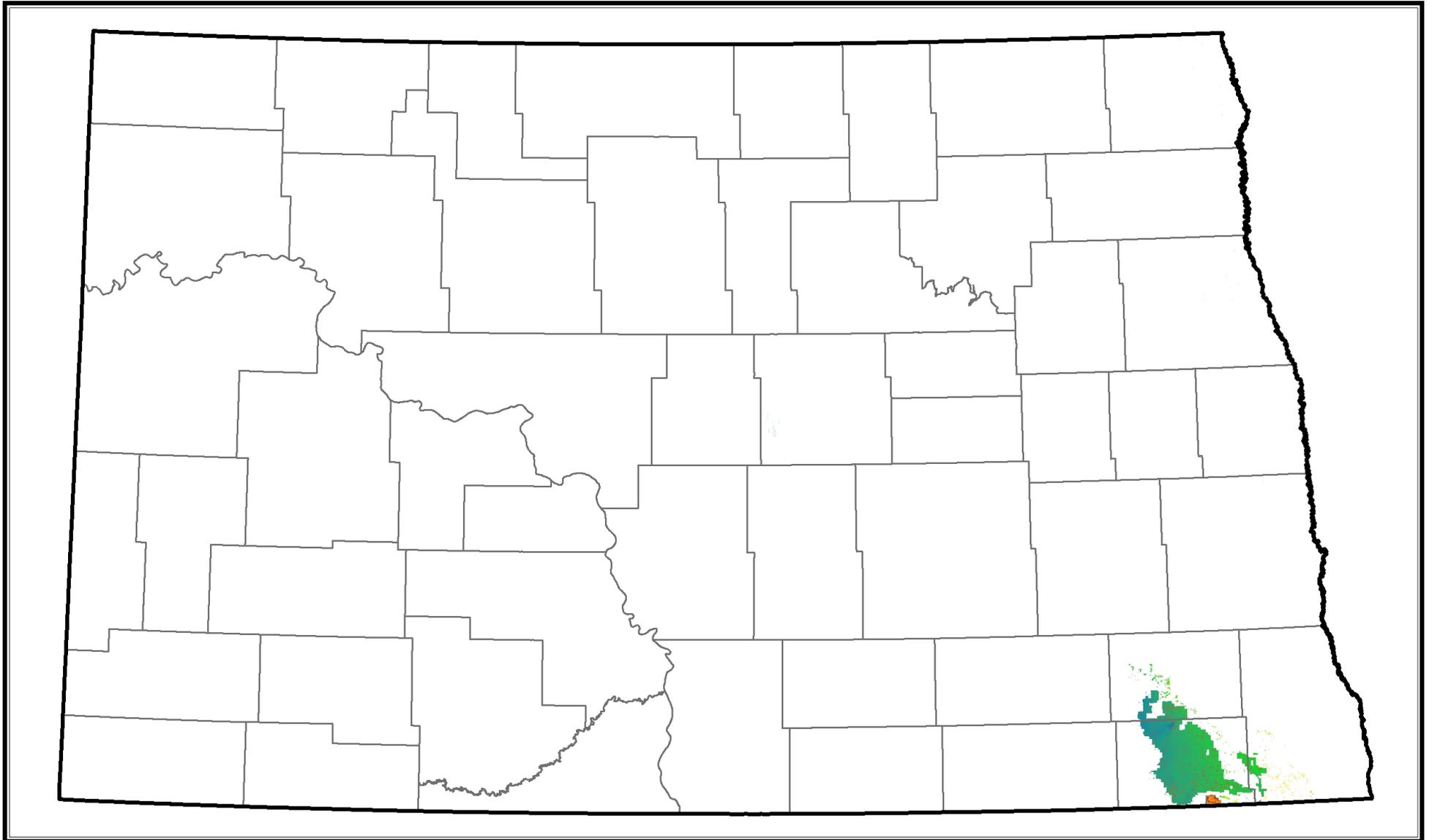
Carex backii	S2S3	S3
Carex diandra	S2S3	S3
Carex leptalea	S2S3	S3
Cyperus diandrus	S2S3	S2
Cypripedium candidum	S2S3	S2
Cypripedium parviflorum	S2S3	S2
Cypripedium reginae	S2S3	S2
Dalea enneandra	S2S3	S3
Eleocharis pauciflora	S2S3	S3
Eriogonum visherii	S2S3	S2
Halenia deflexa	S2S3	S3
Myriophyllum pinnatum	S2S3	S2
Onoclea sensibilis	S2S3	S2
Polygonum punctatum	S2S3	S3
Potamogeton diversifolius	S2S3	S3
Potamogeton filiformis	S2S3	S3
Thelesperma subnudum var. marginatum	S2S3	S2
Utricularia minor	S2S3	S2
Viola conspersa	S2S3	S2
Aster sericeus	S2S3	S2
Astragalus australis	S2S3	S3
Cinna arundinacea	S2S3	S2
Potamogeton amplifolius	S2S3	S3
Acorus americanus	S3	S4
Astragalus vexilliflexus	S3	S3
Athyrium filix-femina	S3	S3
Carex athrostachya	S3	S3
Carex lasiocarpa	S3	S3
Dryopteris carthusiana	S3	S3
Dryopteris cristata	S3	S3
Galium labradoricum	S3	S3
Menyanthes trifoliata	S3	S2
Mitella nuda	S3	S3
Monotropa uniflora	S3	S3
Potamogeton vaginatus	S3	S3
Ribes cynosbati	S3	S3
Salix pedicellaris	S3	S3
Thelypteris palustris	S3	S3
Agrimonia gryposepala	S3	S3

Anemone quinquefolia	S3	S3
Carex disperma	S3	S3
Carex lasiocarpa var. americana	S3	S3
Carex pseudocyperus	S3	S3
Circaea alpina	S3	S3
Eragrostis spectabilis	S3	S3
Geum macrophyllum	S3	S3
Najas flexilis	S3	S3
Polygonum douglasii	S3	S3
Senecio tridenticulatus	S3	S3
Ulmus rubra	S3	S2
Corallorhiza striata	S3S4	S3
Corallorhiza trifida	S3S4	S3
Hordeum pusillum	S3S4	S3
Pteridium aquilinum	S3S4	S3
Linnaea borealis	S4	S4
Pellaea glabella	S4	S3
Astragalus gracilis	S4	S4
Cornus canadensis	S4	S4
Osmorhiza claytonii	S4	S3
Pycnanthemum virginianum	S4	S3
Ribes inebrians	S4	S4

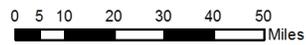
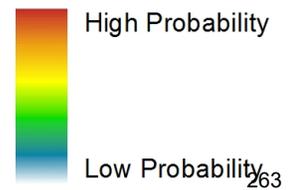
## **APPENDIX F**

### Distribution Maps

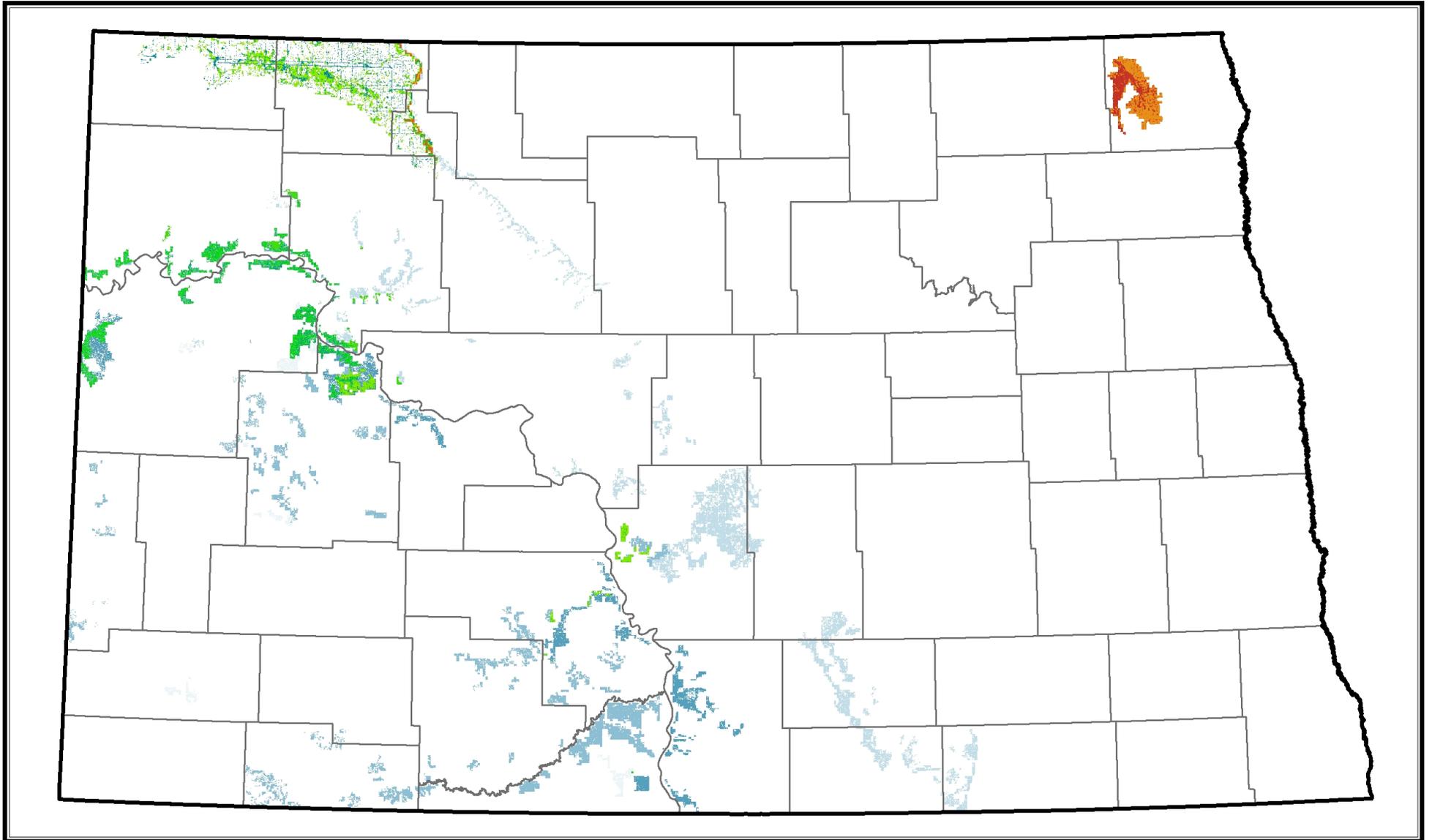
# Habitat Distribution Map



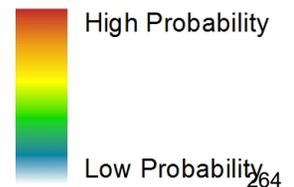
Meadow onion  
*Allium canadense*  
Level I



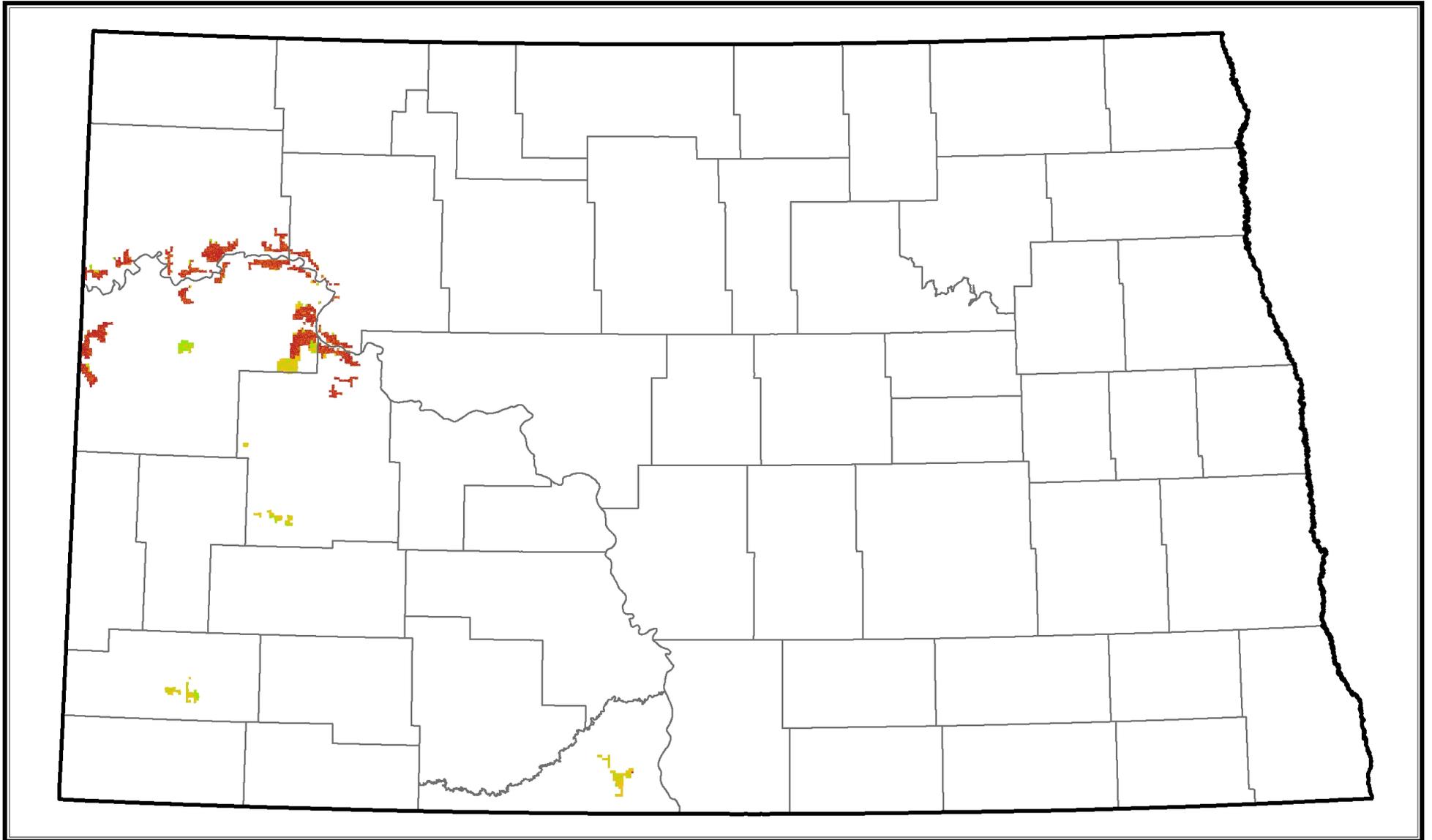
# Habitat Distribution Map



Woolly milkweed  
*Asclepias lanuginosa*  
Level I



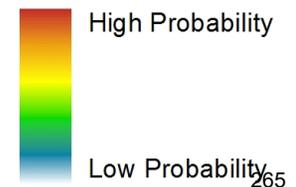
# Habitat Distribution Map



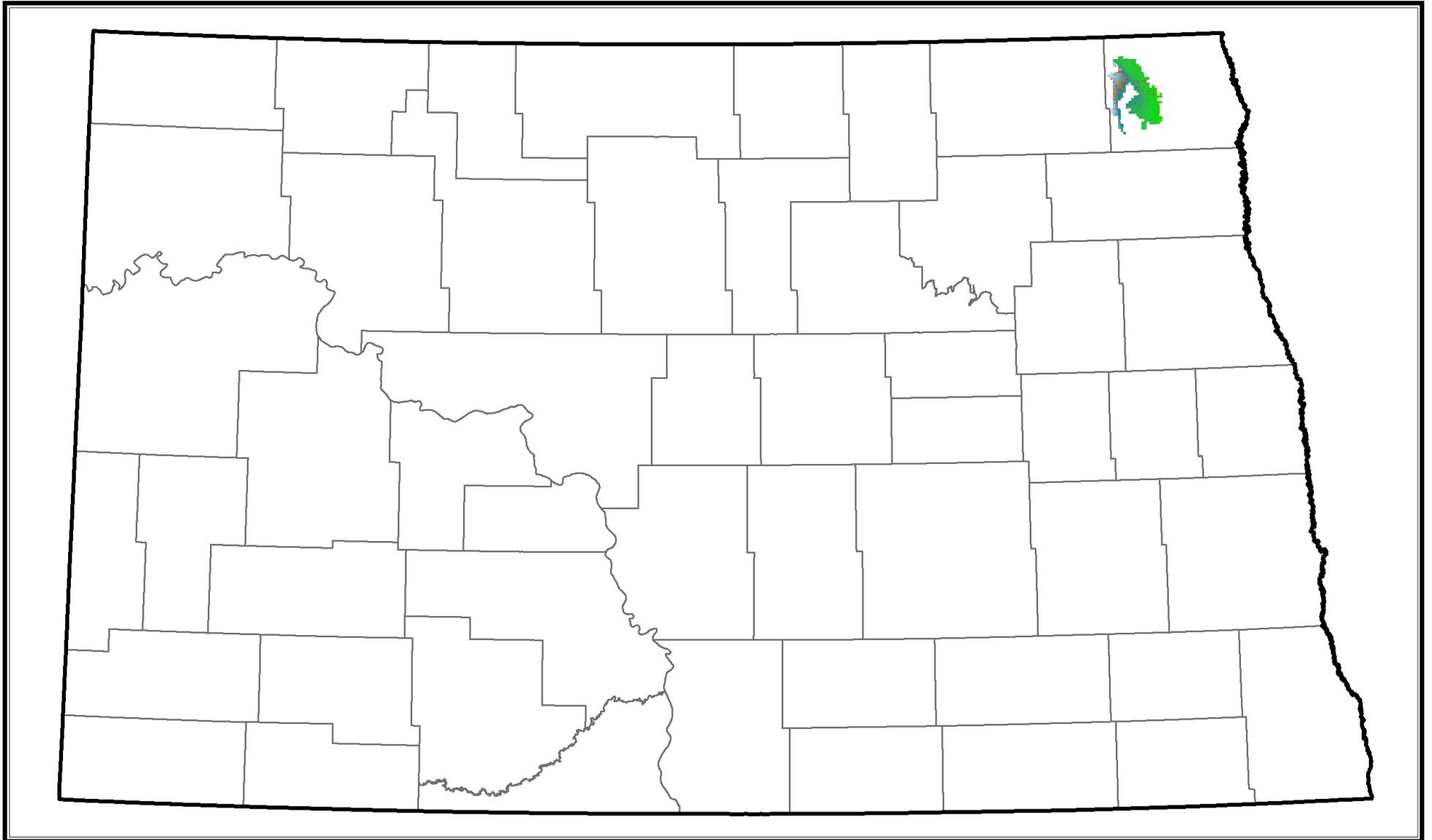
0 5 10 20 30 40 50 Miles

NDNHI 2012

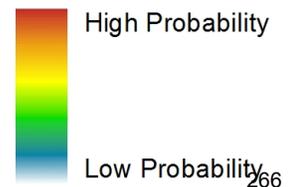
Drummond's milkvetch  
*Astragalus drummondii*  
Level III



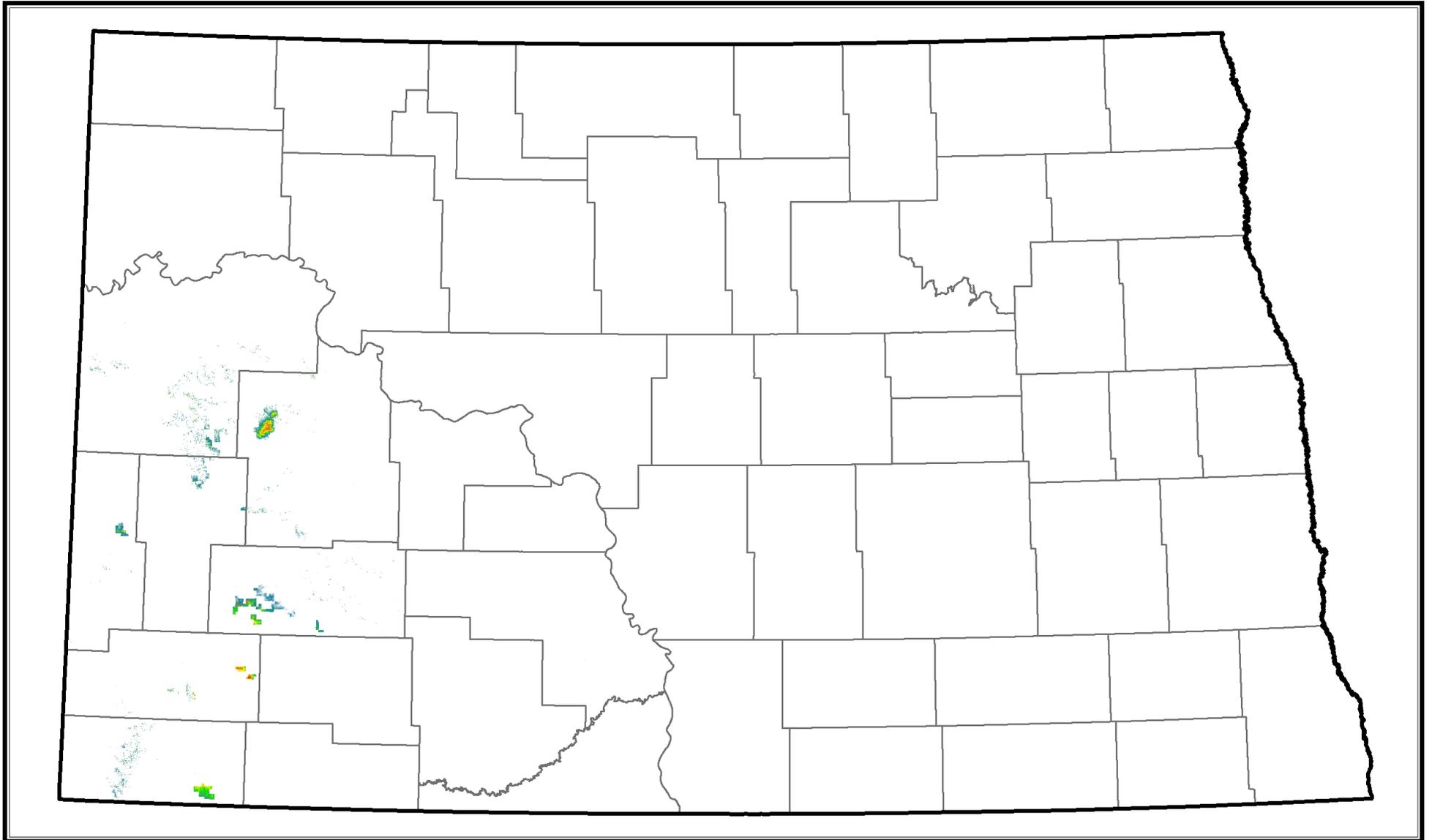
# Habitat Distribution Map



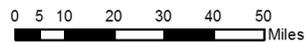
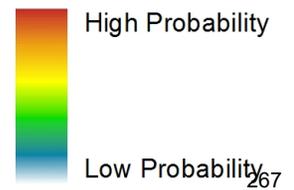
Cooper's milkvetch  
*Astragalus neglectus*  
Level I



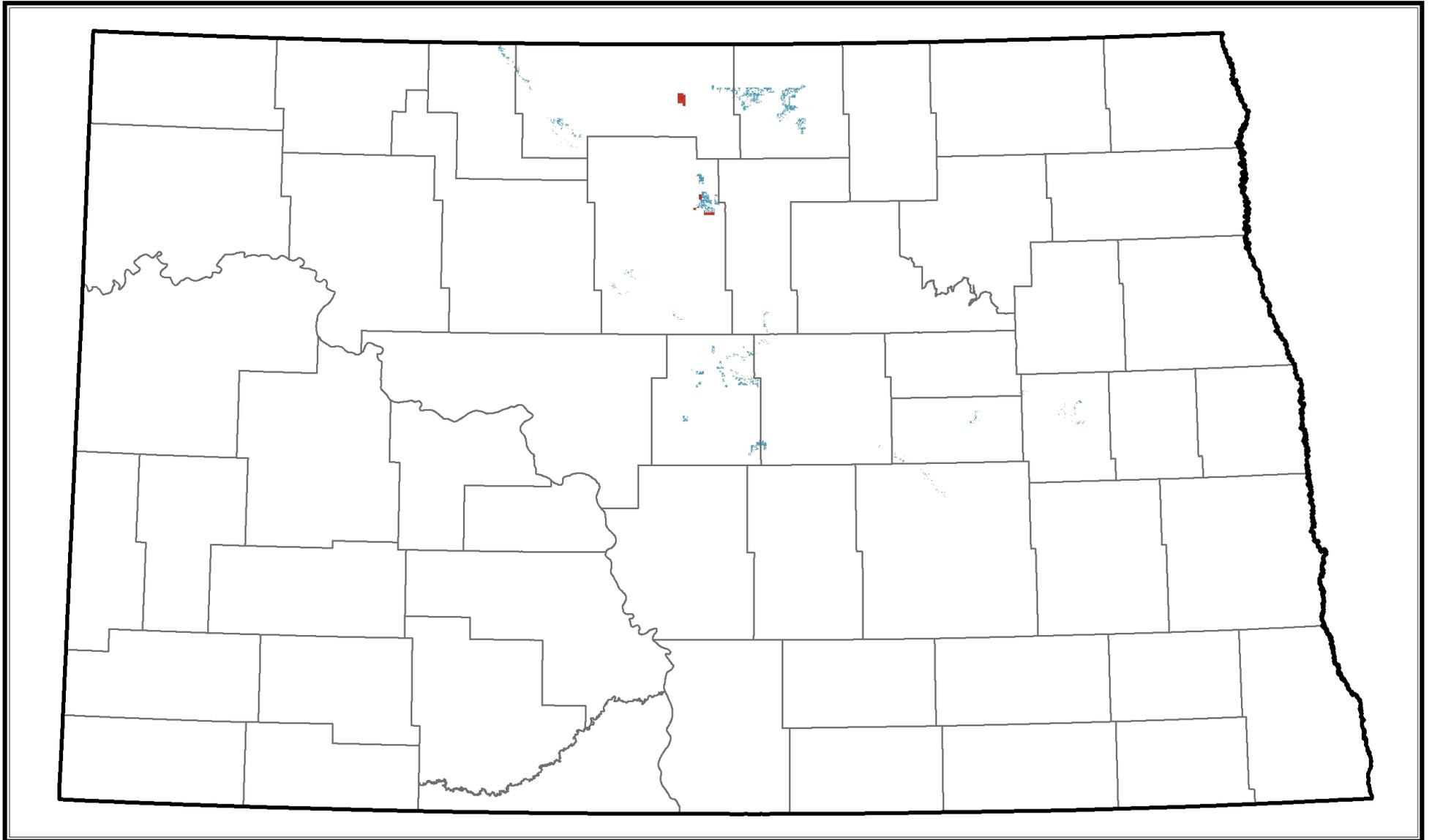
# Habitat Distribution Map



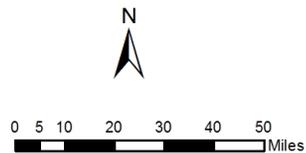
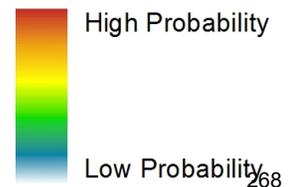
Bent-flowered milkvetch  
*Astragalus vexilliflexus*  
Level III



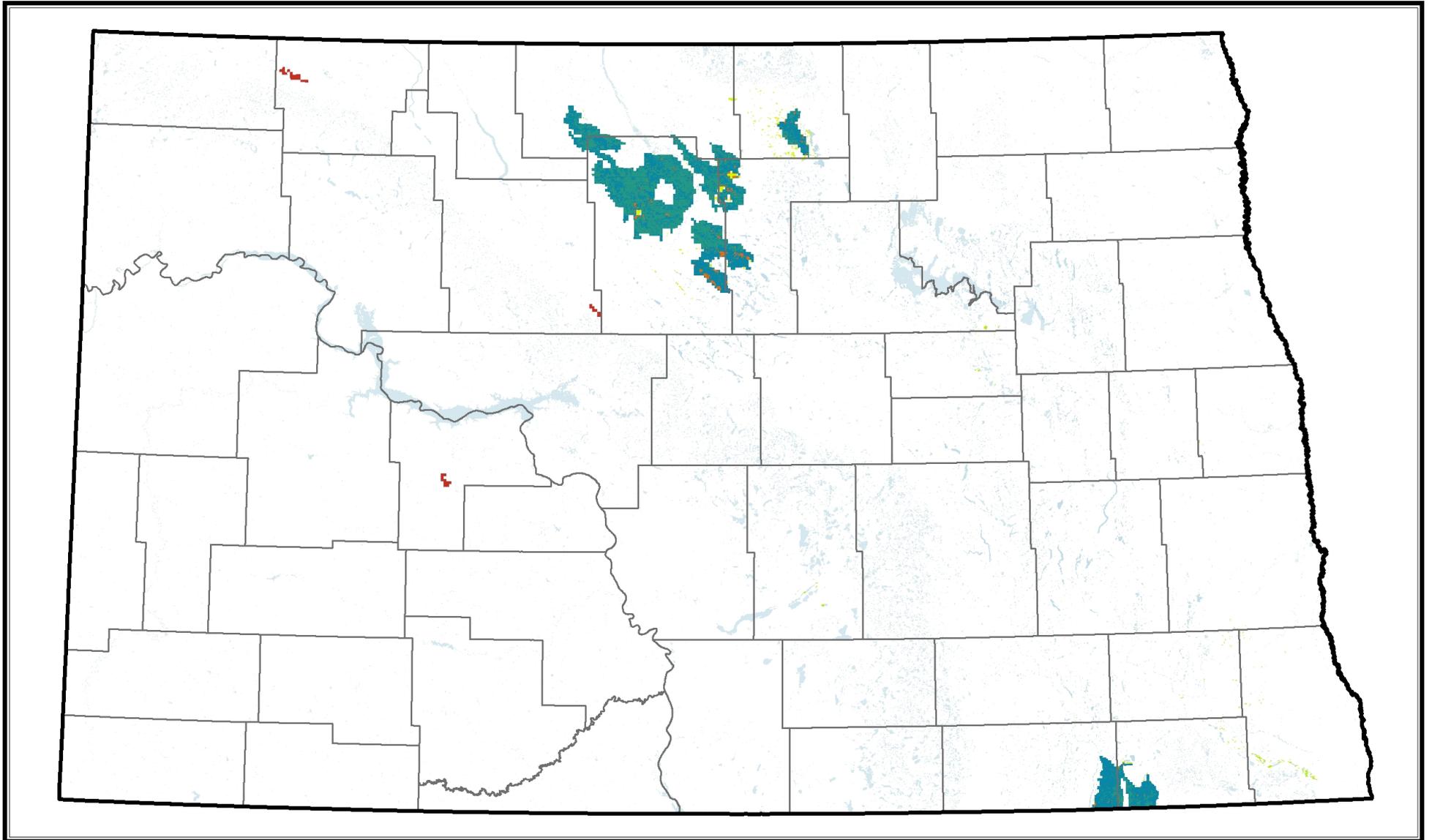
# Habitat Distribution Map



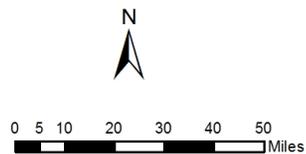
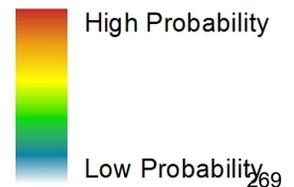
Prairie grapefern  
*Botrychium campestre*  
Level I



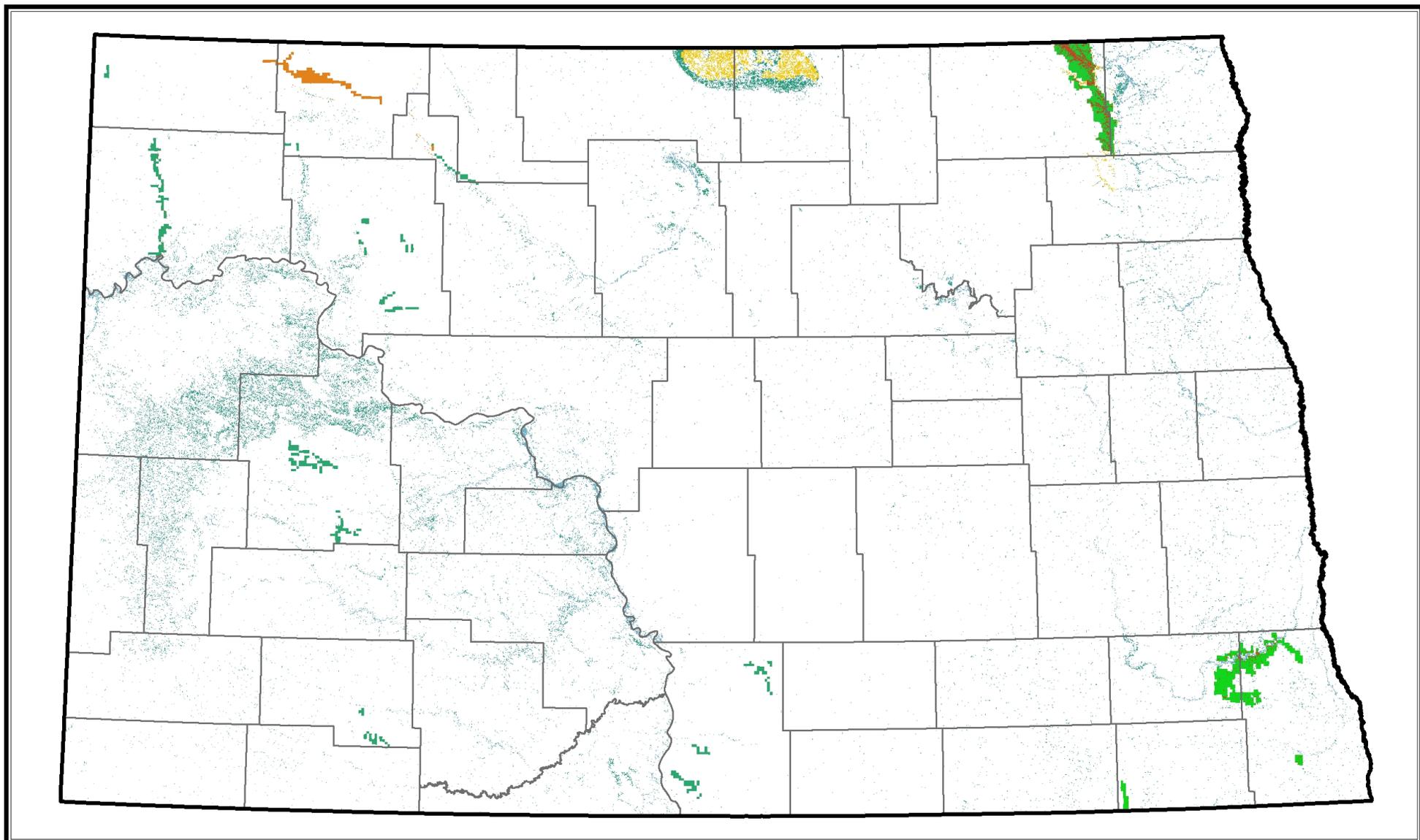
# Habitat Distribution Map



Chamomile grapefern  
*Botrychium matricariifolium*  
Level III

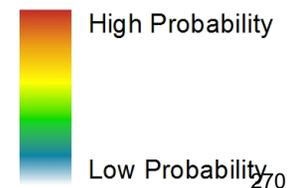


# Habitat Distribution Map



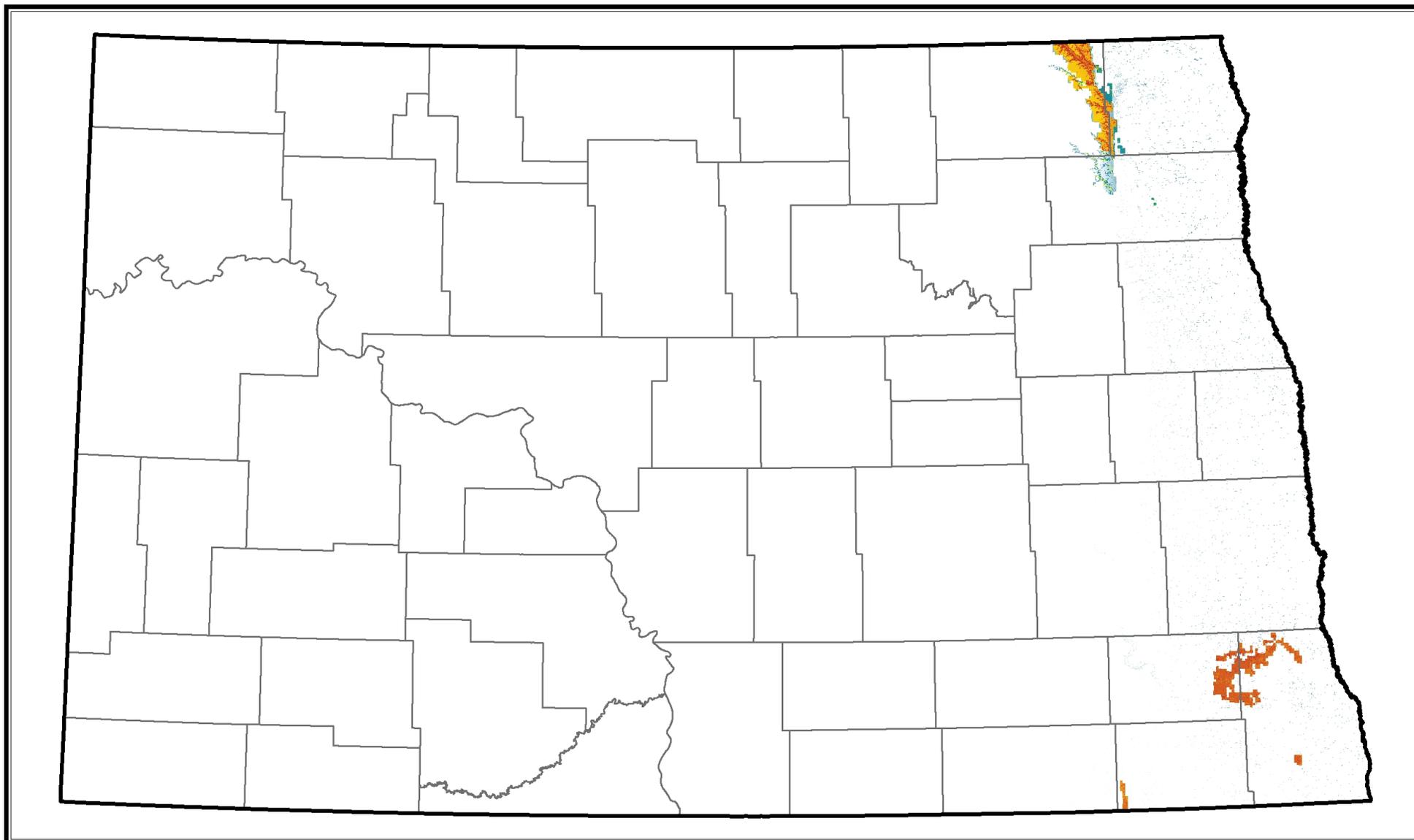
NDNHI 2012

Moonwort  
*Botrychium minganense*  
Level II

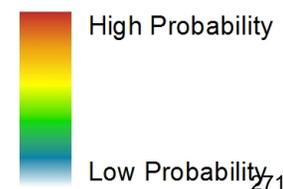


270

# Habitat Distribution Map

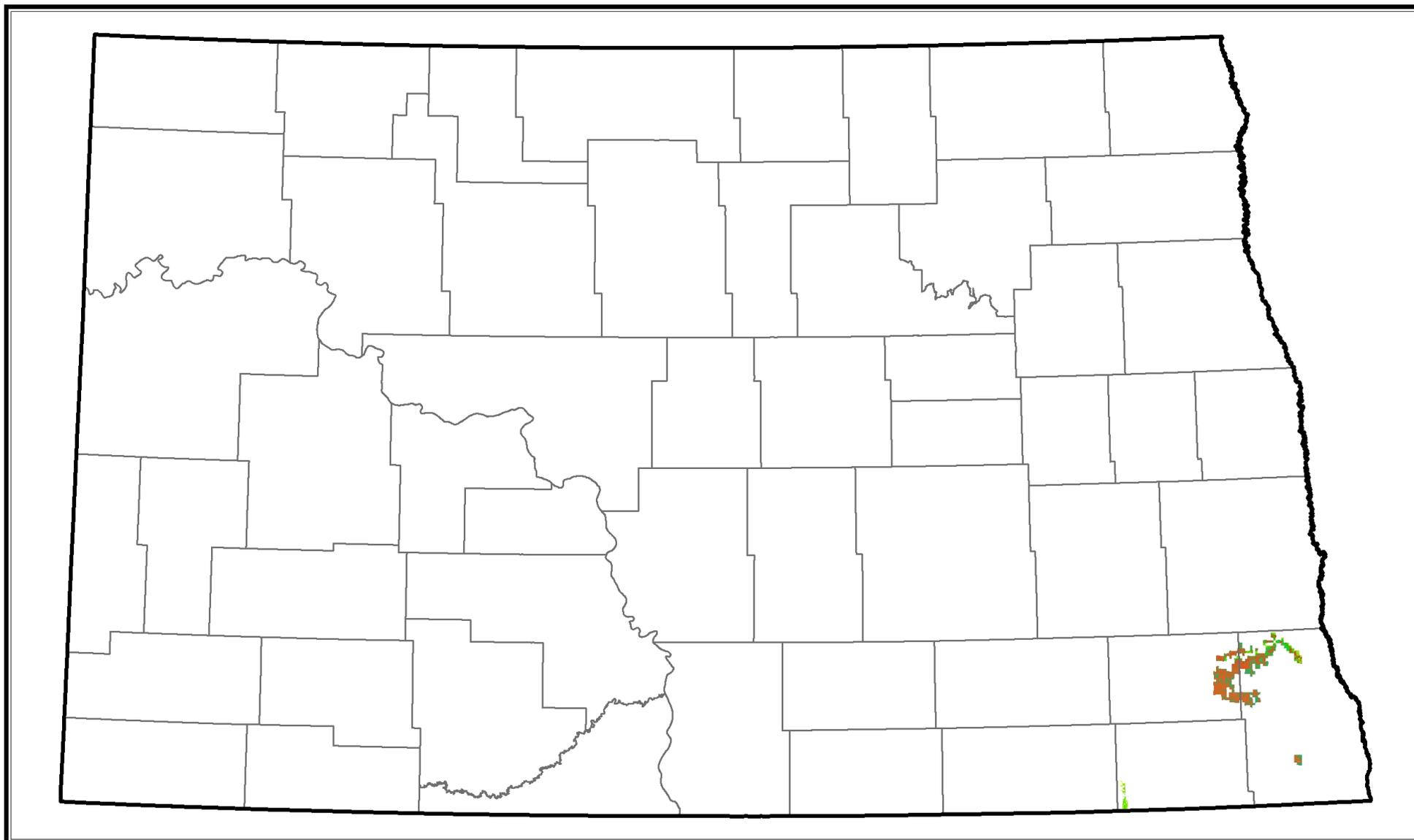


Leathery grapefern  
*Botrychium multifidum*  
Level II

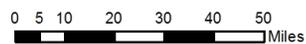
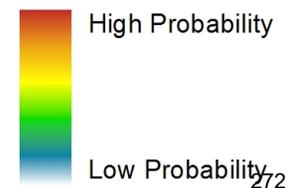


0 5 10 20 30 40 50 Miles

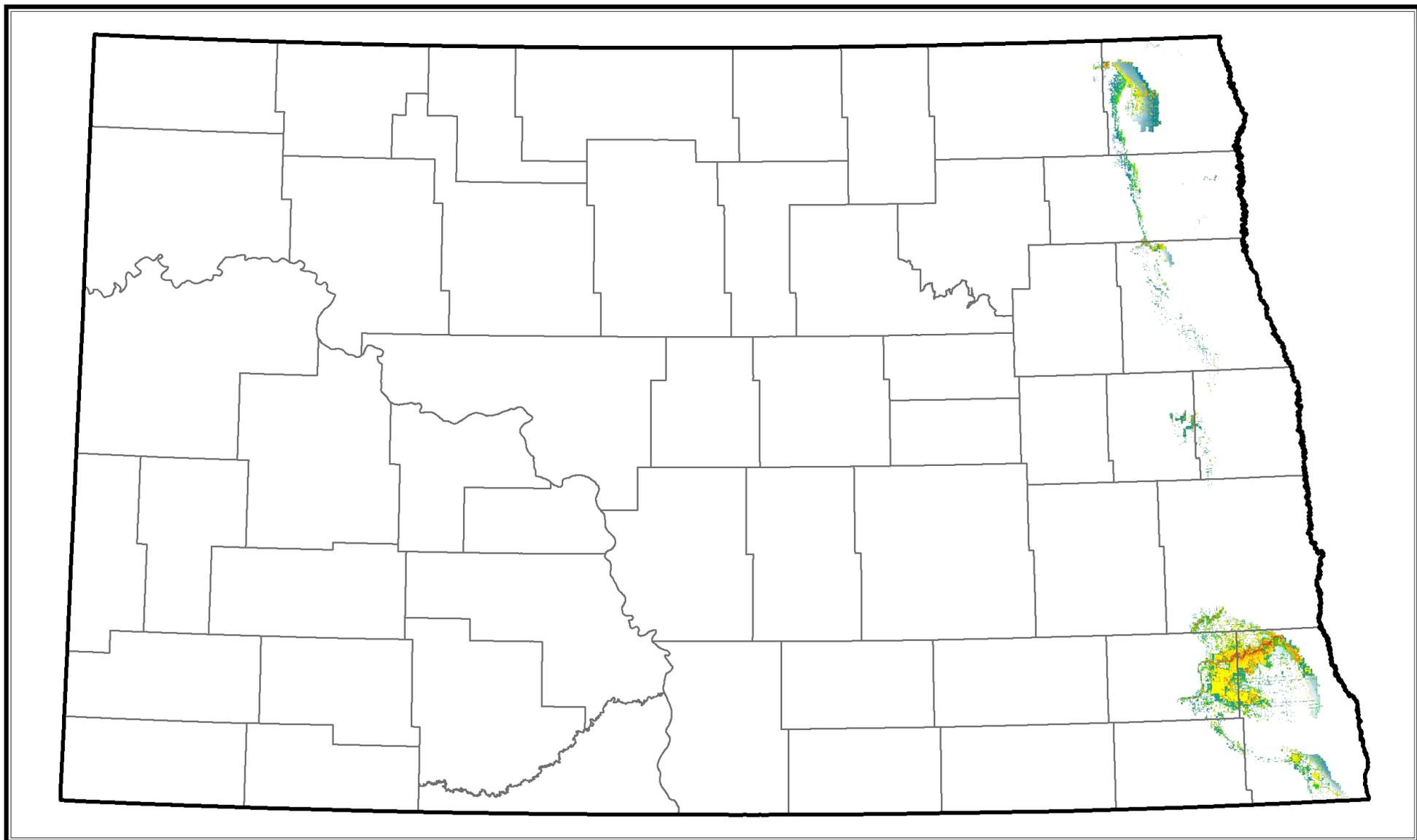
# Habitat Distribution Map



Least grapefern  
*Botrychium simplex*  
Level II

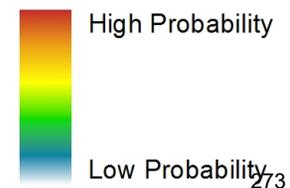


# Habitat Distribution Map

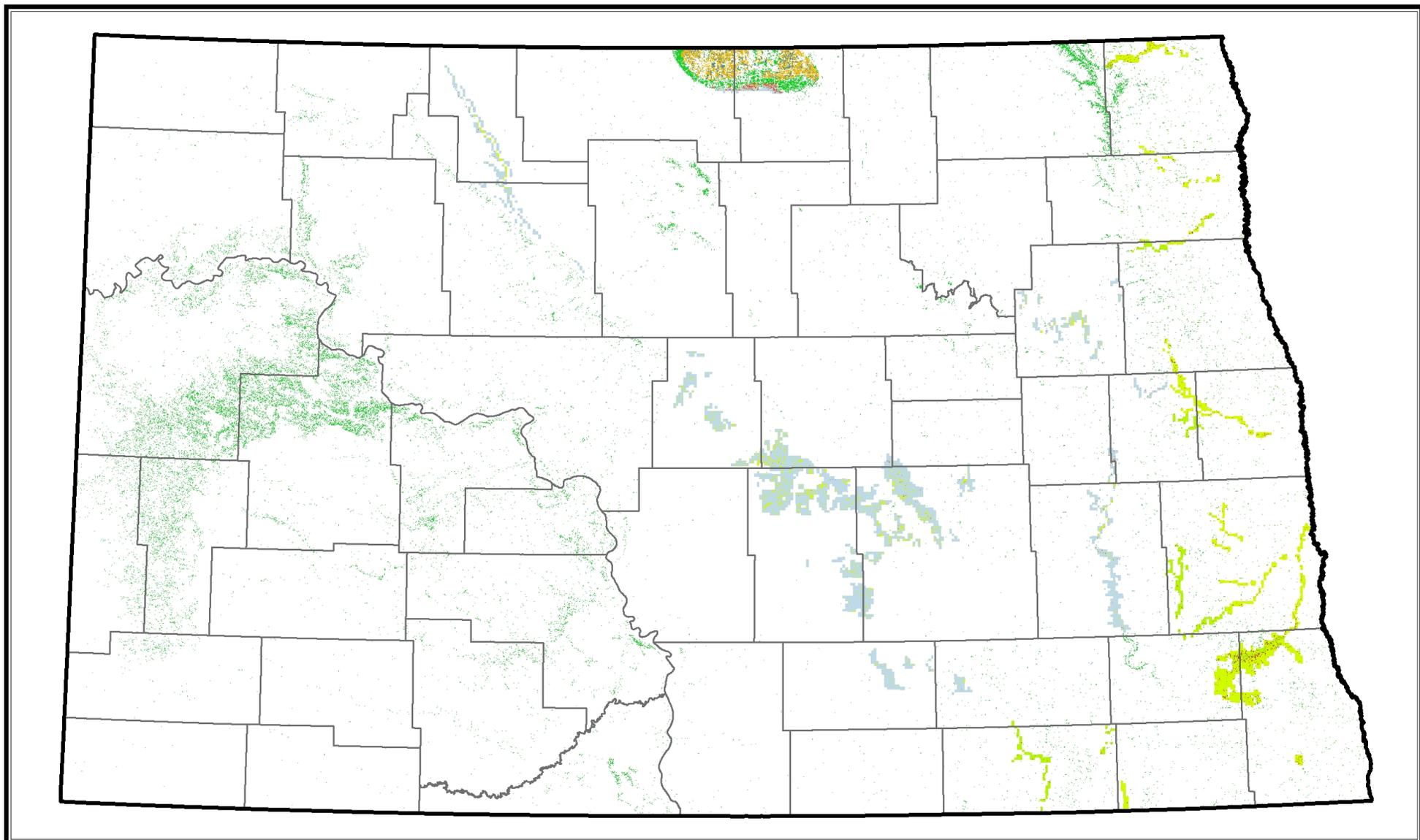


NDNHI 2012

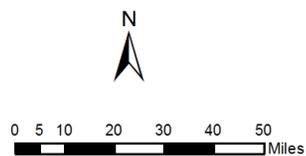
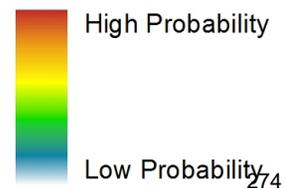
Marsh bellflower  
*Campanula aparinoides*  
Level II



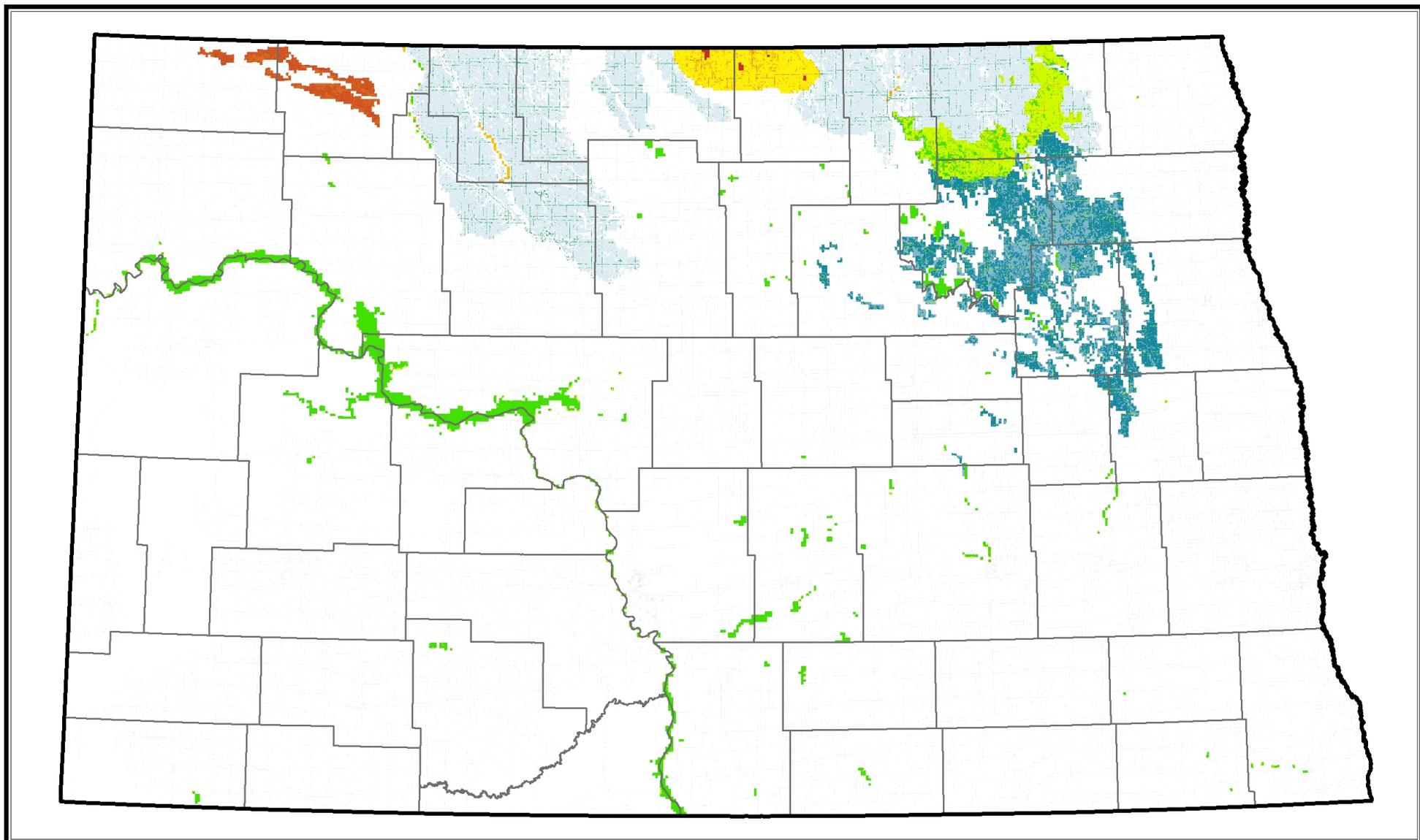
# Habitat Distribution Map



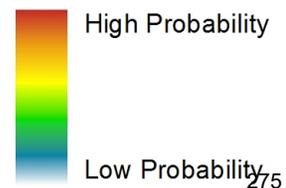
Foxtail sedge  
*Carex alopecoidea*  
Level II



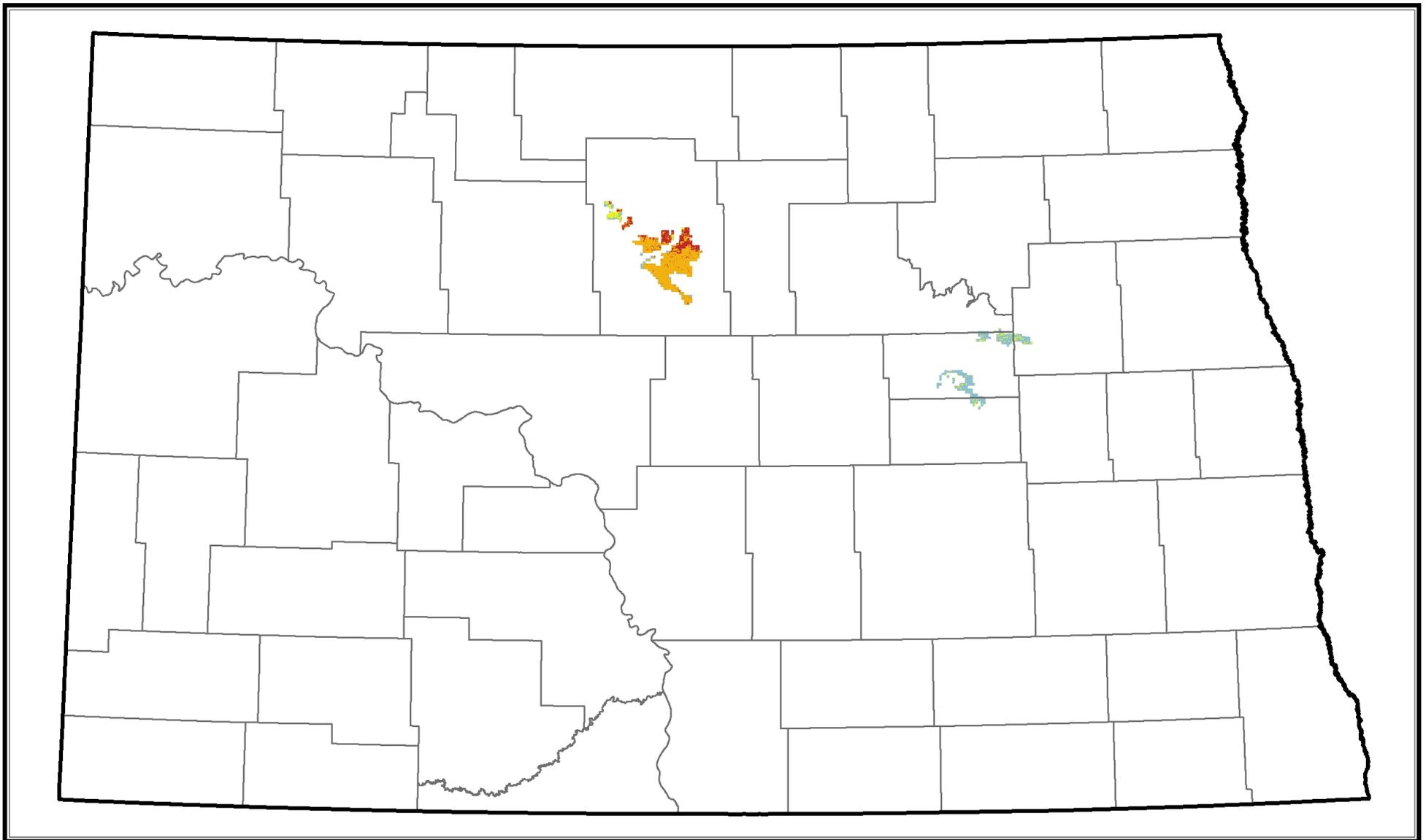
# Habitat Distribution Map



Back's sedge  
*Carex backii*  
Level III



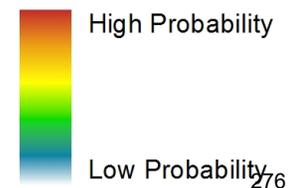
# Habitat Distribution Map



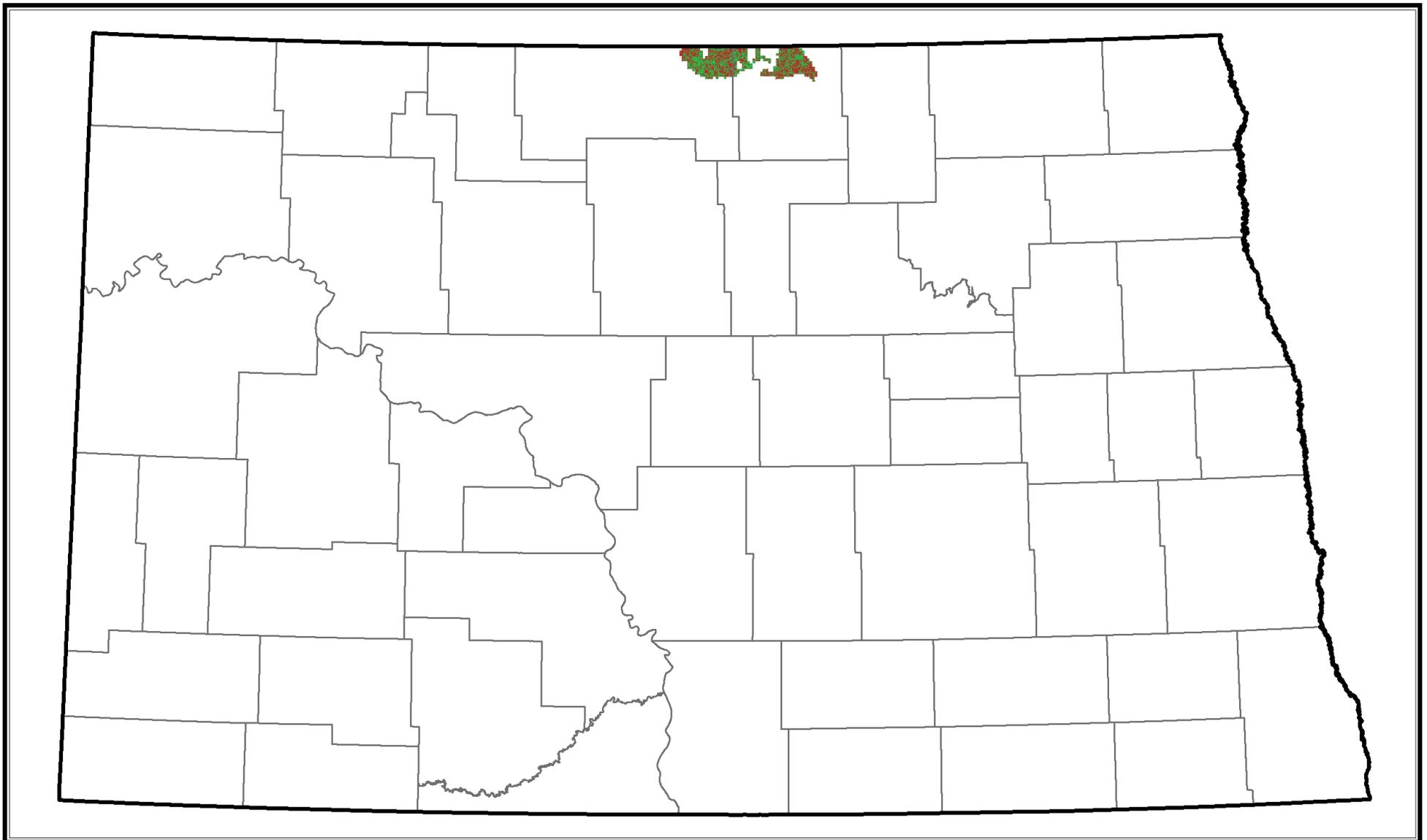
0 5 10 20 30 40 50 Miles

NDNHI 2012

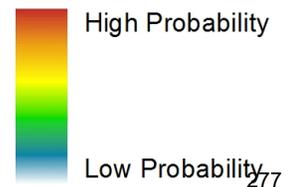
Hair-like sedge  
*Carex capillaris*  
Level III



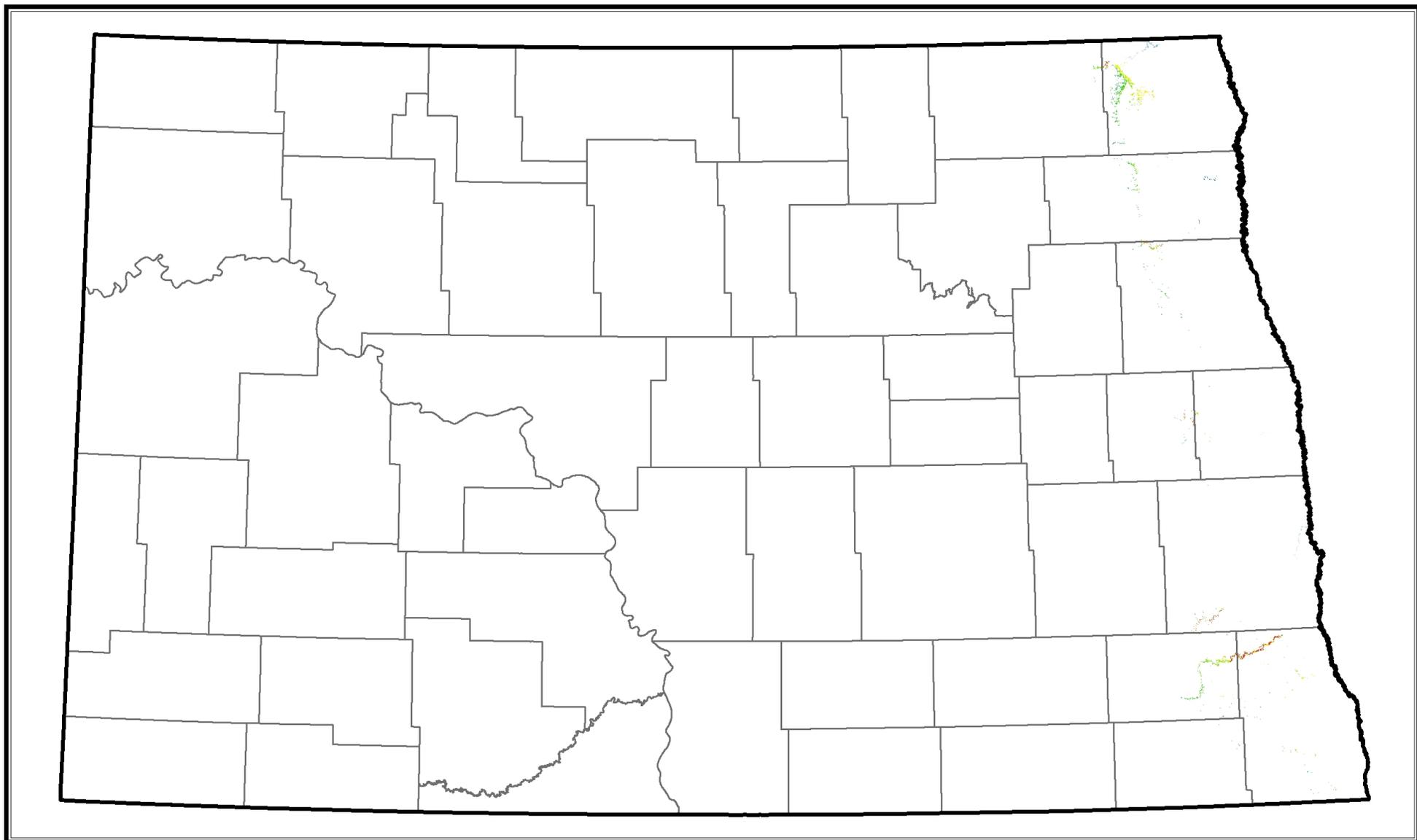
# Habitat Distribution Map



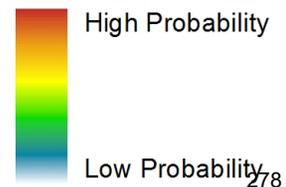
Spiny sedge  
*Carex echinata* ssp. *echinata*  
Level II



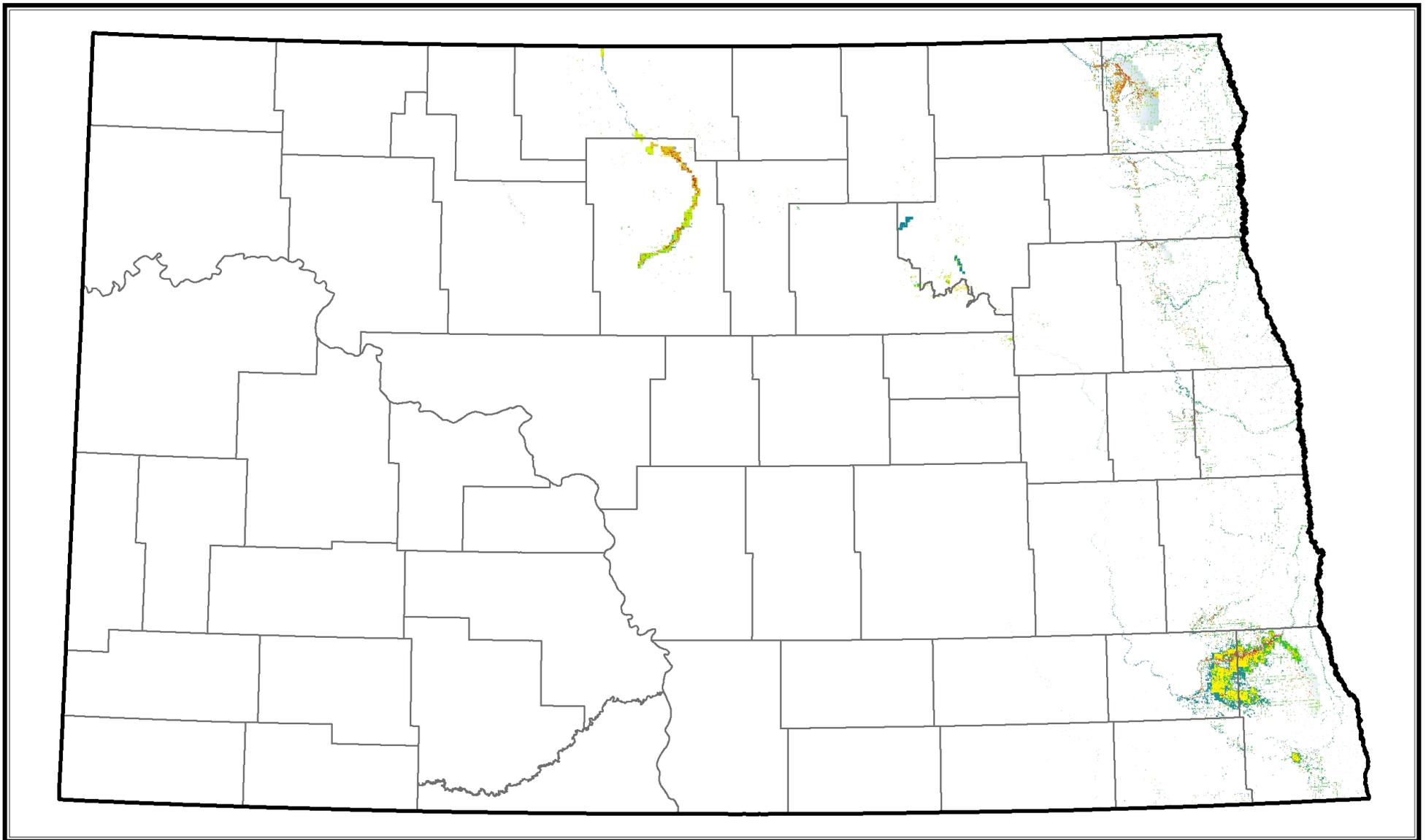
# Habitat Distribution Map



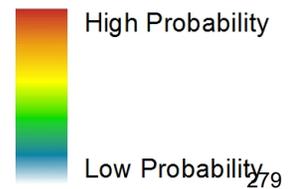
Handsome sedge  
*Carex formosa*  
Level I



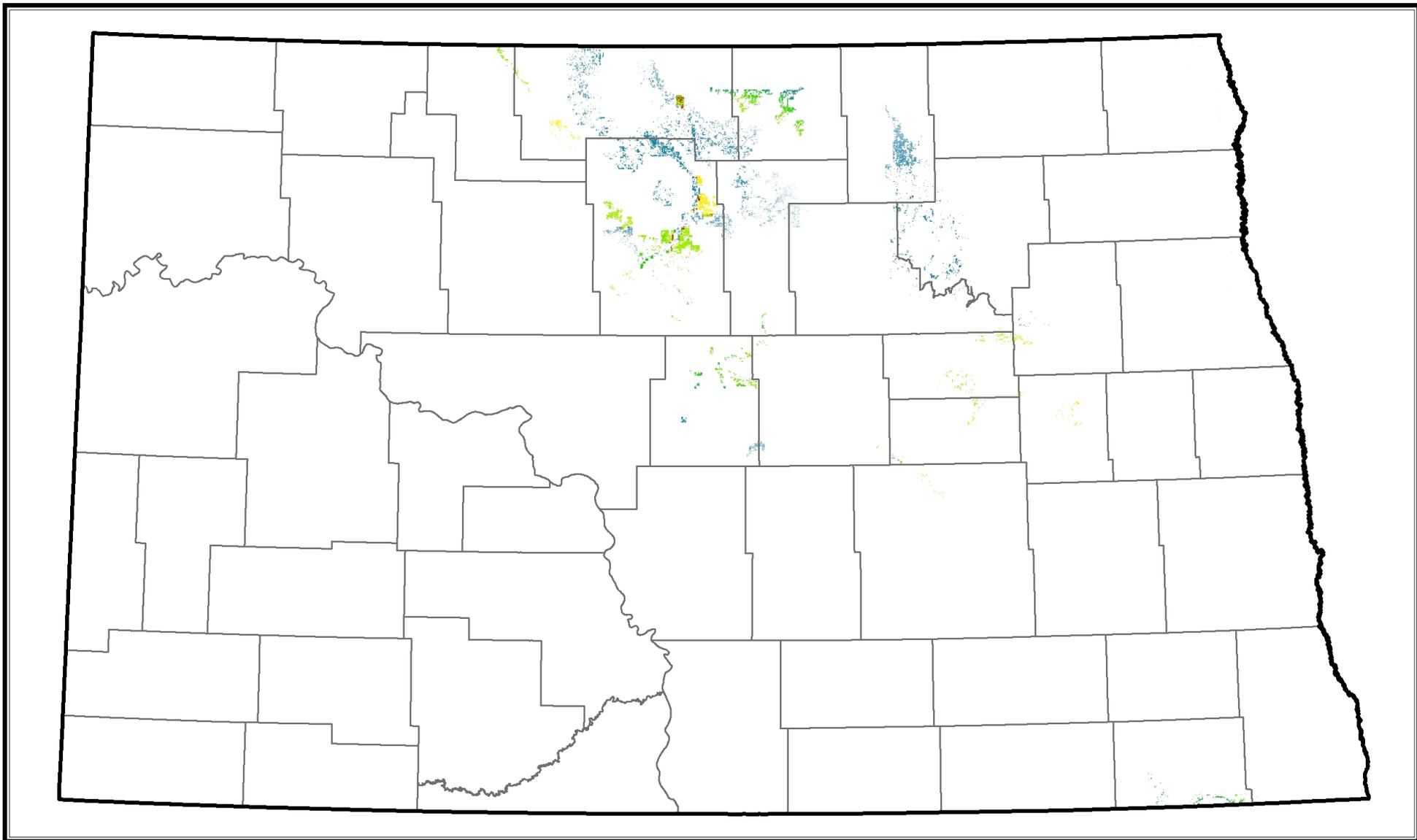
# Habitat Distribution Map



Delicate sedge  
*Carex leptalea*  
Level II

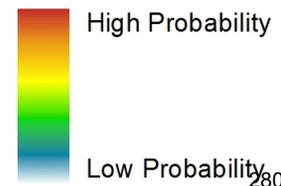


# Habitat Distribution Map

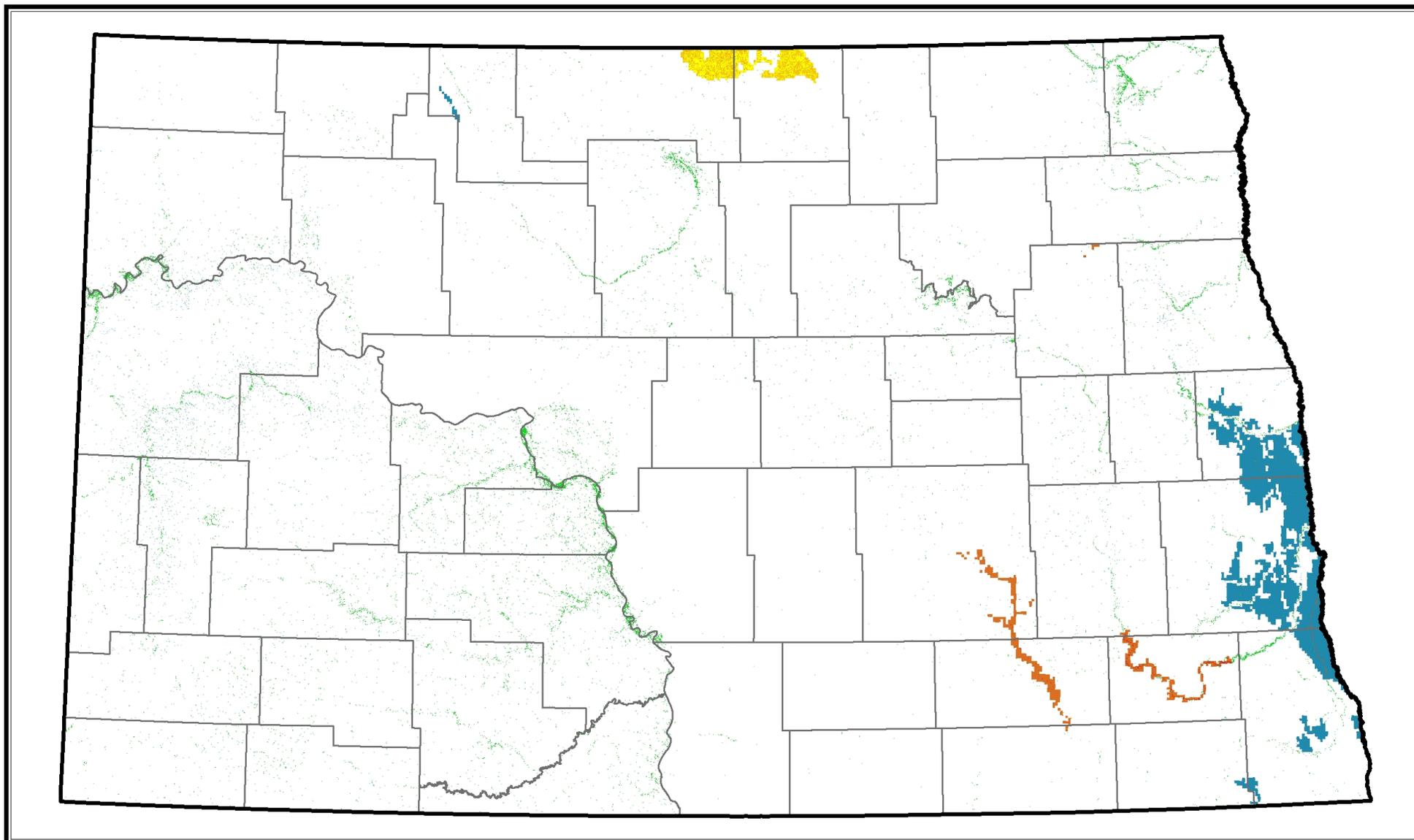


0 5 10 20 30 40 50 Miles

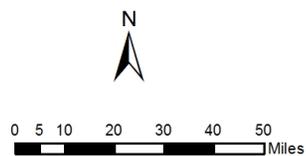
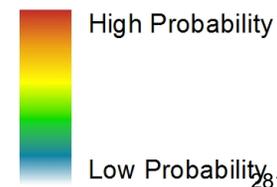
Sterile sedge  
*Carex sterilis*  
Level II



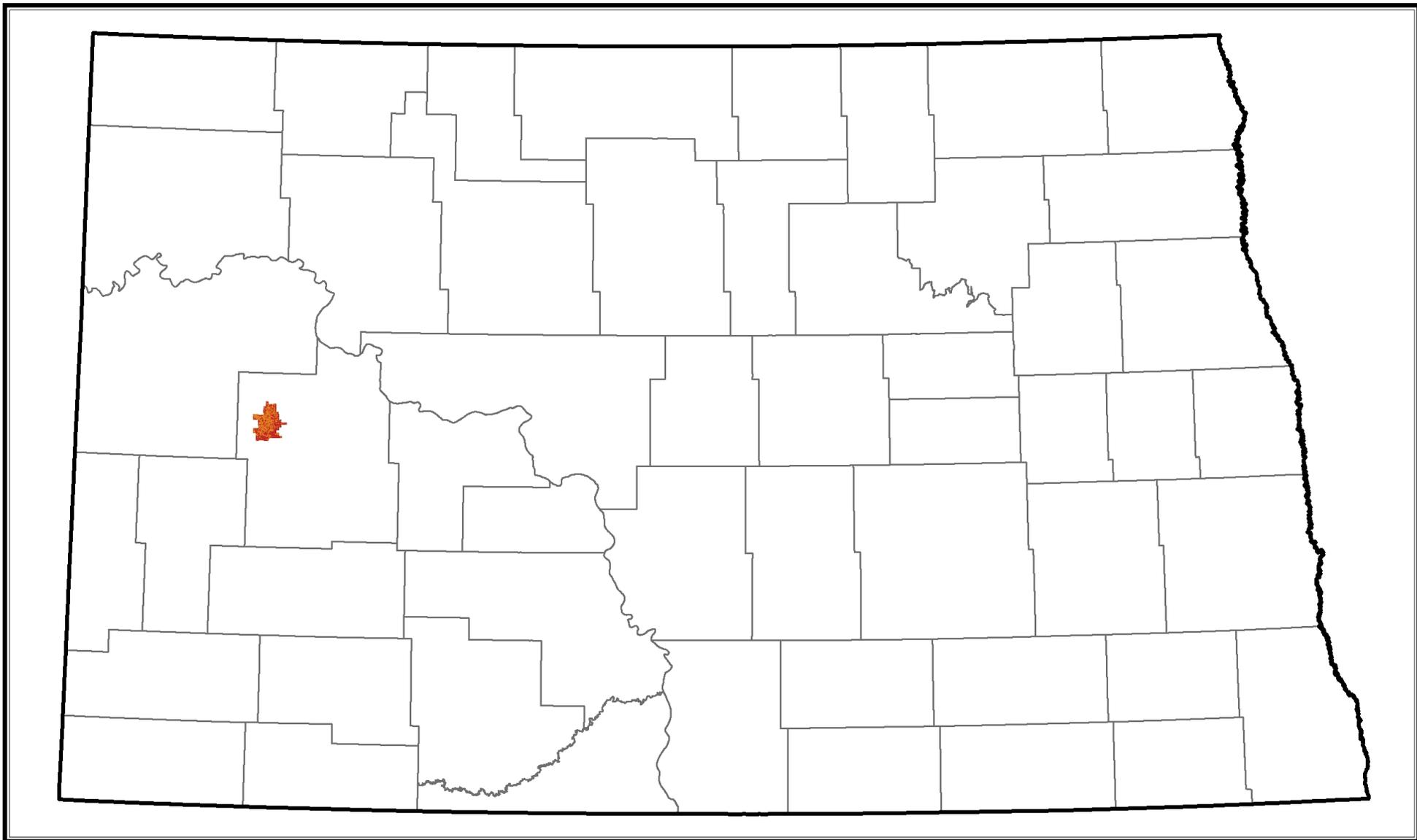
# Habitat Distribution Map



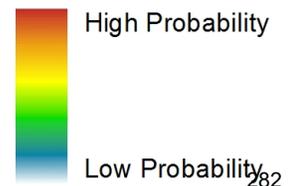
Blue cohosh  
*Caulophyllum thalictroides*  
Level II



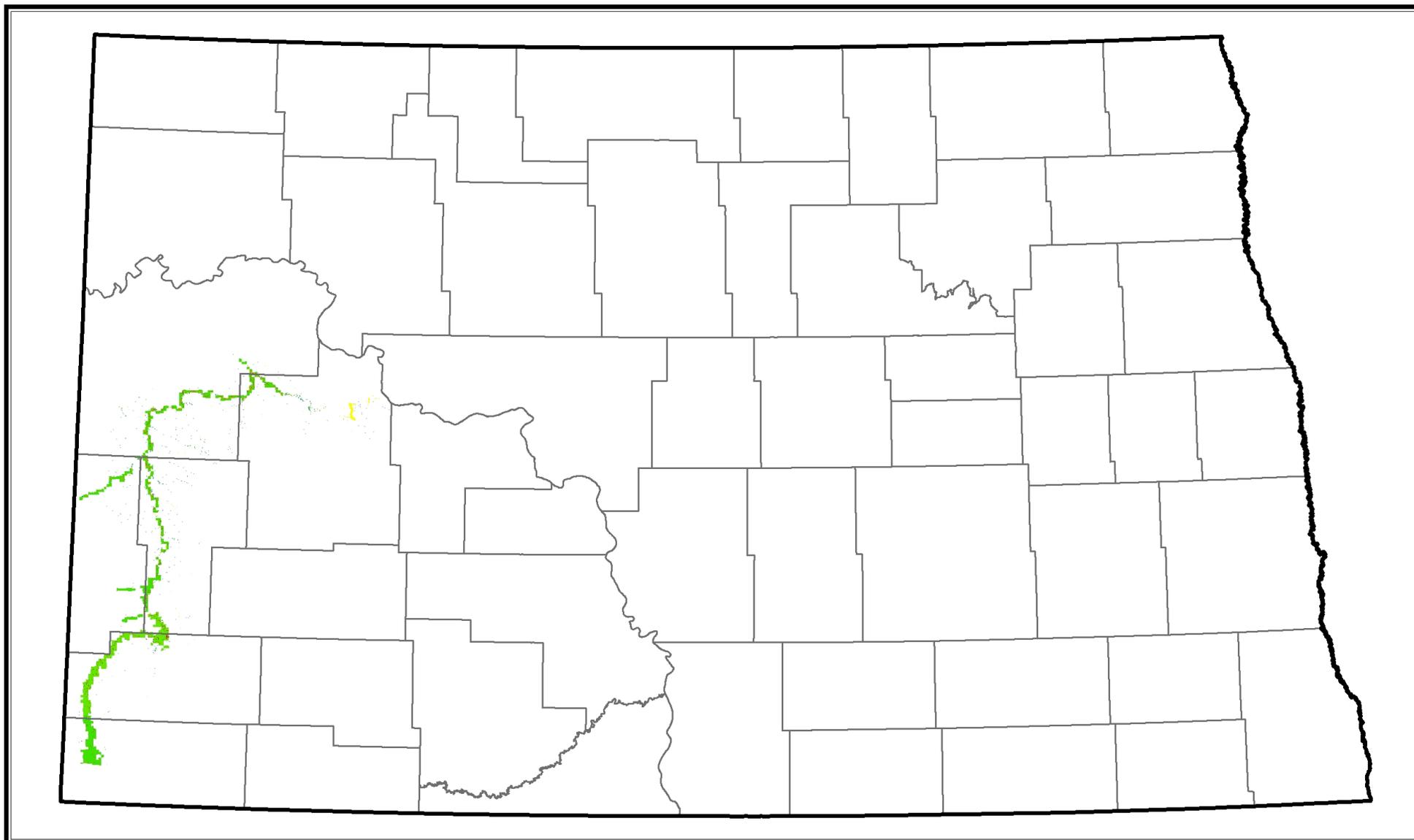
# Habitat Distribution Map



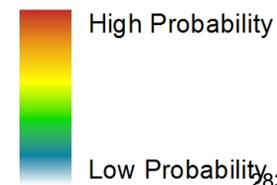
Slender lip fern  
*Cheilanthes feei*  
Level II



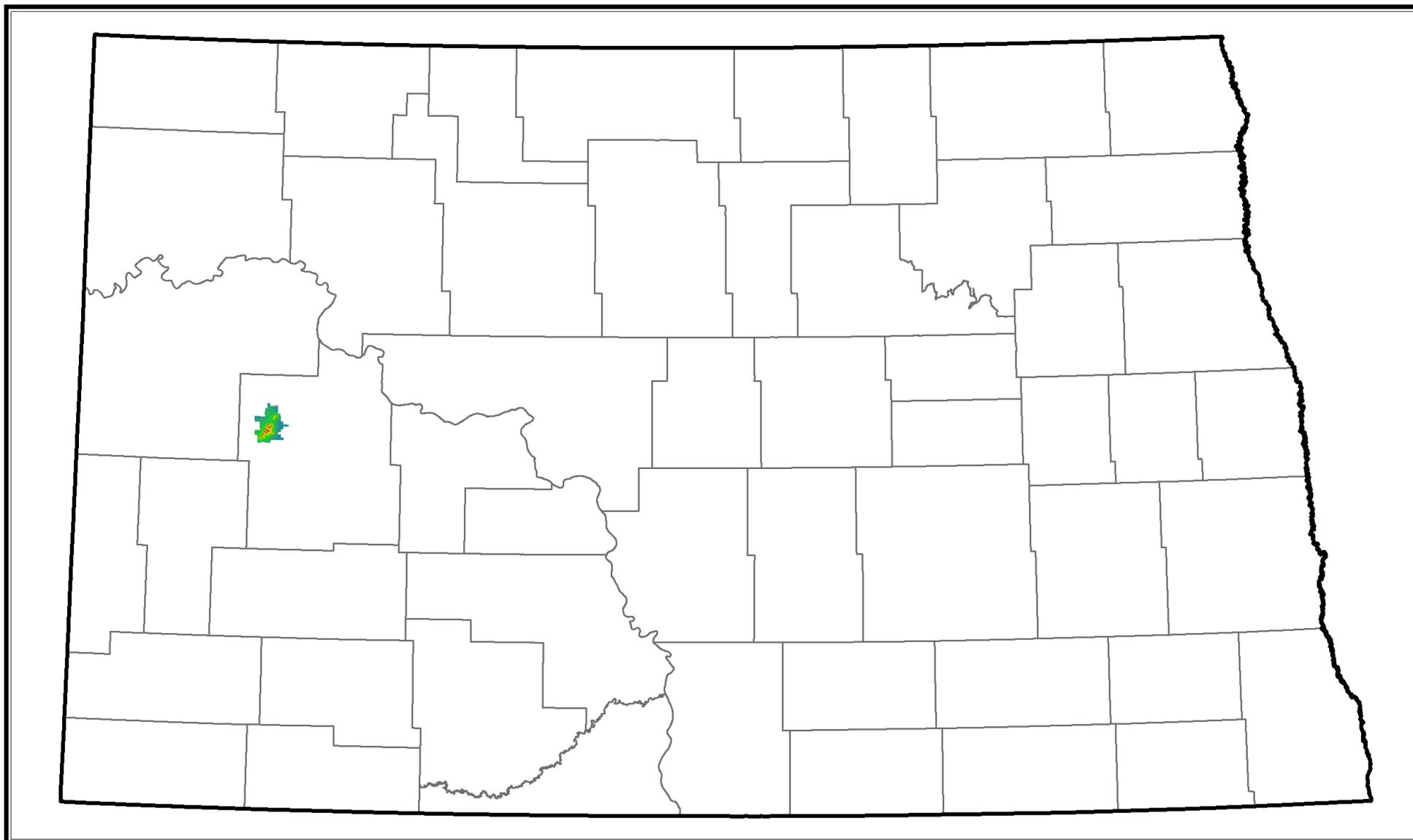
# Habitat Distribution Map



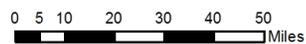
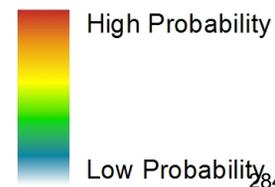
Smooth goosefoot  
*Chenopodium subglabrum*  
Level I



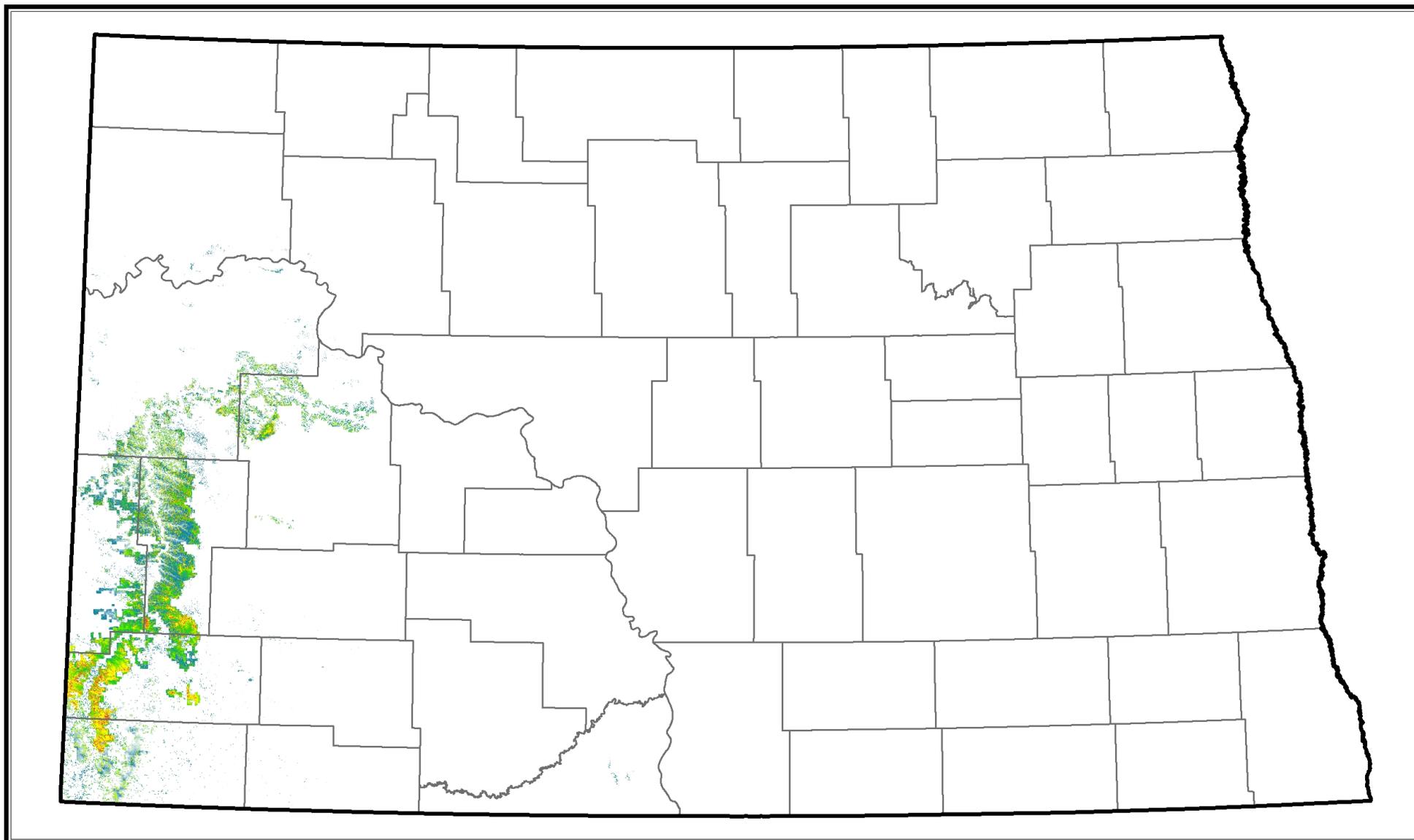
# Habitat Distribution Map



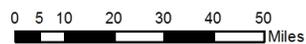
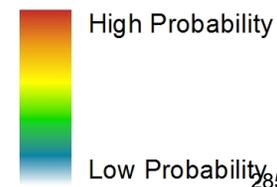
Slender-lobed clematis  
*Clematis columbiana* var. *tenuiloba*  
Level II



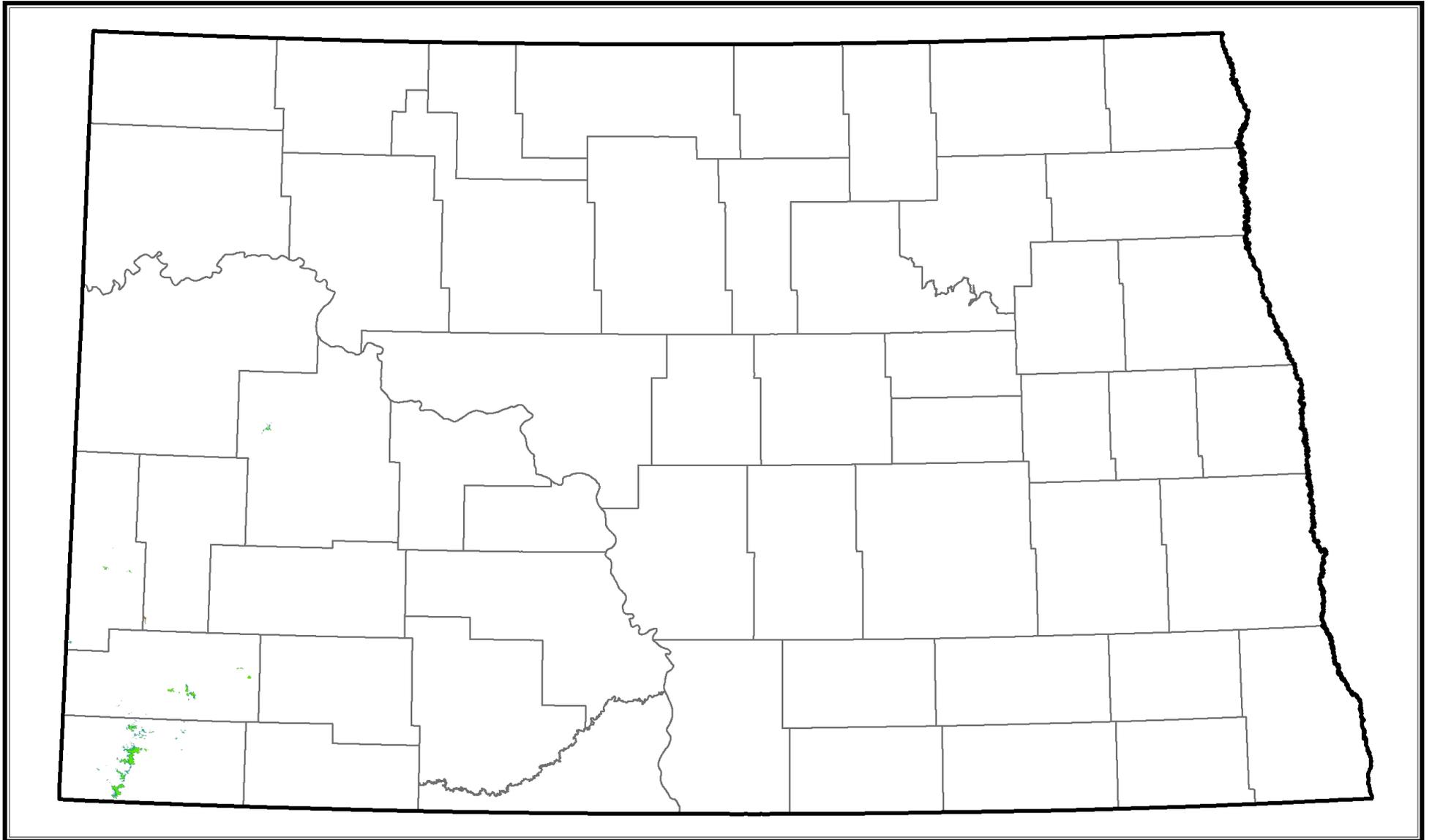
# Habitat Distribution Map



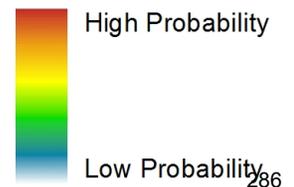
Blue lips  
*Collinsia parviflora*  
Level II



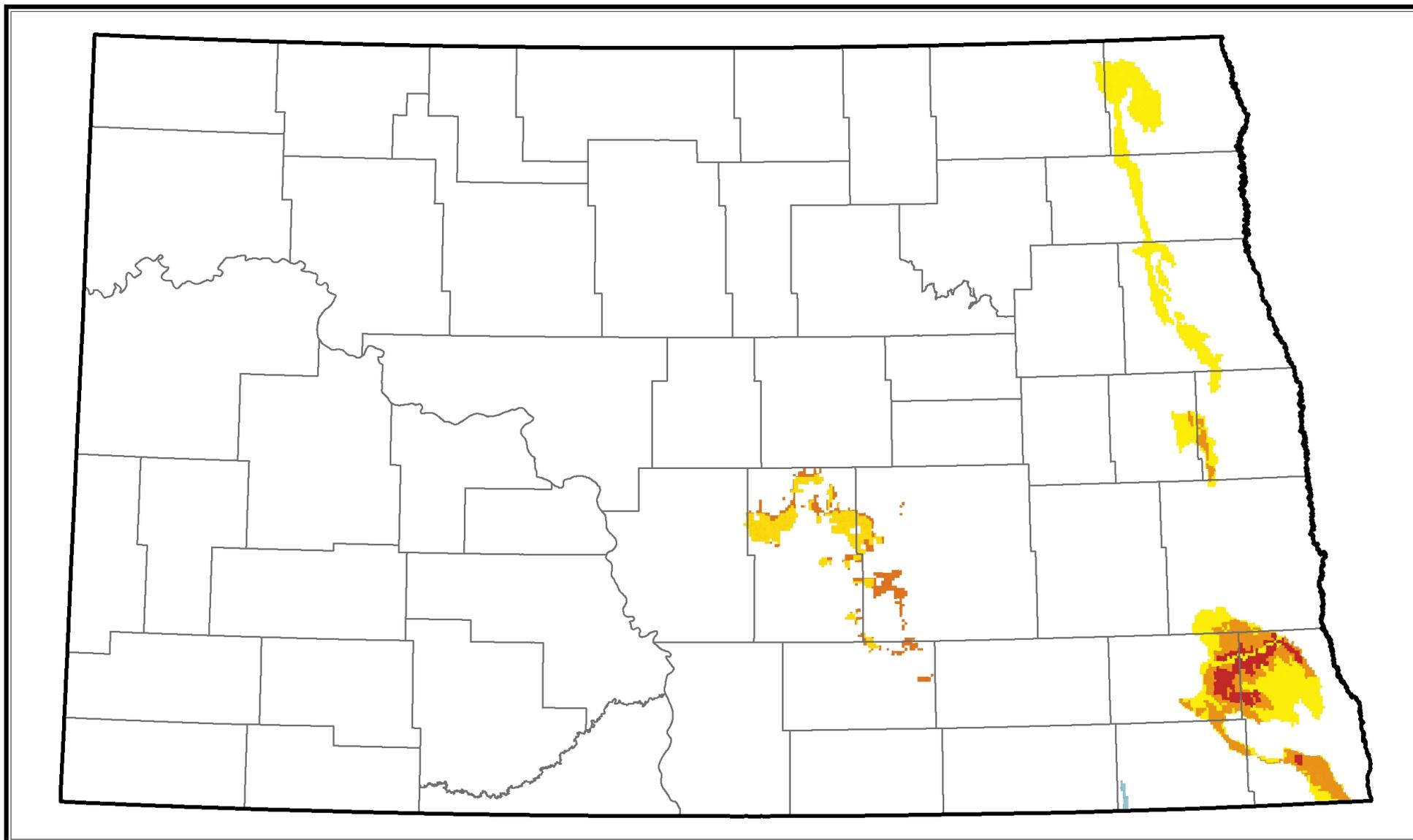
# Habitat Distribution Map



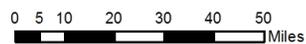
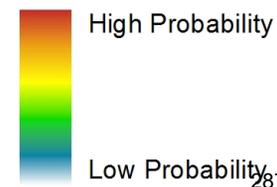
Torrey's cryptantha  
*Cryptantha torreyana*  
Level II



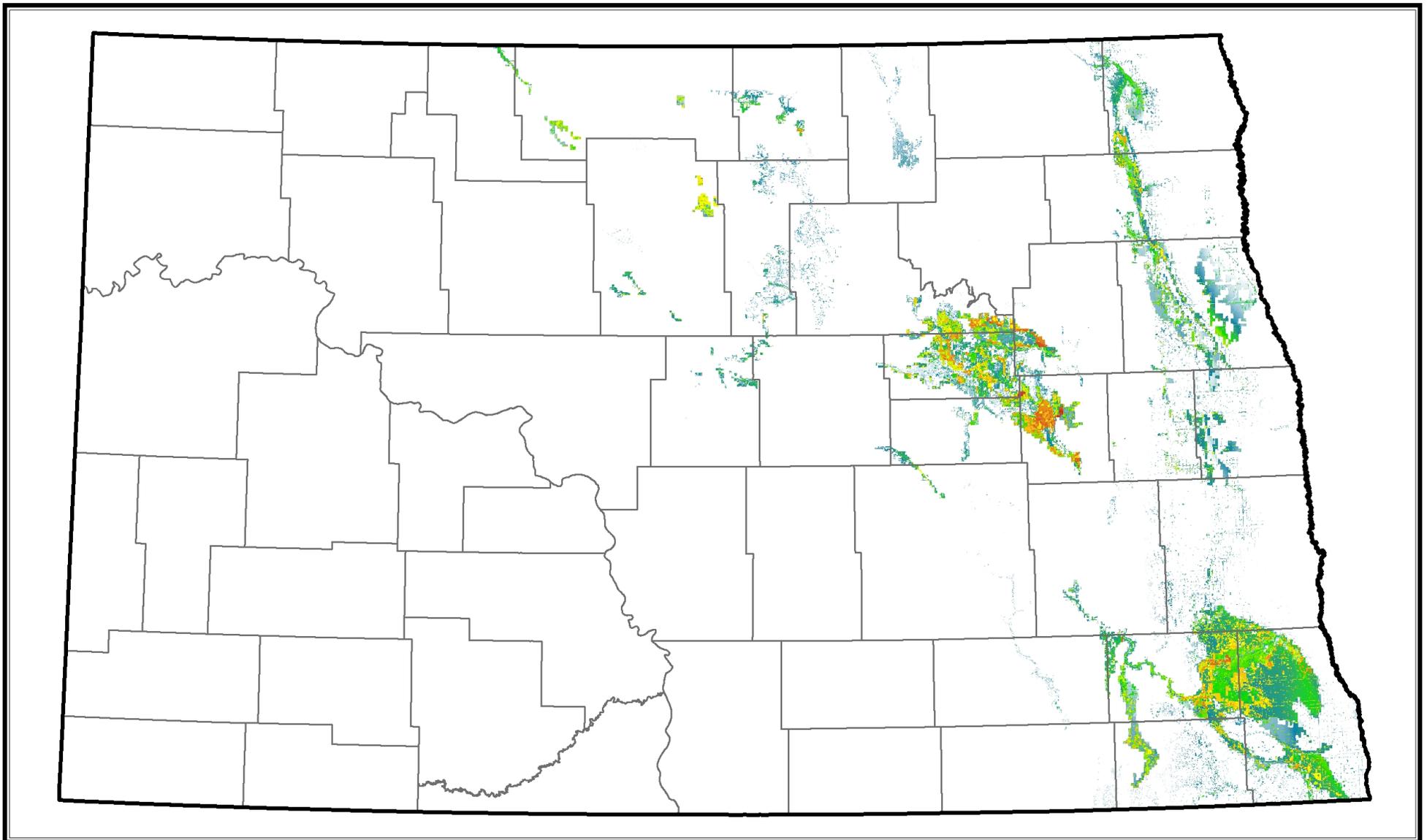
# Habitat Distribution Map



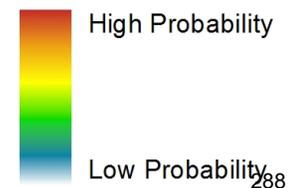
Brook flatsedge  
*Cyperus bipartitus*  
Level II



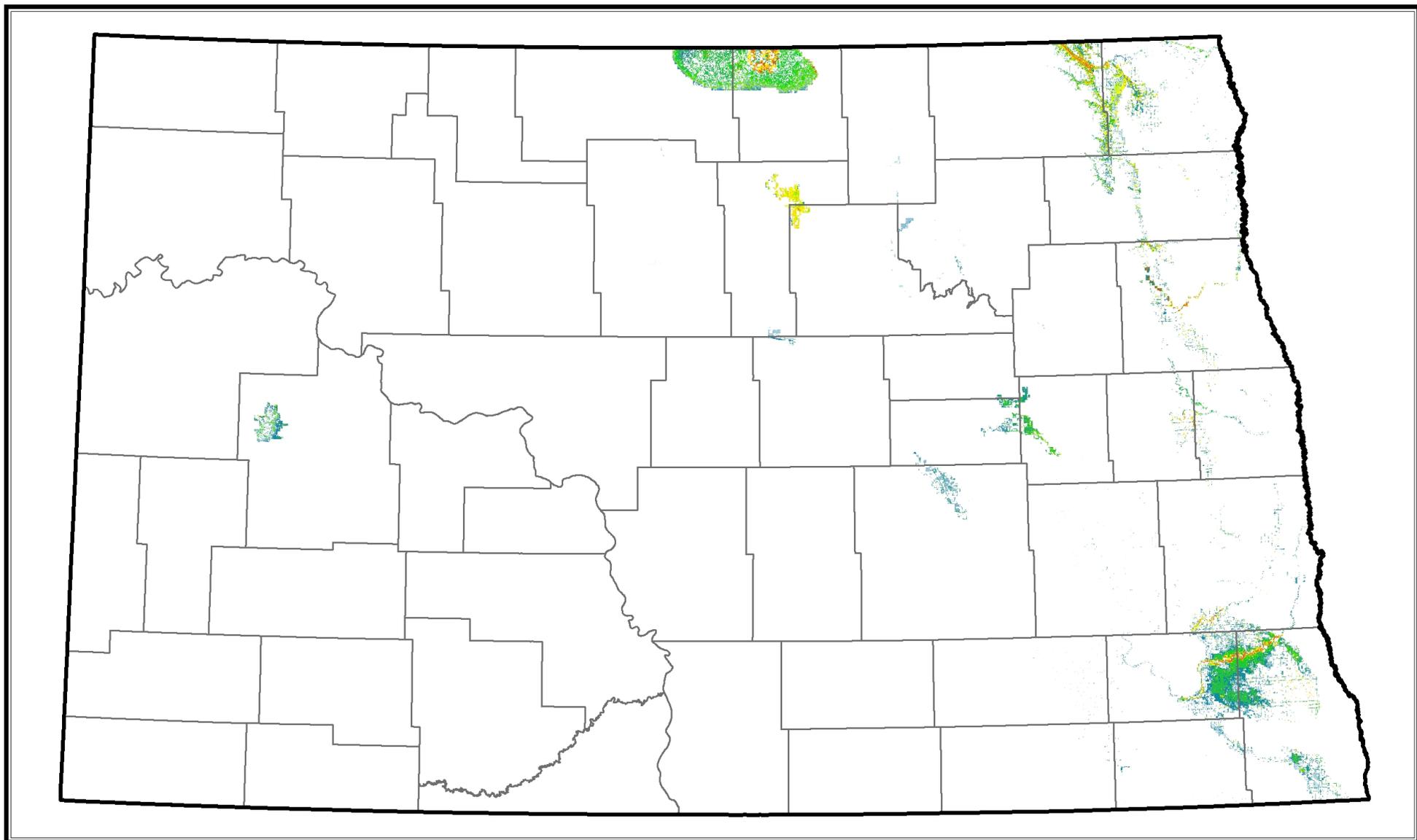
# Habitat Distribution Map



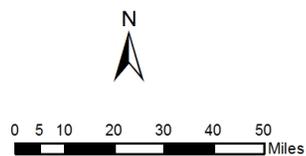
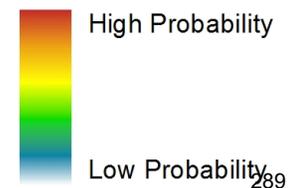
White lady's-slipper  
*Cypripedium candidum*  
Level I



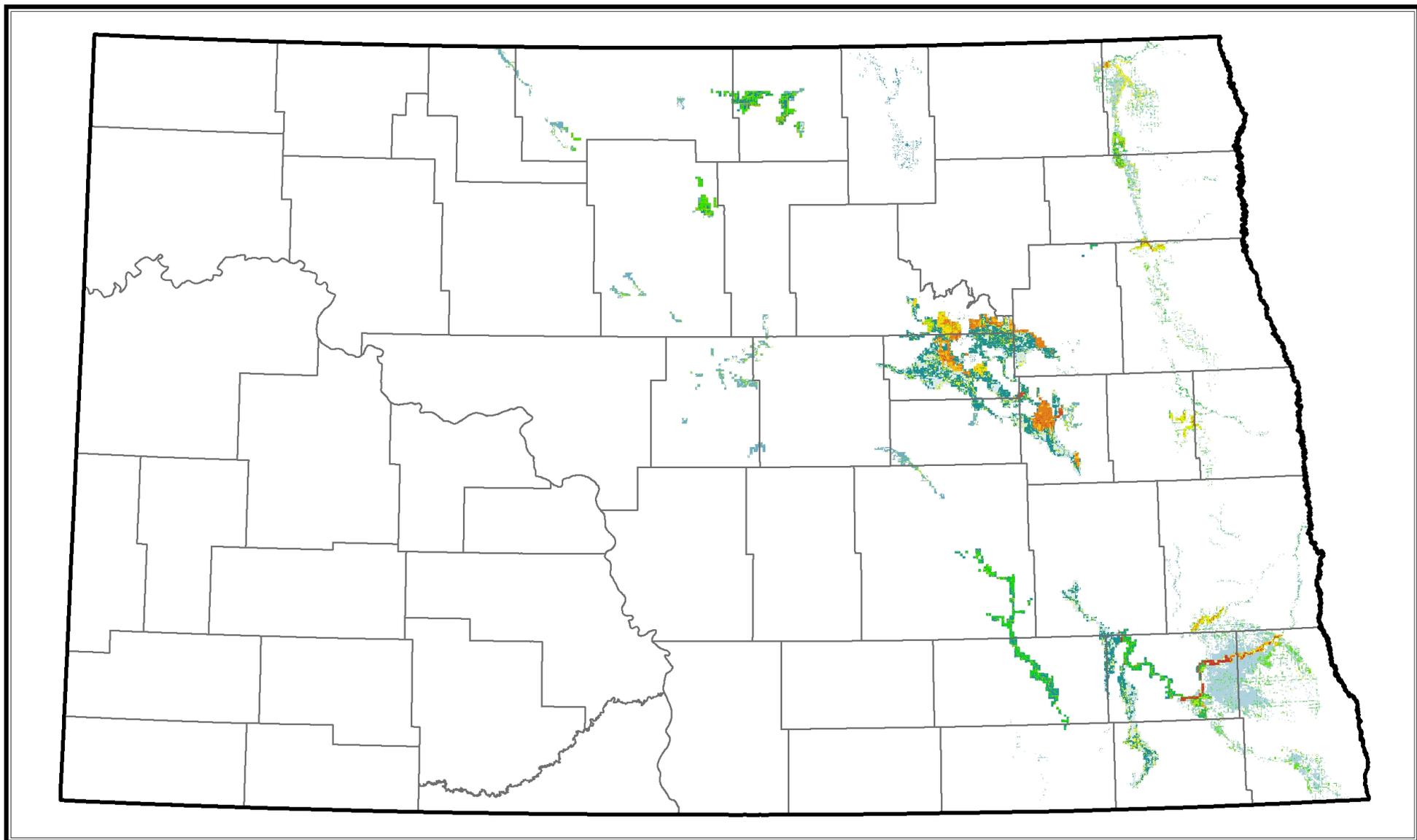
# Habitat Distribution Map



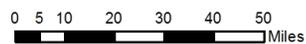
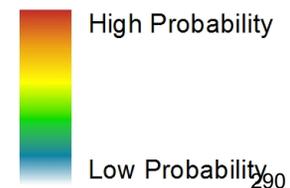
Small yellow lady's-slipper orchid  
*Cypripedium parviflorum*  
Level II



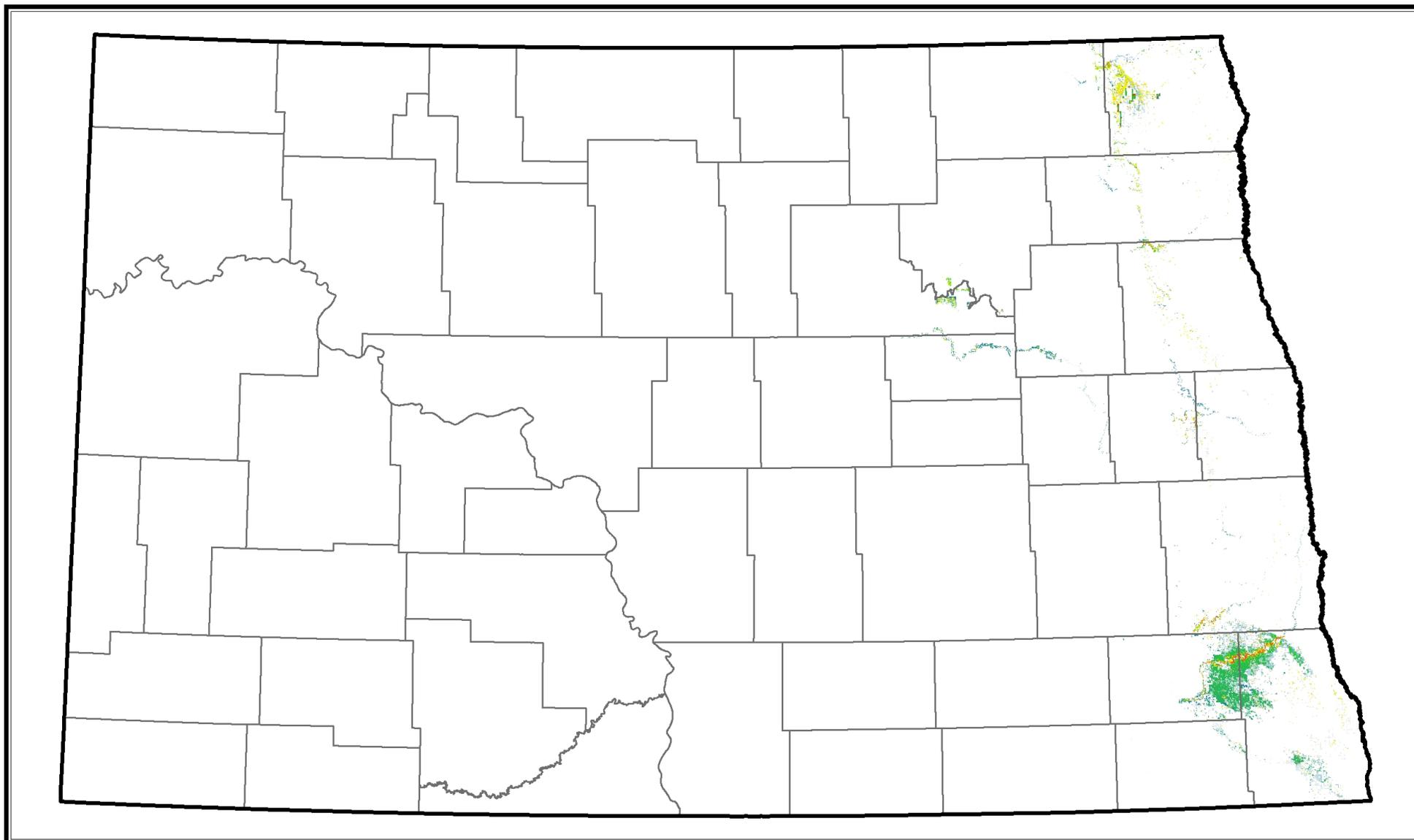
# Habitat Distribution Map



Large yellow lady's-slipper  
*Cypripedium parviflorum* var. *pubescens*  
Level III

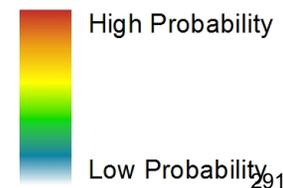


# Habitat Distribution Map

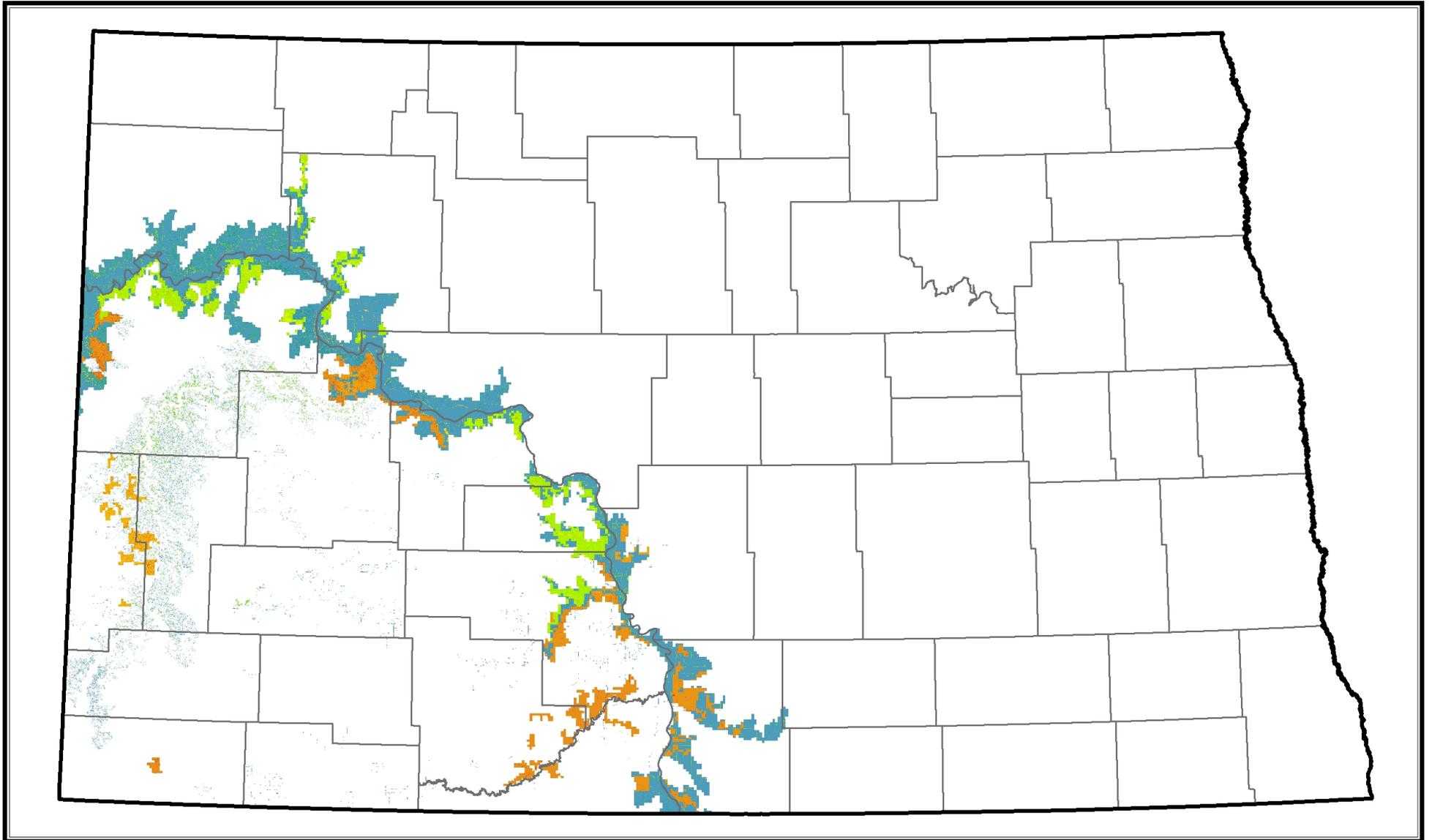


Showy lady's-slipper  
*Cypripedium reginae*

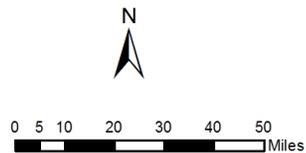
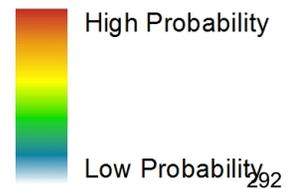
Level II



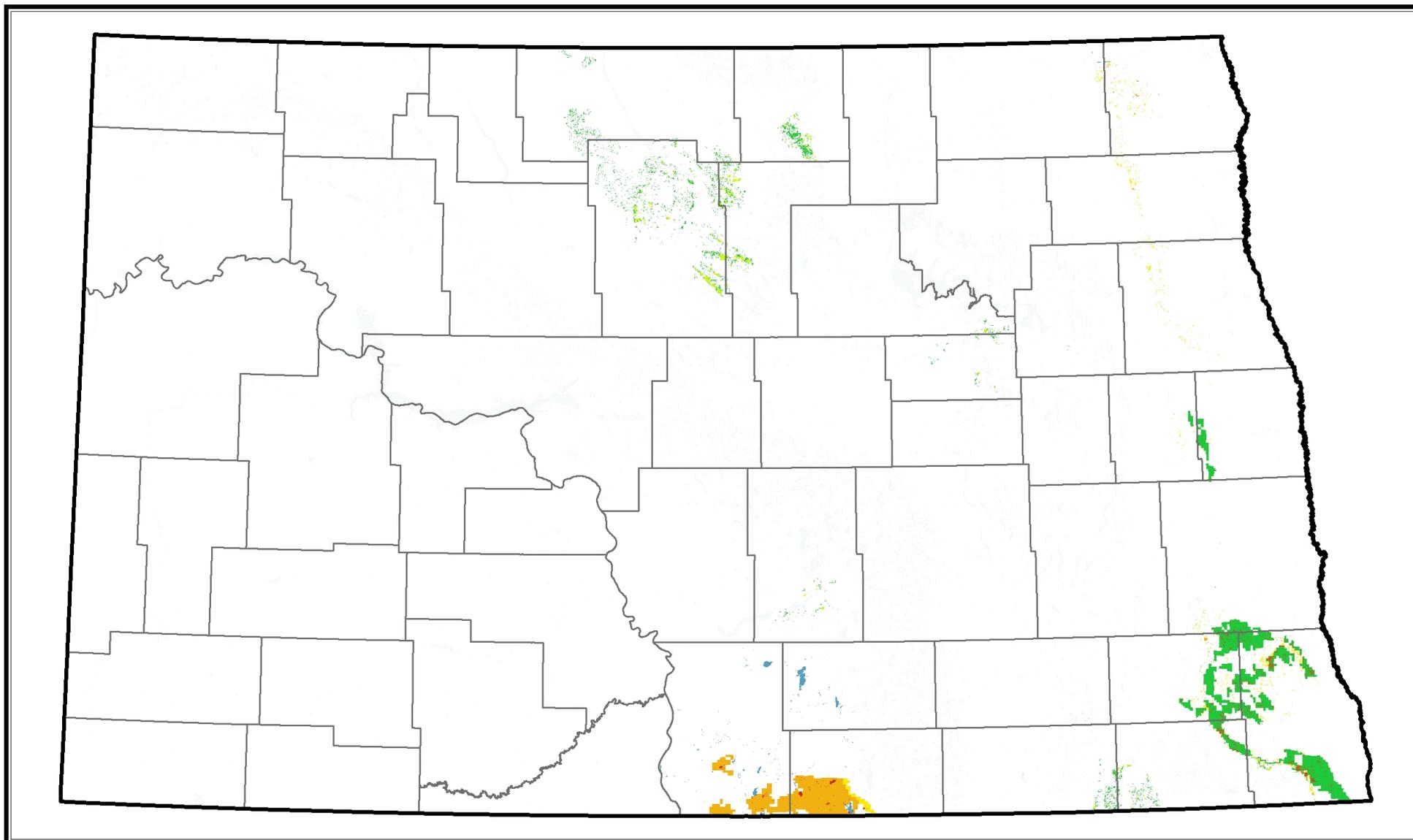
# Habitat Distribution Map



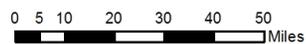
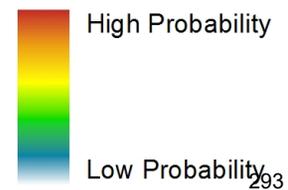
Nine-anthered dalea  
*Dalea enneandra*  
Level III



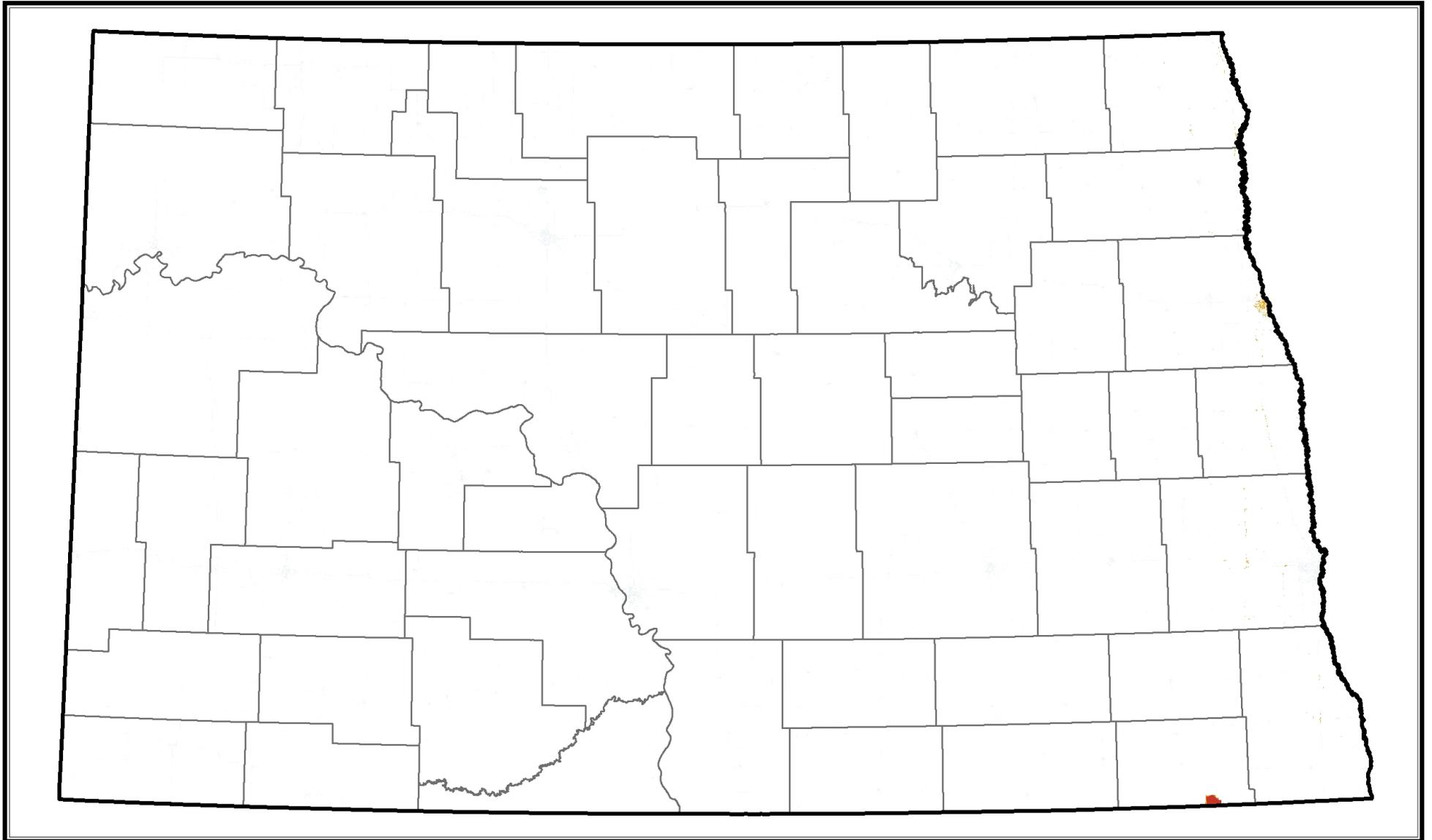
# Habitat Distribution Map



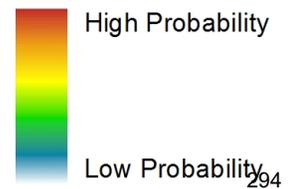
Prairie mimosa  
*Desmanthus illinoensis*  
Level III



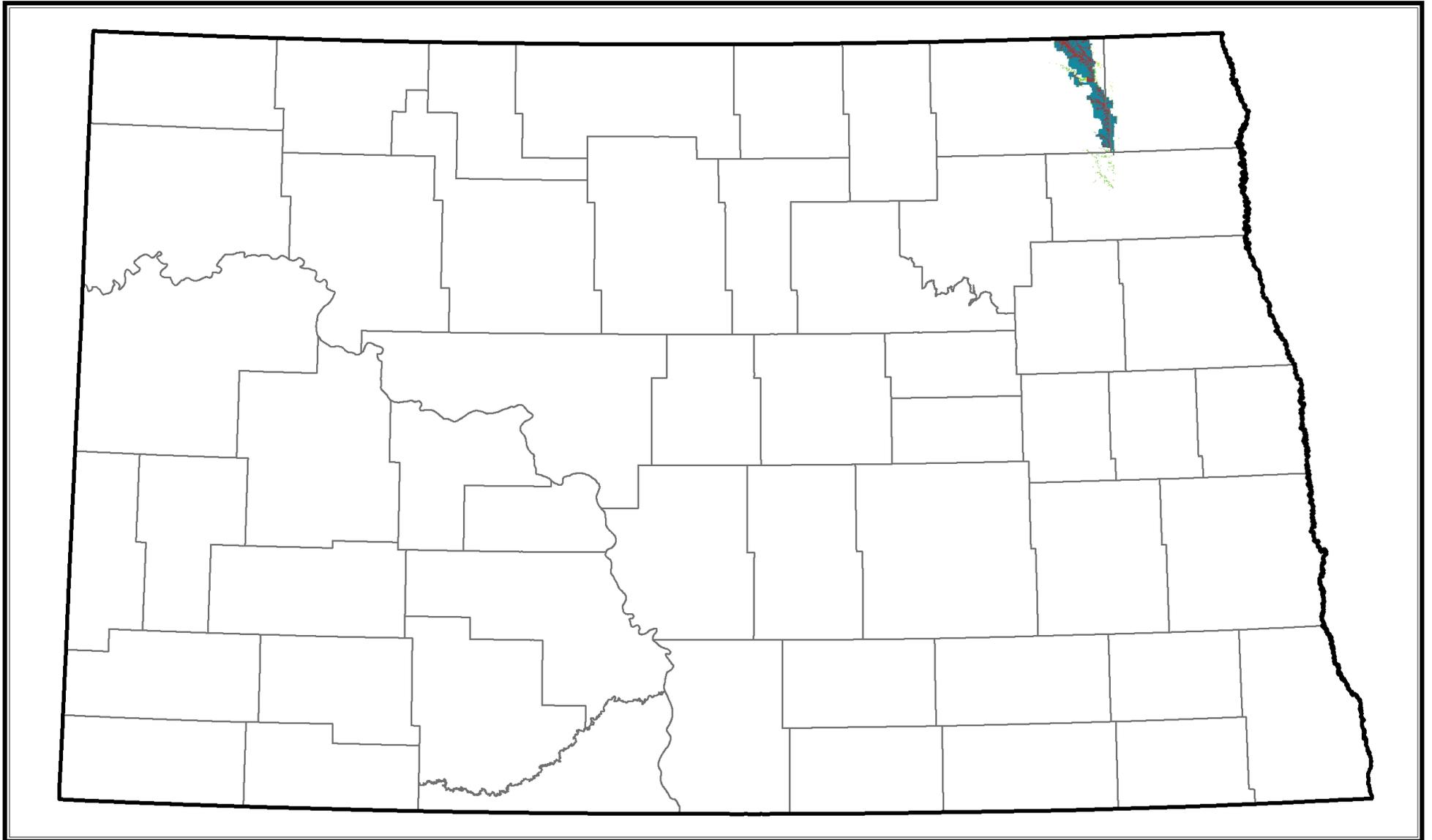
# Habitat Distribution Map



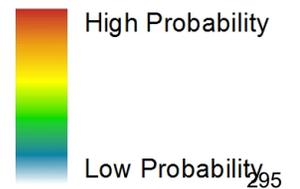
Dutchman's breeches  
*Dicentra cucullaria*  
Level III



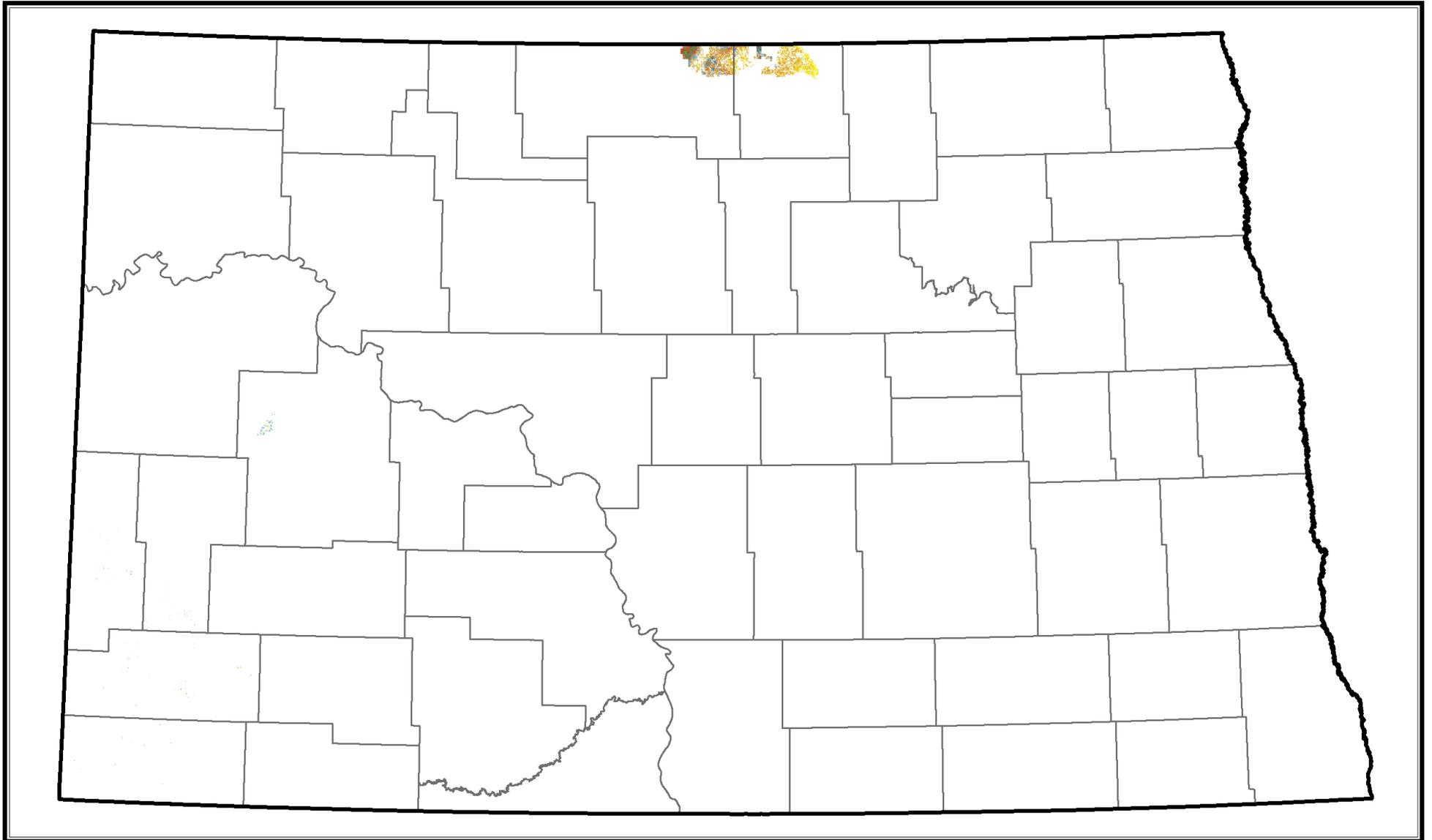
# Habitat Distribution Map



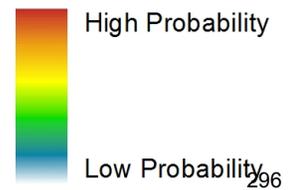
Leatherwood  
*Dirca palustris*  
Level II



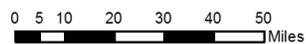
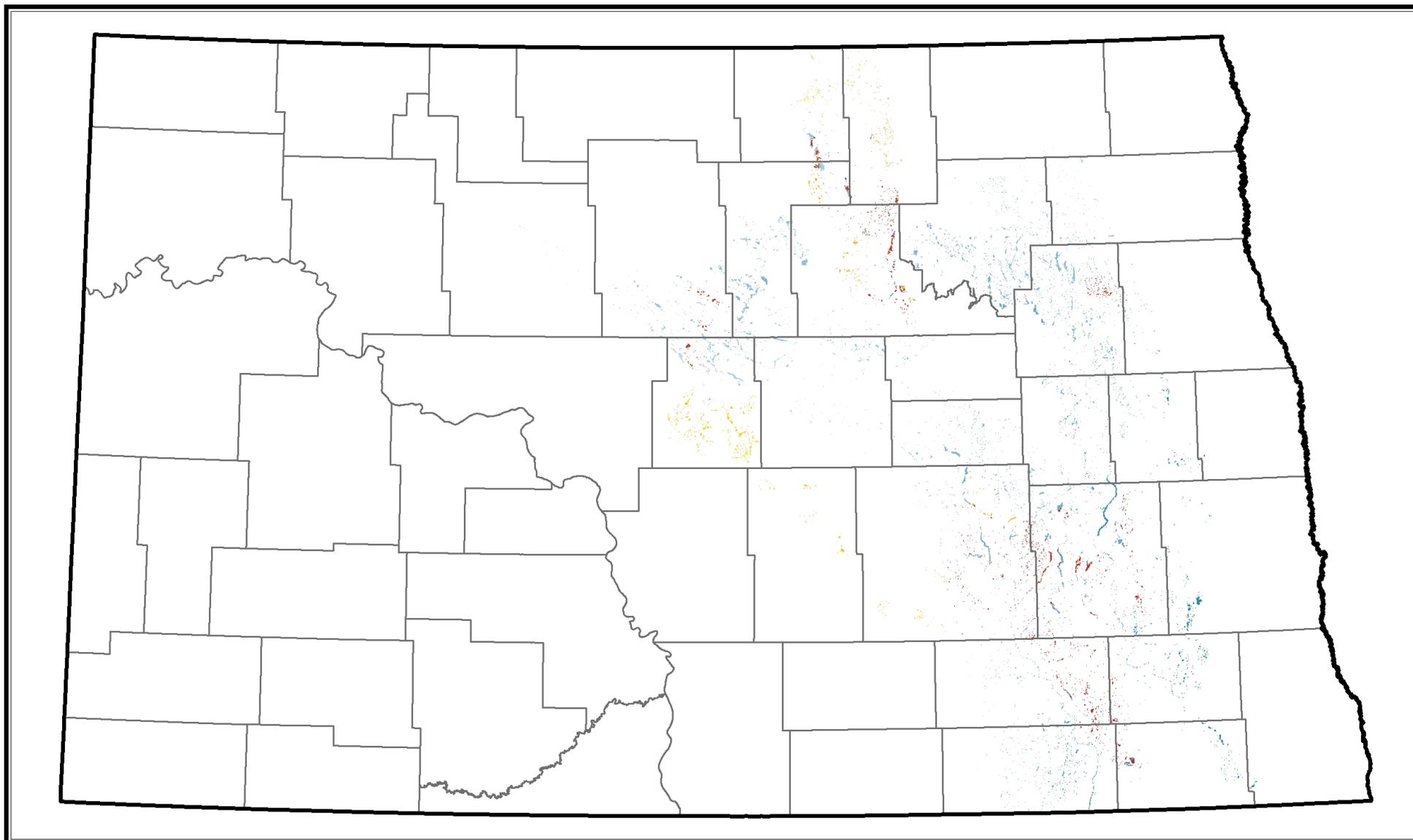
# Habitat Distribution Map



Round-leaved sundew  
*Drosera rotundifolia*  
Level II

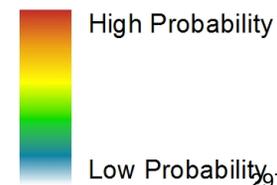


# Habitat Distribution Map



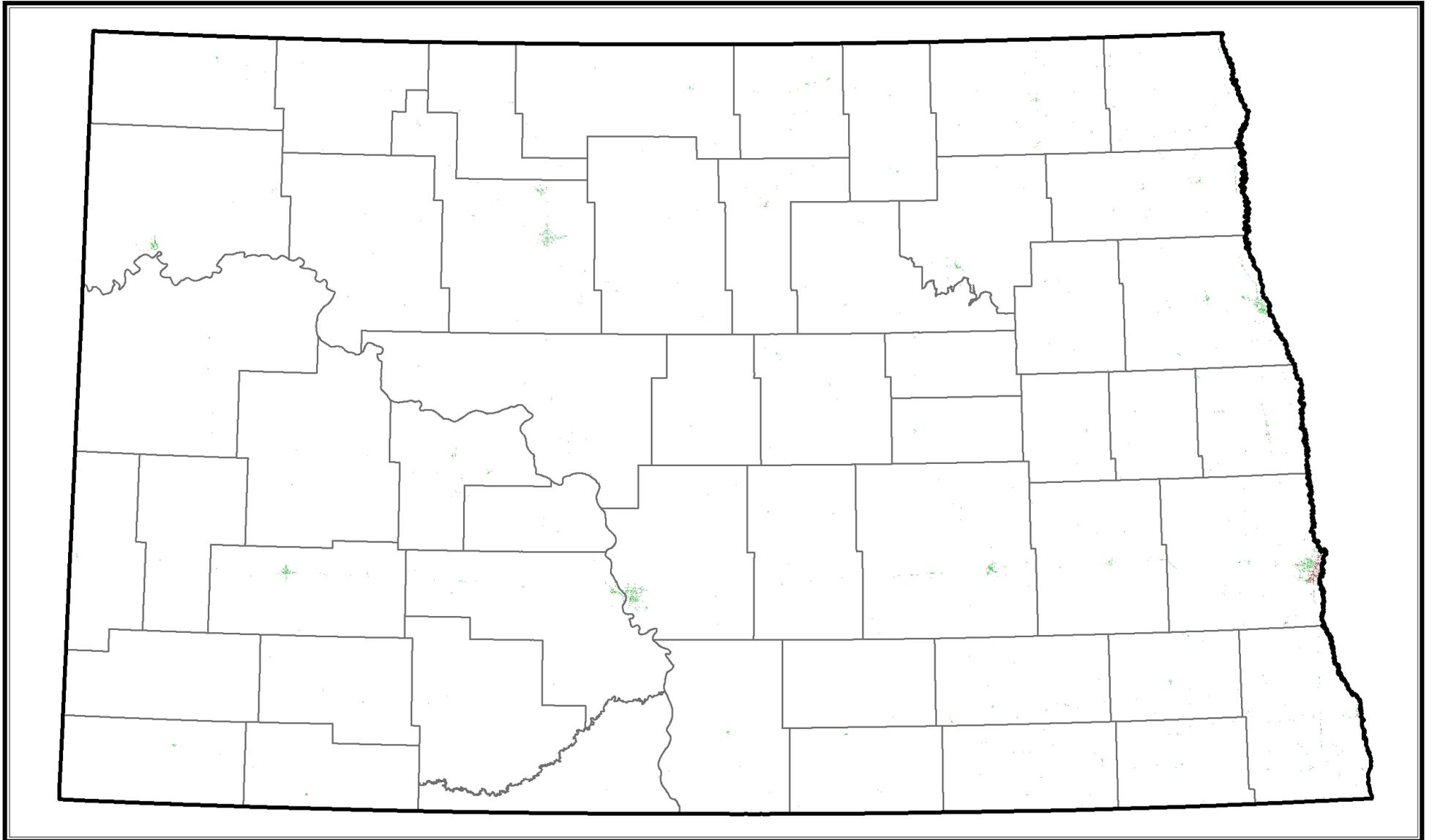
NDNHI 2012

Dwarf spikerush  
*Eleocharis parvula*  
Level III

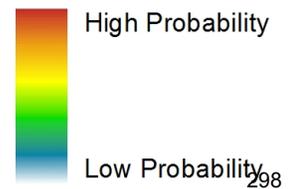


207

# Habitat Distribution Map

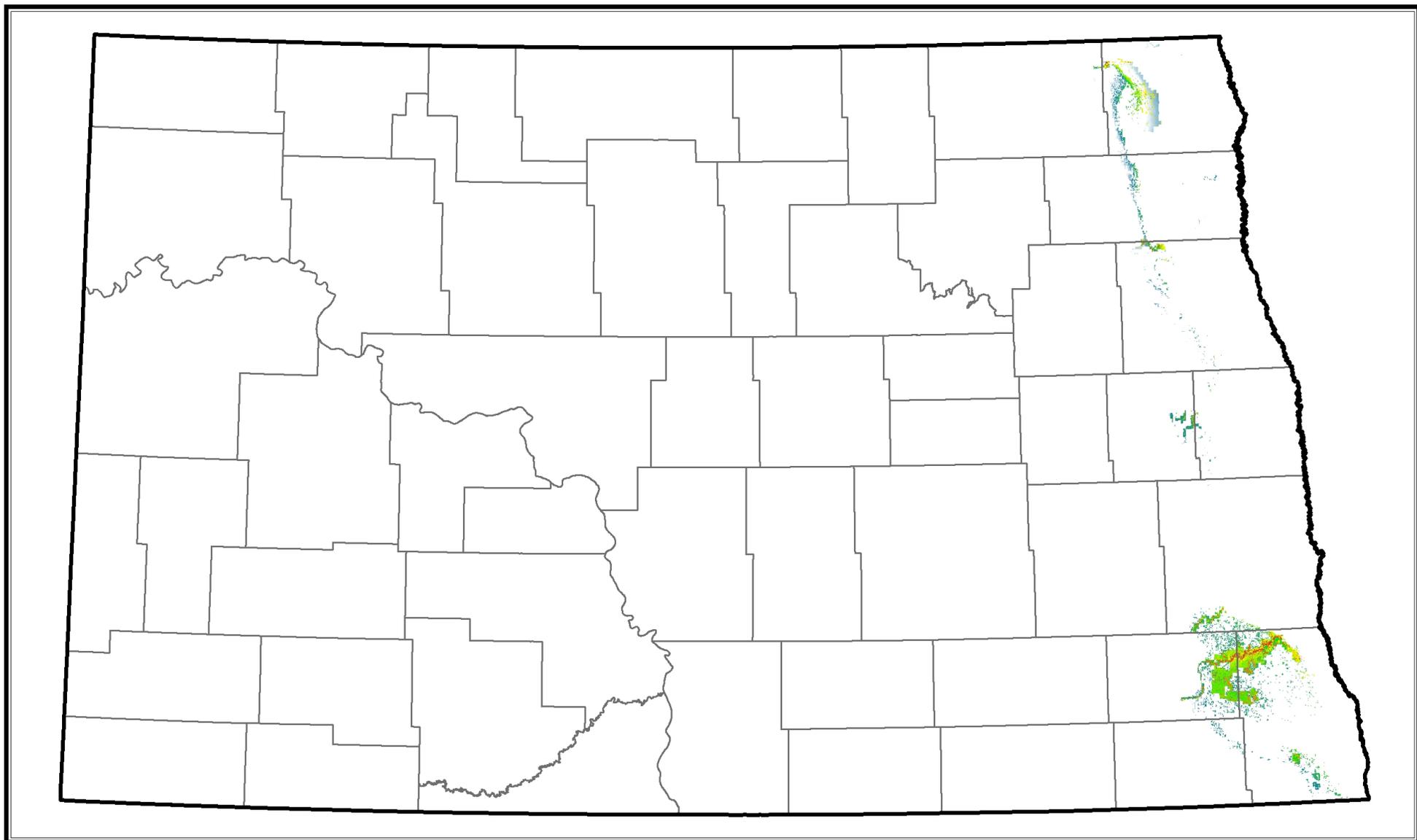


Wolf's spikerush  
*Eleocharis wolfii*  
Level III



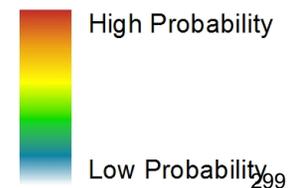
0 5 10 20 30 40 50  
Miles

# Habitat Distribution Map



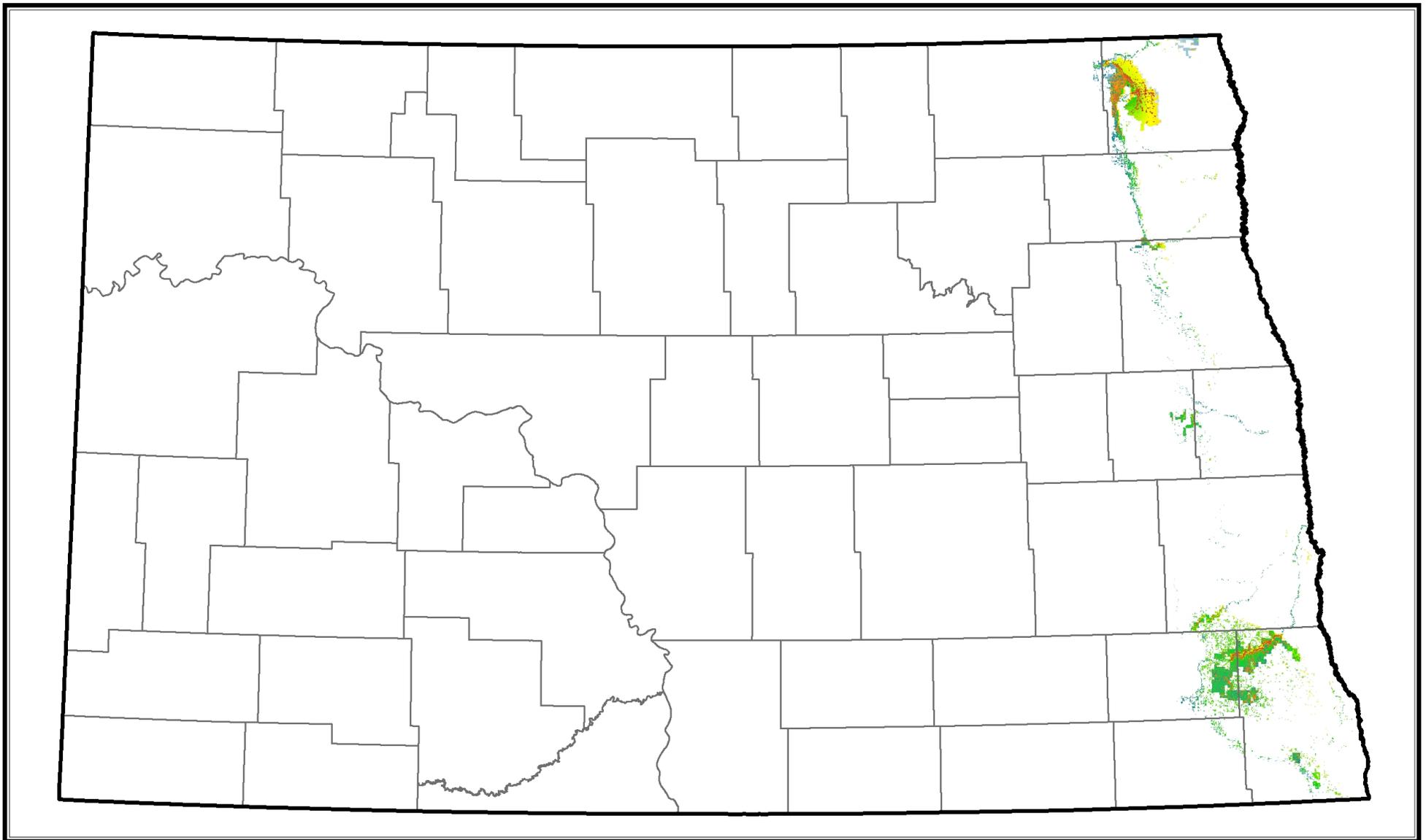
NDNHI 2012

Marsh horsetail  
*Equisetum palustre*  
Level II

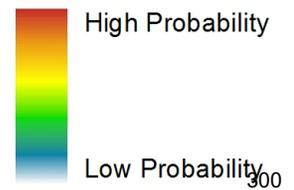


2009

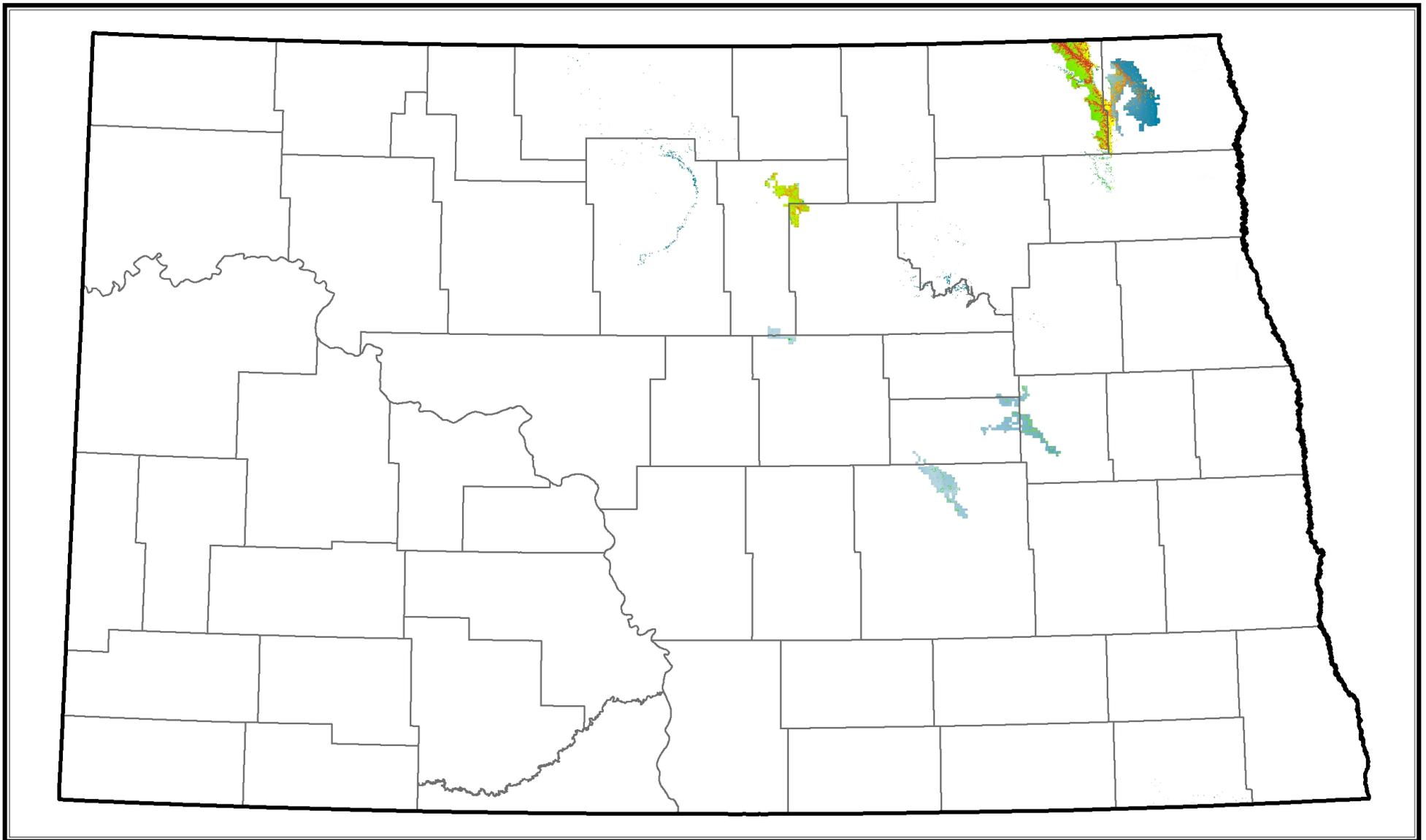
# Habitat Distribution Map



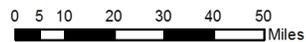
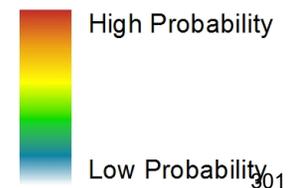
Meadow horsetail  
*Equisetum pratense*  
Level II



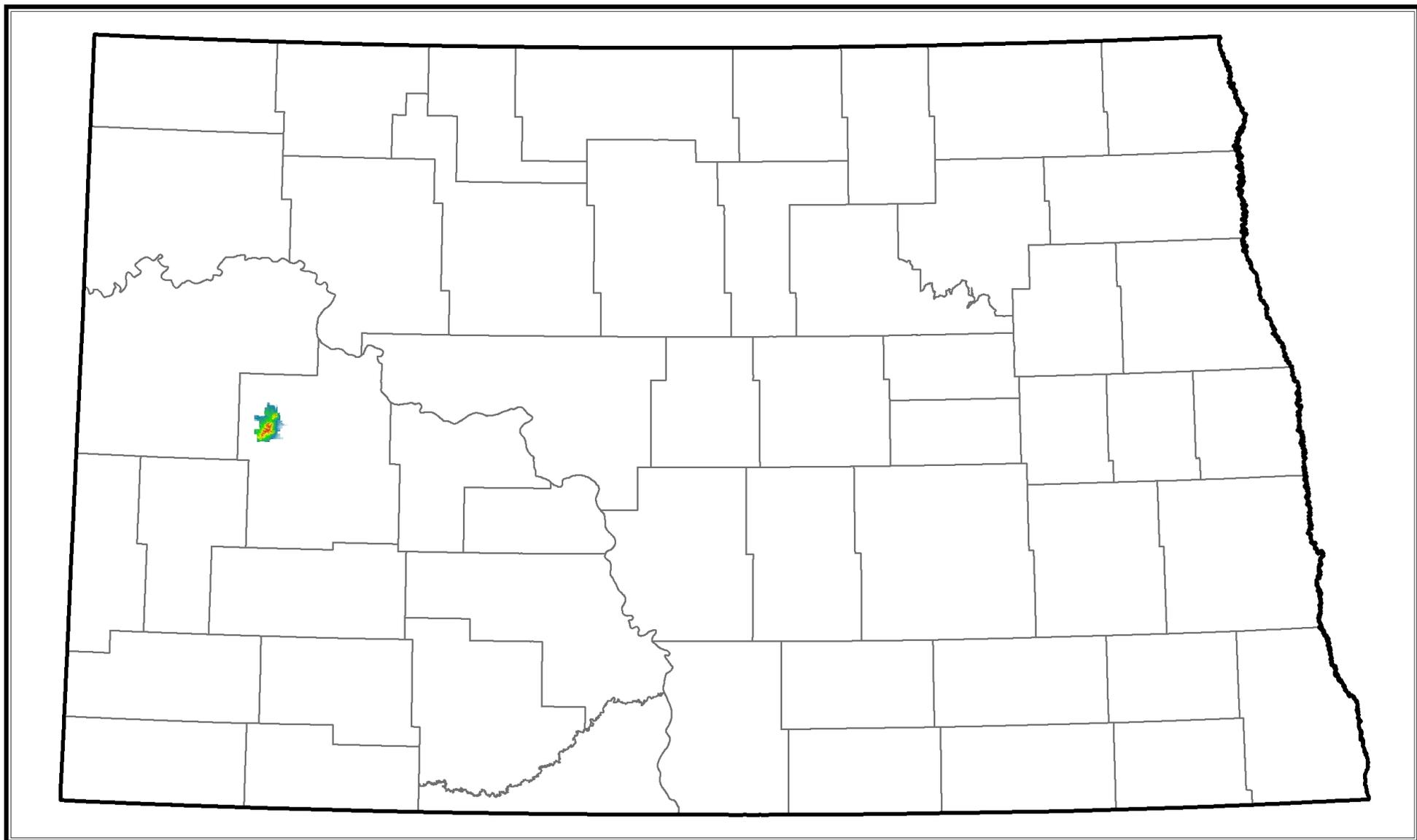
# Habitat Distribution Map



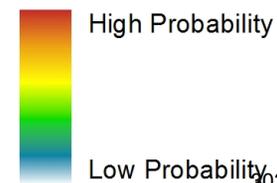
Wood horsetail  
*Equisetum sylvaticum*  
Level III



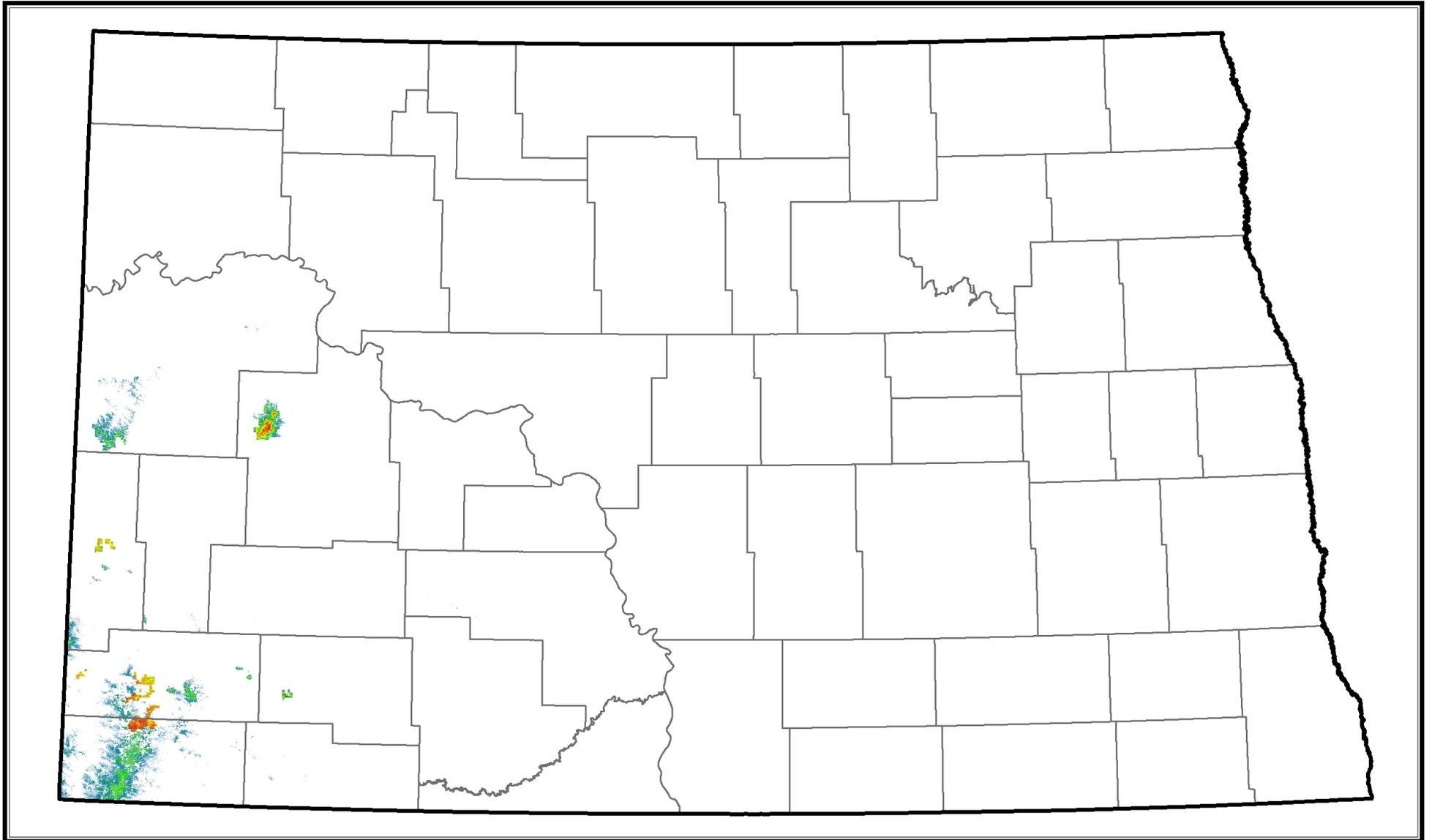
# Habitat Distribution Map



Cushion fleabane  
*Erigeron radicans*  
Level II



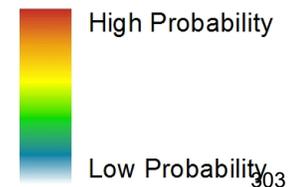
# Habitat Distribution Map



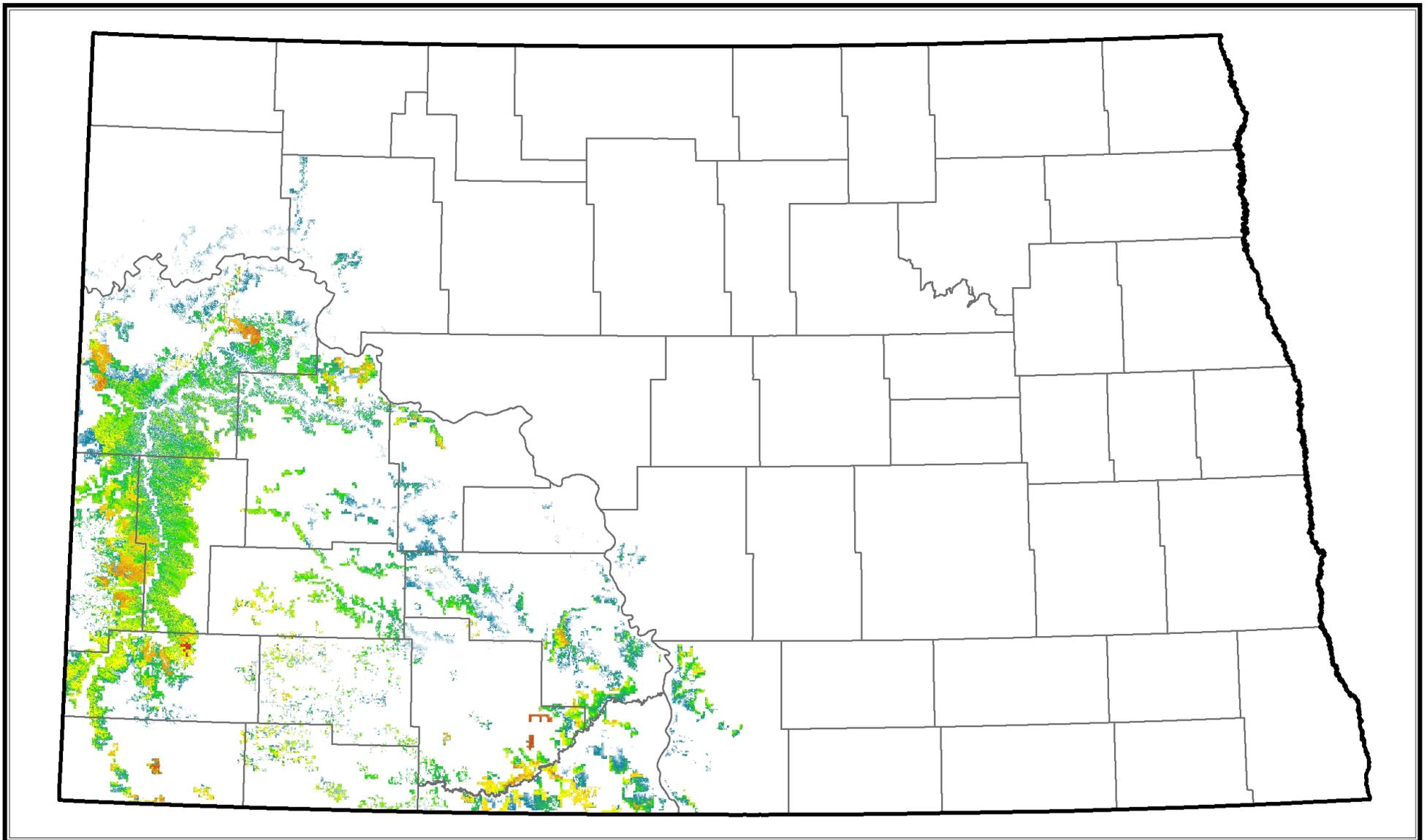
0 5 10 20 30 40 50 Miles

NDNHI 2012

Nodding buckwheat  
*Eriogonum cernuum*  
Level II



# Habitat Distribution Map

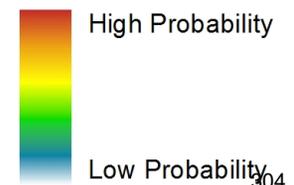


0 5 10 20 30 40 50 Miles

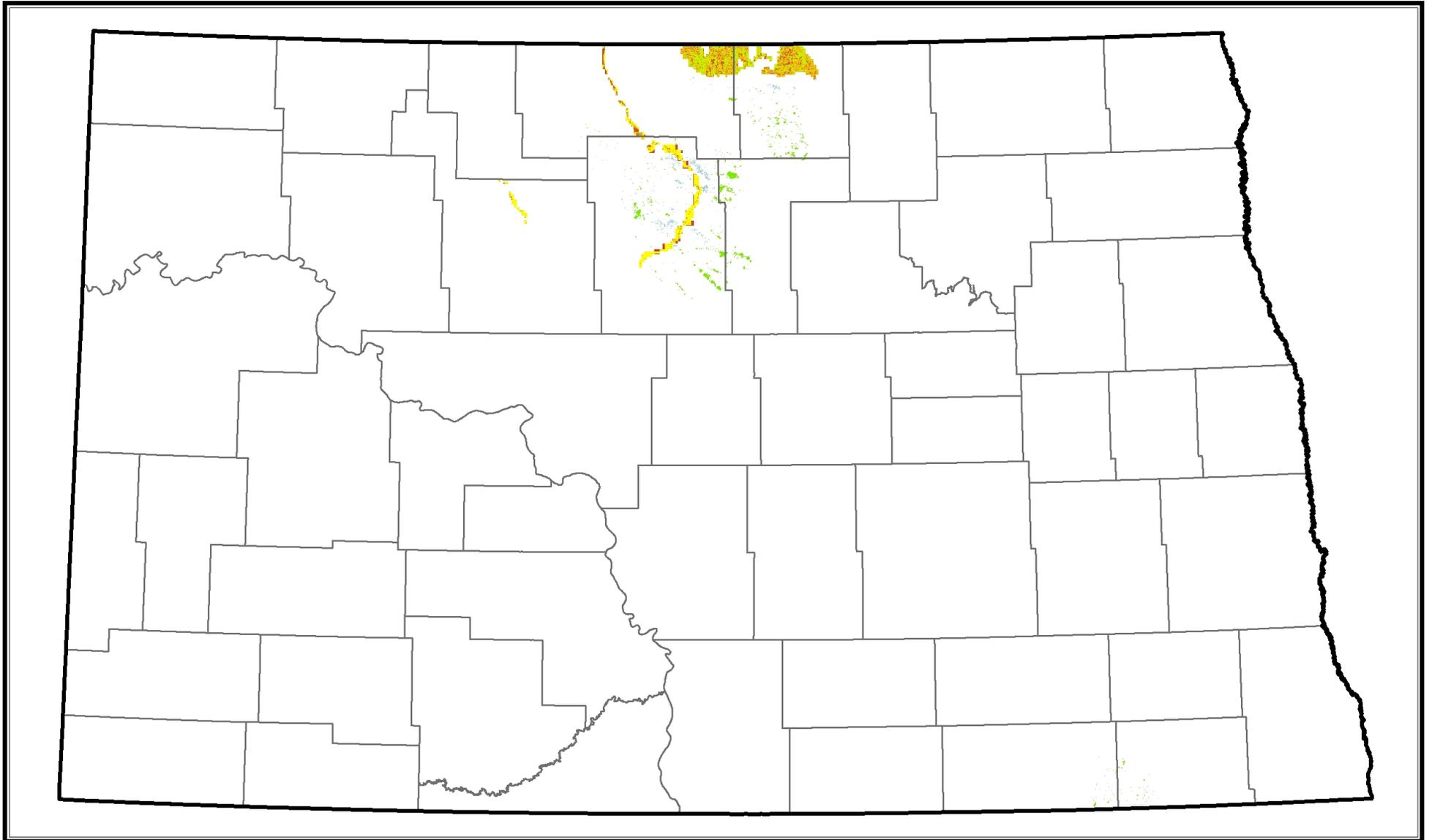
NDNHI 2012

Dakota buckwheat  
*Eriogonum visheri*

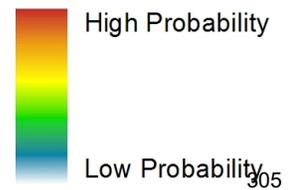
Level I



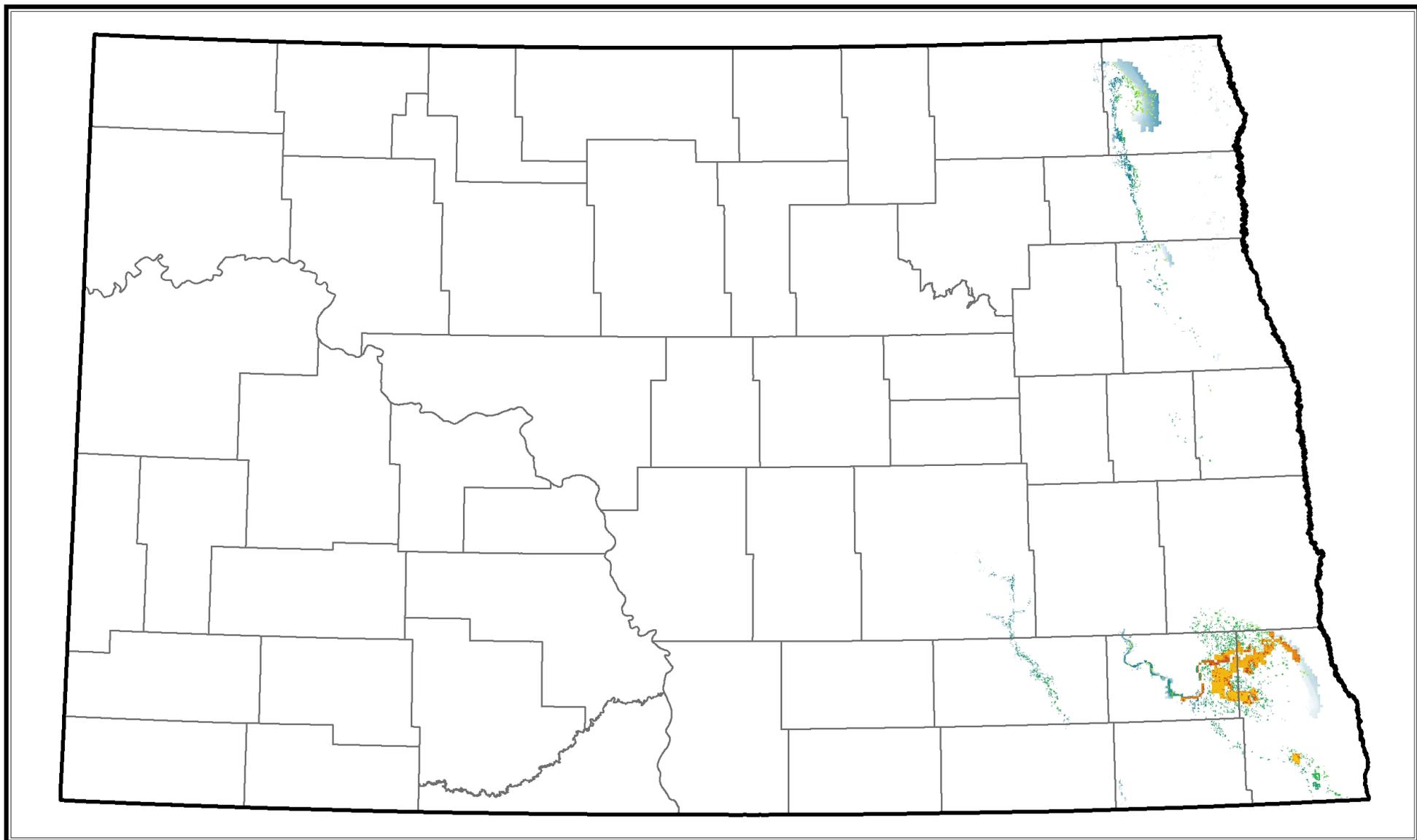
# Habitat Distribution Map



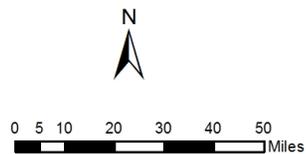
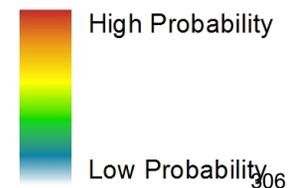
Chamisson's cottongrass  
*Eriophorum chamissonis*  
Level III



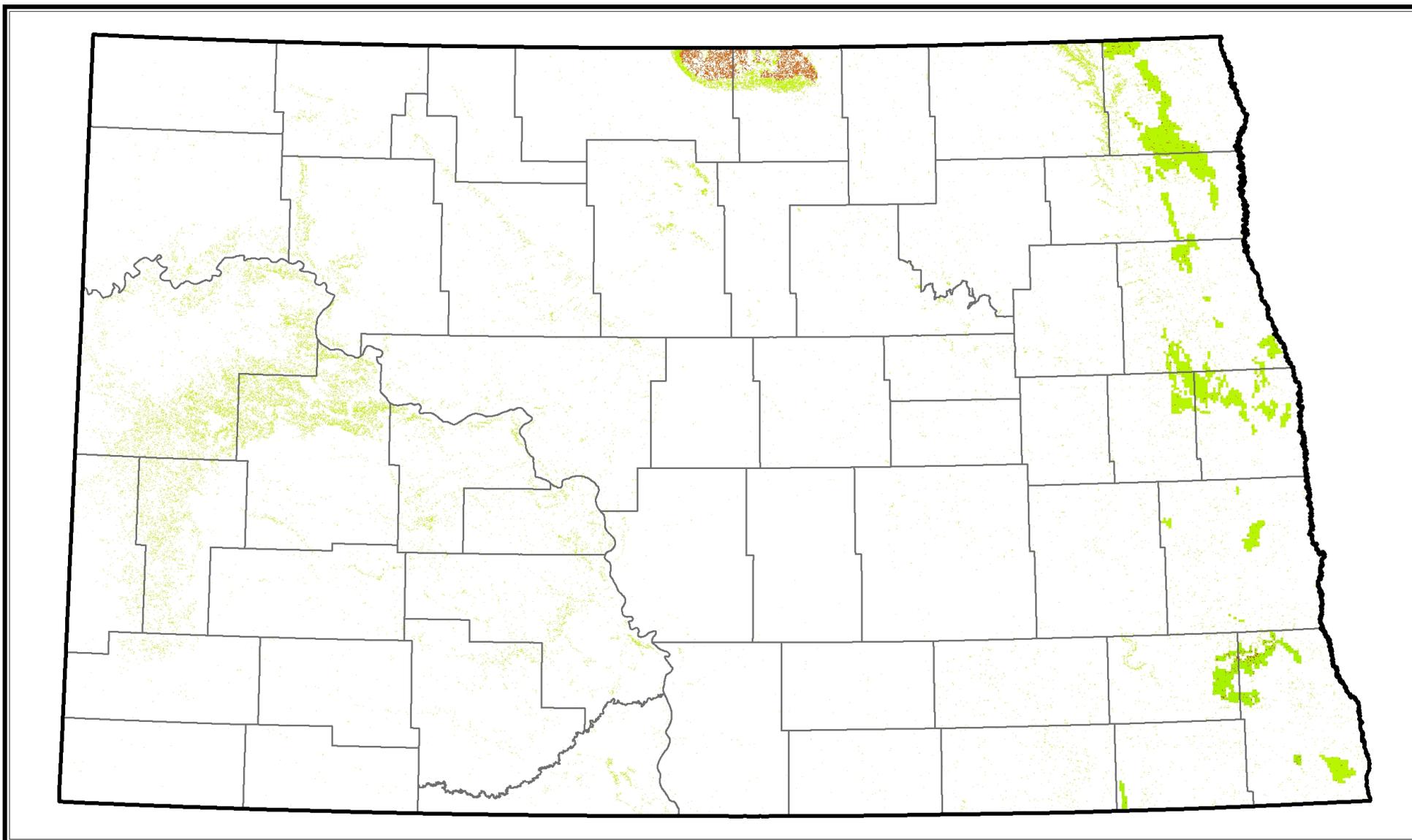
# Habitat Distribution Map



Slender cottongrass  
*Eriophorum gracile*  
Level II

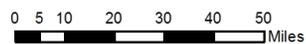
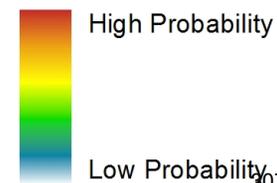


# Habitat Distribution Map

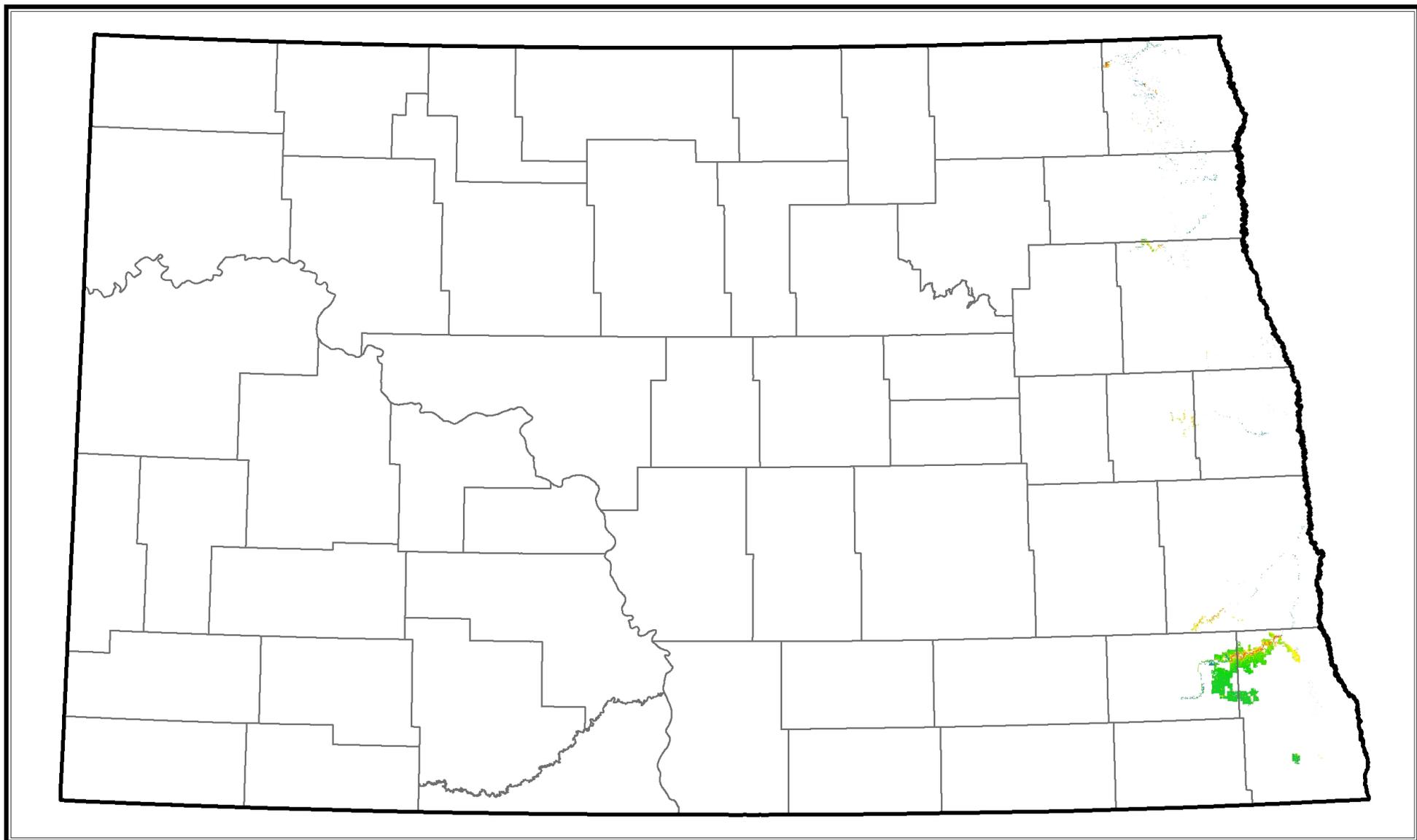


Green keeled cottongrass  
*Eriophorum viridicarinatum*

Level III



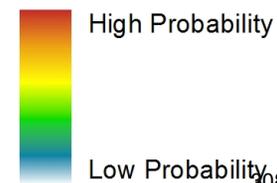
# Habitat Distribution Map



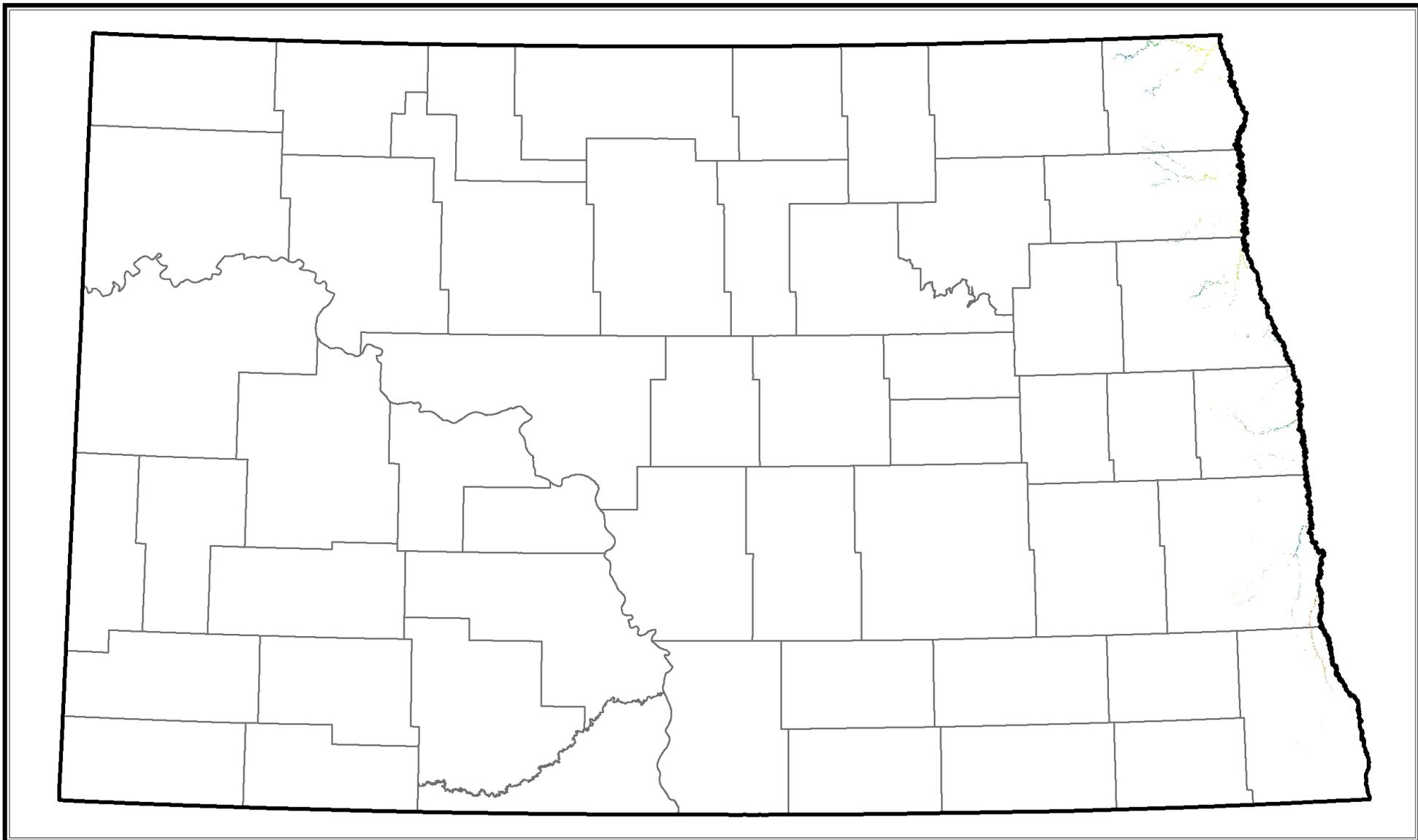
0 5 10 20 30 40 50 Miles

NDNHI 2012

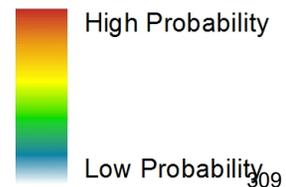
Wahoo  
*Euonymus atropurpureus*  
Level II



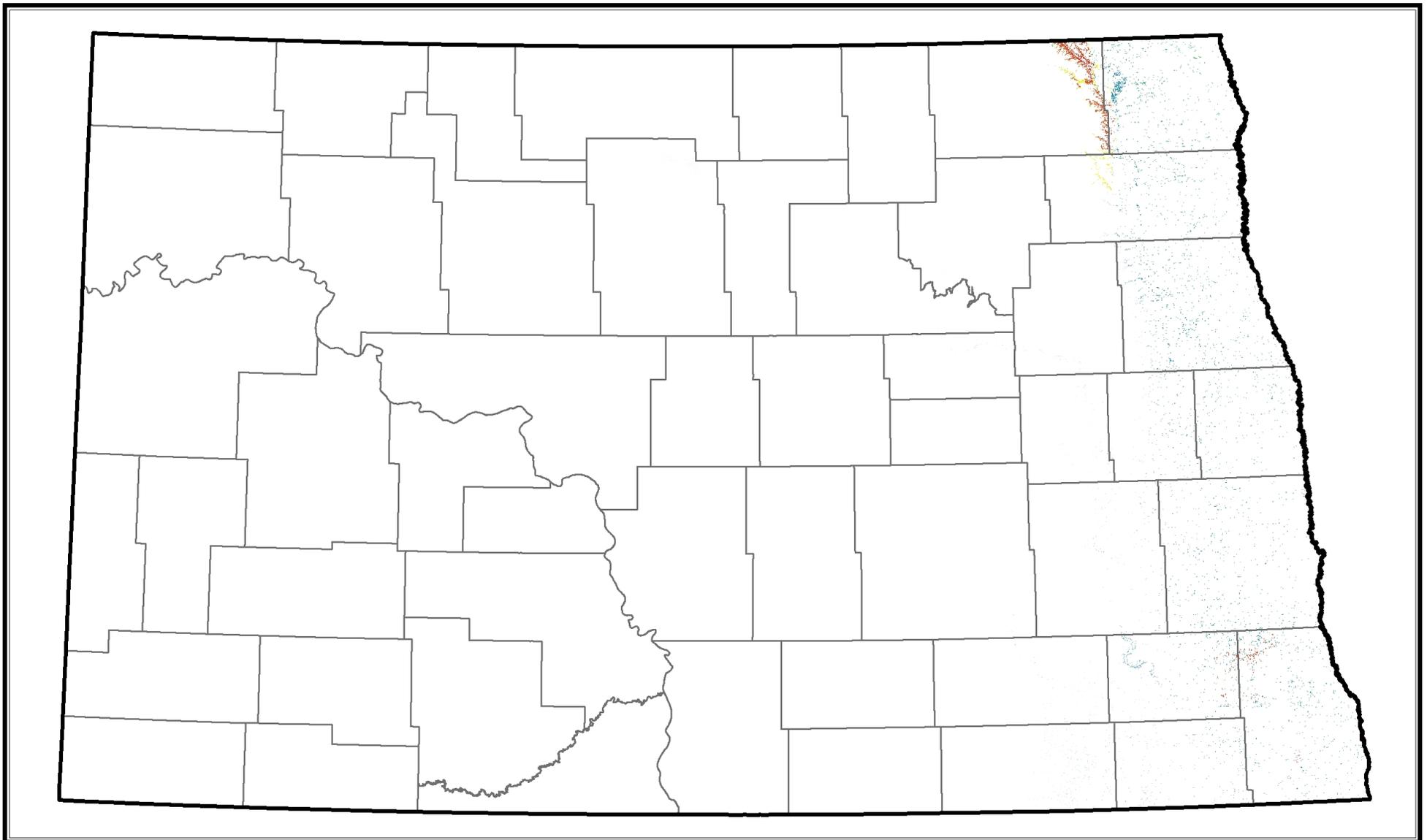
# Habitat Distribution Map



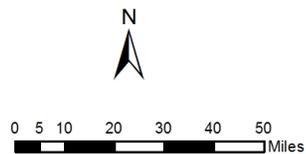
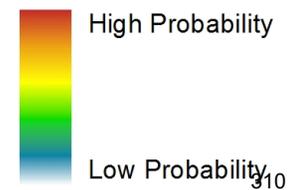
Wild geranium  
*Geranium maculatum*  
Level III



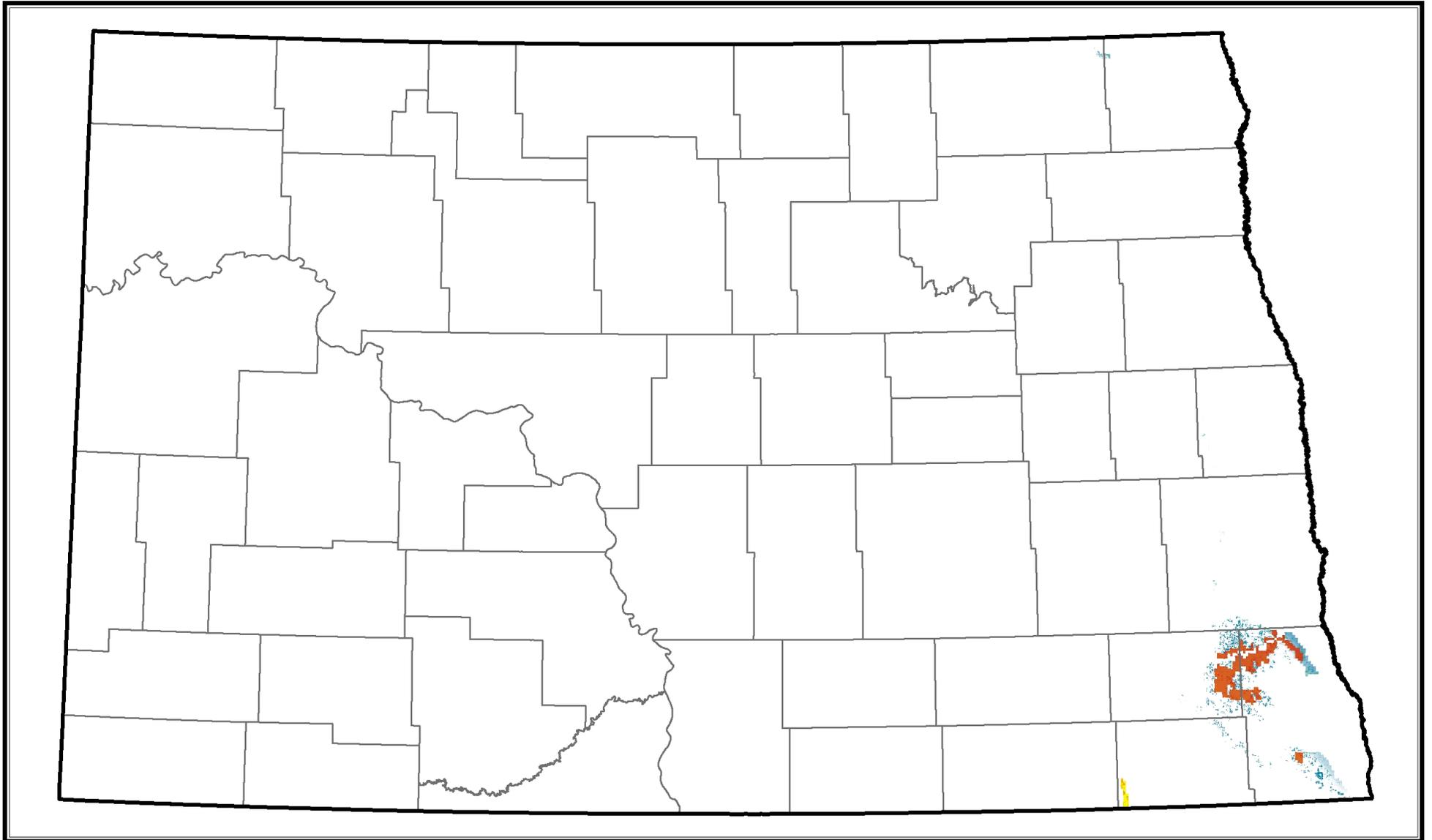
# Habitat Distribution Map



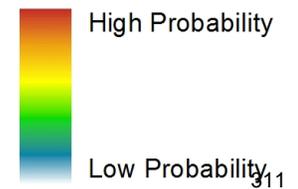
Oakfern  
*Gymnocarpium dryopteris*  
Level II



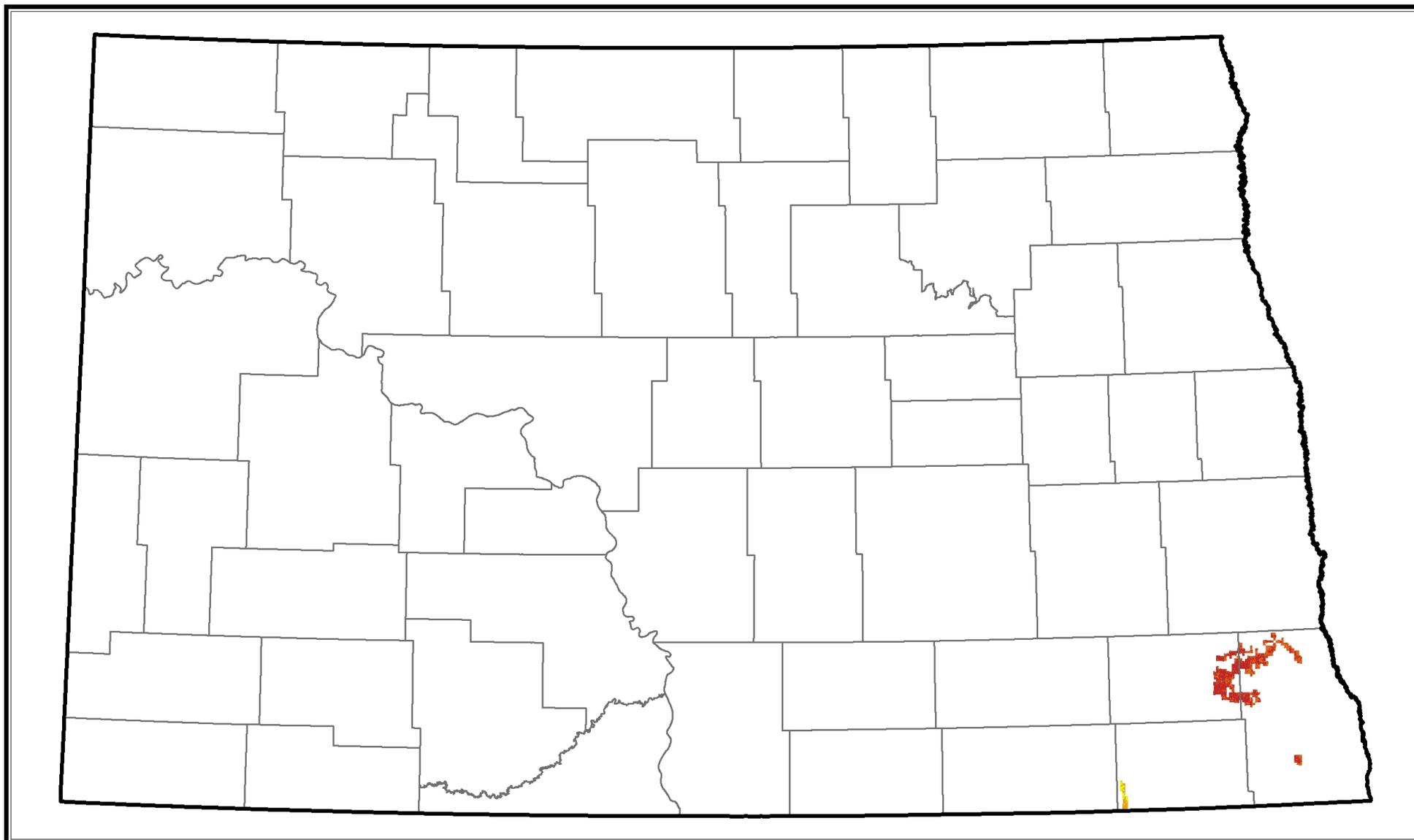
# Habitat Distribution Map



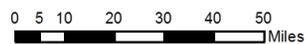
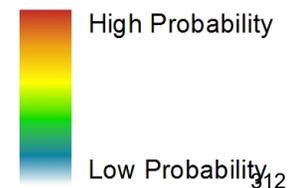
Bicknell's sunrose  
*Helianthemum bicknellii*  
Level I



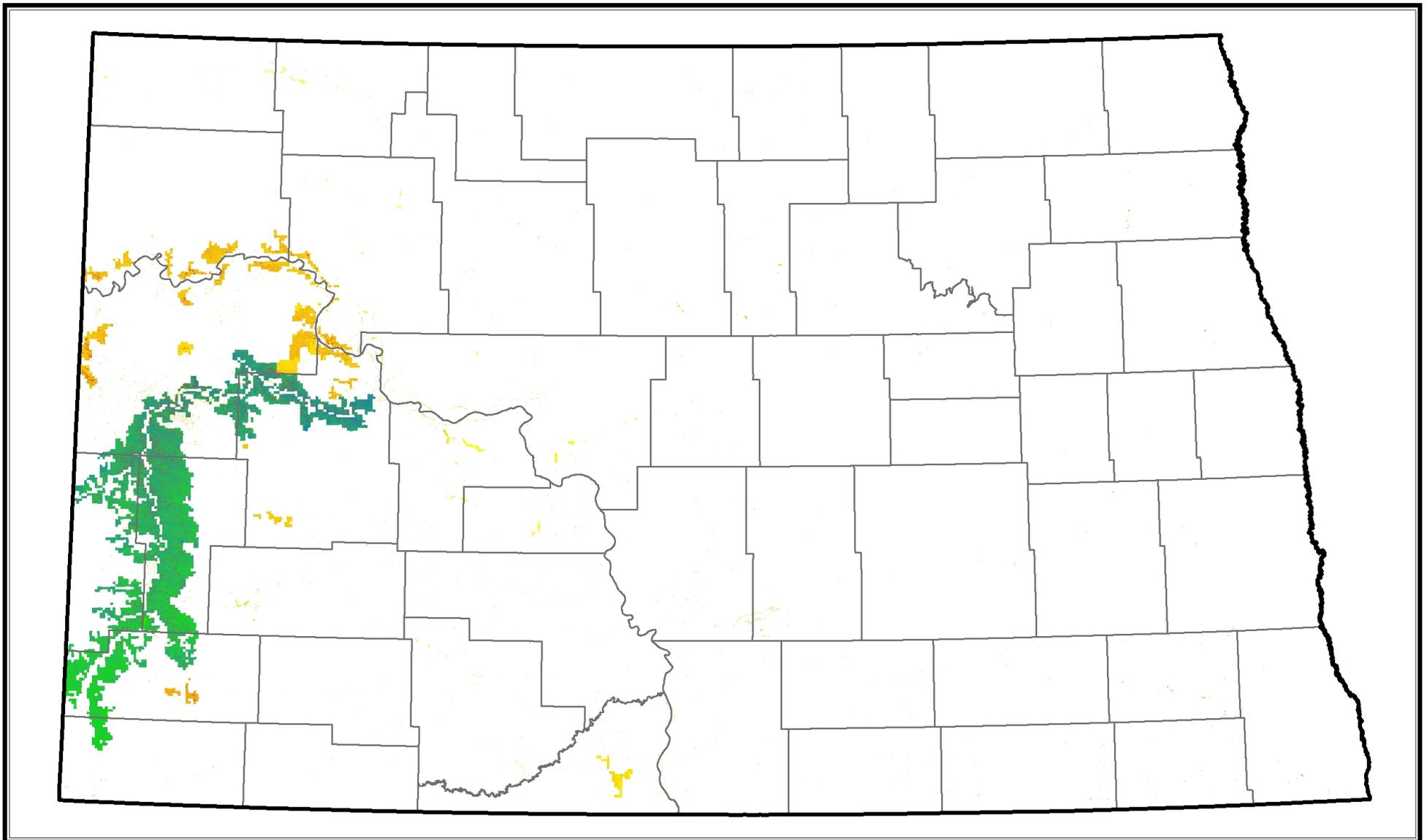
# Habitat Distribution Map



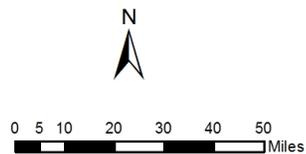
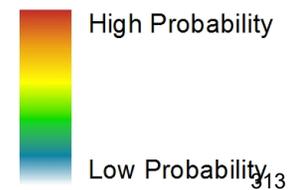
Woolly beach-heather  
*Hudsonia tomentosa*  
Level II



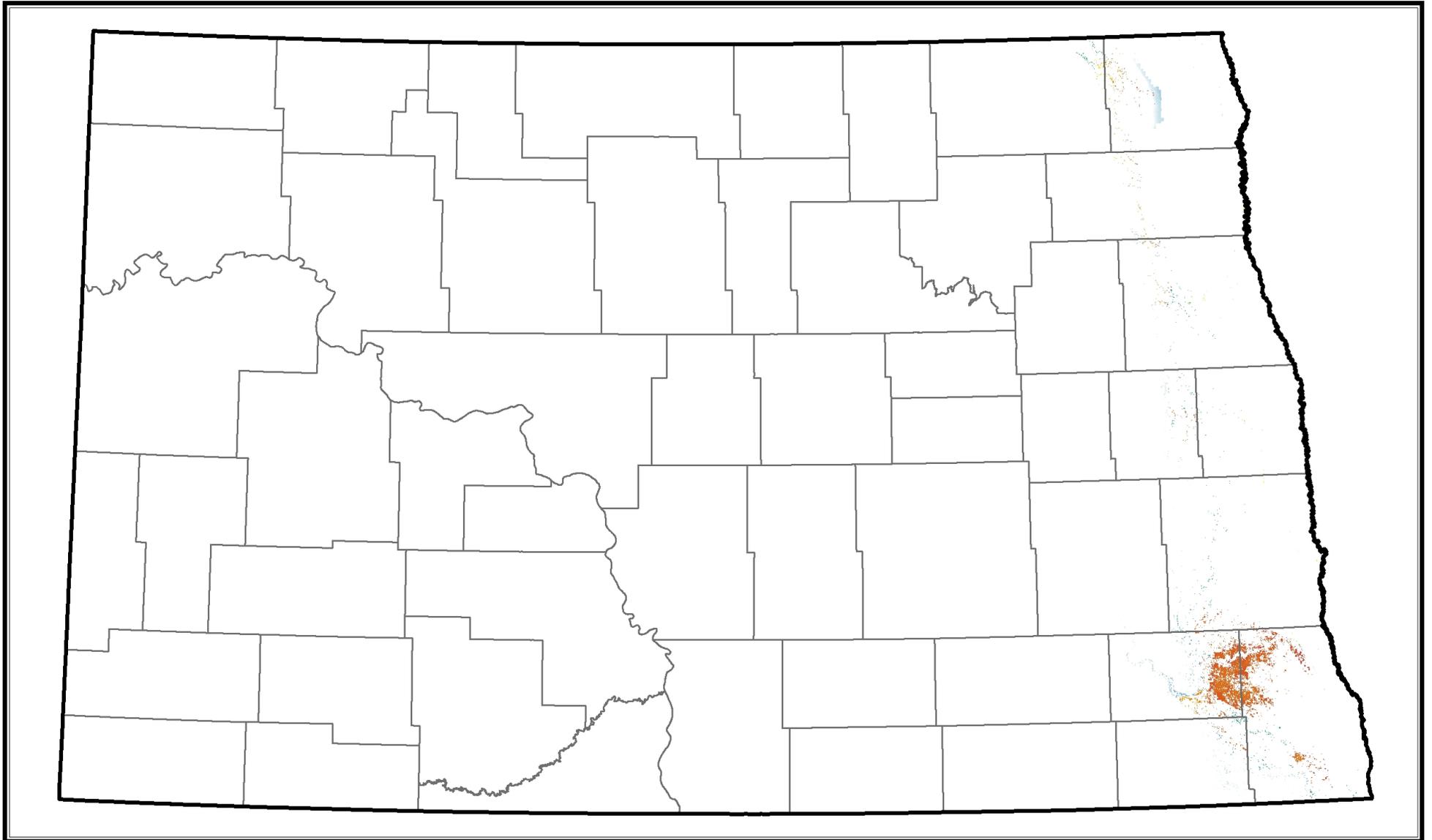
# Habitat Distribution Map



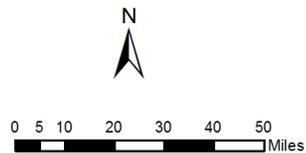
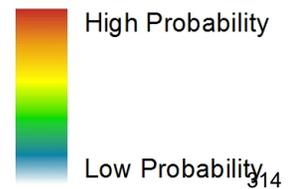
Stickseed  
*Lappula cenchrusoides*  
Level II



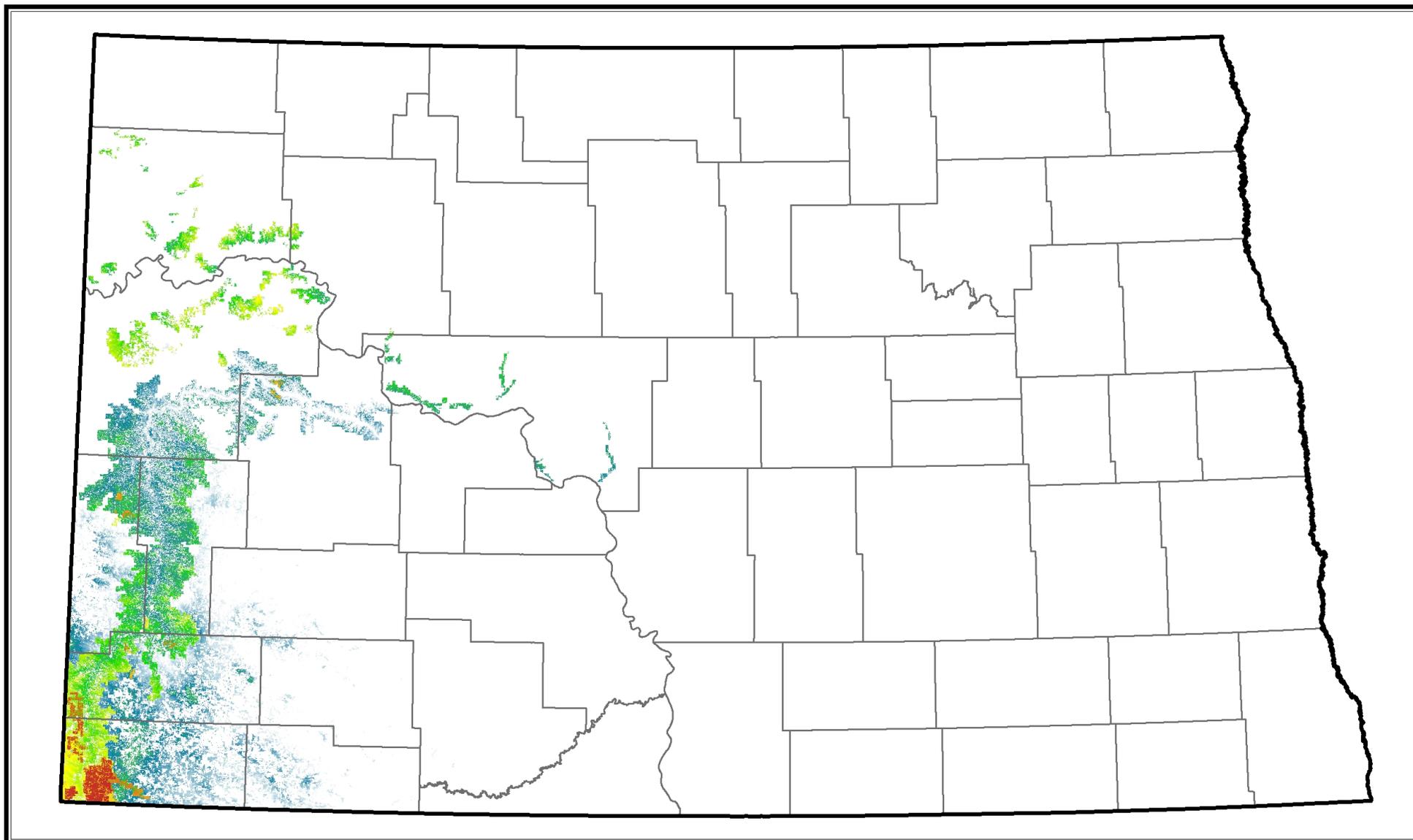
# Habitat Distribution Map



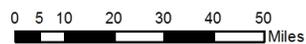
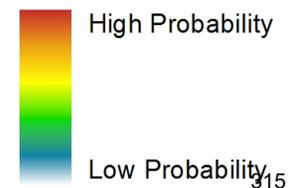
Upright pinweed  
*Lechea stricta*  
Level II



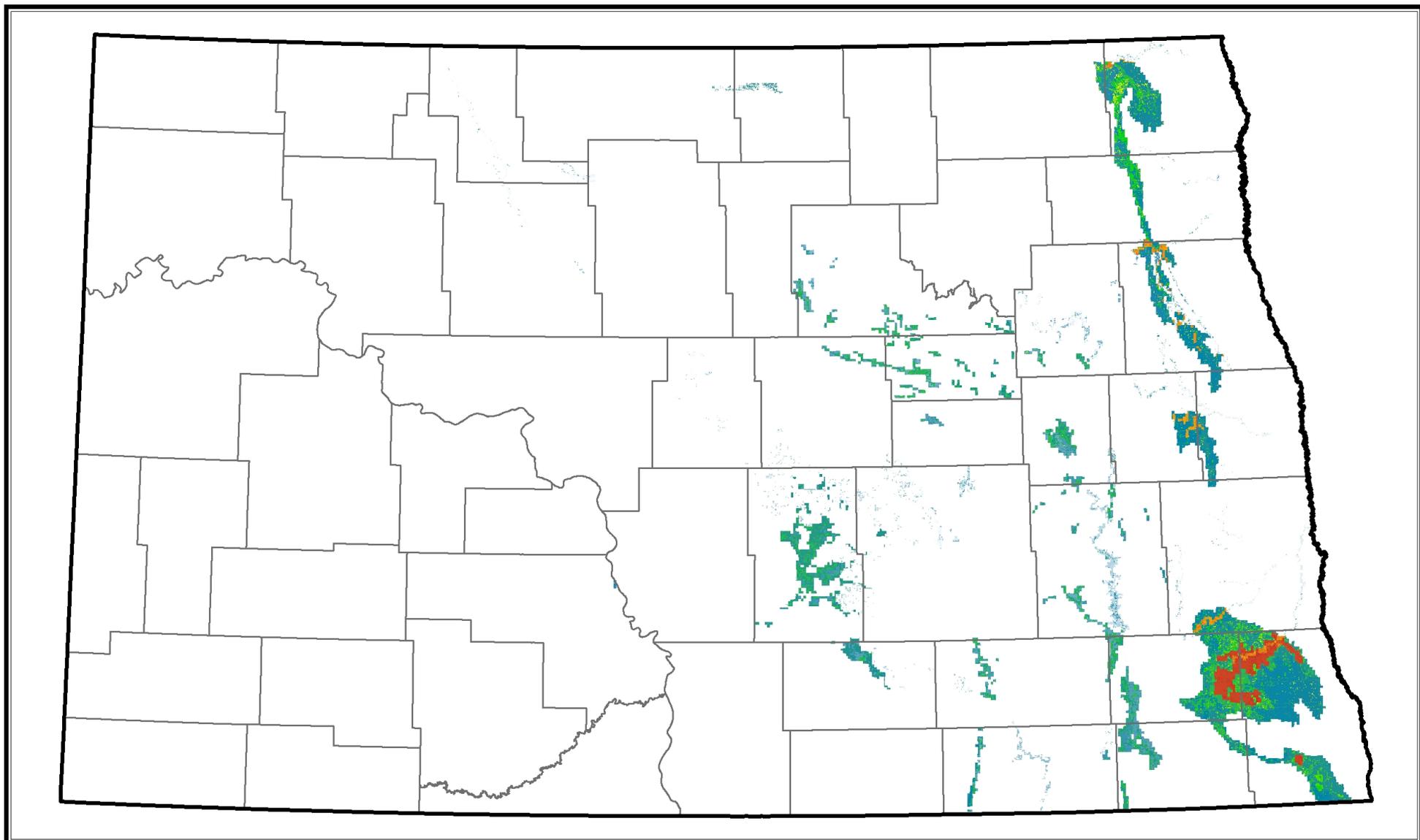
# Habitat Distribution Map



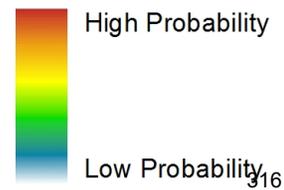
Sand lily  
*Leucocrinum montanum*  
Level II



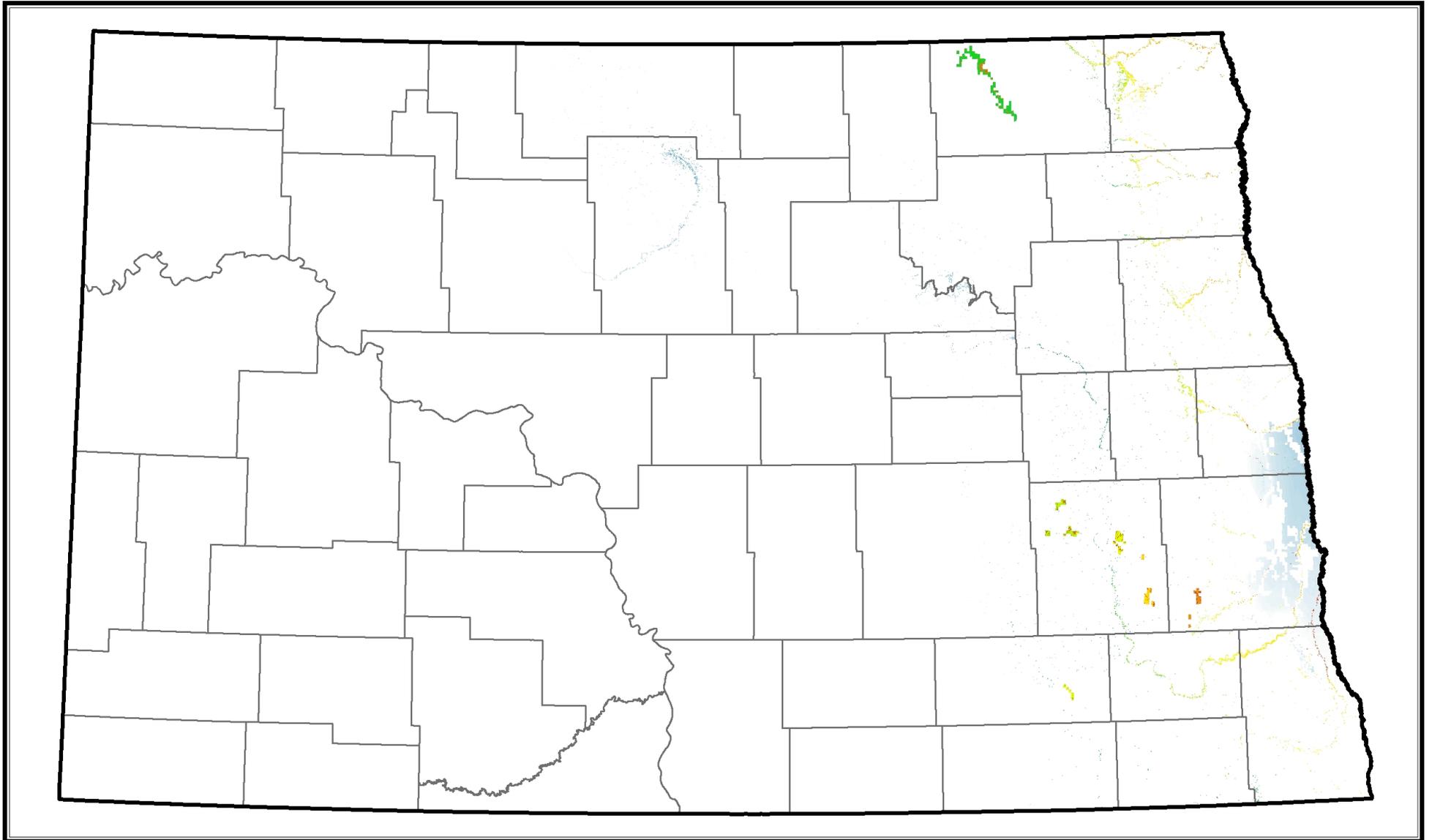
# Habitat Distribution Map



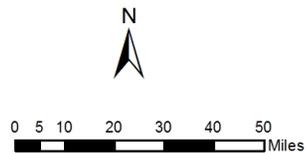
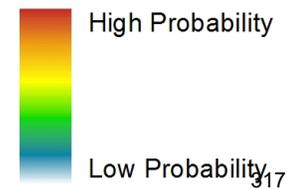
Loesel's twayblade  
*Liparis loeselii*  
Level II



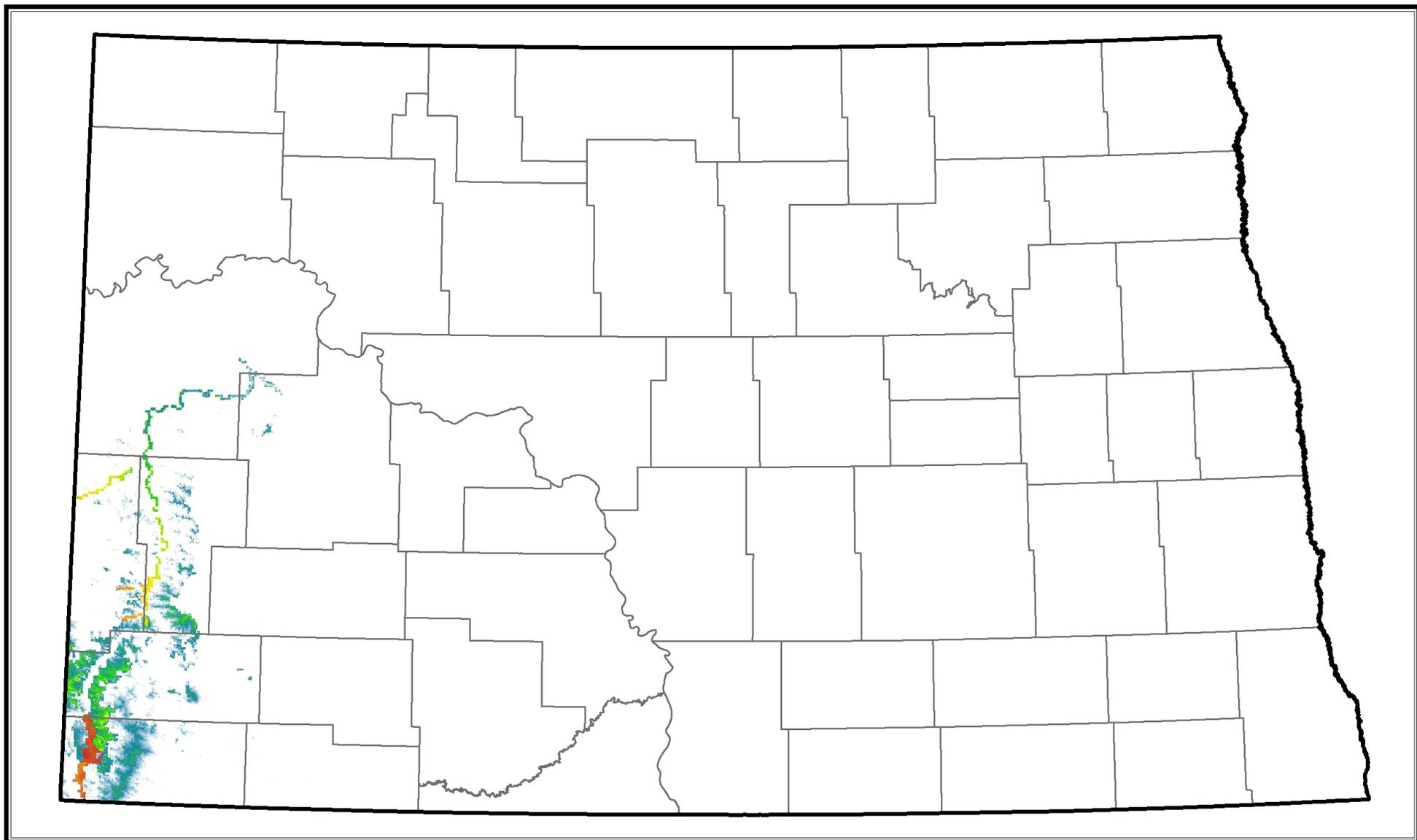
# Habitat Distribution Map



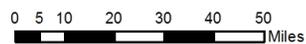
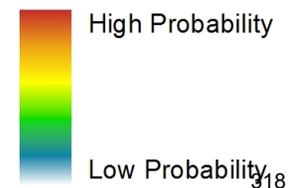
Small-flowered lipocarpa  
*Lipocarpa micrantha*  
Level II



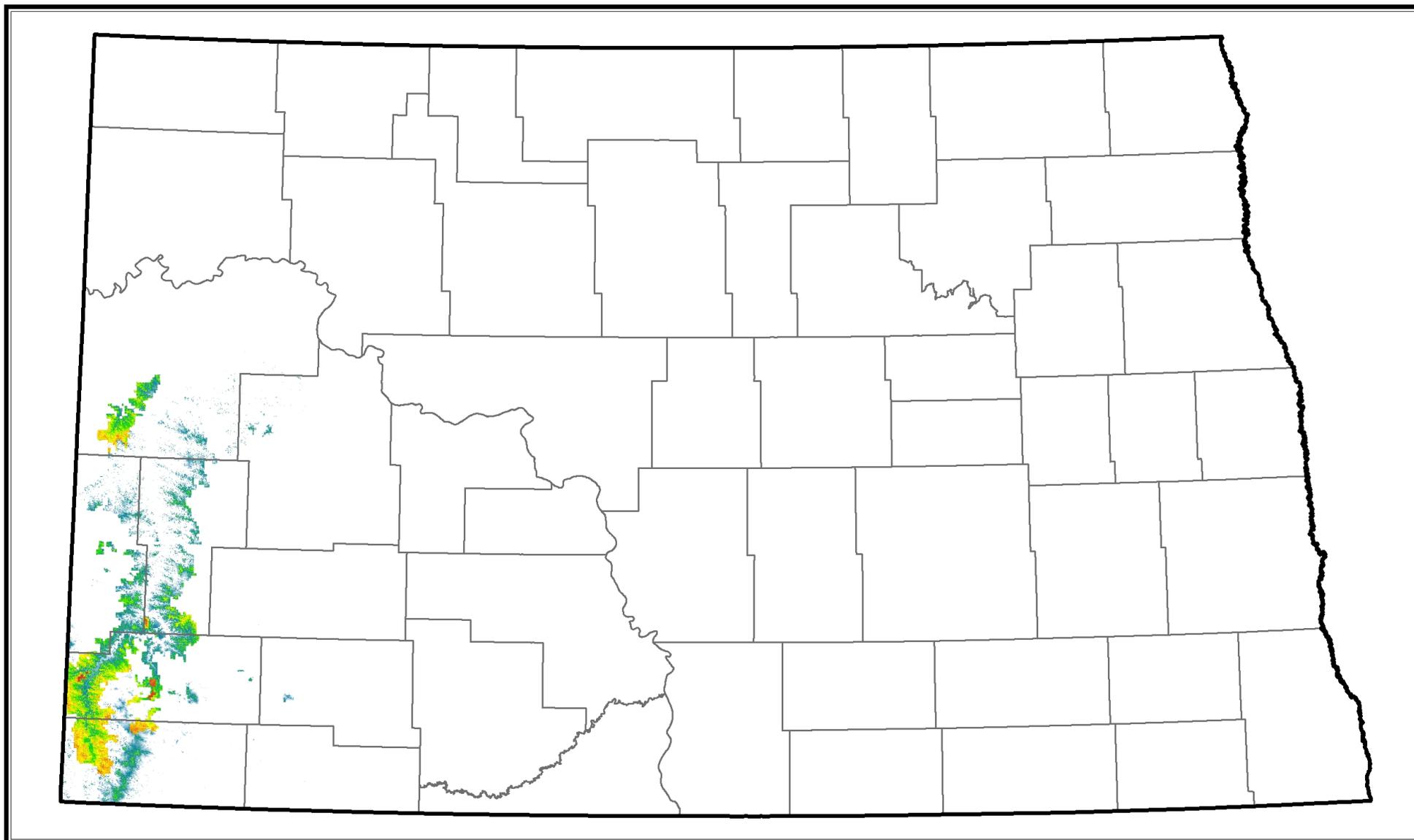
# Habitat Distribution Map



Creeping barberry  
*Mahonia repens*  
Level III



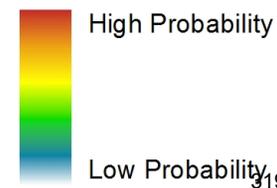
# Habitat Distribution Map



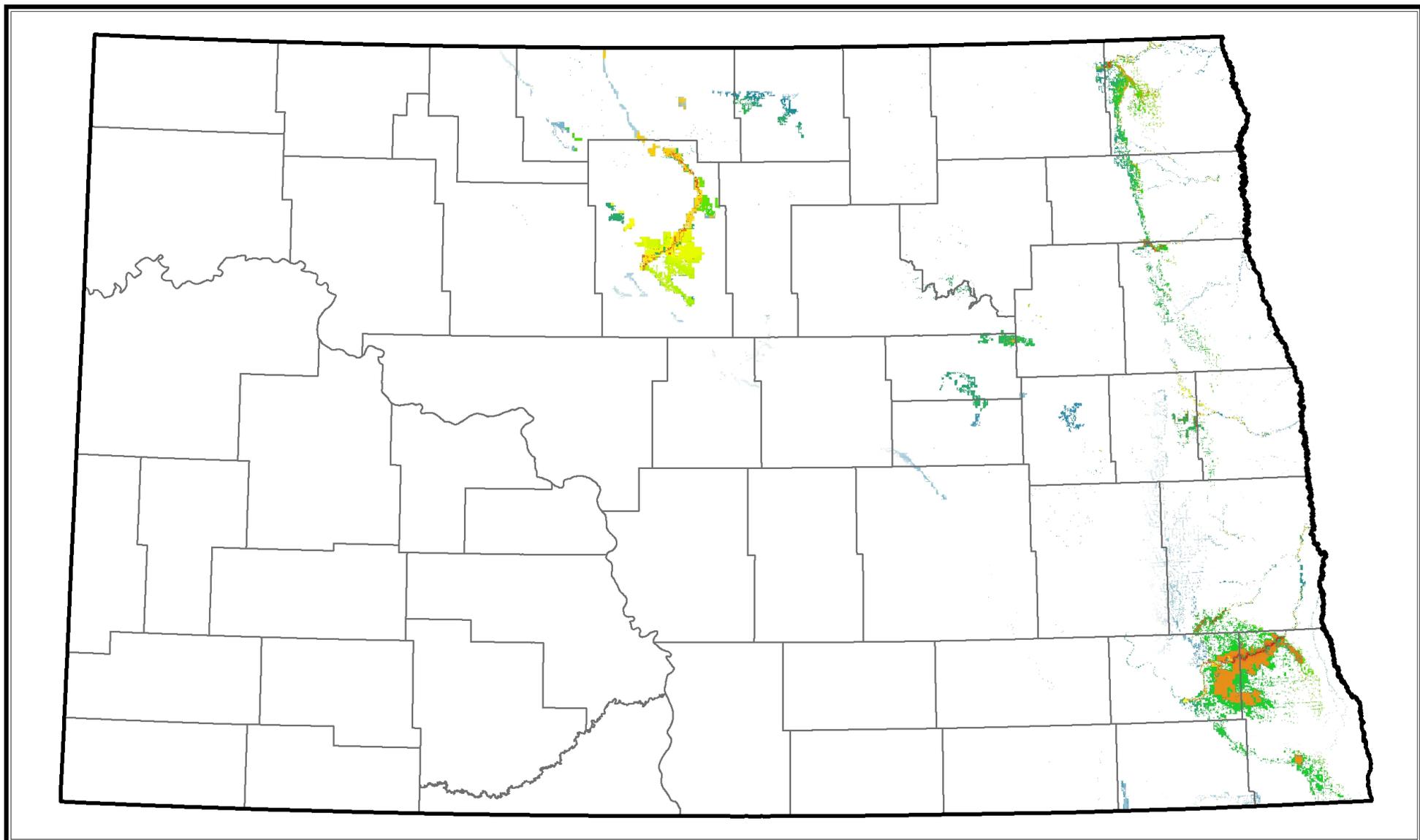
0 5 10 20 30 40 50 Miles

NDNHI 2012

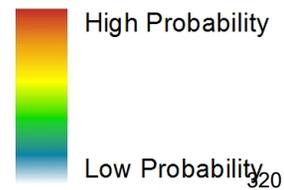
Dwarf mentzelia  
*Mentzelia pumila*  
Level I



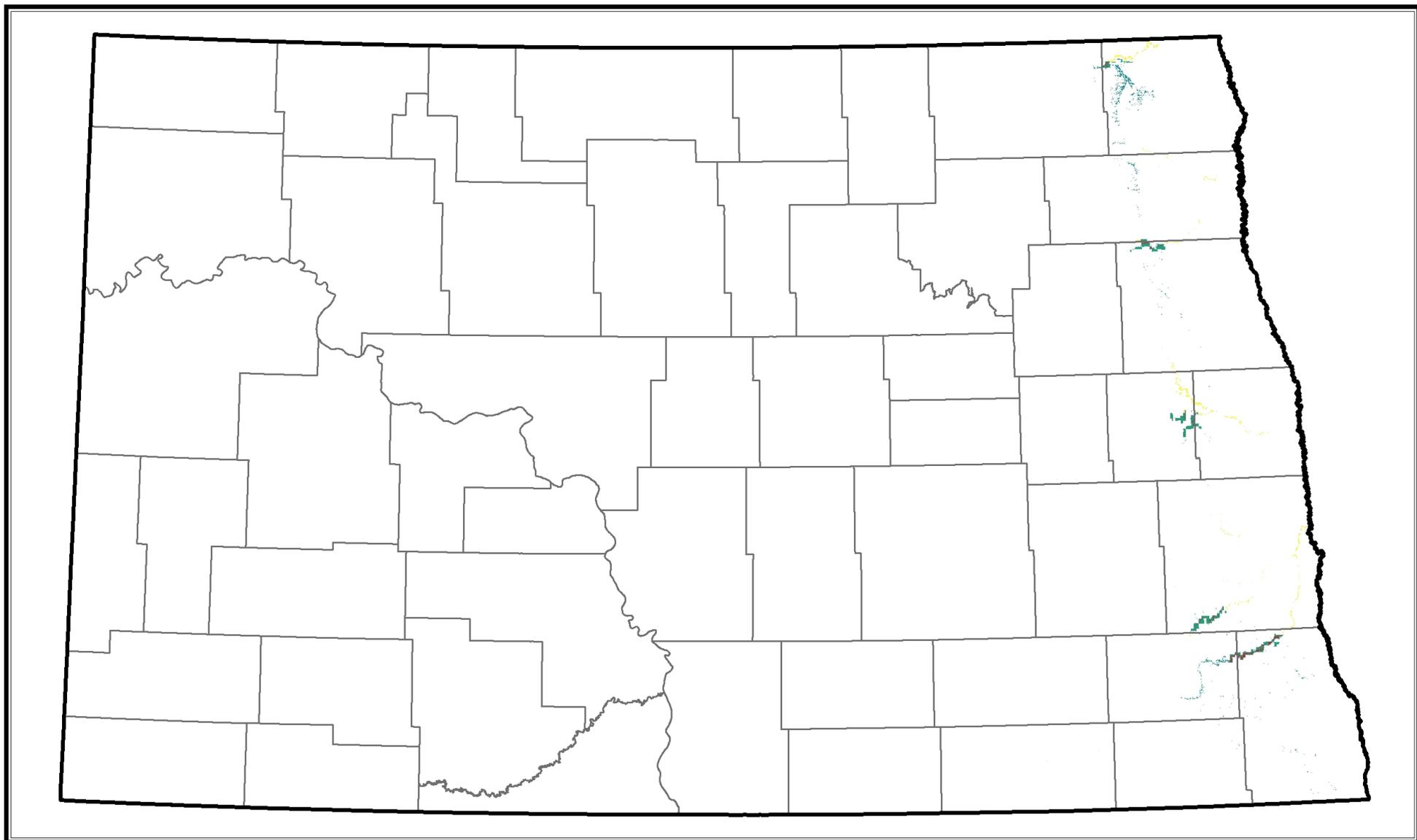
# Habitat Distribution Map



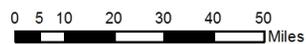
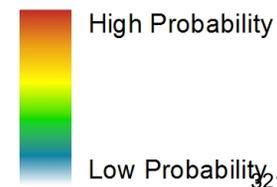
Buckbean  
*Menyanthes trifoliata*  
Level II



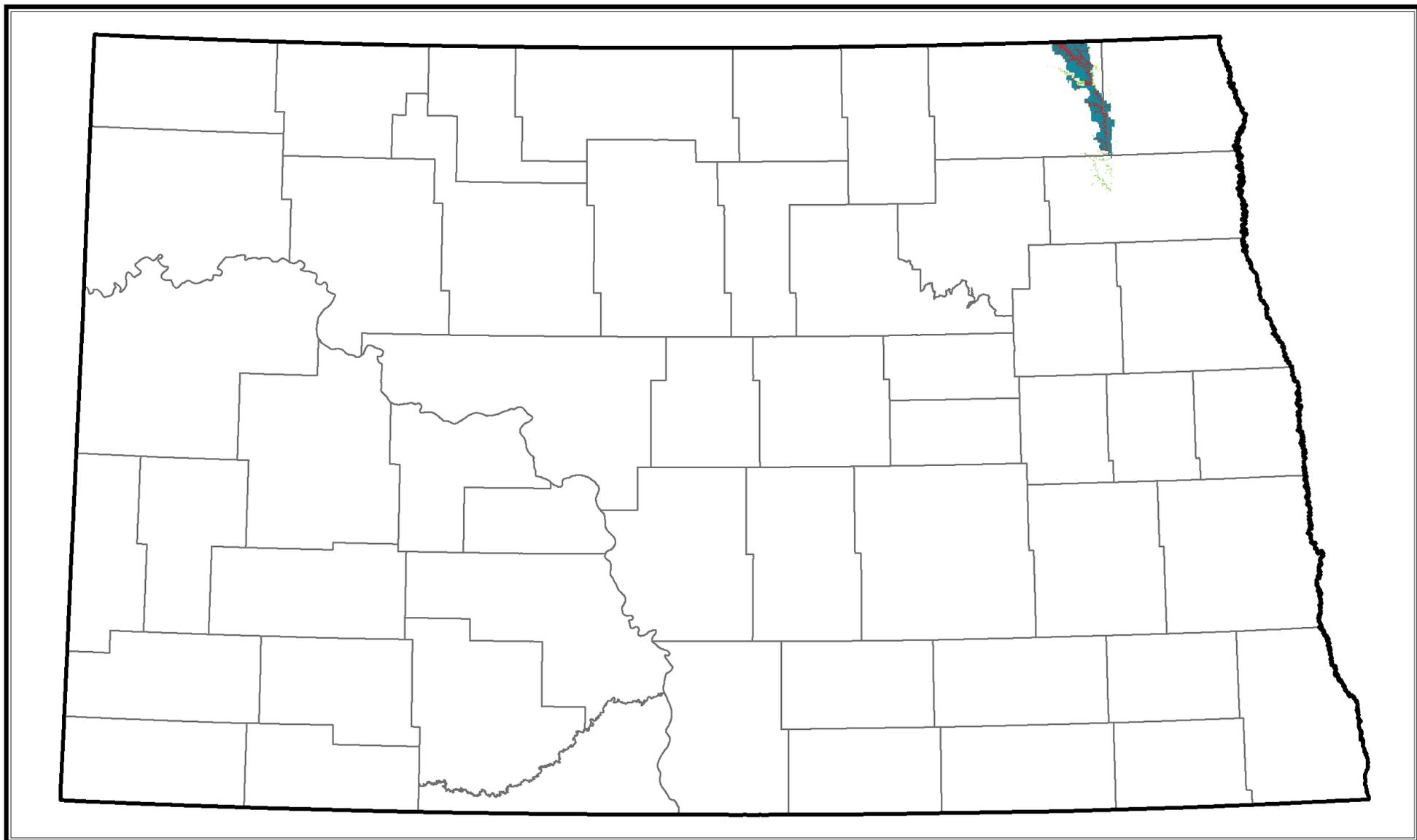
# Habitat Distribution Map



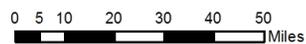
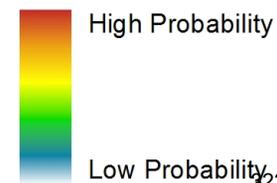
Yellow monkeyflower  
*Mimulus guttatus*  
Level III



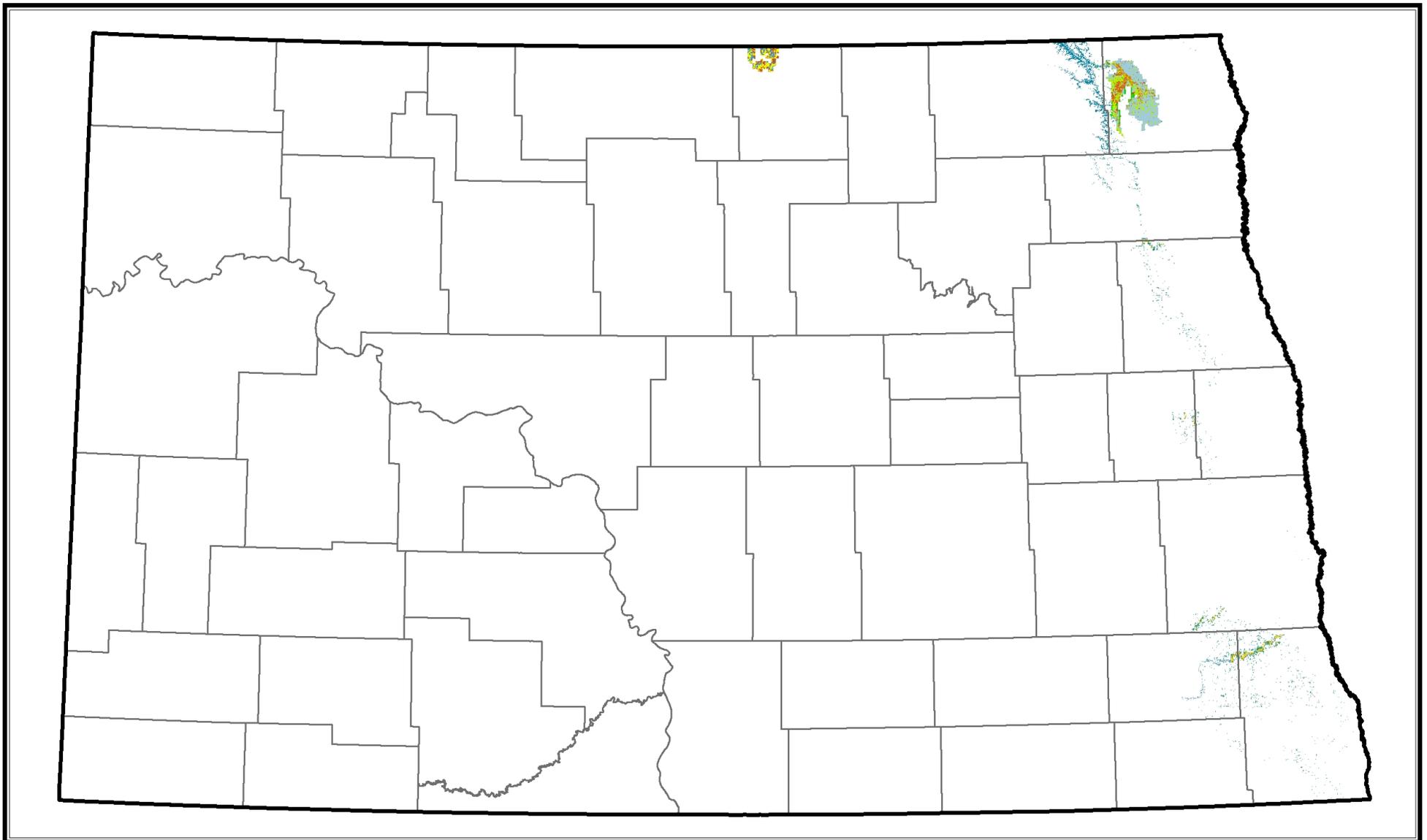
# Habitat Distribution Map



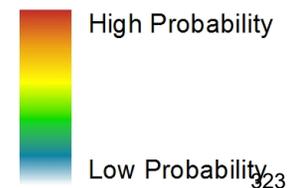
Stiff sandwort  
*Minuartia dawsonensis*  
Level II



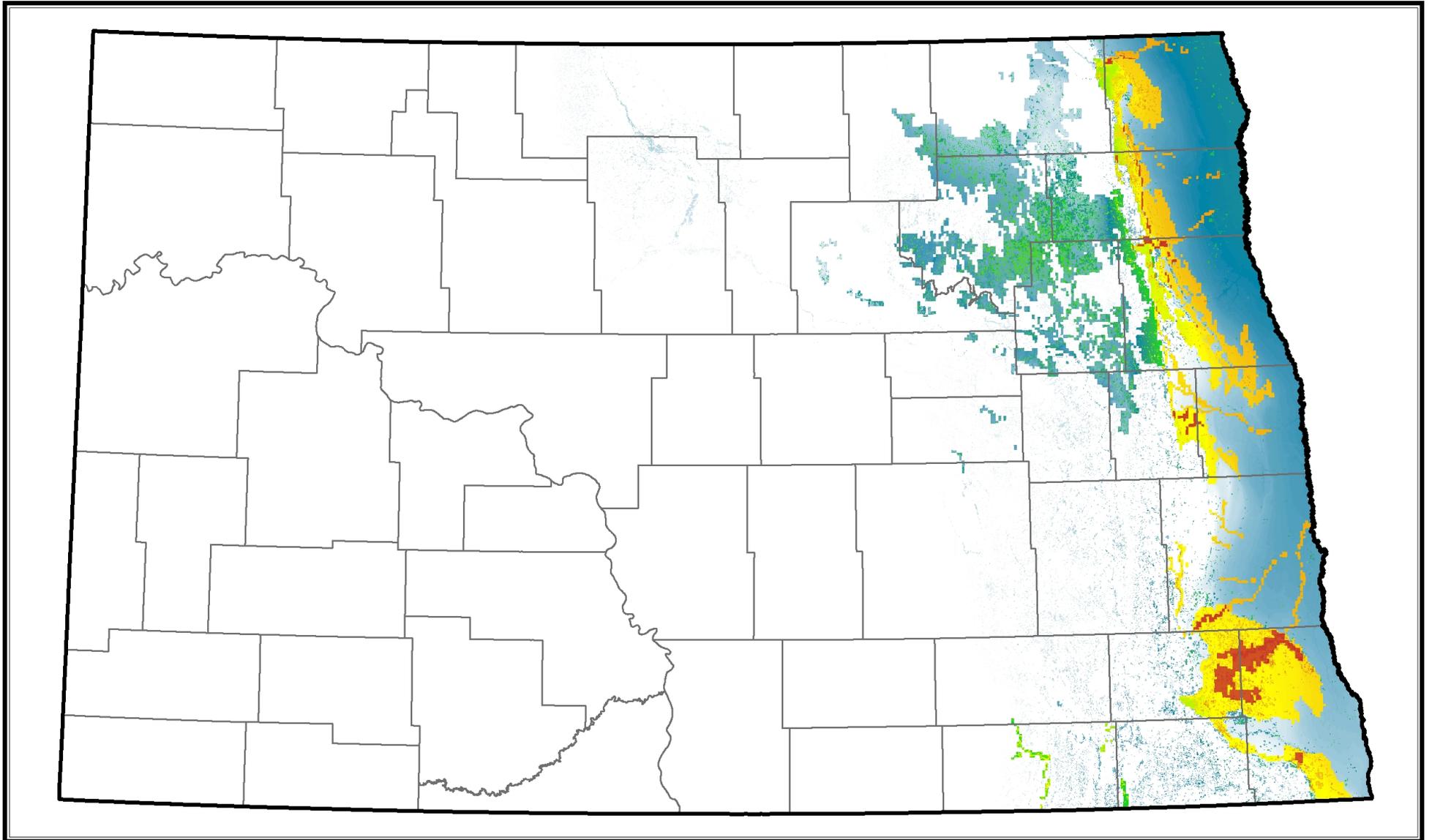
# Habitat Distribution Map



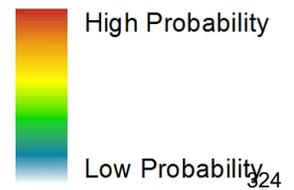
Naked mitrewort  
*Mitella nuda*  
Level III



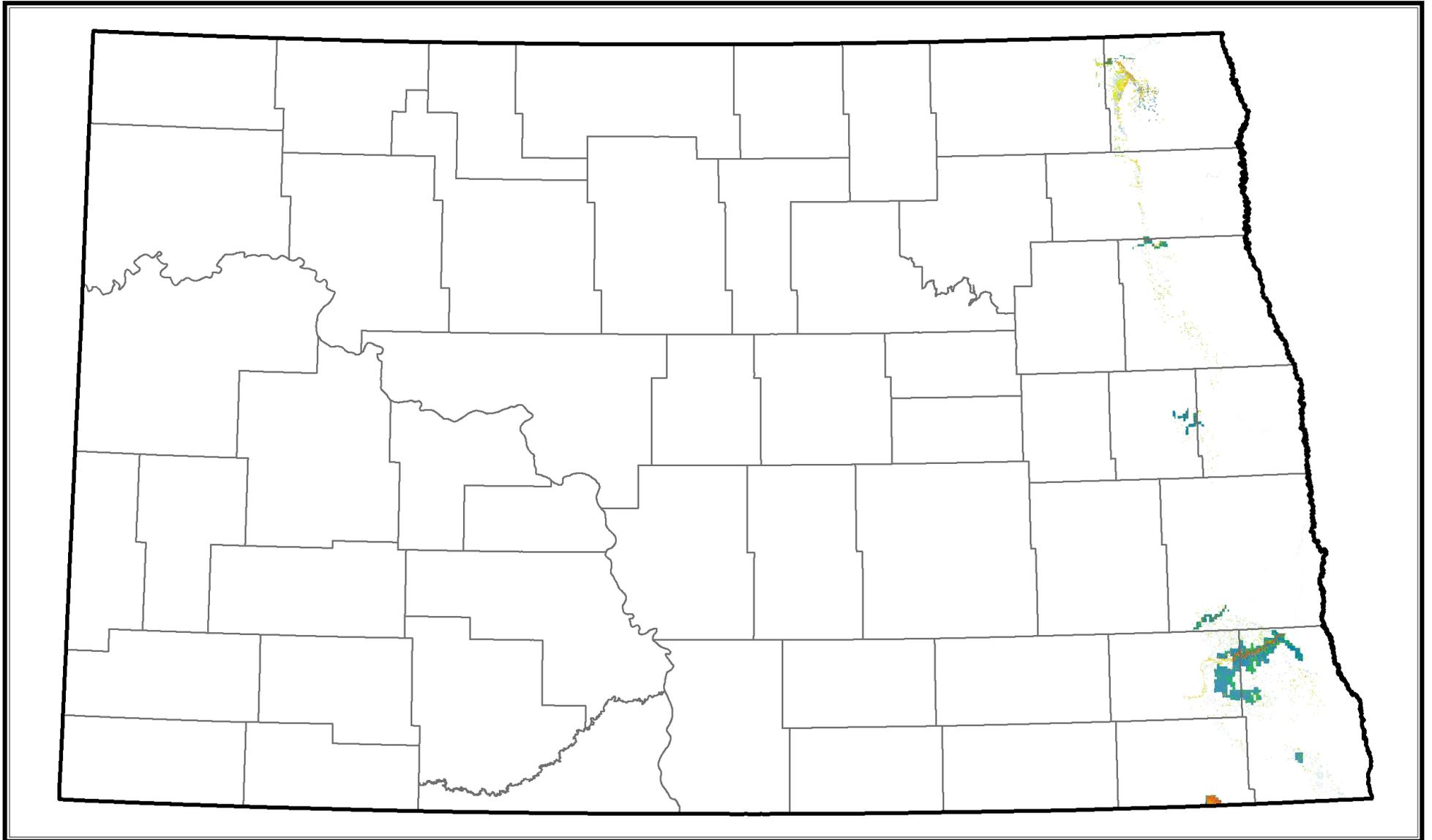
# Habitat Distribution Map



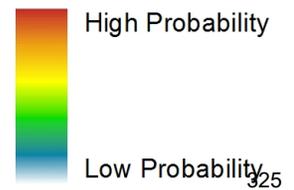
Rhombic evening-primrose  
*Oenothera rhombipetala*  
Level III



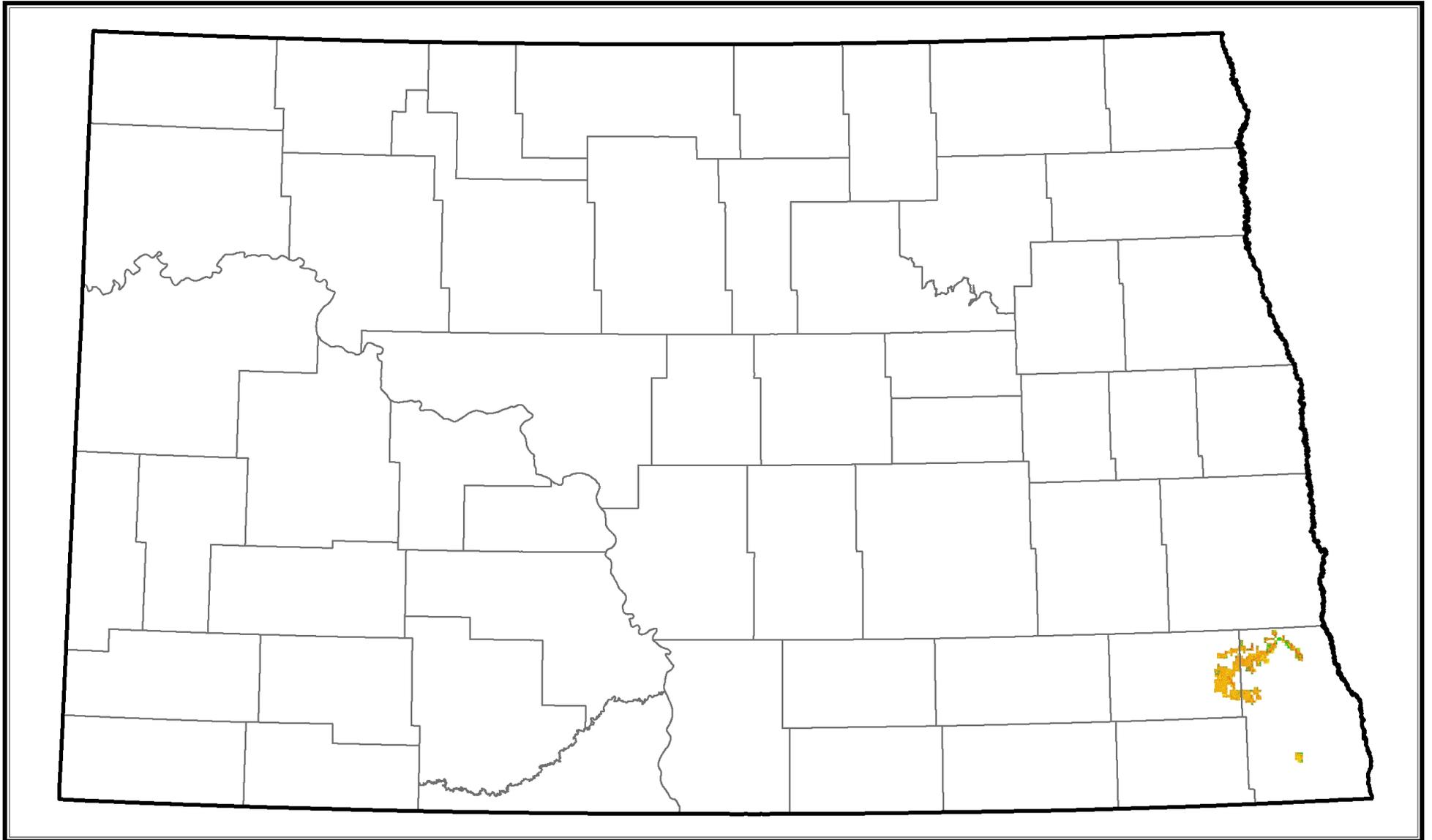
# Habitat Distribution Map



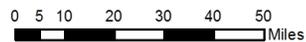
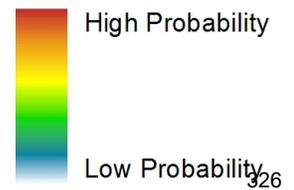
Sensitive fern  
*Onoclea sensibilis*  
Level II



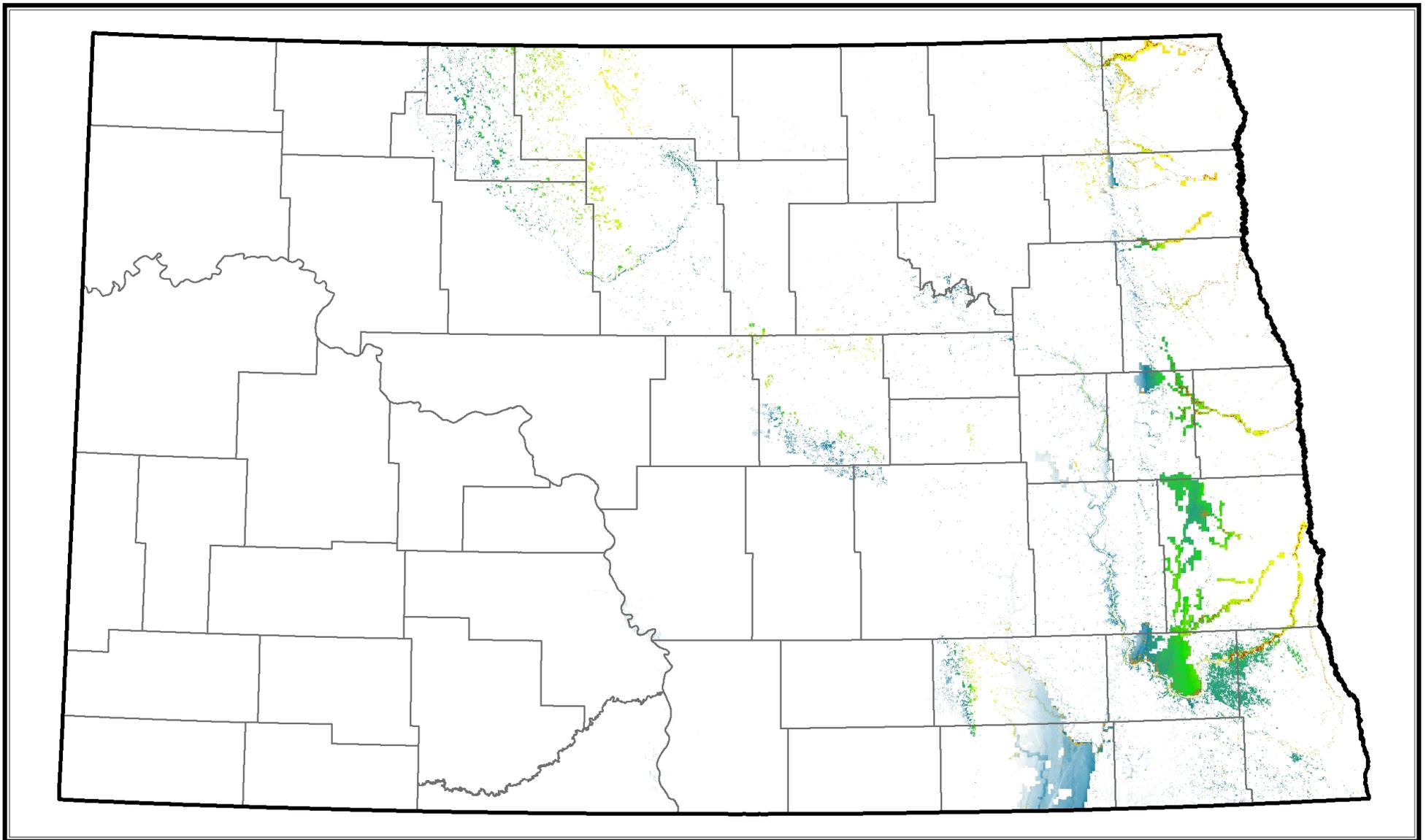
# Habitat Distribution Map



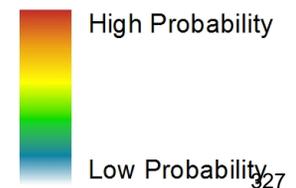
Adder's-tongue fern  
*Ophioglossum pusillum*  
Level II



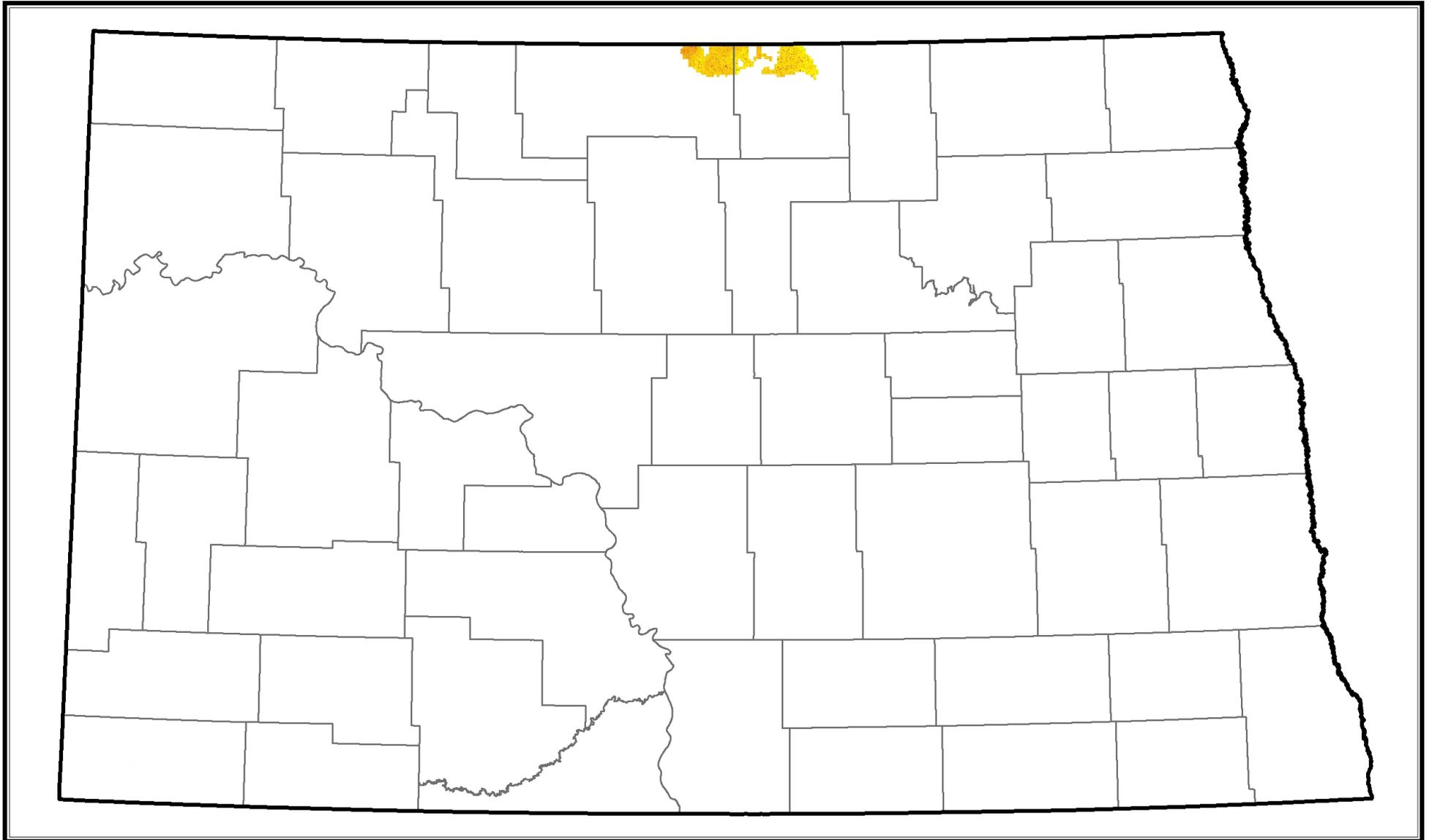
# Habitat Distribution Map



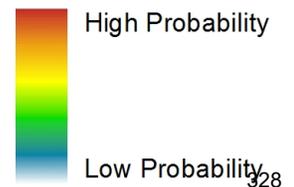
One-flowered broomrape  
*Orobanche uniflora*  
Level III



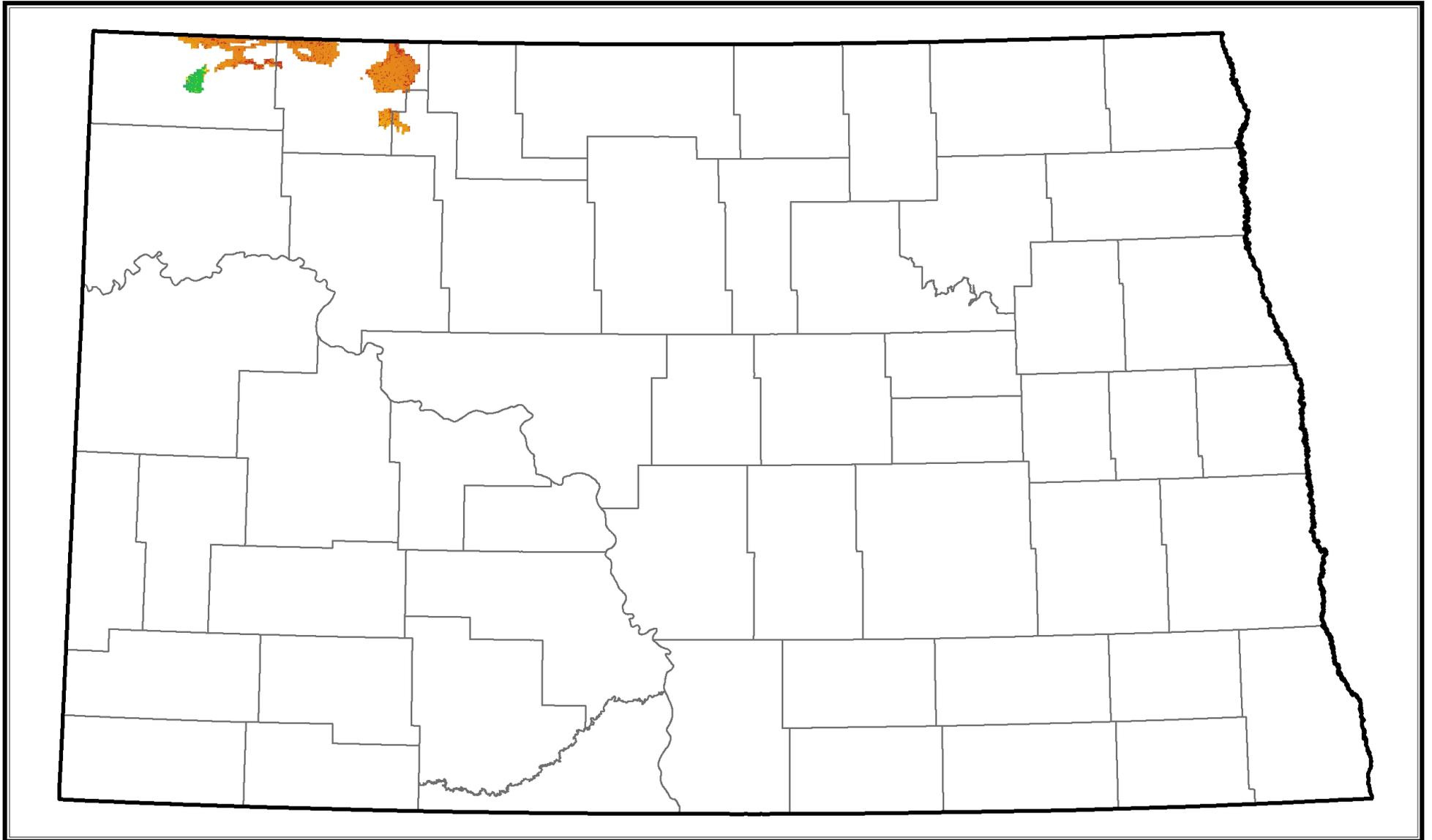
# Habitat Distribution Map



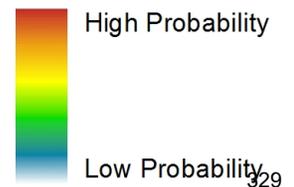
Small-flowered grass-of-parnassus  
*Parnassia palustris* var. *parviflora*  
Level III



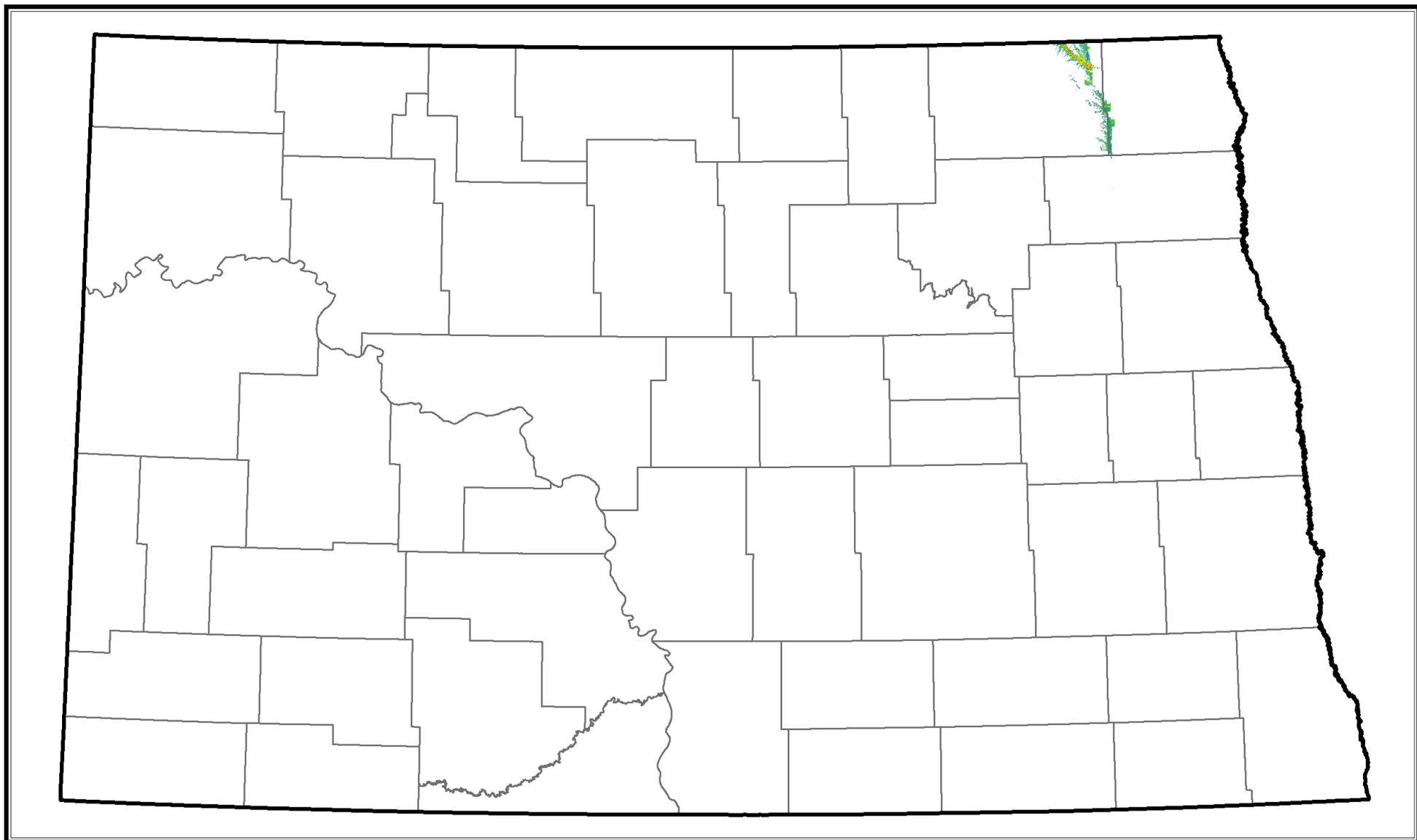
# Habitat Distribution Map



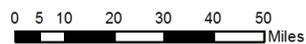
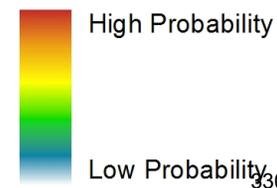
Small-flowered penstemon  
*Penstemon procerus*  
Level III



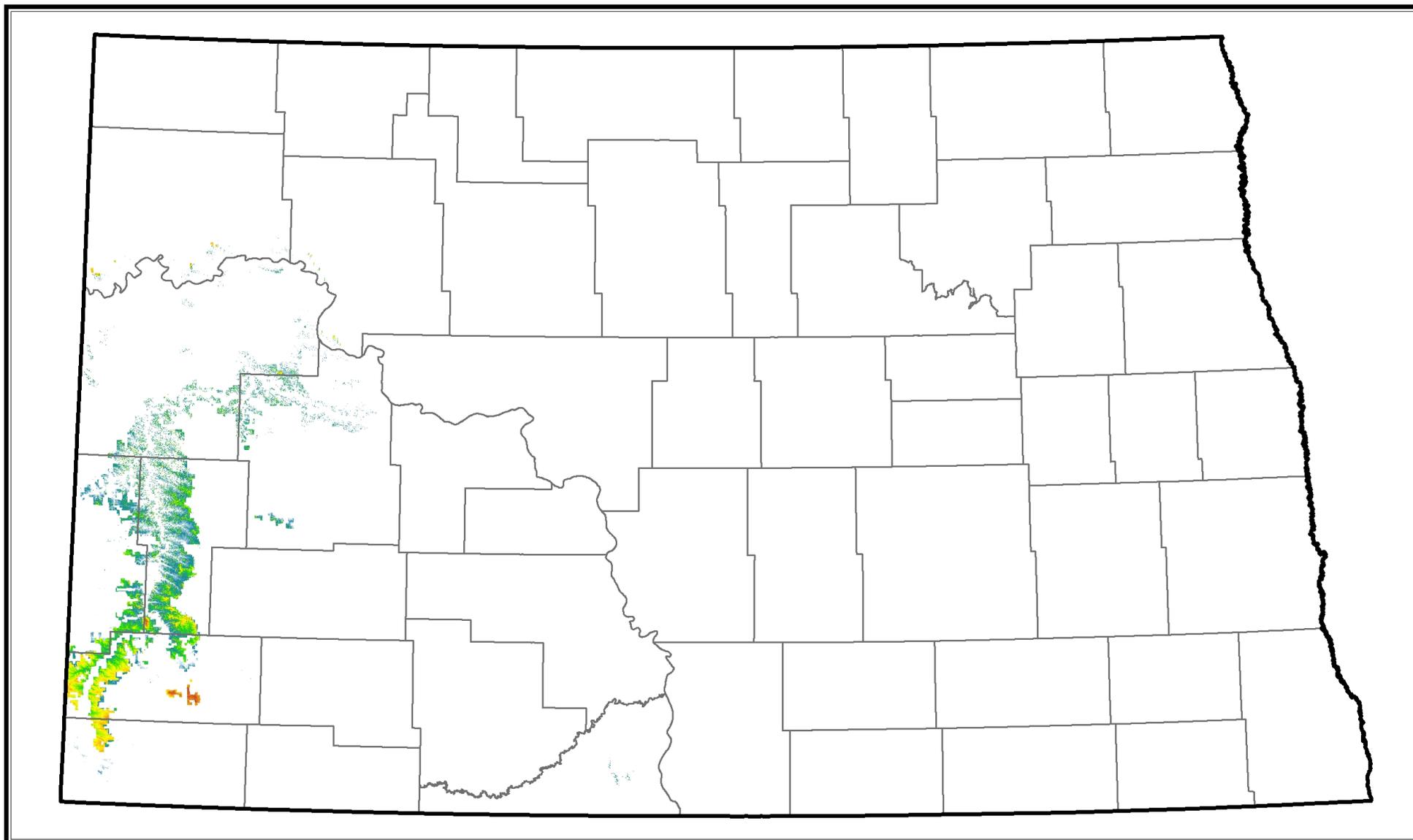
# Habitat Distribution Map



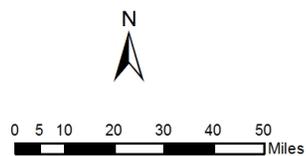
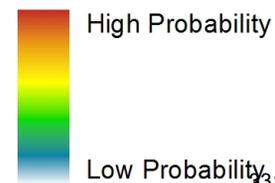
Sweet coltsfoot  
*Petasites frigidus*  
Level III



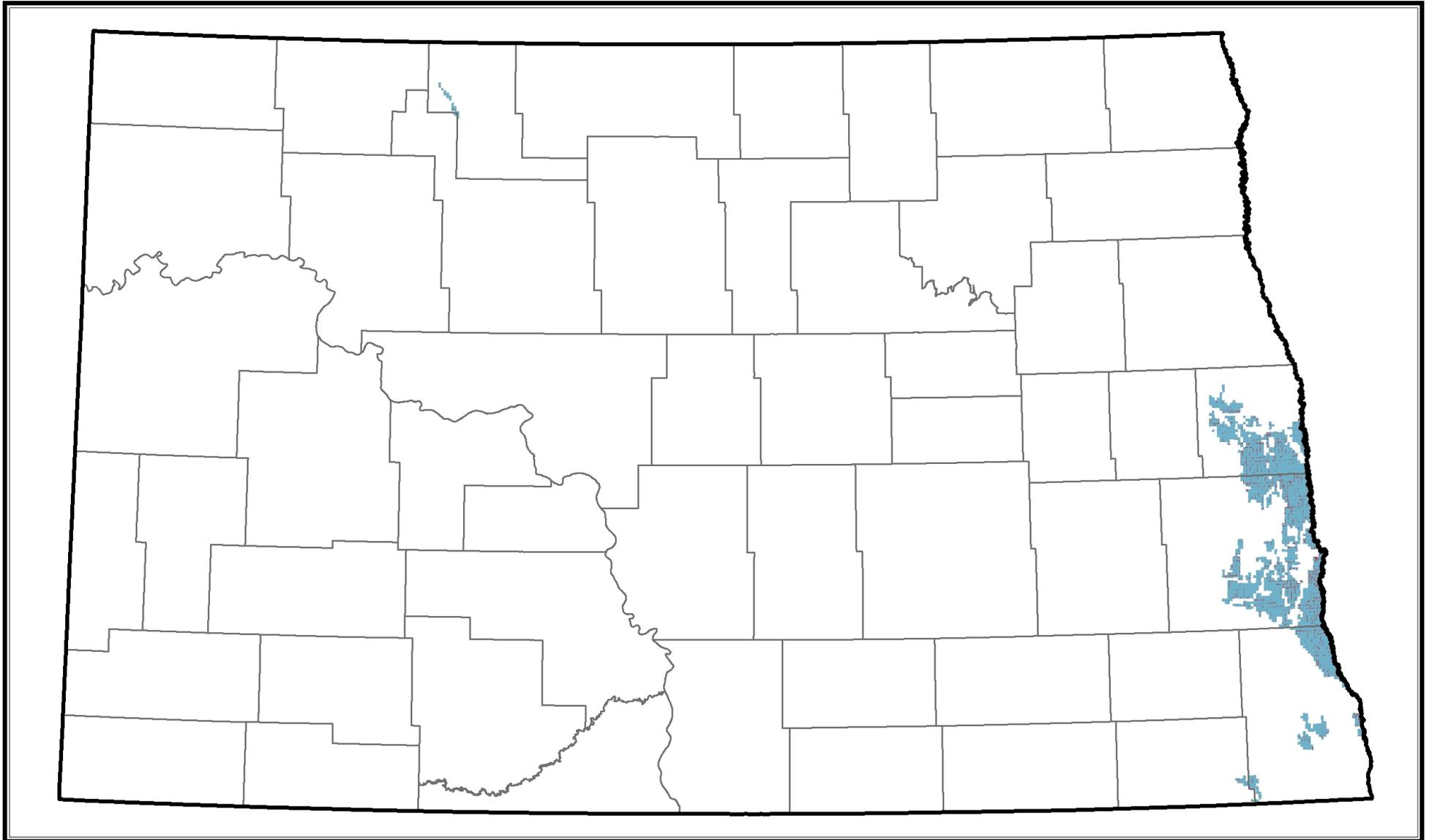
# Habitat Distribution Map



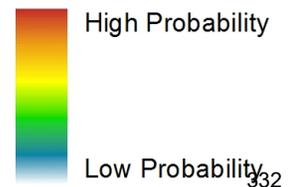
Alyssum-leaved phlox  
*Phlox alyssifolia*  
Level II



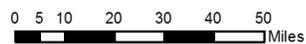
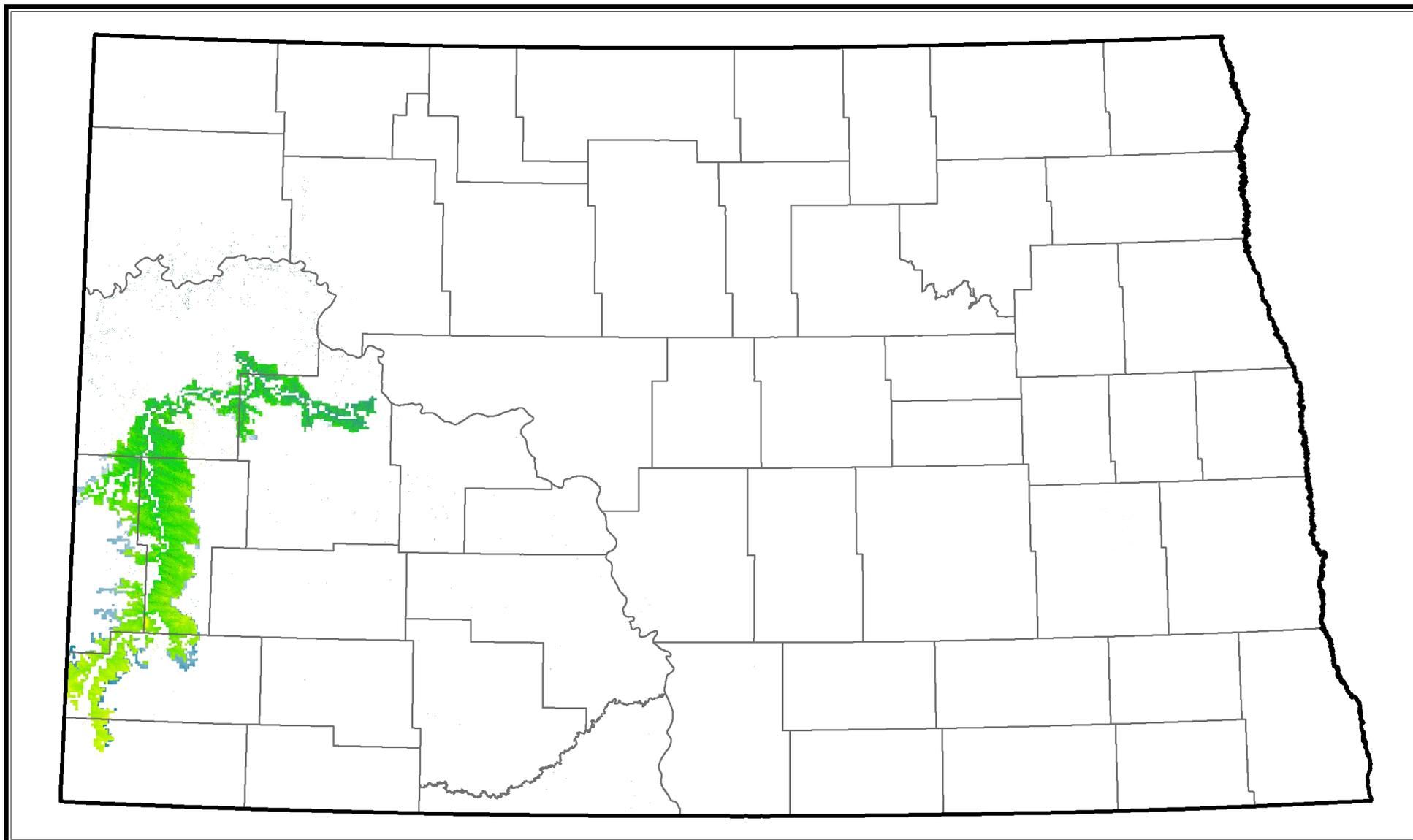
# Habitat Distribution Map



Downy phlox  
*Phlox pilosa*  
Level III

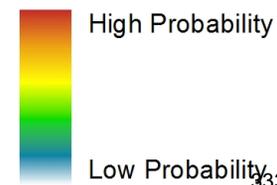


# Habitat Distribution Map

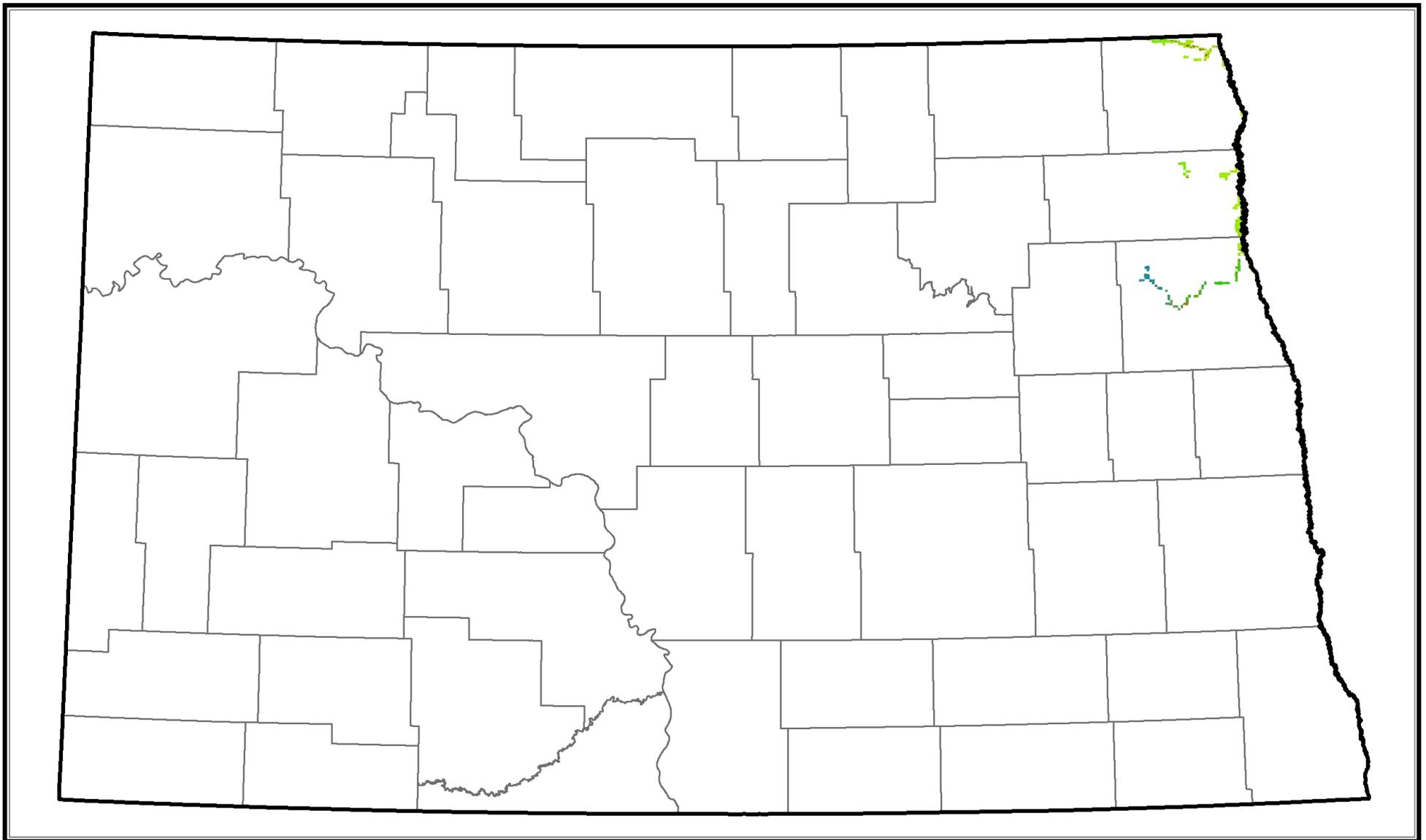


NDNHI 2012

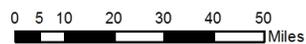
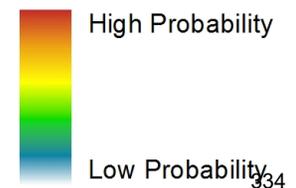
Limber pine  
*Pinus flexilis*  
Level II



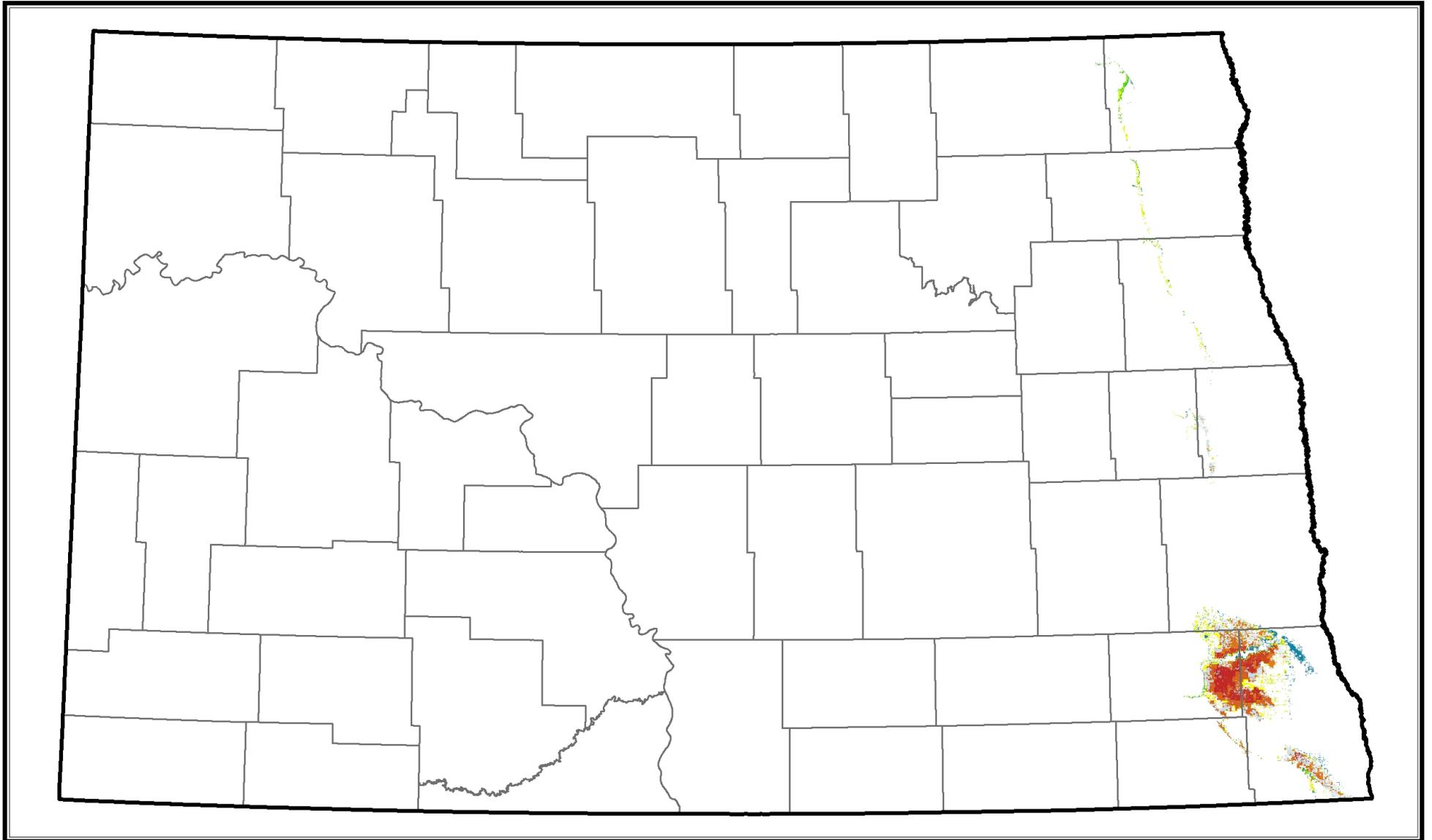
# Habitat Distribution Map



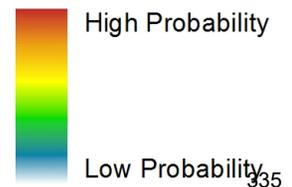
Green woodland orchid  
*Platanthera clavellata*  
Level III



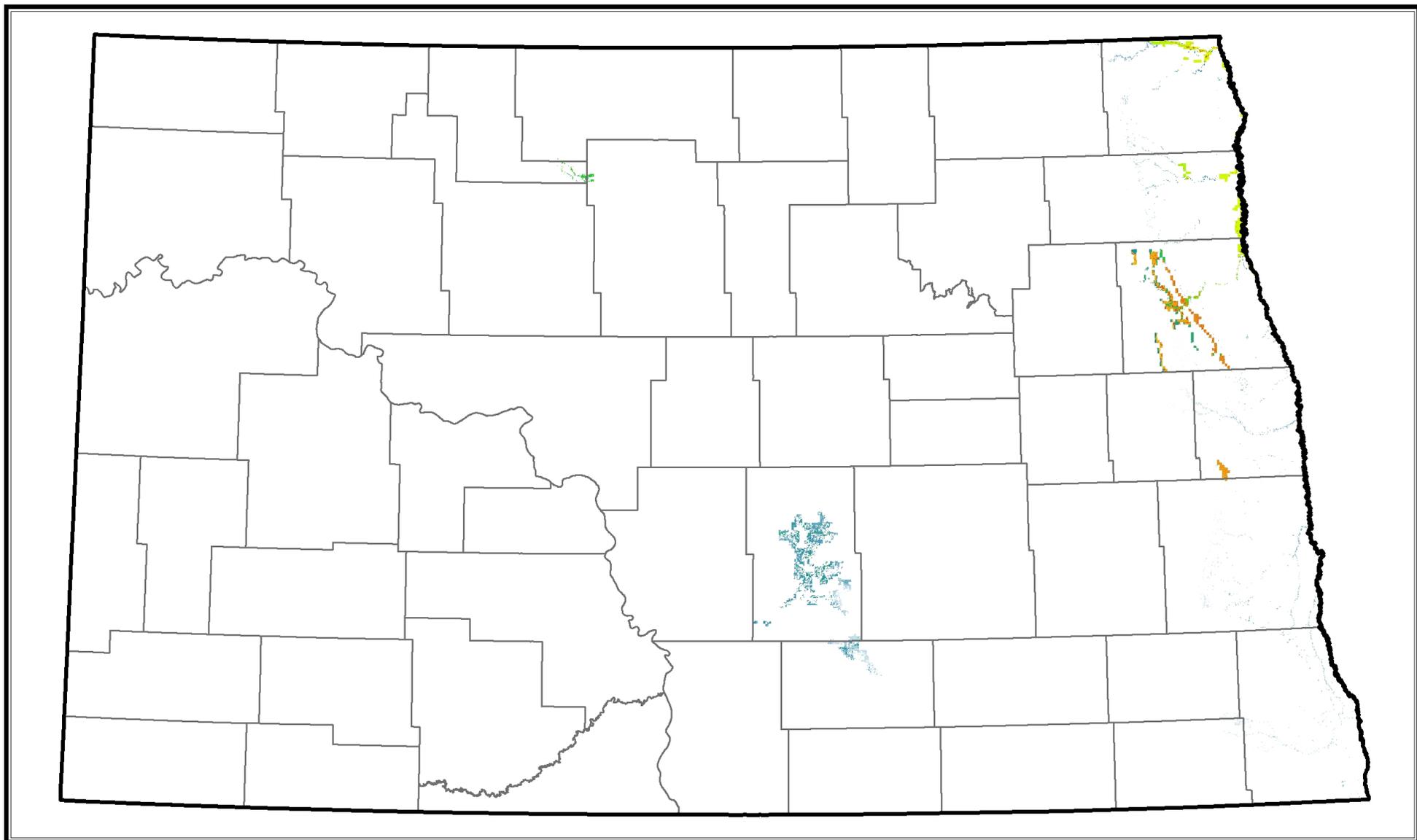
# Habitat Distribution Map



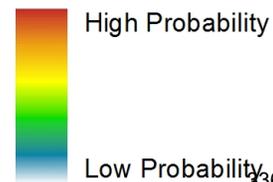
Western prairie fringed orchid  
*Platanthera praeclara*  
Level I



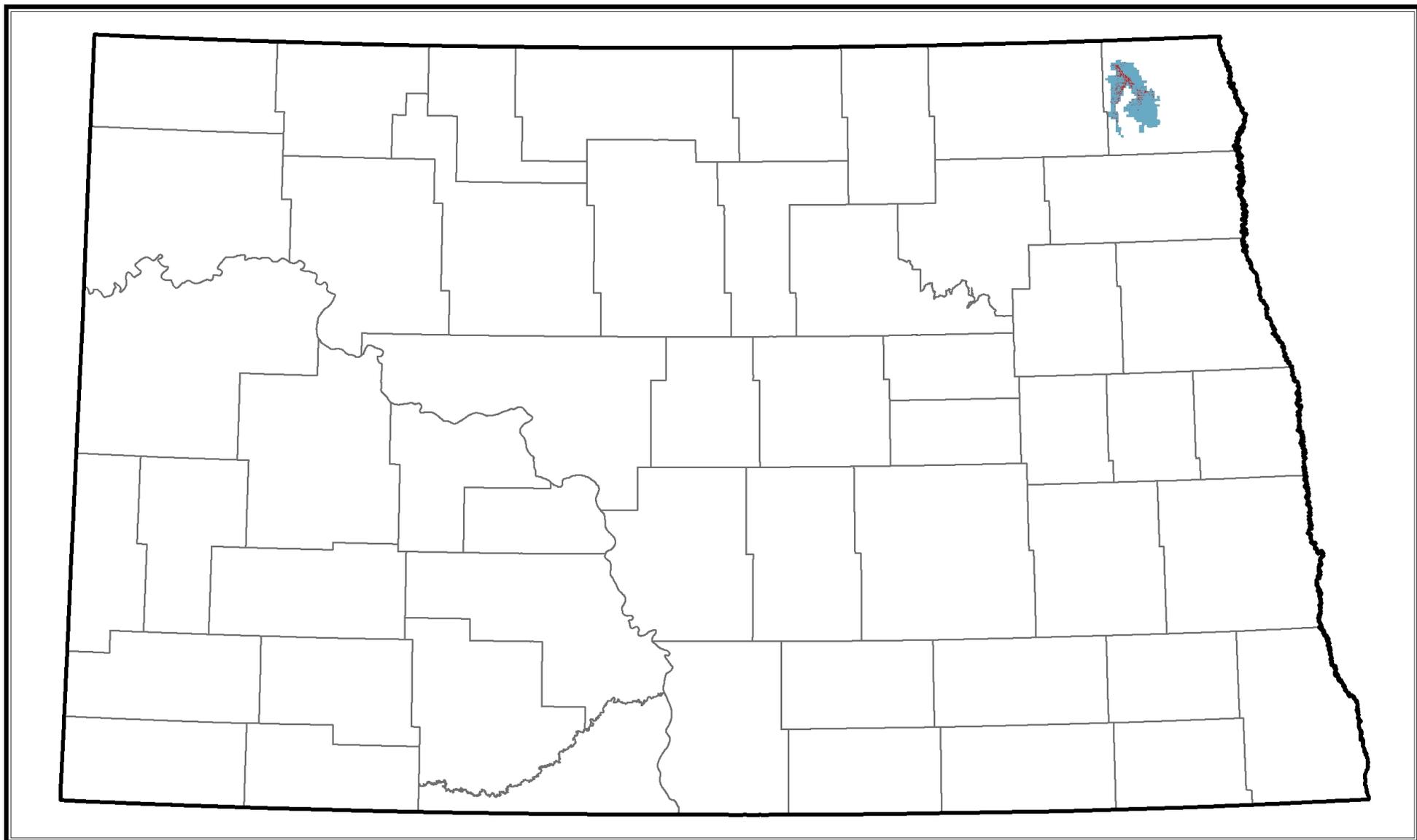
# Habitat Distribution Map



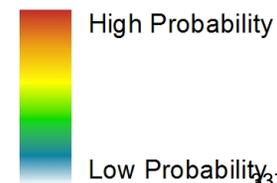
Rose pogonia  
*Pogonia ophioglossoides*  
Level II



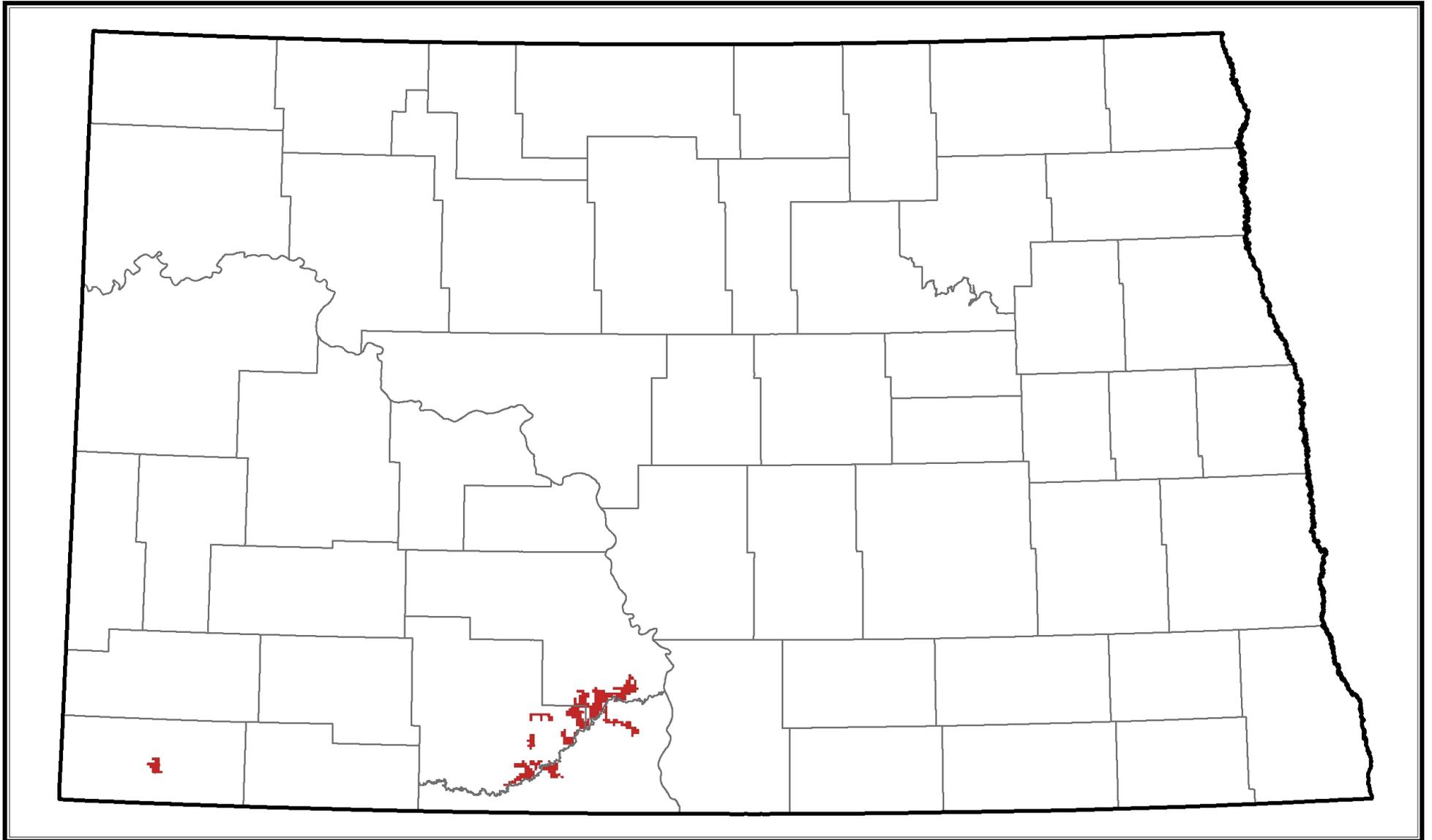
# Habitat Distribution Map



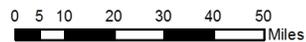
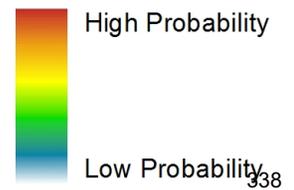
Swamp smartweed  
*Polygonum hydropiperoides*  
Level II



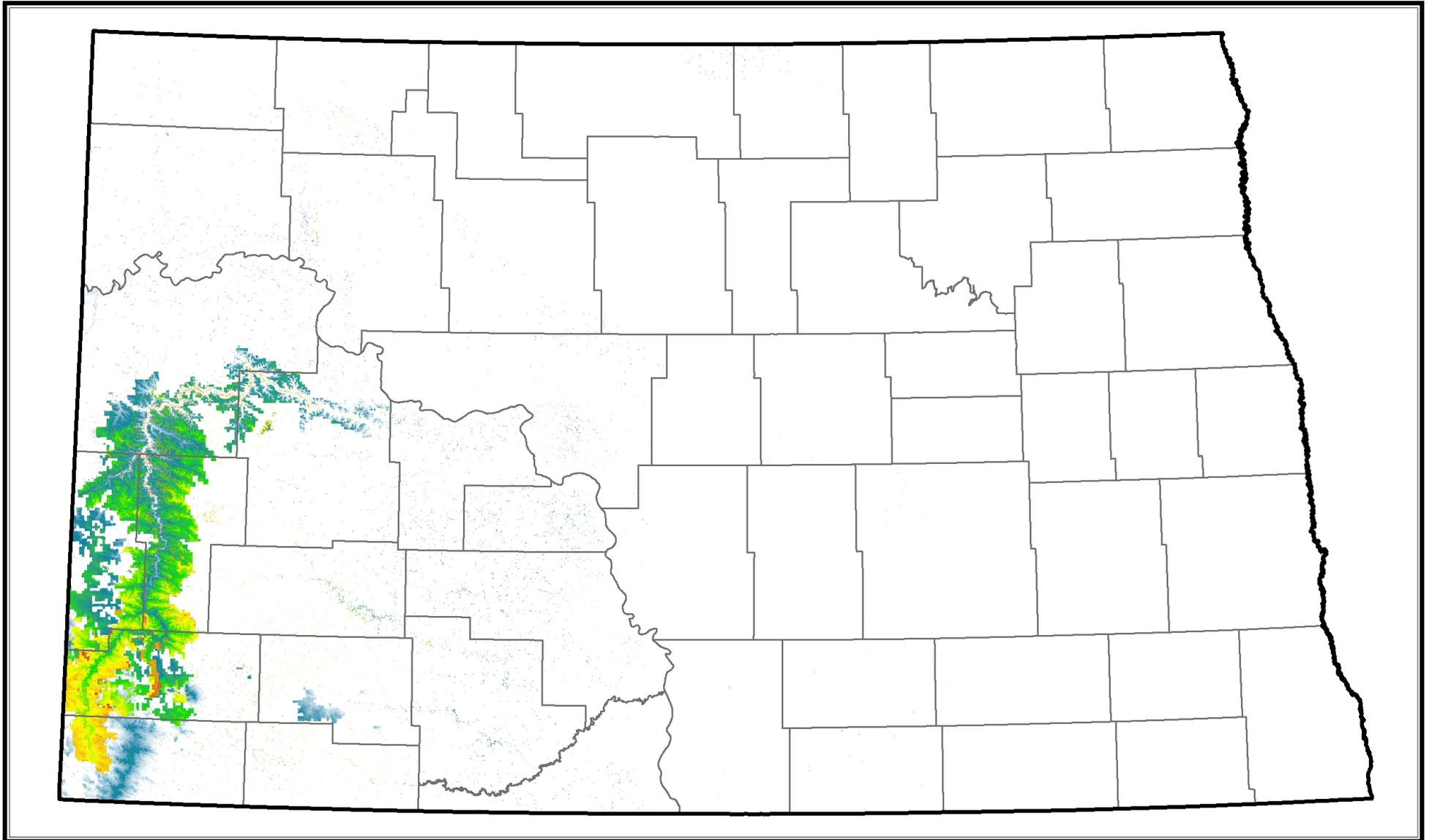
# Habitat Distribution Map



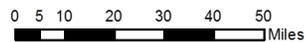
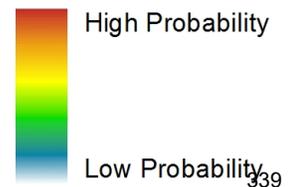
Thin-fruited knotweed  
*Polygonum leptocarpum*  
Level I



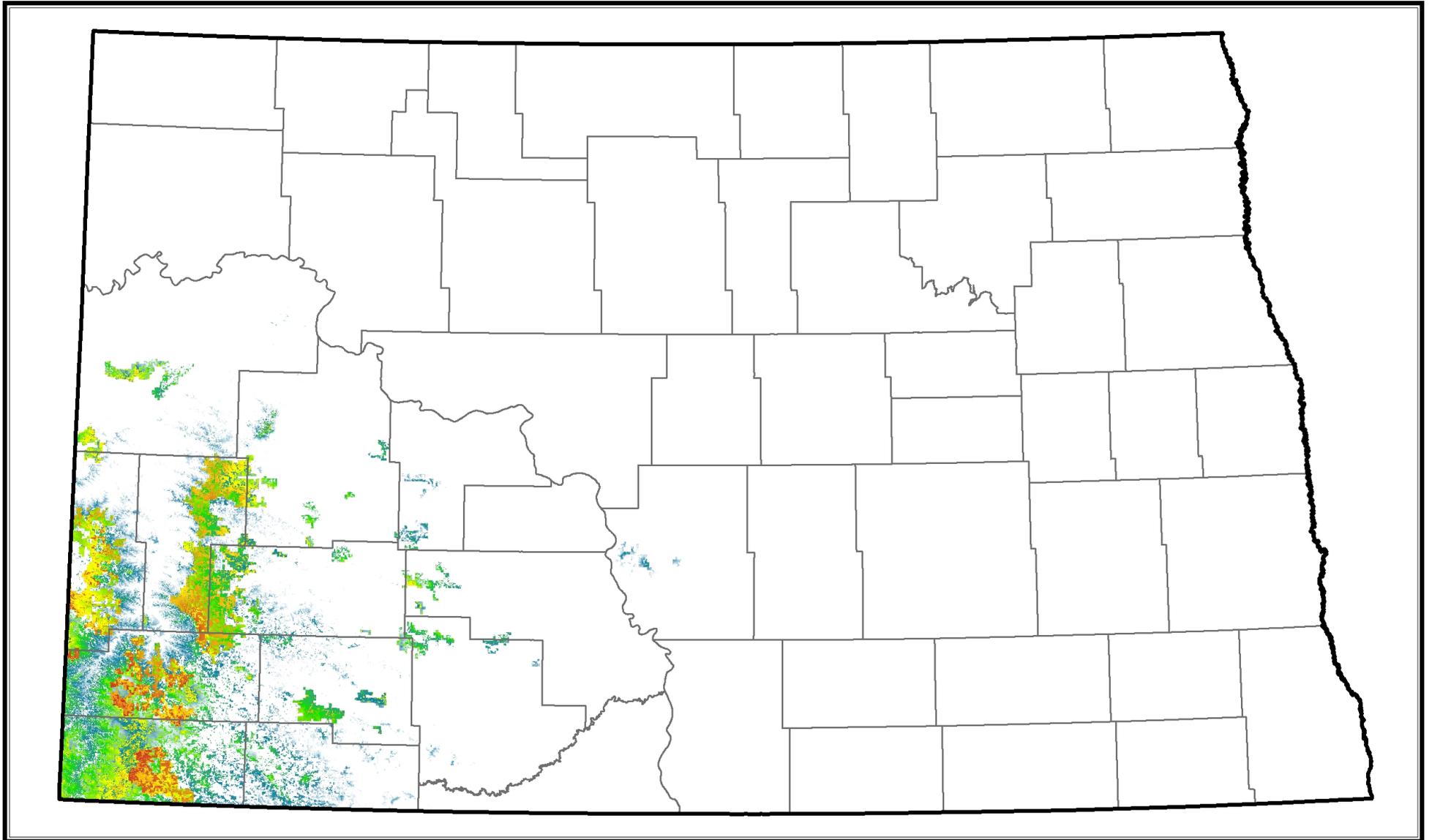
# Habitat Distribution Map



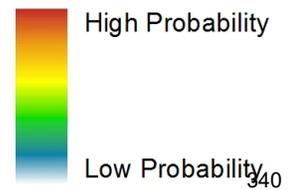
Lanceleaf cottonwood  
*Populus x acuminata*  
Level II



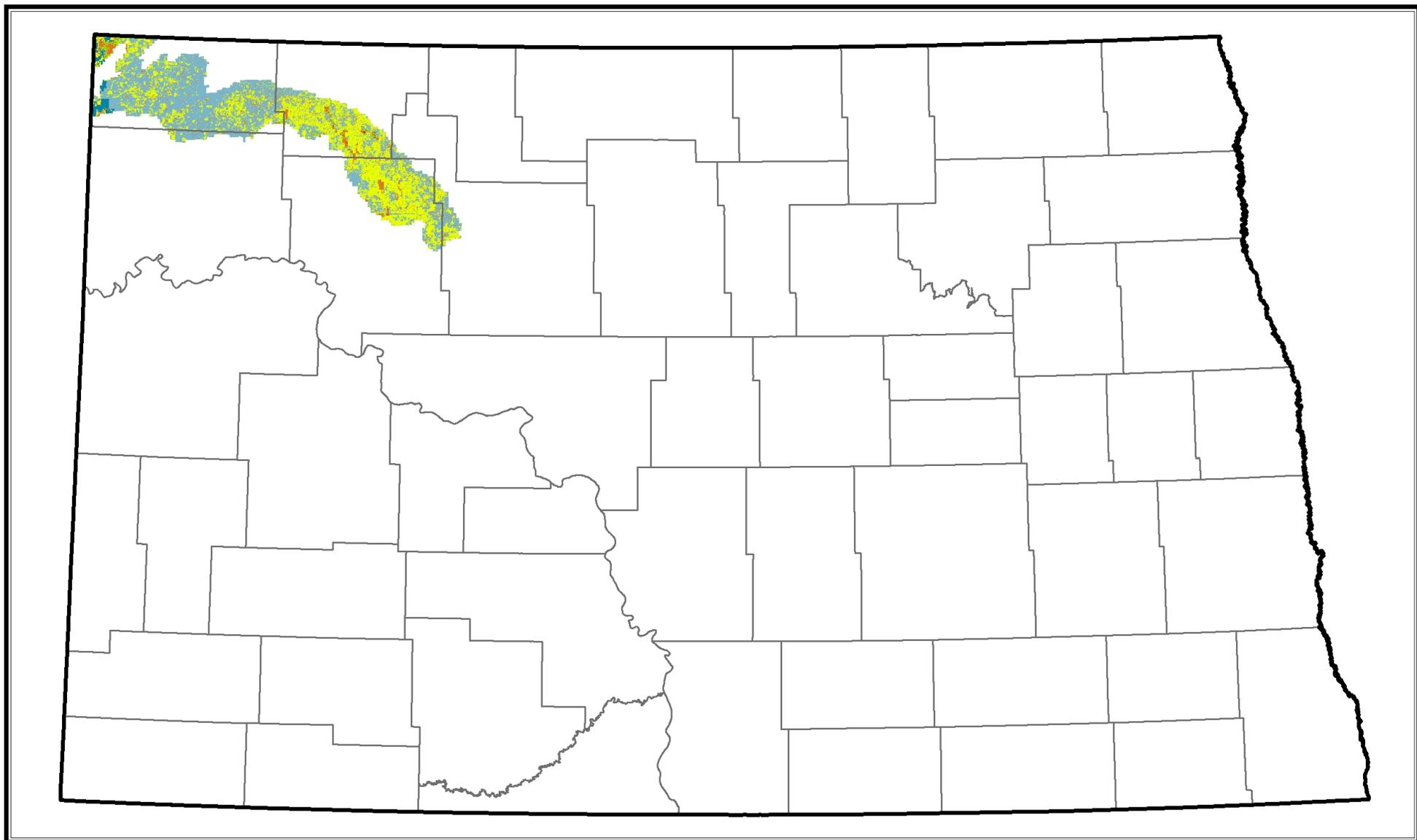
# Habitat Distribution Map



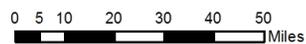
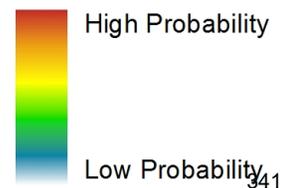
Mountain meadow cinquefoil  
*Potentilla diversifolia*  
Level III



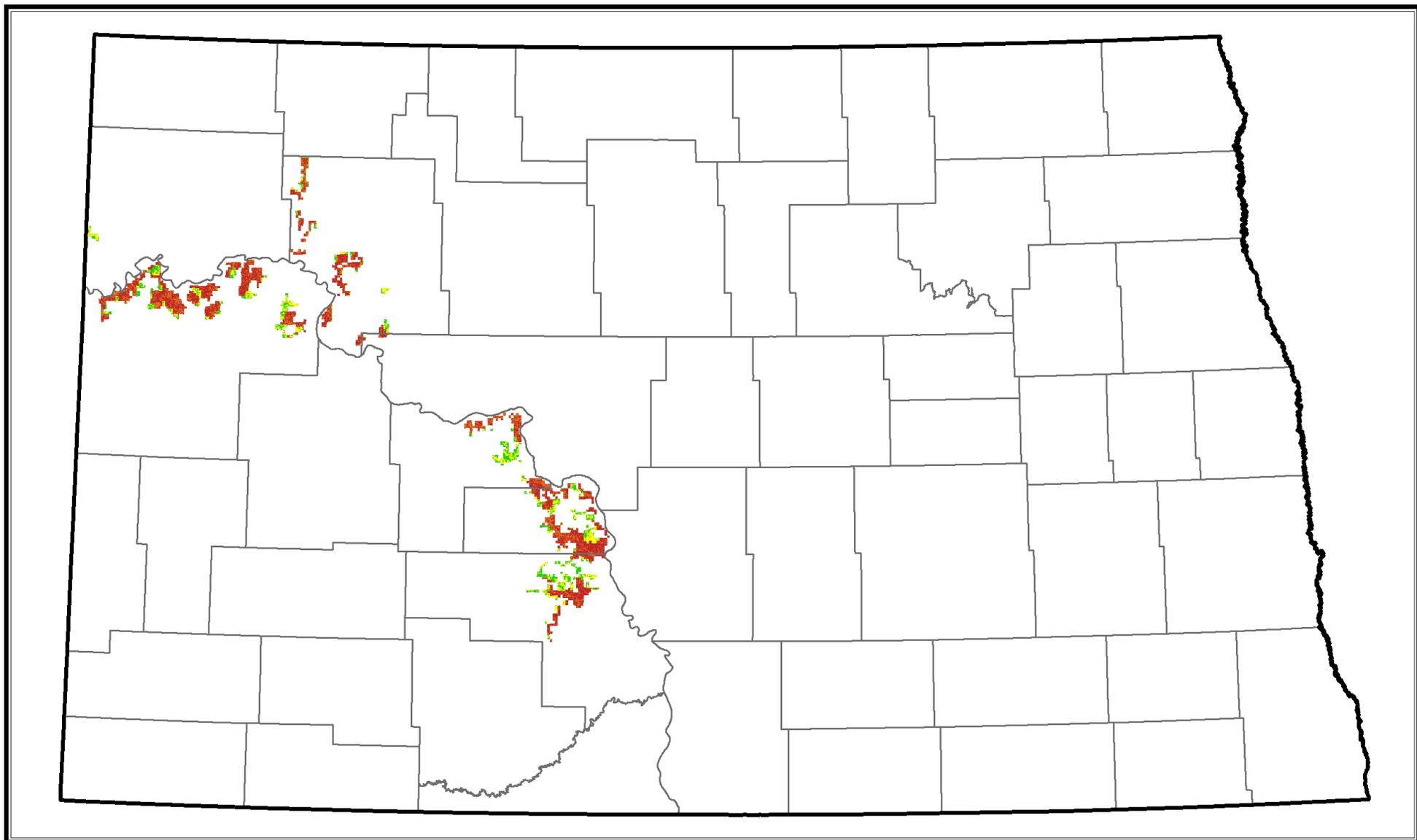
# Habitat Distribution Map



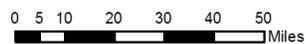
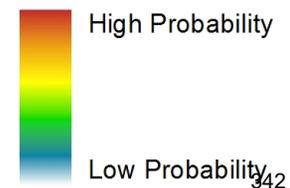
American primrose  
*Primula incana*  
Level II



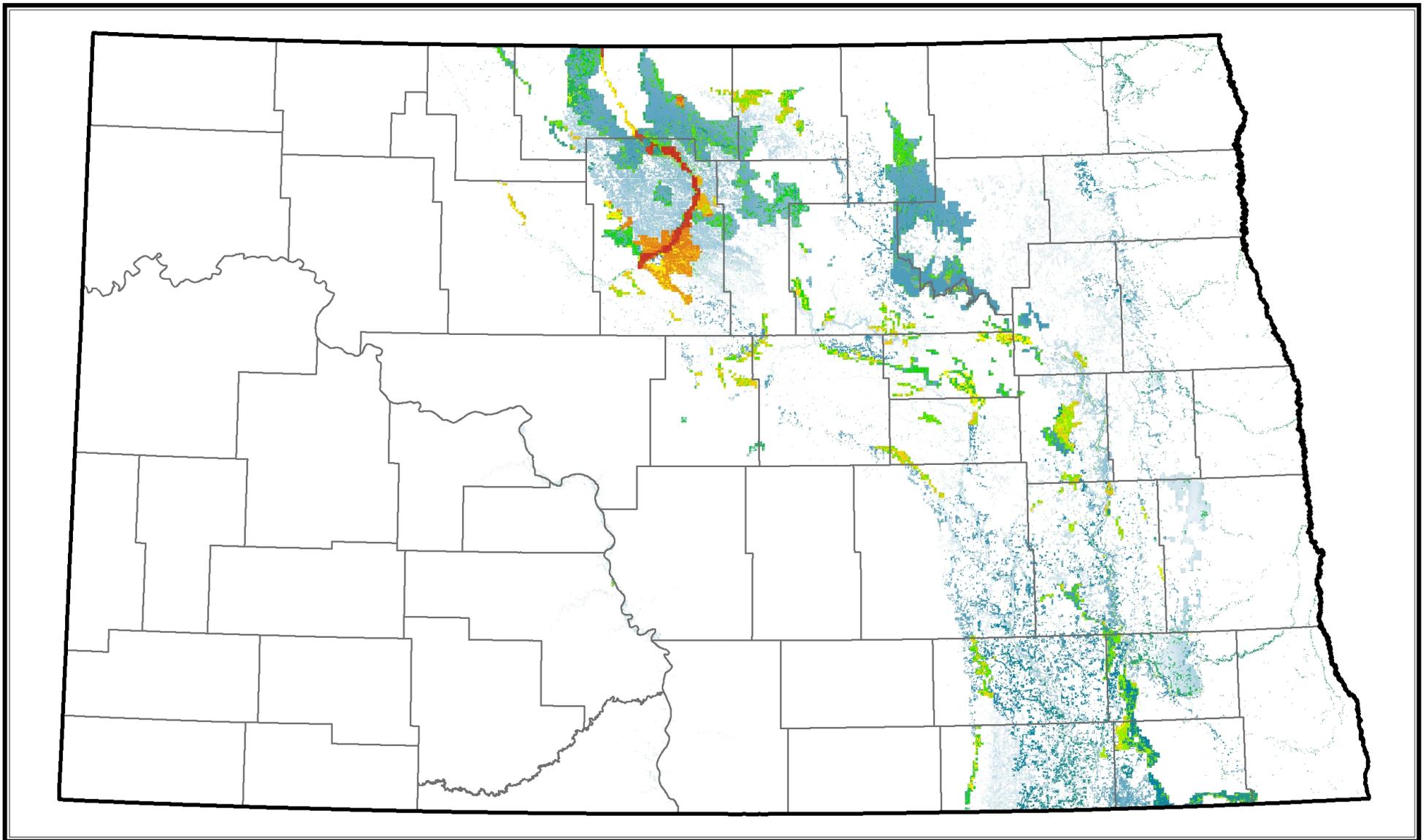
# Habitat Distribution Map



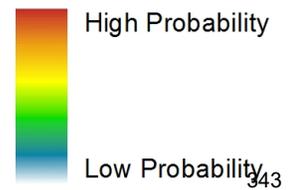
Heart-leaved buttercup  
*Ranunculus cardiophyllus*  
Level III



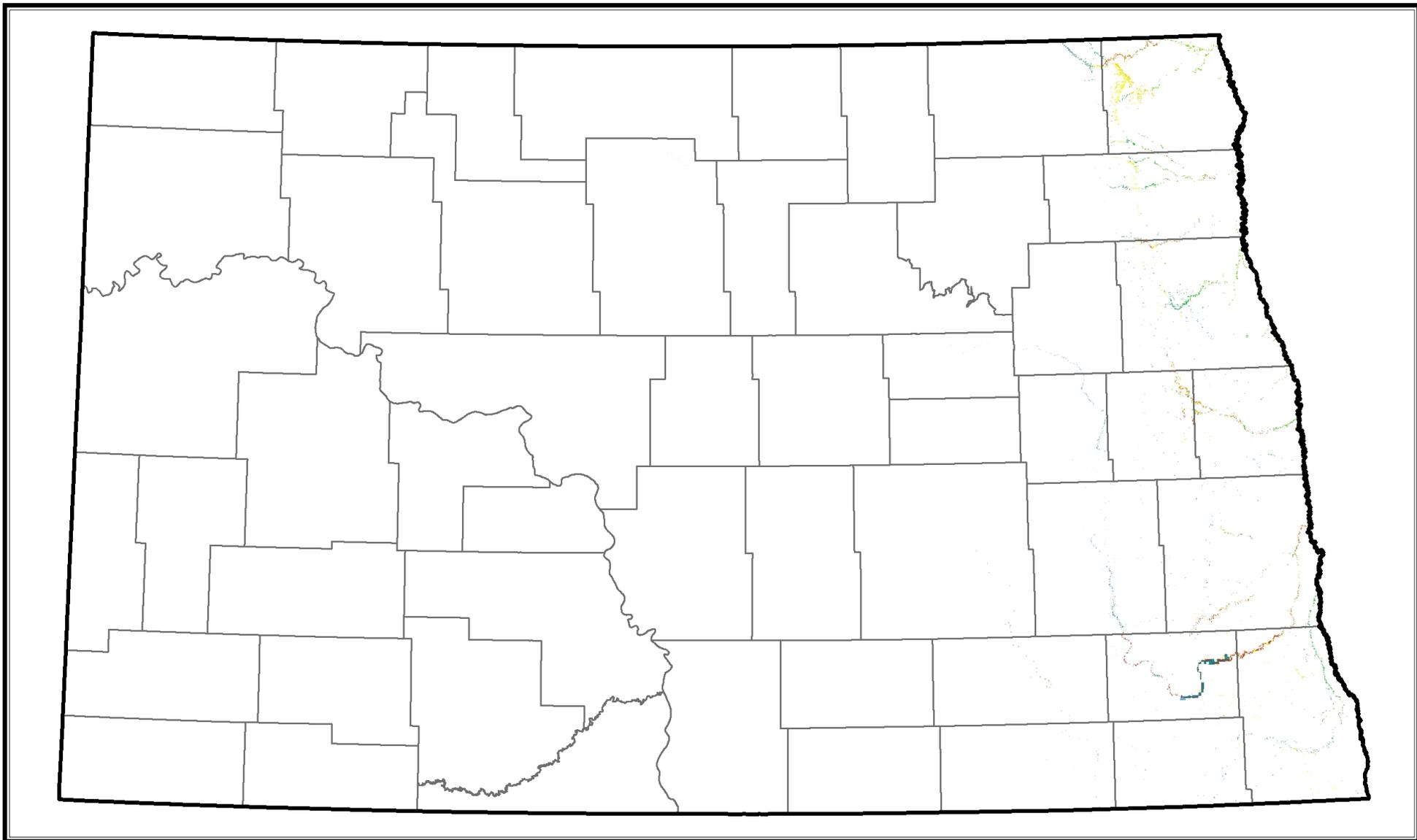
# Habitat Distribution Map



Hair beakrush  
*Rhynchospora capillacea*  
Level III



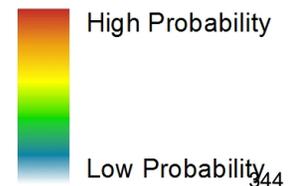
# Habitat Distribution Map



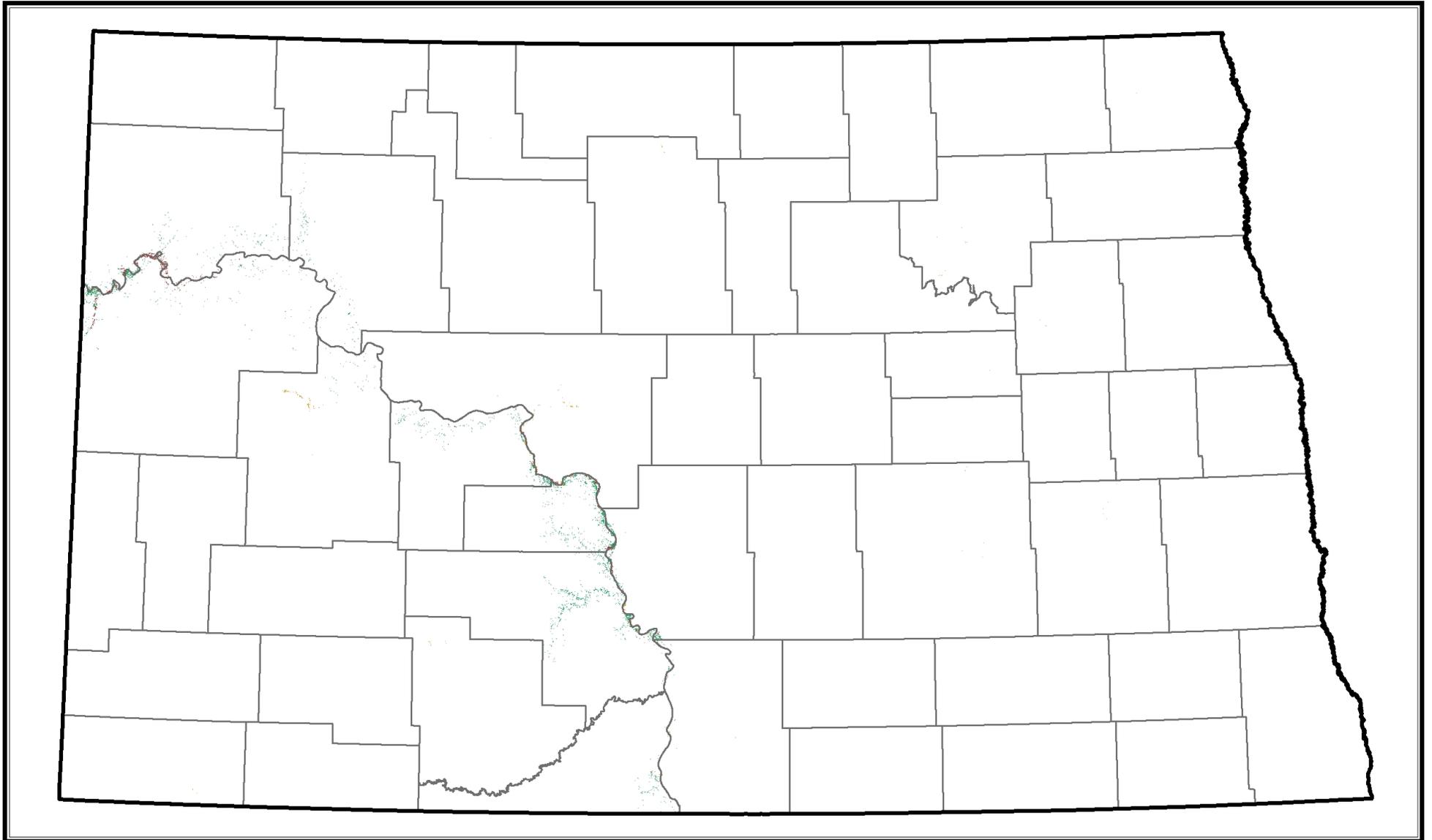
0 5 10 20 30 40 50 Miles

NDNHI 2012

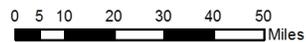
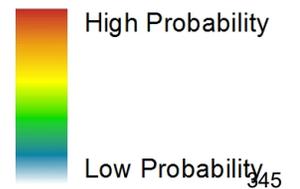
Prickly gooseberry  
*Ribes cynosbati*  
Level II



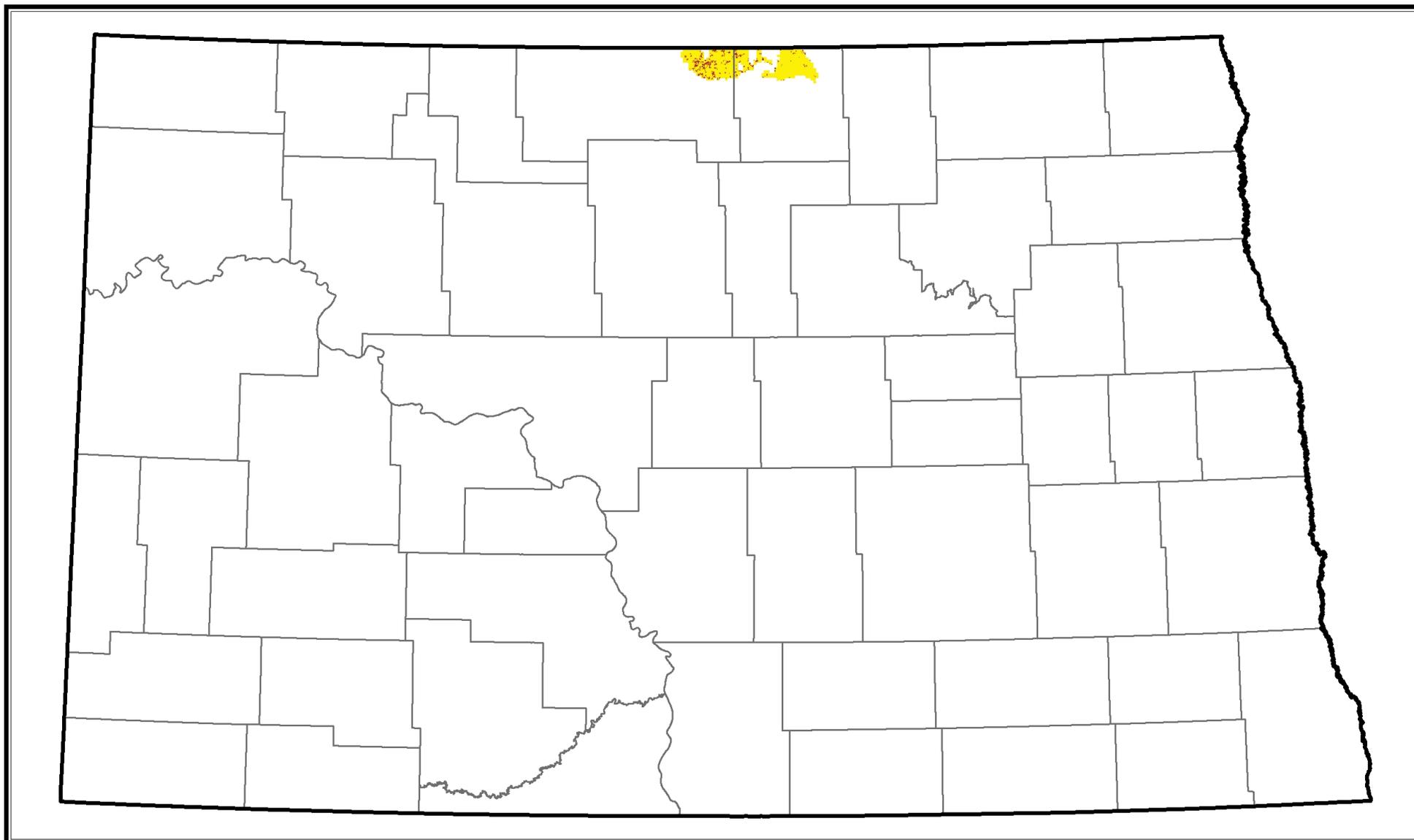
# Habitat Distribution Map



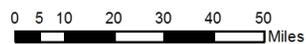
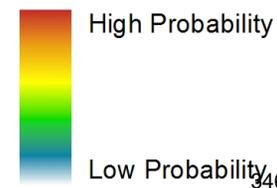
Hayden's yellowcress  
*Rorippa calycina*  
Level II



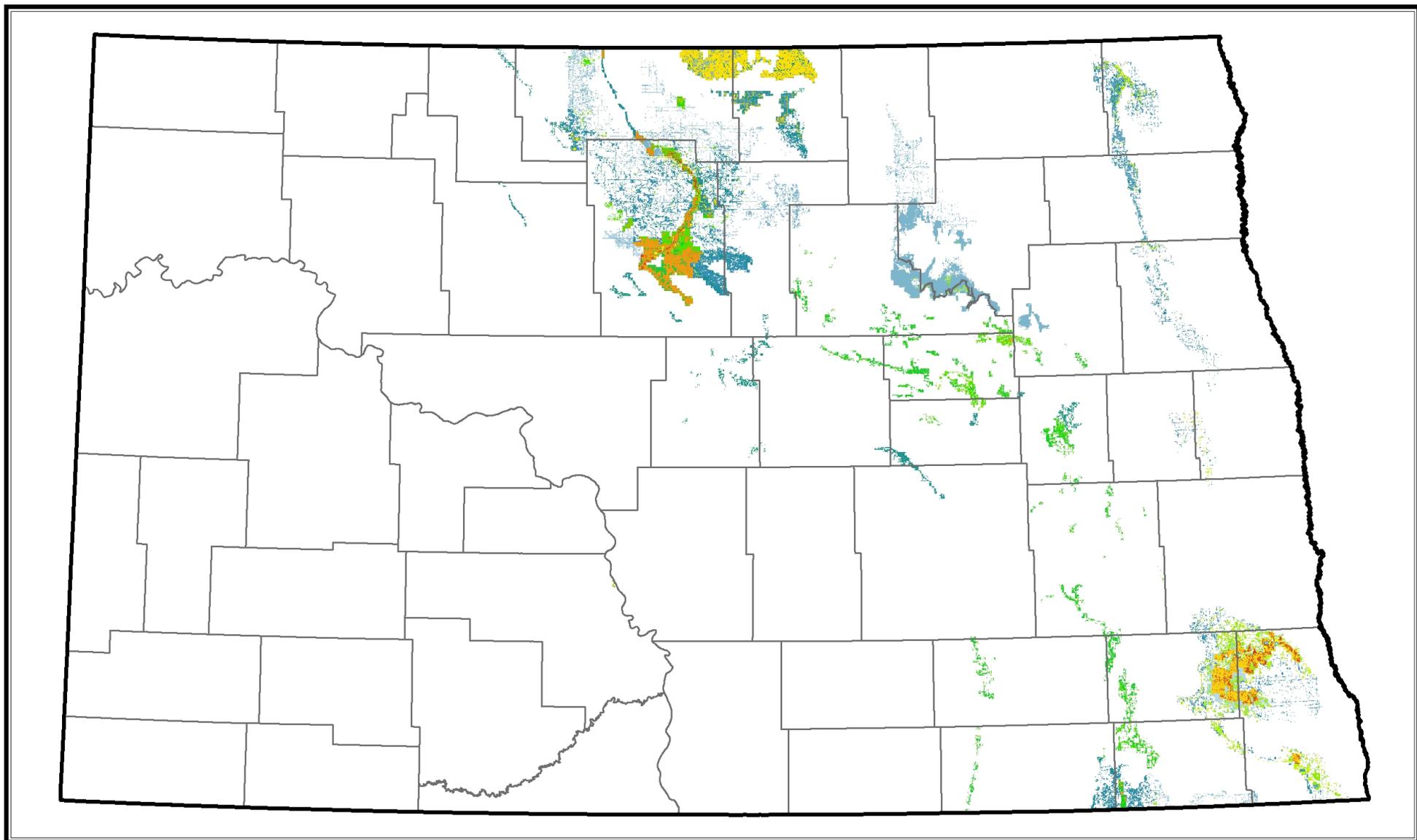
# Habitat Distribution Map



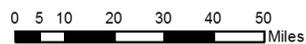
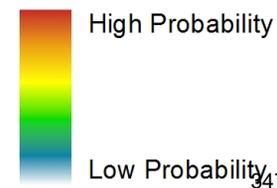
Swamp willow  
*Salix maccalliana*  
Level II



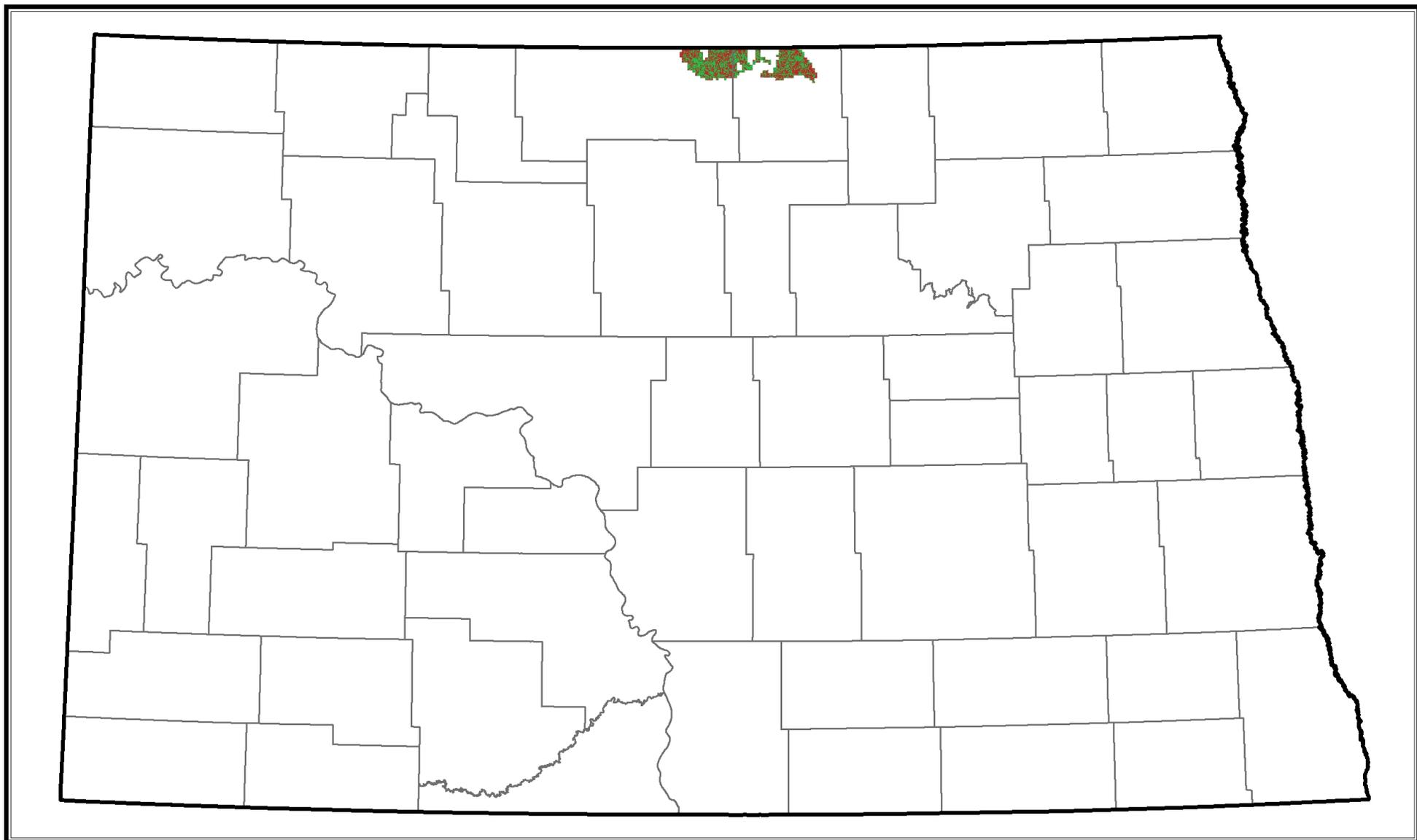
# Habitat Distribution Map



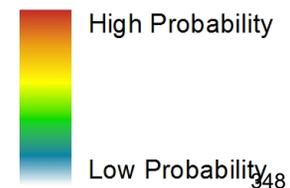
Bog willow  
*Salix pedicellaris*  
Level II



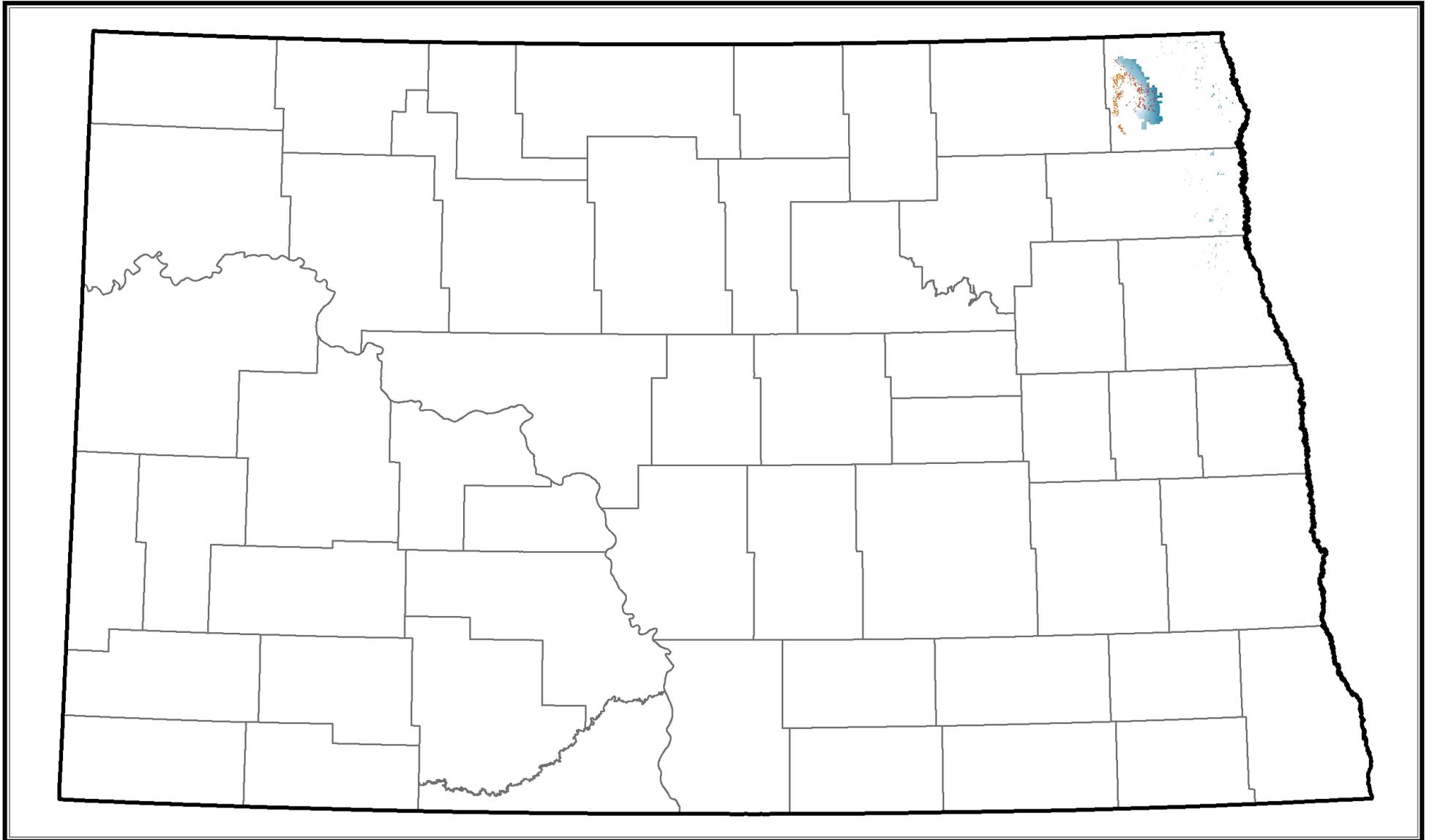
# Habitat Distribution Map



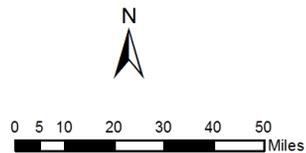
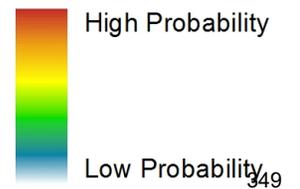
Pod grass  
*Scheuchzeria palustris*  
Level III



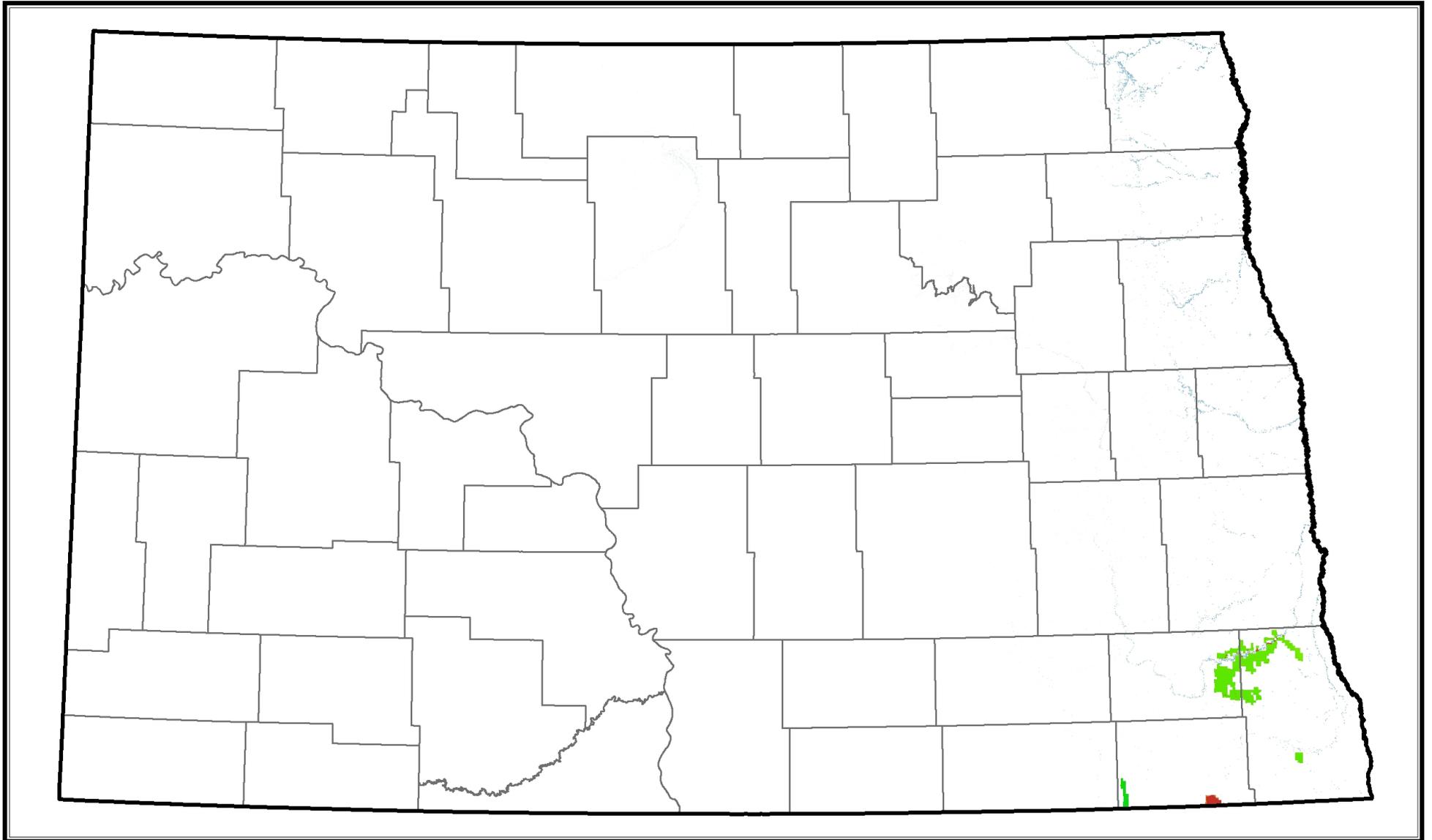
# Habitat Distribution Map



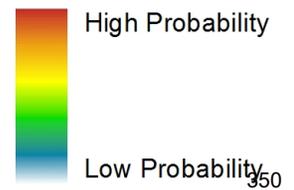
Ledge spike-moss  
*Selaginella rupestris*  
Level II



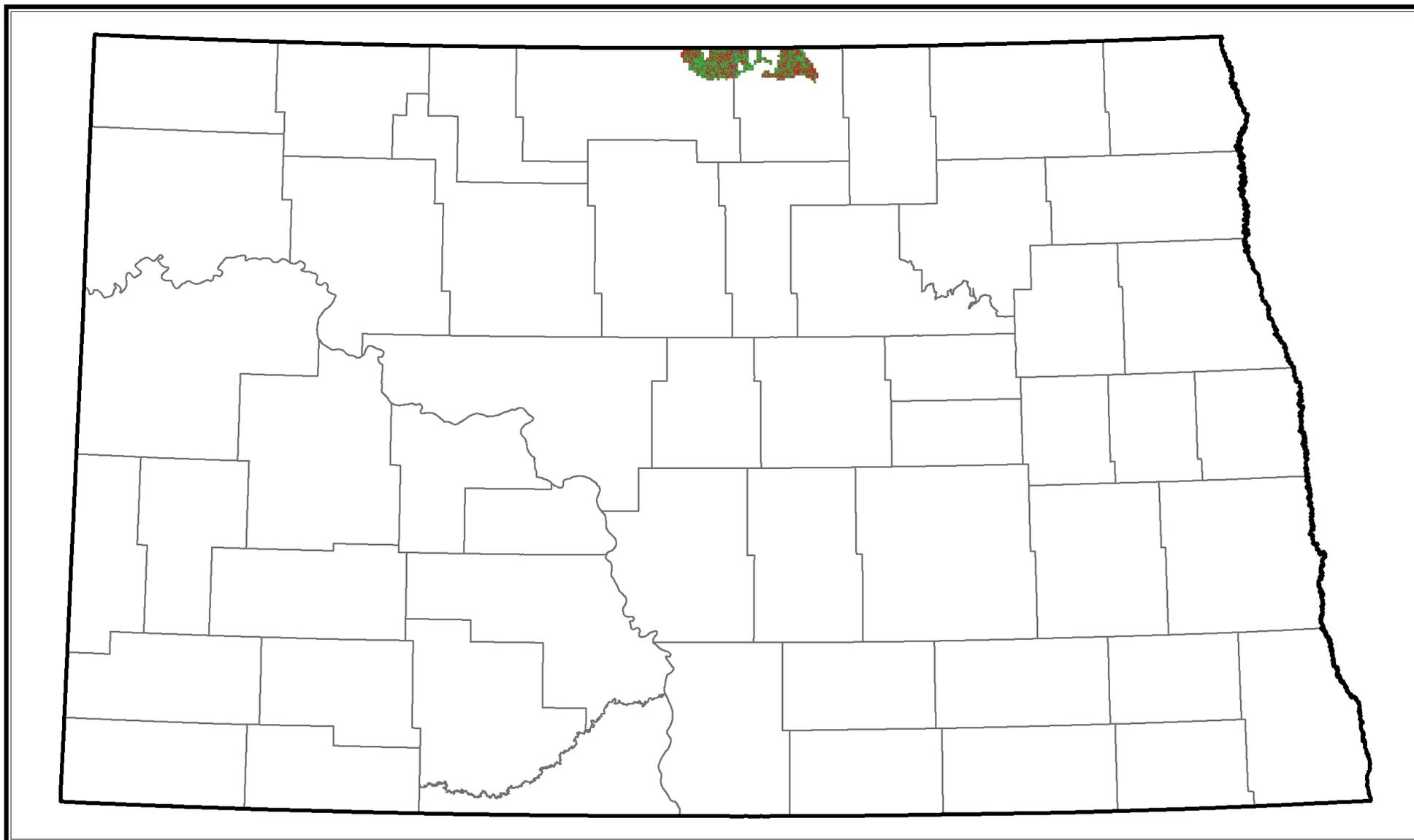
# Habitat Distribution Map



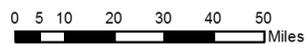
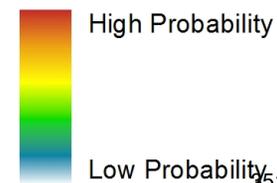
Zigzag goldenrod  
*Solidago flexicaulis*  
Level II



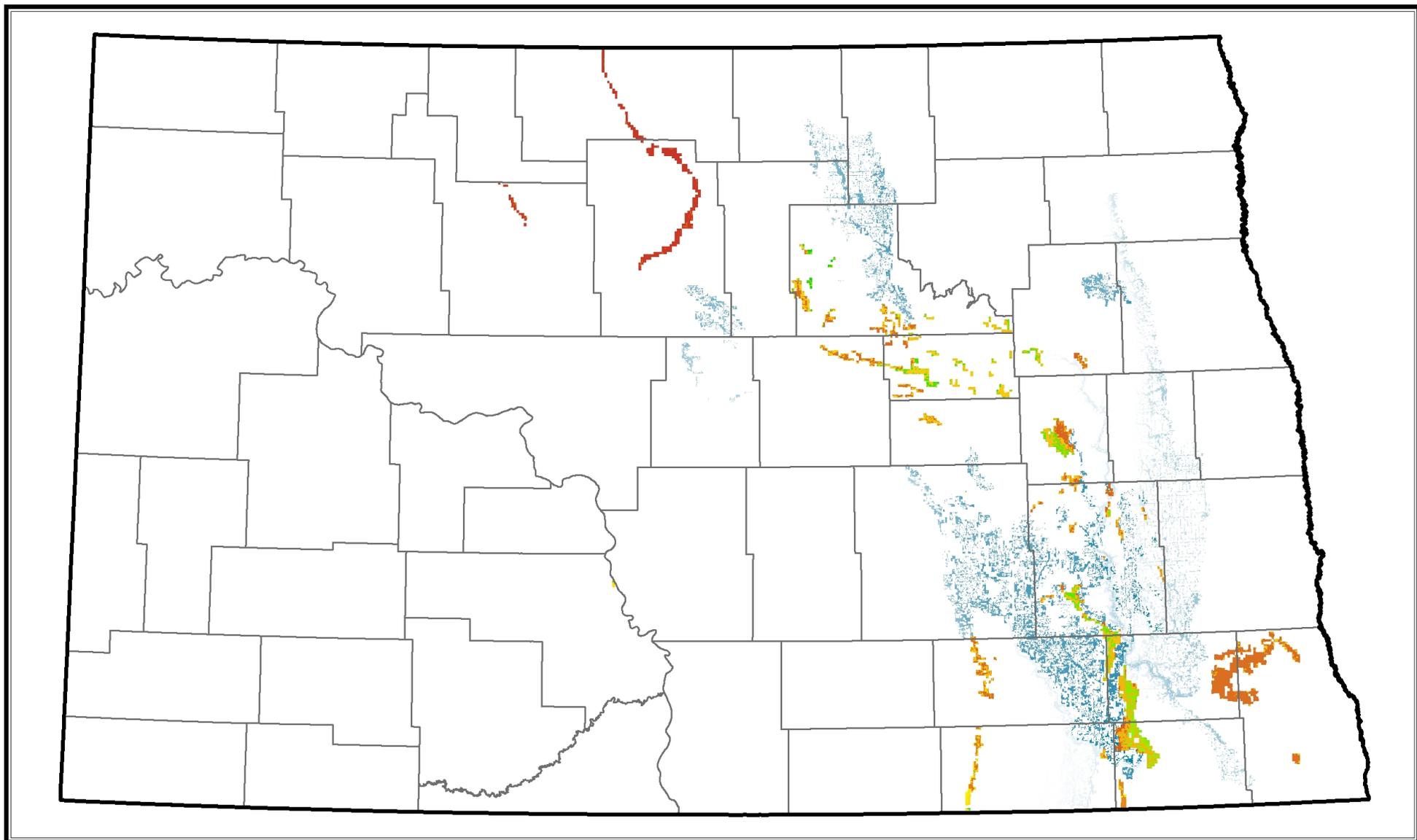
# Habitat Distribution Map



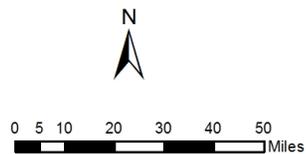
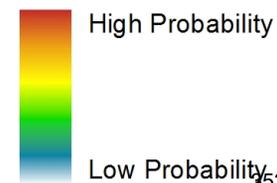
Round-leaved sphagnum  
*Sphagnum teres*  
Level II



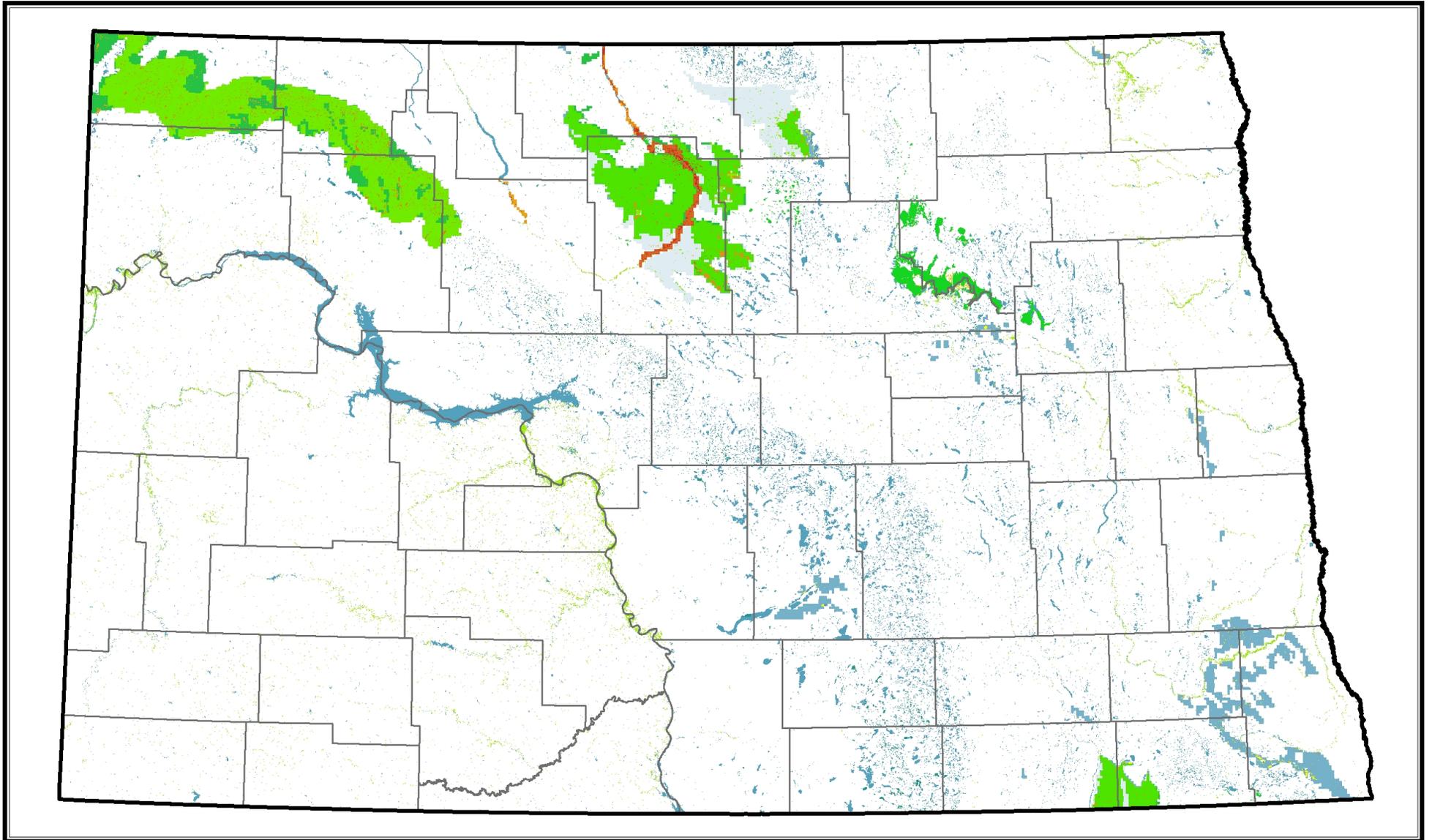
# Habitat Distribution Map



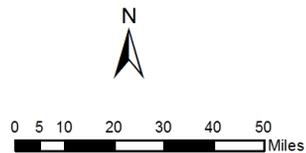
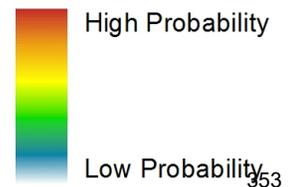
Nodding ladies'-tresses  
*Spiranthes cernua*  
Level III



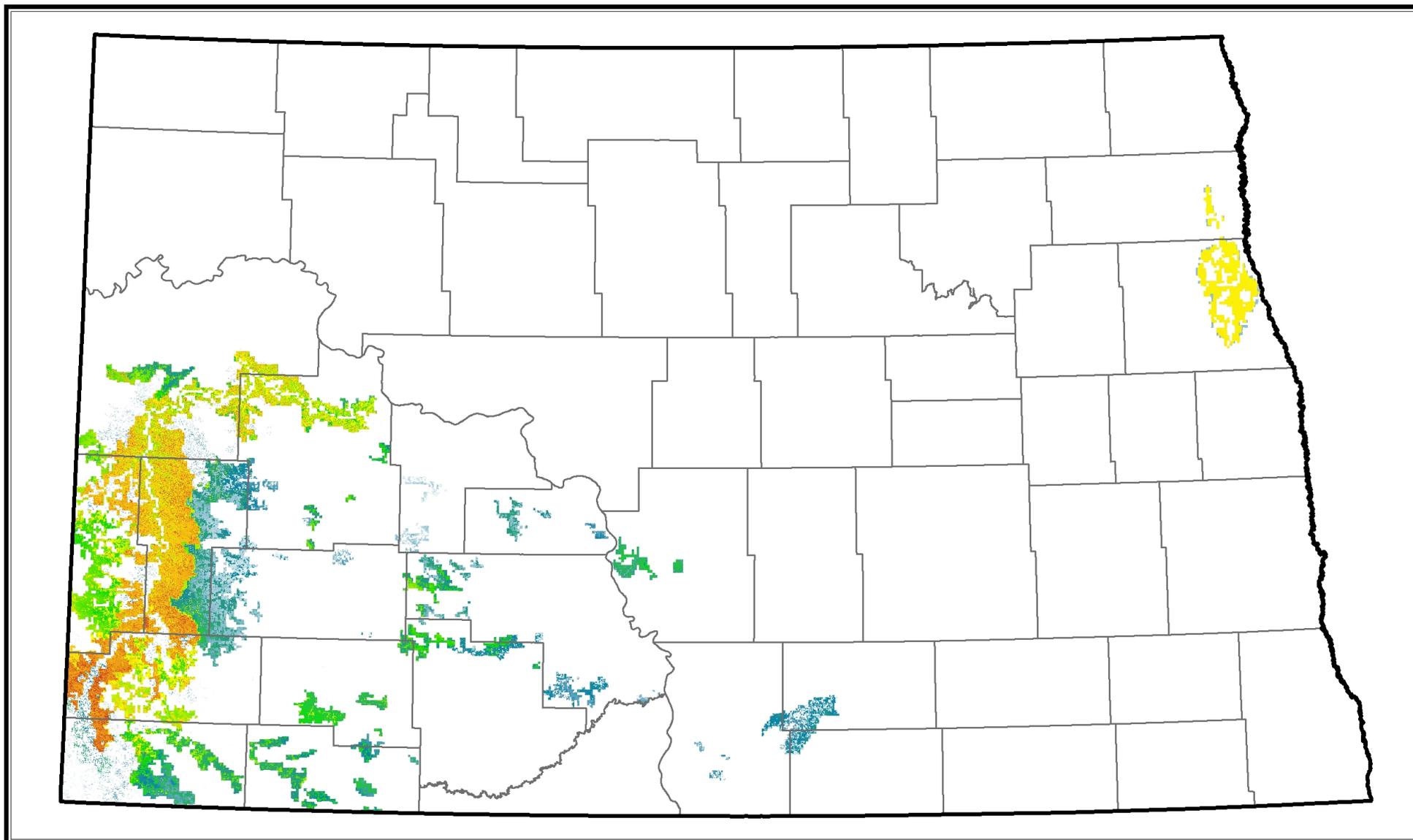
# Habitat Distribution Map



Hooded ladies'-tresses  
*Spiranthes romanzoffiana*  
Level III



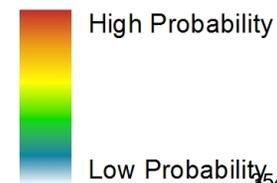
# Habitat Distribution Map



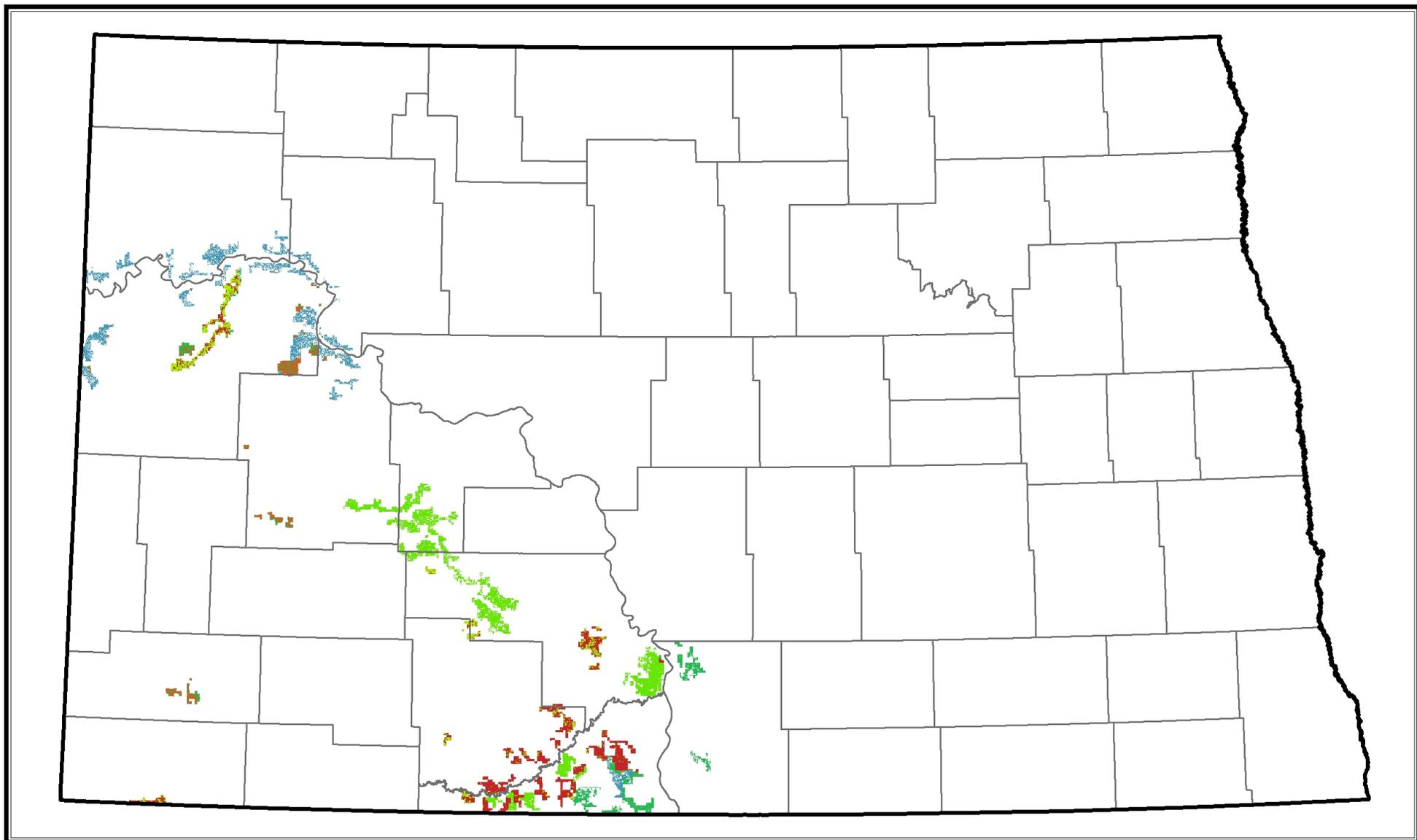
0 5 10 20 30 40 50 Miles

NDNHI 2012

Alkali sacaton  
*Sporobolus airoides*  
Level II



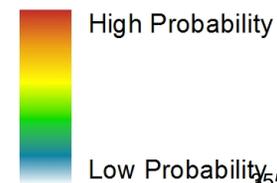
# Habitat Distribution Map



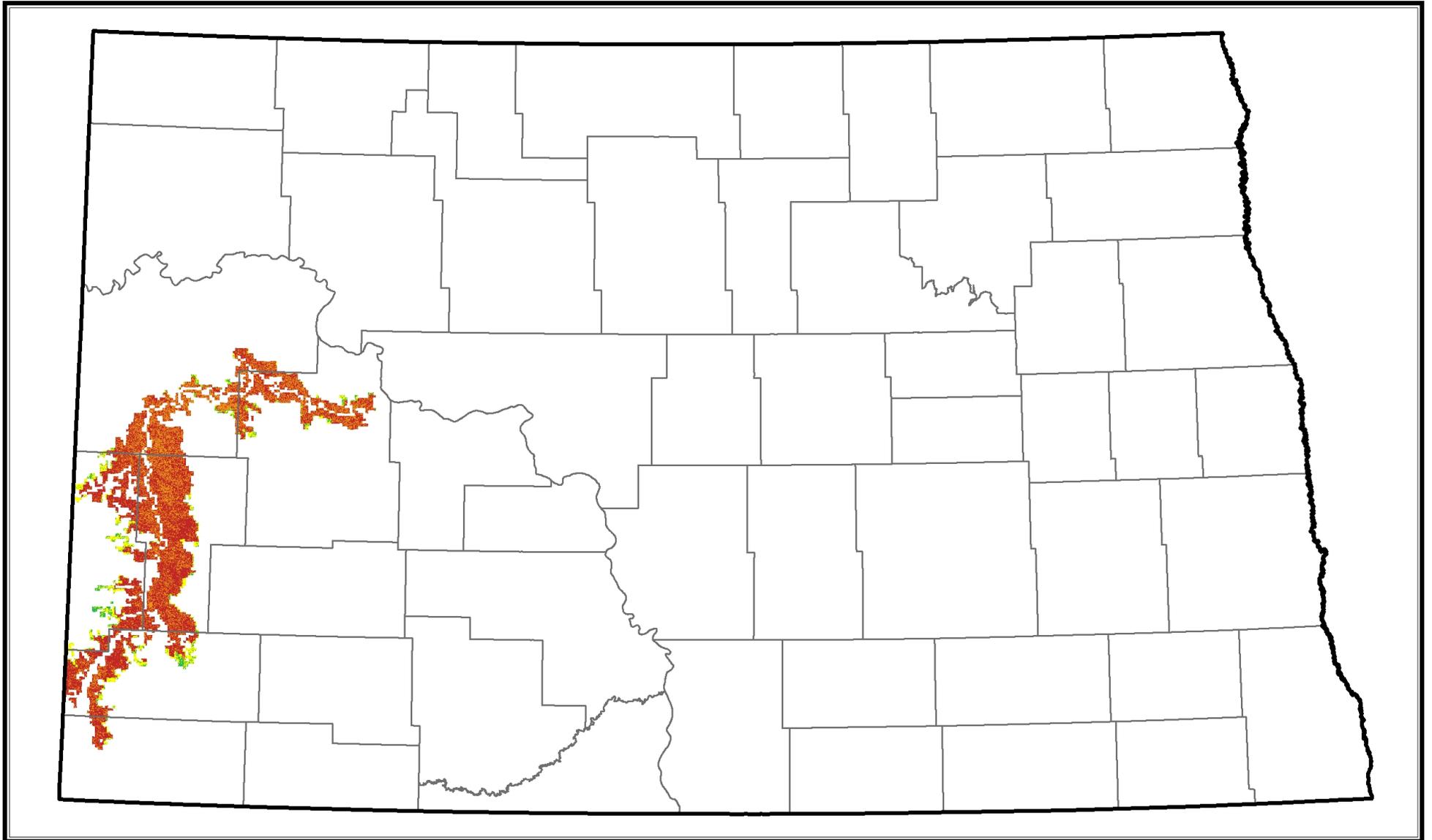
0 5 10 20 30 40 50 Miles

NDNHI 2012

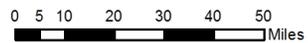
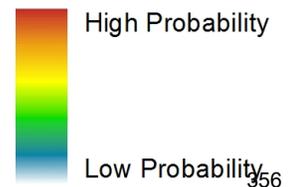
Prairie fameflower  
*Talinum parviflorum*  
Level II



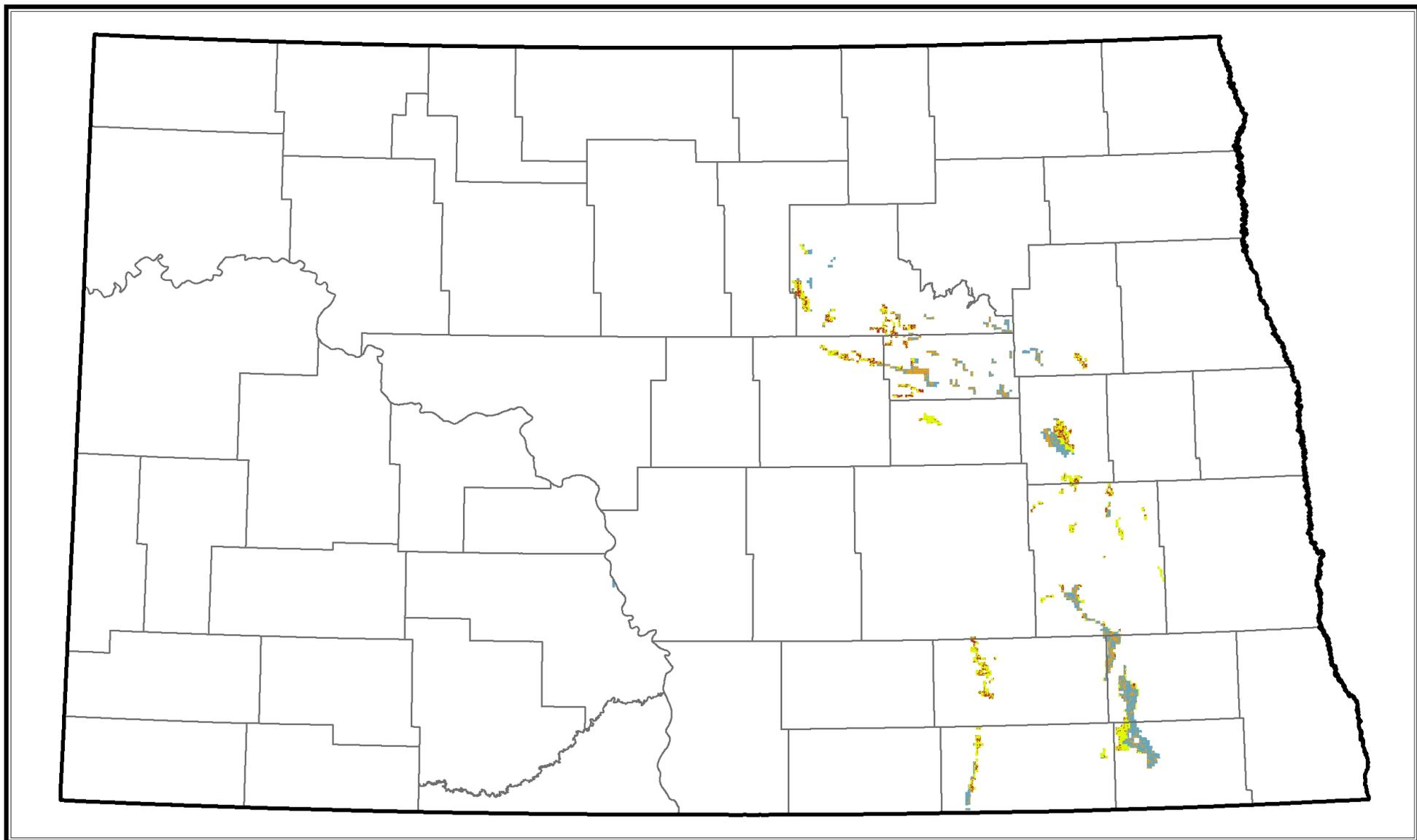
# Habitat Distribution Map



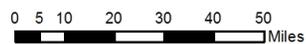
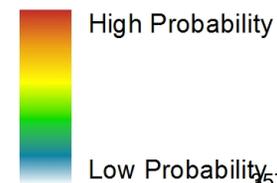
Hooker's townsendia  
*Townsendia hookeri*  
Level II



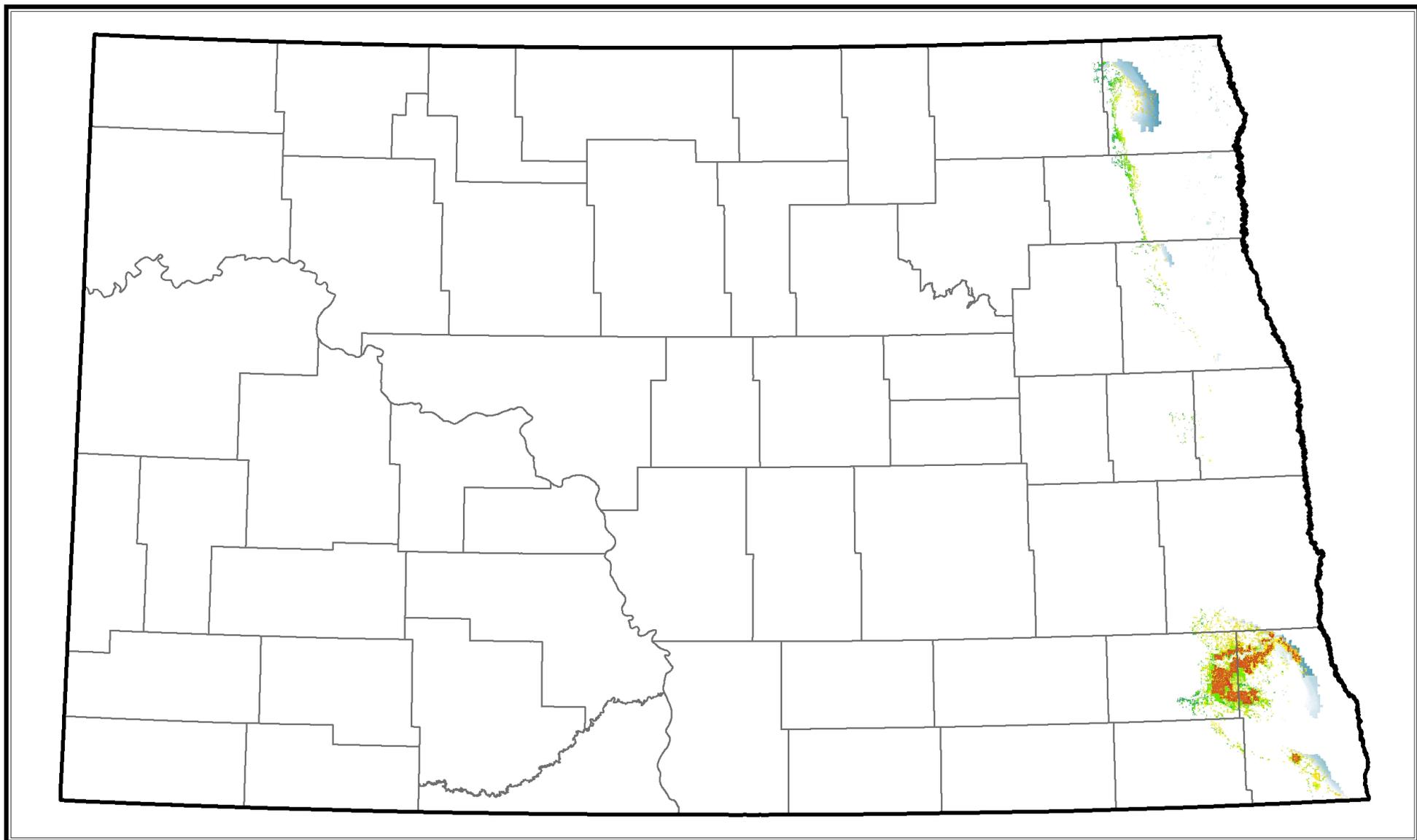
# Habitat Distribution Map



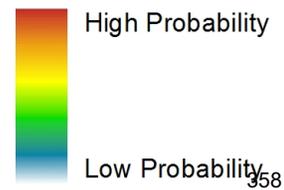
Sticky false-asphodel  
*Triantha glutinosa*  
Level I



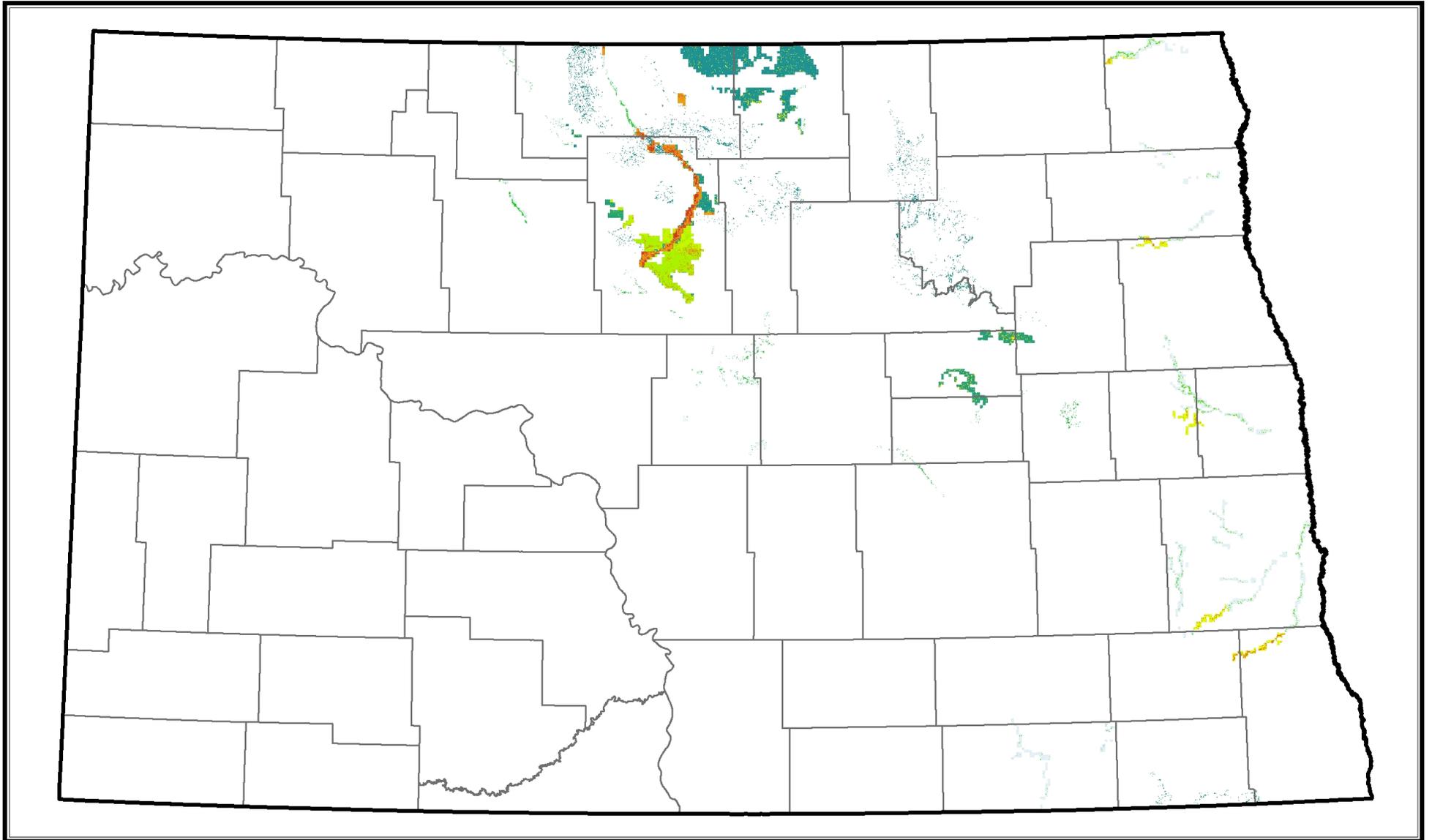
# Habitat Distribution Map



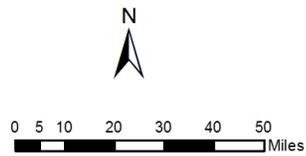
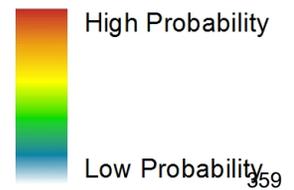
Purple sandgrass  
*Triplasis purpurea*  
Level II



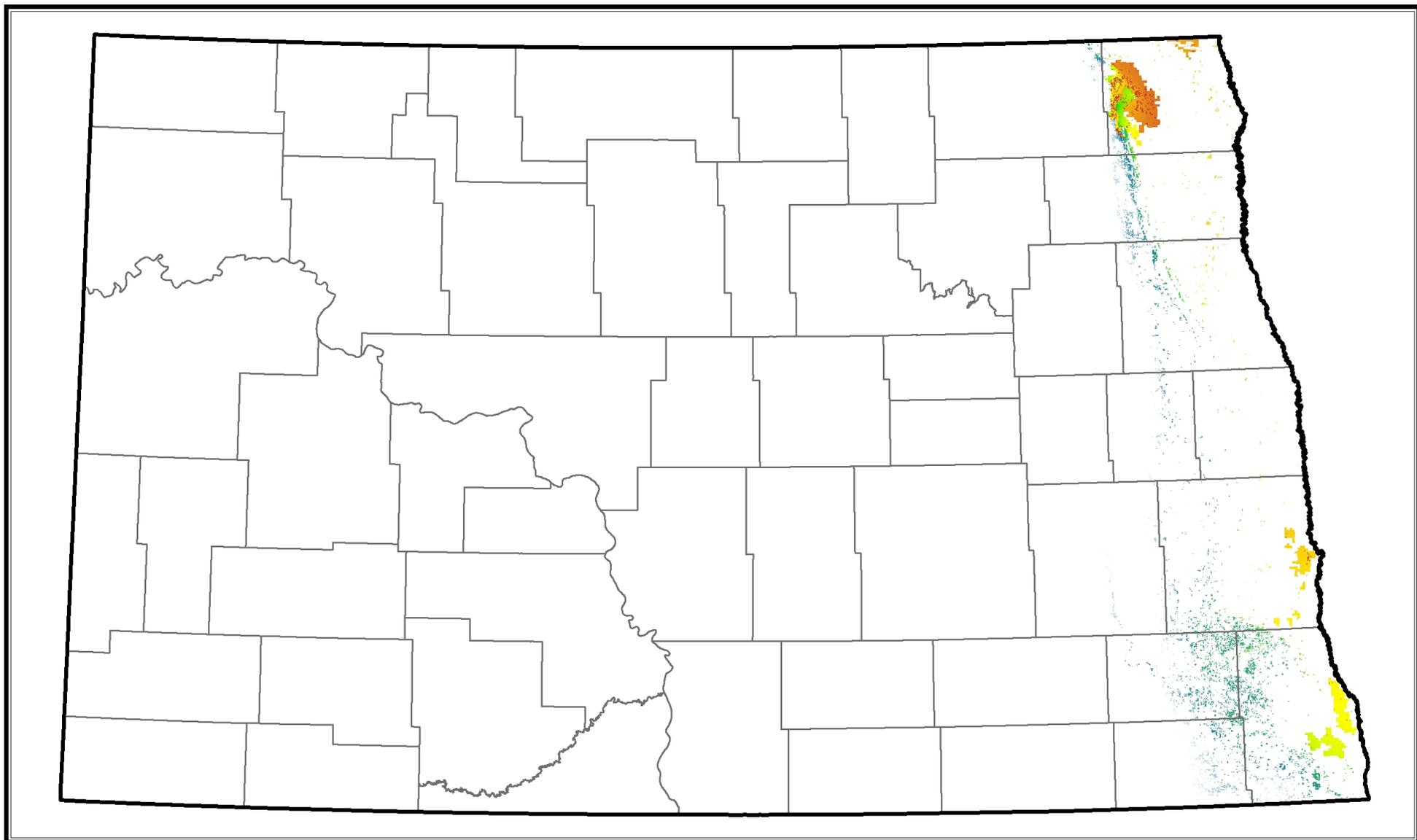
# Habitat Distribution Map



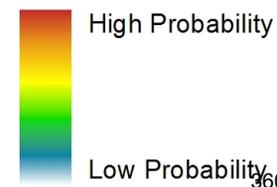
Flat-leaved bladderwort  
*Utricularia intermedia*  
Level III



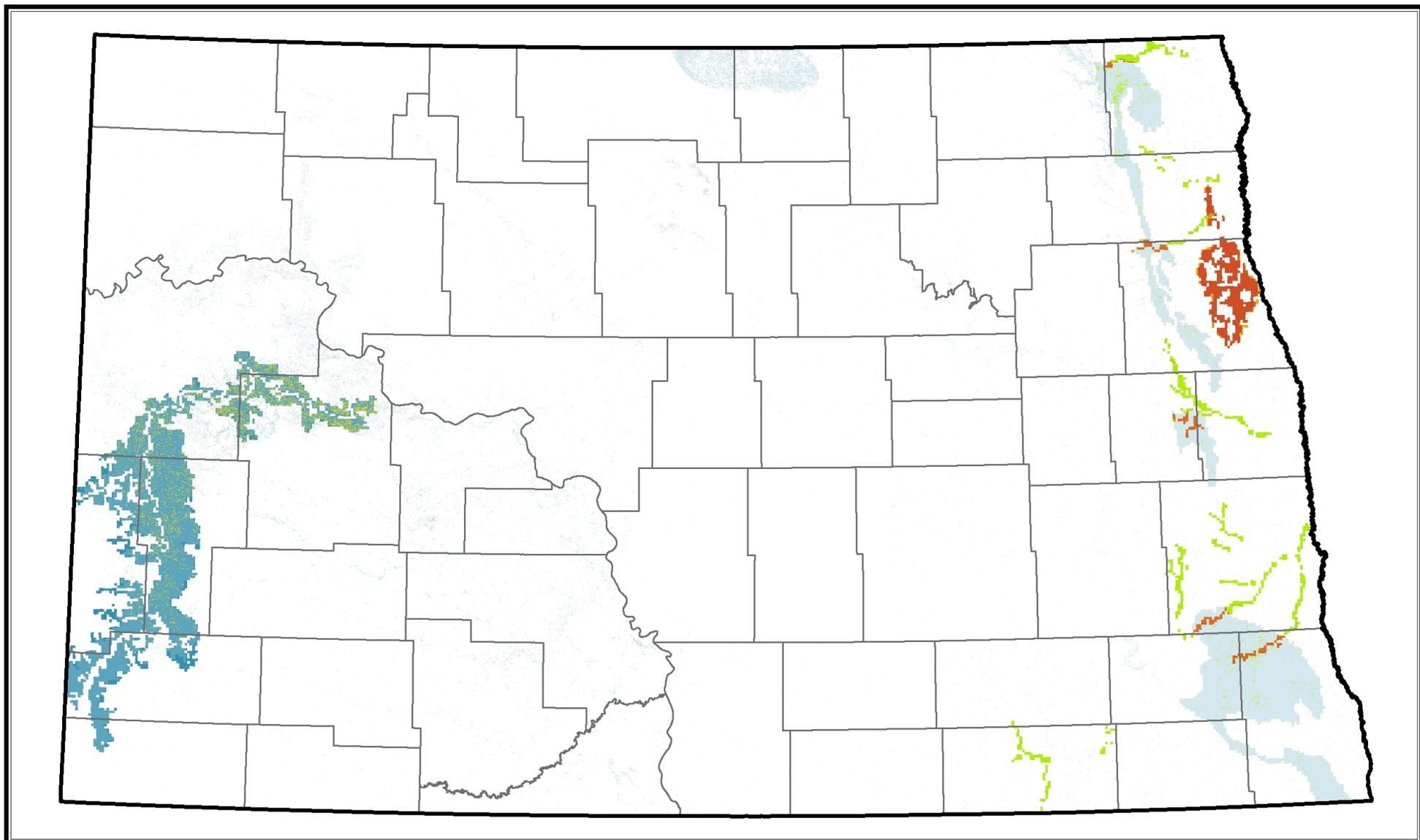
# Habitat Distribution Map



Culver's-root  
*Veronicastrum virginicum*  
Level III



# Habitat Distribution Map



Bog violet  
*Viola conspersa*  
Level III

