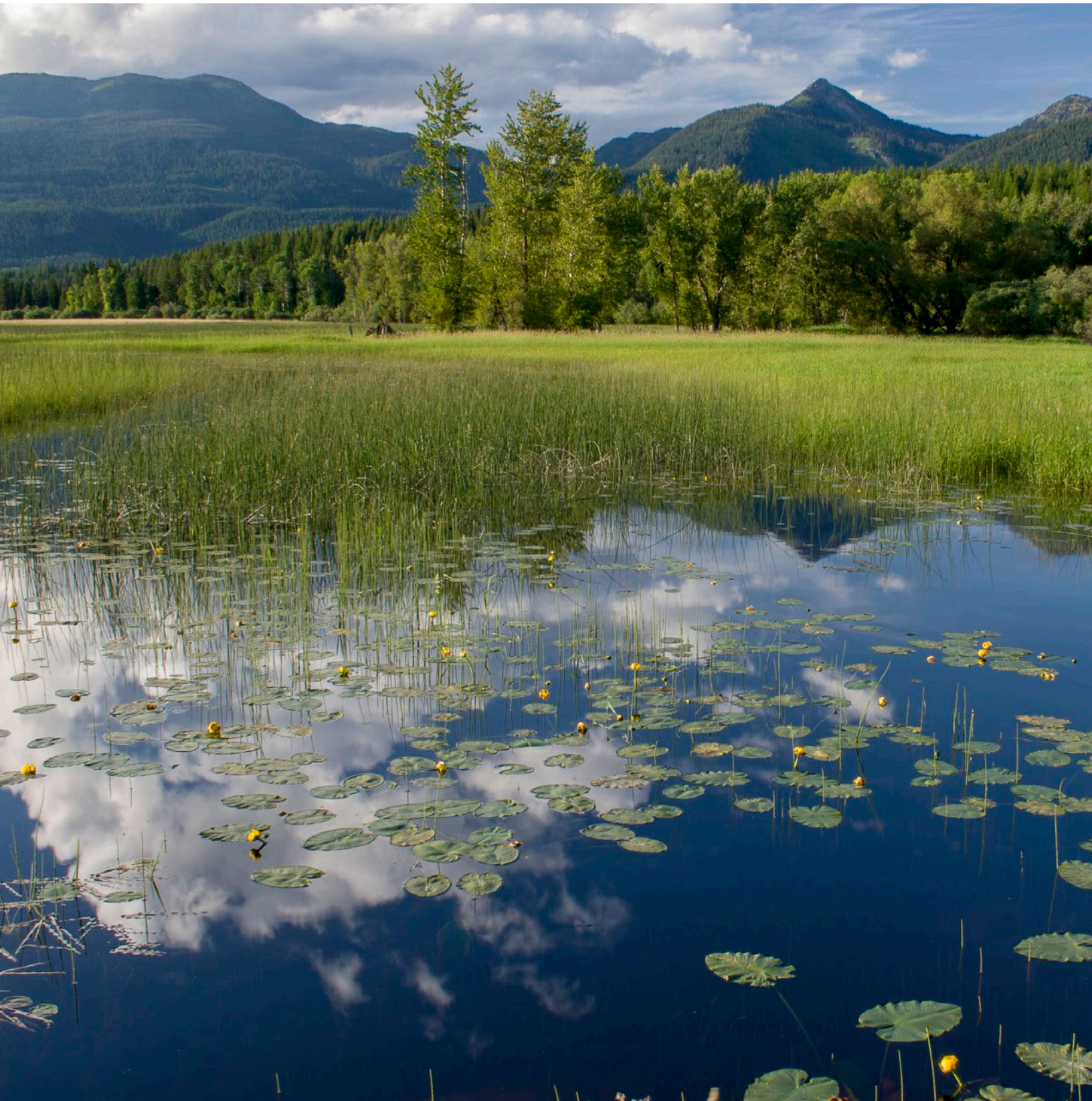
SECTION 5

Unique Habitats of Greatest Conservation Need



SECTION 5
UNIQUE HABITATS OF GREATEST CONSERVATION NEED

UNIQUE HABITATS IN MONTANA

In various locations throughout Montana there are unique habitats that have formed under specific, uncommon environmental conditions. Unique habitats differ from most plant communities in that they occupy relatively small areas, have formed under unusual combinations of geology, soil chemistry, hydrology, and/or other factors, and typically support plant assemblages that are not common. These plant assemblages may be rare plant community associations or rare plant species, such as Plant Species of Greatest Conservation Need (see Section 4). In some situations, the specific plant species is not just rare in Montana but is restricted to occurring only in a particular unique habitat (see Section 4). To date, conservation efforts for these restricted rare plants have mostly focused on the species, and less on sustaining the unique habitat.

Unique Habitats are highlighted in the *Montana Native Plant Conservation Strategy*, hereafter the *Strategy*, because of their distinctive characteristics that typically are not included in plant community classifications such as the U.S. National Vegetation Classification (USNVC 2024). Unique habitats are priorities for conservation because they support rare elements (species and/or plant assemblages), along with unique physical components (uncommon combinations of geology, soils, hydrology, or other ecological characteristics); yet, have largely gone unnoticed in some vegetation classification systems.

Determining Unique Habitats of Greatest Conservation Need

The initial list of unique habitats for Montana was compiled by an ecologist and a botanist who each have more than 30 years of experience in conducting vegetation inventories throughout the state. Their proposed list was discussed with the Criteria-Species-Habitat Subcommittee (Montana Native Plant Conservation Strategy-Criteria-Species-Habitat Subcommittee 2021). Criteria used to identify and determine a 'unique habitat of greatest conservation need' in Montana includes the following elements: 1) spatially limited in Montana, 2) formed under unusual conditions or combinations of geology, hydrology, soils, and/or other ecological factors, 3) is habitat for at least one plant Species of Concern (SOC) or Potential Species of Concern (PSOC)[1] which is partially or entirely restricted to those conditions, and 4) may include at least one rare plant community (plant association, habitat type, or other). The subcommittee identified nine Unique Habitats of GCN[1] in Montana (Table 5-1).

[1] Refer to the "Acronyms and Abbreviations" and "Glossary" sections in *Strategy*.

Table 5-1. Unique Habitats of Greatest Conservation Need (GCN) prioritized in the Montana Native Plant Conservation Strategy for Vascular Plant Species and Habitats of GCN.

Unique Habitat	General Location(s)	Associated Plant Species of GCN[1] and Uncommon Botanical Species & Vegetation Types	Conservation Profile or Habitat Strategy Developed?
Metamorphosed Limestone: Calcareous soils overlying limestone that were metamorphosed during the uplifting of adjacent mountain ranges.	West-central and Southwest Montana: • North and east flanks, Pioneer Mountains • Western foothills, Sapphire Mountains	• Sapphire Rockcress - *Boechera fecunda*	Conservation Profile: Appendix B in *Strategy*
Centennial Valley Sand Dunes: • Sand dunes deposited post-Pleistocene. • Includes other areas of sandy deposits that are not part of a dune system.	Southwest Montana: • Base of the east-west oriented Centennial Range towards the eastern extremity of Centennial Valley	• Painted Milkvetch – *Astragalus ceramicus* var. *apus* • Sand Wildrye – *Elymus flavescens* • Fendler Cat's-eye – *Cryptantha fendleri*	Conservation Profile: Appendix B in *Strategy*
Wooded Vernal Ponds[2]: • Formed by melting glacial ice deposits. • Depressional wetlands within forested areas that fill with water by spring and partially to fully dry by autumn.	Northwest Monana: • Swan Valley	Water Howellia - *Howellia aquatilis*	No
Obsidian Sands: • Eroded material from the rhyolite-dominated plateaus of Yellowstone National Park that has been water-sorted with the coarse-textured fraction (sands, with a large fraction of volcanic glass or obsidian) deposited in the West Yellowstone basin. • These sands are exceedingly nutrient poor, occur in a basin known for cold-air ponding, and combine with factors to produce a unique forest community.	Southwest Montana: • Yellowstone region	Unique Forest Community: Lodgepole Pine (*Pinus contorta*) is the long-term (climax) dominant and the undergrowth is characterized by Antelope Bitterbrush (*Purshia tridentata*) and bunchgrasses.	No
Bedrock Glades: Treeless sites where a thin soil mantle has formed over level to gently sloping bedrock. The areas covered with soil are typically interspersed with the exposed bedrock.	West-central and Northwest Montana: • East flank, Bitterroot Mountains • Kootenai National Forest • Glacier National Park	To be determined.	No

Table 5-1 (continued). Unique Habitats of Greatest Conservation Need (GCN) prioritized in the Montana Native Plant Conservation Strategy for Vascular Plant Species and Habitats of GCN.

Unique Habitat	General Location(s)	Associated Plant Species of GCN[1] and Uncommon Botanical Species & Vegetation Types	Conservation Profile or Habitat Strategy Developed?
Vernally Moist Cliffs: Gently sloping ledges found on steeper terrain or cliffs, in areas with high winter and spring precipitation, and typified by well-developed moss layers that are moist in spring and dry out by late summer.	West-central and Northwest Montana	• Sandweed - *Athysanus pusillus* • Scalepod - *Idahoa scapigera.*	No
Shale Barrens: Slopes with sedimentary rock that has eroded into thin, flat "flakes" that create a well-drained and unstable surface.	Central Montana: • Big Belt Mountains • Little Belt Mountains	• *Physaria klausii* - Divide bladderpod • Several *Cladonia* lichen species of limited distribution, under study (McCune 2022)	No
Peatlands [Fens][3]: Wetlands that accumulate organic matter at a rate that exceeds decomposition, resulting in an accumulation of permanently saturated peat.	Predominantly West-central and Northwest Montana: • Continental Divide, east & west sides at lower elevations	• Vascular Plants of GCN: *Carex tenuiflora; Drosera anglica; Drosera linearis; Eleocharis rostellata; Epipactis gigantea; Liparis loeselii; Lobelia kalmii; Mimulus primuloides; Ophioglossum pusillum; Petasties frigidus* var. *frigidus; Pinquicula macroceras; Scheuchzeria palustris; Trichophorum alpinum; Trichophorum cespitosum; Utricularia intermedia.* • Moss SOC/PSOC plants: certain species of *Spaghnum* and other genera • Lichen SOC: *Cetraria sepincola*	No
Bentonite Deposits: • Soils of Hydrothermally altered ash originating from the Yellowstone hotspot. Typically forms a shallow convex surface that extends from a few hundred to thousands of square meters. • These deposits constitute a horizontal "badland", evidently inimical to vegetation. Plants are often restricted to the periphery of deposits or exhibit low densities,	Southeast Montana: • Northern to southern state border in eastern edge of State.	Plants are often restricted to the periphery of deposits or exhibit low densities. • Bur Oak - *Quercus macrocarpa*	No

[1] Used the "Search Field Guide" tool to find species profiles on the Montana Field Guide: https://fieldguide.mt.gov/default.aspx
[2] Wooded Vernal Ponds may also be represented as a plant community in other literature and classifications.
[3] Fens are a type of Peatlands, and both may also be represented as a plant community in other literature and classifications.

CONSERVATION GOALS & OBJECTIVES FOR UNIQUE HABITATS OF GREATEST CONSERVATION NEED

The *Strategy's* purpose is to promote the collective and coordination stewardship of Montana's Unique Habitats of GCN to ensure their viability and persistence now and into the future. To effectively conserve Unique Habitats of GCN requires a fusion of academic and pragmatic approaches to conservation problems, so that solutions are both innovative and realistic (Given 1994). Effective conservation also depends upon public attitudes, having good techniques that are cost-effective, and developing a range of approaches (Given 1994). Here in the Unique Habitats of GCN section of the *Strategy*, we present goals and over-arching objectives from four areas that are pillars of plant habitat conservation:

- Information Needs [Inventory, Monitoring, Research]
- Protection and Restoration
- Outreach and Education
- Policy and Regulation

Photo Credit: J. Stephen Shelly

Photo 5-1. Bent Flat Fen on the Flathead National Forest in Montana provides habitat for rare vascular and moss plants

The conservation objectives apply to most, if not all, nine Unique Habitats of GCN. They were developed by the Strategy's Core Team from 2021 to 2024 and are based on literature and professional expertise and field observations. In addition, generalized conservation objectives or actions from other strategies that could be pertinent to all, or most unique habitats were sought out, but not found. To-date, conservation profiles for the Centennial Valley Sand Dunes and Metamorphosed Limestone Unique Habitats of GCN have been completed (Appendix B).

Implementing conservation objectives is expected to enhance public awareness, develop a statewide Geographic Information System (GIS) data layer for unique habitats, and garner land stewardship support for these ecologically valuable habitats that harbor great biodiversity. Working within and across jurisdictional boundaries, these conservation objectives are voluntary measures intended to aid land managers, landowners, conservation practitioners, educators, and individuals who want to help sustain Unique Habitats of GCN across the Montana landscape.

Information Needs [Inventory, Monitoring, Research]

Conservation Goal

Improve scientific and cultural understandings of Montana's Unique Habitats of GCN through statewide coordination, inventory, monitoring, and research.

Conservation Objectives

1) Coordinate with the Montana Native Plant Conservation Strategy's Stewards Committee to establish a working group or subcommittee to address either all or specific Unique Habitats of GCN in Montana. A statewide working group could elevate public and agency awareness about the specific unique habitat, compile information, evaluate needs and resources, provide direction, and/or write the habitat-specific conservation profile.

   a. The formation of a working group to address one to all Unique Habitats of GCN could include conservation practitioners, landowners, ecologists, land managers, botanists, and others who work for, but are not limited to the following organizations:

   - Private industry, consultants, landowners, and retired individuals
   - Federal land management agencies
   - State land management agencies
   - Montana Native Plant Society
   - Montana Natural Heritage Program
   - Tribal Nations, such as Elders, traditionalists, ethnobotanists, plant gatherers, biologists, cultural directors, and administrators
   - Non-governmental conservation organizations
   - Academic researchers

   b. Recommended statewide topics for a Unique Habitats of GCN working group to address includes, but is not limited to:

   - Update the process for identifying and prioritizing Unique Habitats of GCN.
   - Review and refine the list of Unique Habitats of GCN.
   - Provide coordination and oversight to compile information and monitor conservation activities relative to Unique Habitats of GCN.
   - Assist efforts to implement conservation activities relative to Unique Habitats of GCN. Assistance could be provided by writing proposals, identifying funds or funding conservation actions, collaborating on proposals or projects, creating or implementing actions that support a conservation objective, and many others.
   - Provide direction on content development and formats (peer-reviewed publications, unpublished reports, online, etc.) for sharing information, data, and mapping.
   - Create a process to evaluate, determine, and recommend sites that are in need of monitoring or restoration for each type of unique habitat.

Information Needs [Inventory, Monitoring, Research]

2) Conduct literature searches and inquire with the network of agency botanists and ecologists to compile and centralize known information on each Unique Habitat of GCN, including hardcopy maps, published reports, ecological field survey forms, photographs, and current project information.

3) Develop a statewide map for each Unique Habitat of GCN using existing information and identify areas that have potential unique habitat. Use, as appropriate, GIS data layers, remote sensing techniques (such as LiDAR), and other mapping tools to identify and map known and potential locations of unique habitats.

4) Initiate field inventories and data collection efforts at known sites for Unique Habitats of GCN. Developing protocols and identifying data collection needs would improve our knowledge about the various physical, abiotic, and biotic elements of each unique habitat, and their ecological condition. Data collection efforts could include, but are not limited to:
   - Mapping or confirming geologic features
   - Measuring, mapping, or characterizing hydrological features
   - Mapping or confirming soil types and profiles
   - Conducting plant inventories to acquire plant population density, distribution, and size data; habitat attributes and condition; threat information; and other data.
   - Evaluating the presence, condition, and extent of land occupied by the particular unique habitat.
   - Develop baseline studies, if not previously established, to monitor for changes in vegetation, land use, population trends (increasing, decreasing, or stable) of non-native plants, Plant Species of GCN, animal species, or other management targets.
   - Conduct assessments in and near the unique habitat to identify and document any existing or potential threats.

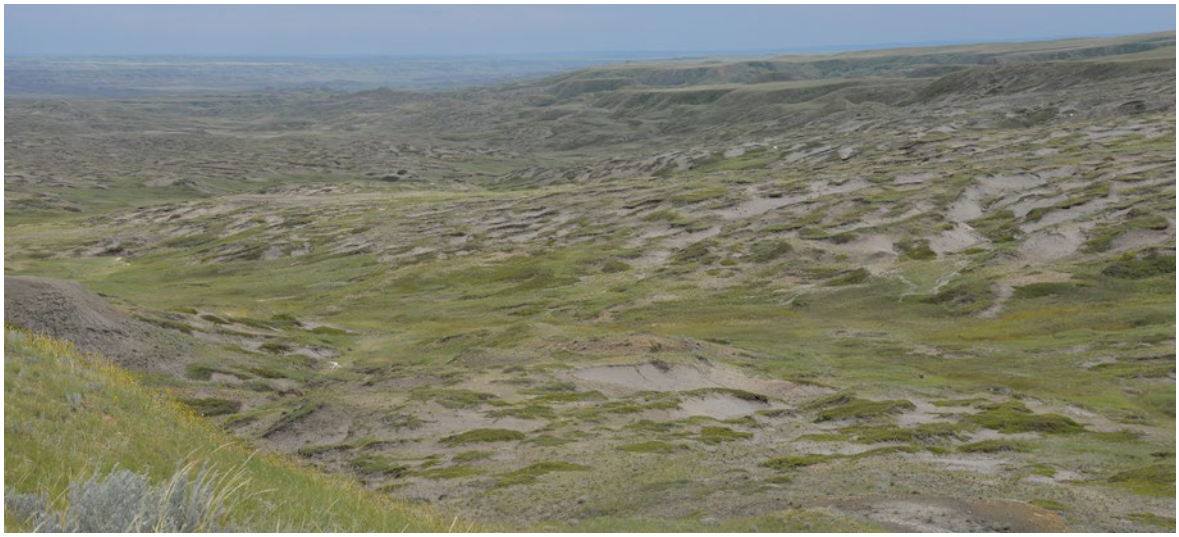


Photo Credit: Andrea Pipp

Photo 5-2. Frenchman Breaks, a Shale Barrens Unique Habitat of GCN, occurs in northeastern Montana where large contiguous acres are managed by the MT/Dakotas BLM.

Protection and Restoration

Conservation Goal

Secure on-the-ground, site specific habitat protection for and/or restoration of Unique Habitats of Greatest Conservation Need plant on public and private lands.

Conservation Objectives

1) Evaluate the protection status at known locations for each type of unique habitat. Identify locations where protection or recognition may be warranted and the level (conservation easement, IPA, change in a management action, etc.) of protection that could aid its persistence. Prioritize the need for protection at each identified location for a given unique habitat type.
2) Evaluate the need for restoration at known locations for each type of unique habitat. Identify locations where restoration may be warranted and the level of restoration that is needed to aid its persistence. Prioritize the need for restoration at each identified location.
3) Develop a monitoring plan to track the presence and invasiveness of non-native plants and animals, including state-designated invasive, noxious, and regulated species, in locations of unique habitats. Work in concert with the land management agency(-ies), private landowner(s), and other stakeholders to create a plan that can be effectively implemented to guide management actions, prevent or reduce negative impacts from non-native species, and be compatible with associated rare plants and animals. On a state-wide basis, non-native species are one of the most common vectors that have the potential to negatively impact unique habitats (MTNHP Threat Assessment 2021).

Photo Credit: Dee Blank

*Photo 5-3. In the rain shadow of the Pryor Mountains is an arid red desert with high biodiversity. This unique part of Montana is habitat for Thickleaf Bladderpod (*Physaria pachyphylla*) and numerous other rare plants.*

Protection and Restoration

4) Evaluate the Montana Native Plant Society's (MNPS) Important Plant Area (IPA) Program[2] for its ability to identify or prioritize the botanical value of sites relative to the type of unique habitat. Where there is potential for nominating a unique habitat site as an IPA, convene a meeting or working group led by MNPS members and invite pertinent stake holders. Use collaboration among all stakeholders to discuss, define (including its boundaries), and determine if an official IPA can be nominated to the MNPS. The goal of the Montana Native Plant Society's IPA Program is to identify the most important sites for plant conservation across Montana using consistent criteria (MNPS 2024). Important Plant Area sites exhibit exceptional populations of one or more globally rare plants or uncommon or threatened plant assemblages in Montana (MNPS 2024). An IPA is an informal recognition by the MNPS.

Outreach and Education

Conservation Goal

Facilitate the stewardship of Montana's Unique Habitats of Greatest Conservation Need through education, outreach, and coordination.

Conservation Objectives

1) Initiate coordination with the *Montana Native Plant Conservation Strategy's* Stewards Committee (refer to Section 1, Box 1-2) or the Unique Habitats Working Group (see Information Needs, Conservation Objective #1) to establish one or more working groups that can develop and write the conservation profile for each Unique Habitat of GCN (see Appendix B for templates). In the process of developing this Strategy, we have found that working groups, meet virtually or in-person, are the best way to gather information, discuss needs, problems, and issues, formulate conservation objectives, and develop a useful conservation profile. The Working Group should include people with an array of knowledge of or responsibility for the unique habitat or the property, including biological, administrative, regulatory, specific conservation-focus (Audubon, Penstemon Society, etc.), landowner, and other interests.

2) Revise profiles on the Montana Field Guide[3] for each Plant Species of GCN and other native plant species that associate with a Unique Habitat of GCN. Using the newest MTNHP standards will update and expand known information on the plant species' life history, ecology, wildlife-plant interactions, identification, taxonomy, range, habitat, biology, economics, management, threats, taxonomy, and other interesting facts; improve readability; and link to other online resources. Cross-walking plants, animals, and habitats on the Montana Field Guide will elevate awareness of Montana's Unique Habitats of GCN.

3) Revise profiles on the Montana Field Guide[3] for each animal Species of Concern that occurs within a Unique Habitat of GCN. Cross-walking plants, animals, and habitats on the Montana Field Guide will elevate awareness of Montana's Unique Habitats of GCN.

[2] MNPS Important Plants Areas Program: https://mtnativeplants.org/important-plant-areas/
[3] Montana Field Guide: https://fieldguide.mt.gov/

4) Work with land trusts and conservation organizations to inform them about Unique Habitats of GCN and engage in discussions about conservation of Montana's Unique Habitats of GCN. Many people involved in conservation are not aware of some of the rarer habitats in Montana.

5) Extend invitations to members of Tribal nations in Montana to engage in conversations, listen to their knowledge, and hear their concerns and needs regarding the Unique Habitat of GCN. For any cultural plant associated with these unique habitats consult the appropriate approvals from Tribal leaders or Tribal Liaisons in respectful ways for how to incorporate traditional or indigenous uses and management, including the action to not convey.

6) Consult with educators or educational staff at Montana Fish, Wildlife and Parks, Helena-Lewis and Clark National Forest, Montana Native Plant Society, or other organizations to develop an educational presentation on Unique Habitats of GCN.

7) Support the development and use of specific conservation assessments that address Unique Habitats of GCN that are produced by land management agencies, non-governmental organizations, academia, and other groups. The U.S. Forest Service produces General Technical Reports that provide information with a sound scientific foundation for management. The U.S. Fish and Wildlife Service develops status reports for plants to document conservation status and inform listings. These documents are extremely useful for providing information across land management jurisdictions, assisting with conservation decisions, and informing on current research. A few examples include:
   - *Peatlands on National Forests of the Northern Rockies: Ecology and Conservation* (Chadde et al. 1998).
   - *Fens and Their Rare Plants in the Beartooth Mountains, Shoshone National Forest, Wyoming* (Heidel et al. 2017)
   - *Restoration Guidelines for Wetlands of the Western Prairie Pothole Region* (Luna et al. 2012)

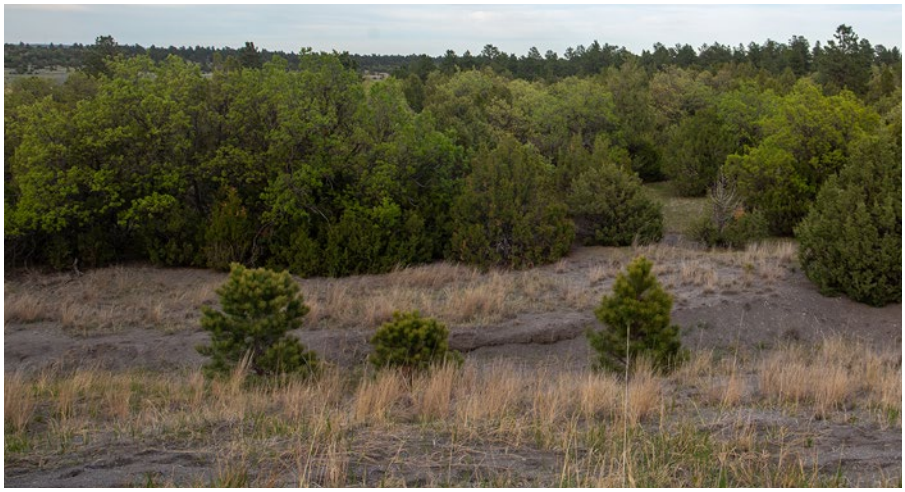


Photo Credit: Matthew Stewart

*Photo 5-4. Junipers, pines, and Burr Oaks (*Quercus macrocarpa*) in southeast Montana. Burr Oak, a Plant Species of GCN, often occurs at the periphery of Bentonite Deposits, a Unique Habitat of GCN.*

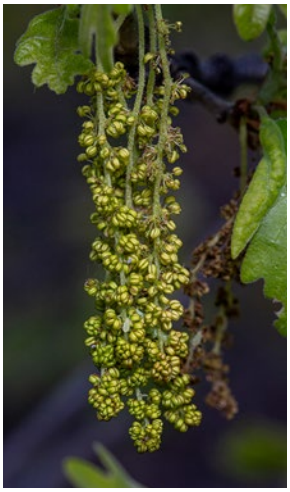


Photo Credit: Matthew Stewart, 406 Stewart Photography

Photo 5-5. Burr Oak male flowers are borne in a drooping catkin; when mature they release pollen.

Policy and Regulation

Conservation Goal

Work with public land managers, private landowners, and other interested stakeholders, to improve the conservation of Montana's Unique Habitats of Greatest Conservation Need through existing policies and regulations.

Conservation Objectives

1) State and federal agencies are encouraged to continue to build the Montana Natural Area System by identifying and nominating existing and potential natural area sites to the board of land commissioners [MCA 79-12-104(1)] for possible designation, in accordance with the Montana Natural Areas Act of 1974 (MCA 76-12). Areas that include Unique Habitats of GCN are especially encouraged for nomination. A natural area system contains representative examples of all of the state's natural habitats and guarantees the continued existence of the full array of the state's biotic diversity (Roush *in* 1986 Montana Natural Areas Conference proceedings). A natural area system can coordinate the management of individual areas toward common goals which are a benefit to society for recreation, education, research, aesthetic enjoyment, and the unpredictable utility of individual species (Roush in 1986 Montana Natural Areas Conference proceedings).

2) State and federal agency resource professionals should examine if their agencies' policies, regulations, or other administrative rules govern any of the nine identified Unique Habitats of GCN (Table 6-1). Findings should be shared with the *Montana Native Plant Conservation Strategy* Stewards Committee, Unique Habitats of GCN working group, or partnership for the *Strategy*.

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