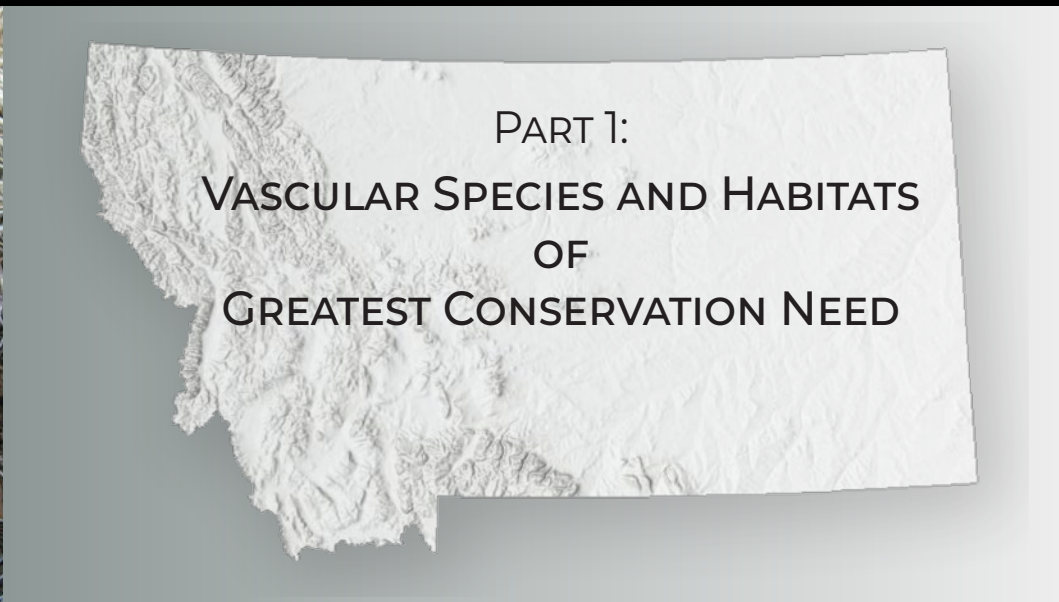




# MONTANA NATIVE PLANT CONSERVATION STRATEGY



## RECOMMENDED CITATION

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The *Montana Native Plant Conservation Strategy: Vascular Species and Habitats of Greatest Conservation Need* was made possible by a large partnership of people representing federal and state agencies, Tribal nations, non-profits, non-governmental organizations, academia, and as individuals. The level of participation greatly varied and is generally reflected by these categories:

**Core Team Members [C]:** Writers, editors, and content builders who developed the *Strategy*. Lead Editor [E] served also as the project manager.

**Representative Partner for their Organization [R]:** Professionals who were formally appointed by their organization to serve in the larger Partnership that was to guide and develop the *Strategy*.

**Interviewee [I]:** Professionals, interviewed in 2021 who have management authority, technical expertise, and/or field-based knowledge relative to focal areas in the *Strategy*.

**Participant [P]:** Non-appointed professionals who participated in scheduled meetings on behalf of their organization or as an individual who gave help or information for the *Strategy*.

**Working Group [W] or Subcommittee [S] Participant:** Professionals who attended small group meetings on focal topics for which they have technical agency and/or field-based knowledge. Meetings on the following focal topics occurred between 2020 and 2024:

- Criteria, Species, & Habitats S
- Strategy Content S
- Montana Herbaria S
- Centennial Valley Sand Dunes W
- Metamorphosed Limestone W
- Quaking Aspen (*Populus tremuloides*) Plant Community W
- Sapphire Rockcress (*Boechea fecunda*) W
- Spalding's Catchfly (*Silene spaldingii*) W
- Ute Ladies'-tresses (*Spiranthes diluvialis*) W
- Water Howelia (*Howellia aquatilis*) W
- Whitebark Pine (*Pinus abicaulis*) W

**Table 1. Montana Native Plant Conservation Strategy partnership. The affiliation and roles of people who from 2018 to 2024 assisted, at some level, in developing the Strategy. Their level of assistance varied greatly, but was always beneficial.**

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## A NOTE ON CAPITALIZING PLANT NAMES

The *Montana Native Plant Conservation Strategy* follows the philosophy of capitalization used by Robin Wall Kimmerer to convey the names of plants, people, animals, and other living beings in her book *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants* (2013).

**Names matter.** They help form identity for each person and the numerous living beings around us. They carry deep personal, cultural, familial, and historical connections. Names also create a level of distinction, reflect the way we view living beings, and affect how we communicate to, with, and about these beings. We accept the convention that a proper noun - that which serves to name a specific place, person, or thing - be capitalized. Biologists have also generally accepted that common names for plants are not capitalized unless they represent a human being's name or other official name. Thus, Ponderosa Pine Lodge in reference to a registered business is capitalized, but ponderosa pine as a species of tree is not capitalized.

**Plants go by many names.** The study of biology devised the scientific name, a formal system for naming species, that is also used to classify and understand relationships (ancestral and hereditary) among different organisms. Based in Latin, the scientific name made it possible for people to communicate about a particular type of plant and its relatives (family, genus, variety, etc.) across languages. Though handy, scientific names are most easily used and understood by people with a background in the biological sciences.

Across a specific plant's distribution, its numerous characteristics often vary, and it is encountered by people of differing communities (culture, heritage, regional, etc.). Hence, people and their culture, heritage, or desire to pay tribute will give to plants other names – a common name. Many common names for the same plant arise – often reflecting the plant's use, value, trait, place of origin, omen, or other significant association developed by those in community. Though we refer to these given names as being “common”, they are nonetheless as important for conveying information and being understood by the people and the community where they originate.

Names matter whether they arise from a formal, scientific process or evolve in relationships with people of community. In this *Strategy*, words like Paintbrush, Woolly, Beardtongue, and Pine are capitalized when referring to a species, and are in lower case (paintbrush, woolly, beardtongue, and pine) when describing a category or concept.

## PHOTO & DRAWING CREDITS FOR COVERS AND SECTION TITLE PAGES

Front Cover: *clockwise from top left photo*

- A fritillary butterfly species rests on the flower of an aster (*Symphotrichum* sp.). Photo Credit: Connie Geiger.
- Autumn in Glacier National Park: Western Larch (*Larix occidentalis*) forests and snowy mountainous habitats in northwestern Montana. Photo Credit: MTNHP staff.
- Grasslands with Two-Grooved Milkvetch (*Astragalus bisulcatus*) on the Charles M. Russell National Wildlife Refuge. Photo Credit: Dee Blank.
- Sparrow's-egg Lady's-slipper (*Cypripedium passerinum*). Photo Credit: Bruce Selyem.
- Bitterroot (*Lewisia rediviva*), Montana's state flower, on BLM lands near Butte, Montana. Photo Credit: Scott Mincemoyer.

Executive Summary:

Pen and ink sketch of the Brittle Bladder Fern (*Cystopteris fragilis*) drawn by Elizabeth Bergstrom.

Section 1:

Remediation of the Clark Fork River – 2014 – MTDEQ, NRDP, and CFRTAC. Mine waste was removed from the river's floodplain. Dirt and alluvium rock were used to reconstruct the floodplain. Microtopography (woody debris) created roughness for native seed. Native aspens, cottonwoods, birch, alders, and willows were planted and fenced to protect them from wildlife browsing. Photo Credit: Andrea Pipp.

Section 2:

Blanchard Lake in the Flathead Valley, Montana. Photo Credit: Dee Blank.

Section 3:

Red Mountain in Glacier National Park, Montana. Photo Credit: Dee Blank.

Section 4:

Granite Creek Trail winds through an old-growth forest in the Cabinet Mountains, Montana. Photo Credit: Dee Blank.

Section 5:

Swan River National Wildlife Refuge in Swan Valley, Montana. Photo Credit: Dee Blank.

Section 6:

Open Sagebrush steppe habitat with Lemhi Beardtongue (*Penstemon lemhiensis*), grasses, and forbs at the Big Hole National Battlefield, Montana. Photo Credit: Andrea Pipp.

Section 7:

An undergraduate student working in the herbarium and wheat breeding lab at Montana State University shows off plant specimens. Photo Credit: Matt Lavin.

Section 8:

Sleeping male mining bees (*Anthophora montana*), Daybreak Ranch, South Dakota. Photo Credit: ©WWF-US / Clay Bolt.

#### Appendix A:

Photo A-1 (front): Sapphire Rockcress (*Boechea fecunda*) in Beaverhead County, Montana.

Photo Credit: Jessie Salix

Photo A-2 (front-back): Yellow blooms of Thicketleaf Bladderpod (*Physaria pachyphylla*) plants, Montana.

Photo Credit: Andrea Pipp.

#### Appendix B:

Photo B-1 (front): Metamorphosed Limestone Unique Habitat in the Canyon Creek Gorge, Montana.

Photo Credit: Andrea Pipp.

Photo B-2 (back): Native plants in the alpine habitat of Glacier National Park, Montana.

Photo Credit: Tara Luna

#### Appendix C:

Photo C-1 (front): A sagebrush community on the Charles M. Russell National Wildlife Refuge, Montana. Photo Credit: Dee Blank.

Photo C-2 (back): Western Montane Grasslands, a Plant Community of GCN. Montana State Trust Land near Lost Trail National Wildlife Refuge. Photo Credit: Dee Blank.

#### Appendix D:

Photo D-1: A Curatorial Assistant for the University of Montana Herbarium mounts plant specimens collected by Peter Stickney. Photo Credit: Andrea Pipp.

#### Appendix E:

Photo E-1: At the Lewis & Clark Library, people can learn about plants and discover what grows on Mount Helena City Park – an undeveloped parkland in Helena, Montana. Donated by the MNPS-Kelsey Chapter, the cabinet houses preserved plant specimens, collection data, and natural history information which complements what is found in the bookshelves and digital library. Photo Credit: Andrea Pipp.

#### Back Cover: *clockwise from top left photo*

- Giant Helleborine (*Epipactis gigantea*). Photo Credit: Bruce Selyem
- Ponderosa Pine (*Pinus ponderosa*), Montana's state tree, on the North Fork in Glacier National Park, Montana. Photo Credit: Dee Blank.
- Bluebunch Wheatgrass (*Agropyron spicatum*), Montana's state grass. Photo Credit: Matt Lavin.
- Alpine Meadowrue (*Thalictrum alpinum*). Photo Credit: Matthew Stewart.

**MONTANA NATIVE PLANT CONSERVATION STRATEGY  
PART 1  
VASCULAR SPECIES AND HABITATS OF GREATEST CONSERVATION NEED**

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Photo Credit: Andrea Pipp

*A group of botanists hike into the Italian Peaks in southwest Montana where they will conduct a plant inventory.*

## SECTION 1

# Introduction



# SECTION 1

## INTRODUCTION

### Purpose

The purpose of the *Montana Native Plant Conservation Strategy: Vascular Species and Habitats of Greatest Conservation Need*, hereafter the *Strategy*, is to promote the collective and coordinated stewardship of Montana’s native flora and habitats. The *Strategy* was developed by a partnership of people representing federal and state agencies, a Tribal nation, non-governmental organizations (NGOs), academic herbaria, and individuals, whose goal is to ensure the persistence of native plant species and habitats, particularly those vulnerable to loss.

Conserving, researching, and sustainably managing Montana’s native plant diversity and resources requires an educated, informed, engaged, and coordinated botanical network across the state. The *Strategy* outlines and prioritizes native plant species, unique habitats, and plant communities that are in greatest need of conservation, and identifies conservation objectives in four areas that guide plant conservation<sup>1</sup>:

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



Photo Credit: Dee Blank

Photo 1-1. Native grassland with Silver Sagebrush (*Artemisia cana*) and Meadow Deathcamas (*Zigadenus venenosus*) at the Bitter Creek Wilderness Study Area in northeastern Montana.

The *Strategy*, also includes four additional elements that intersect with the conservation of species and habitats, specifically acknowledging Tribal sovereignty and Indigenous Traditional Ecological Knowledge (ITEK)<sup>2</sup>; strengthening botanical capacity across the state; investing in Montana’s network of herbaria; and amplifying the role of native plants in pollinator conservation efforts. Collectively, this *Strategy*

<sup>1</sup> This *Strategy* uses the term “conservation” as defined by the International Union for Conservation of Nature (IUCN) (Given 1994): “The management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations, while maintaining its potential to meet the needs and aspirations of future generations. Thus, conservation is positive, embracing preservation, maintenance, sustainable utilization, restoration, and enhancement of the natural environment (IUCN 1980).”

<sup>2</sup> Memorandum on Indigenous Traditional Ecological Knowledge and Federal Decision Making (Lander and Mallory 2021): “Traditional Ecological Knowledge - a form of Indigenous Knowledge - and one of many important bodies of knowledge that contributes to the scientific, technical, social, and economic advancements of the US to our collective understanding of the natural world. ITEK is a body of observations, oral and written knowledge, practices, and beliefs that promote environmental sustainability and the responsible stewardship of natural resources through relationships between human and environmental systems. It is applied to phenomena across biological, physical, cultural, and spiritual systems. ITEK is owned by Indigenous people.”

serves to share developed resources and guide future plant conservation actions using voluntary and non-regulatory mechanisms. The authors anticipate that voluntary implementation of identified conservation objectives will greatly help sustain Montana's native flora, vulnerable species, unique habitats, and plant communities, and strengthen botanical resources for stewardship on public and private lands.

## Scope

The *Strategy* focuses on seven elements pertinent to native plant conservation in Montana and foundational to the state's botanical network (Box 1-1). Hence, the *Strategy* is an electronic document consisting of interrelated, mostly stand-alone sections, posted on the *Montana Native Plant Strategy* web page hosted by the Montana Natural

### **Box 1-1. Montana Native Plant Conservation Strategy: Vascular Species and Habitats of Greatest Conservation Need (GCN) – AT A GLANCE.**

#### **Section 1: Introduction to the Strategy**

*Outlines purpose, scope, components, audience, importance of plants, and needs for a statewide Strategy.*

#### **Section 2: Acknowledgement and Native American Perspectives on Native Plant Conservation**

*Recognizes Tribal sovereignty; relays information on Tribes in Montana; presents some Native American peoples' perspectives on native plant conservation; and suggests actions to improve working relationships with Tribes and Native American peoples.*

#### **Section 3: Strengthening Botanical Capacity**

*Defines botanical capacity, where it comes from, what has been gained, sources eroding it, and conservation goals and objectives to strengthen capacity.*

#### **Section 4: Vascular Plant Species of GCN**

*Addresses Montana's flora; species' rarity, status, distribution, & risk factors; identifies 109 Plant Species of GCN and outlines overarching species conservation objectives for information needs, protection and restoration, outreach and education, and policy and regulation.*

**Appendix A:** *Species-specific conservation profiles for 5 Plant Species of GCN<sup>1</sup>.*

#### **Section 5: Unique Habitats of GCN**

*Defines and identifies 9 Unique Habitats of GCN; outlines overarching habitat conservation objectives for information needs, protection and restoration, outreach and education, and policy and regulation.*

**Appendix B:** *Habitat-specific conservation profiles for 2 Unique Habitats of GCN<sup>1</sup>.*

#### **Section 6: Plant Communities of GCN**

*Defines and identifies 5 Plant Communities of GCN; outlines overarching plant community conservation objectives for information needs, protection and restoration, outreach and education, and policy and regulation.*

**Appendix C:** *Plant community-specific conservation profile for 1 Plant Community of GCN<sup>1</sup>.*

#### **Section 7: Roles of Herbaria in Plant Conservation**

*Addresses Montana's herbaria, their purpose, establishment, and significant contribution to the conservation of plants, fungi, and algae. Identifies 7 challenges facing Montana's herbaria and outlines proactive actions to help ensure their continued use and service to plant conservation.*

**Appendix D:** *Herbarium-specific profiles for 8 herbaria.*

#### **Section 8: Importance of Native Plants and Communities in Sustaining Animal Pollinators**

*Discusses the reciprocal relationship among native plant species, plant communities, and native animal pollinators. Encourages landowners to create native plant pollinator habitats and links readers to resources pertinent to Montana on what and how to grow native plants and communities.*

<sup>1</sup> Conservation profiles for the remaining Plant Species, Unique Habitats, and Plant Communities of GCN will be developed upon collaboration, initiation, and funding by members of the partnership.

Heritage Program<sup>3</sup>. Moving forward, this *Strategy* is meant to be a living document - updated or expanded by the botanical network in Montana (Box 1-2).

This *Strategy* identifies and prioritizes 109 vascular plant species, 9 unique habitats, and 5

plant communities determined to be in greatest need of conservation in Montana. They are referred to in this *Strategy* as Plant Species of Greatest Conservation Need (GCN), Unique Habitats of GCN, and Plant Communities of GCN. They are determined to be of GCN by members of the partnership because either

### Box 1-2. What is meant by a “living document”?

The authors’ intention is to make the *Montana Native Plant Conservation Strategy* - a living document - managed either on a website or webpage that can be completed, revised, and expanded by an educated, informed, engaged, and coordinated botanical network led by a Strategy Stewards Committee.

We envision the Strategy Stewards Committee to provide strategic direction that promotes implementing the goals, conservation objectives and actions, and products identified in the *Strategy*. This includes providing central coordination; general management of working groups; format and content review of products; and approval of products or links to post on the webpage. We envision the Strategy Stewards as composed of at least seven members designated or represented by:

- MNPS - Conservation Committee member;
- MTNHP - botanist and ecologist;
- USFS Region 1 - Regional botanist;
- MT/Dakotas BLM - State botanist;
- MFWP - plant ecologist;
- MTDNRC - forest ecologist; and
- Tribal nation - ethno-botanist.

*Vascular Species and Habitats of Greatest Conservation Need* represents Part 1, which is also a work in progress. We envision that any person, in Montana’s botanical network or associated with the *Strategy*’s larger partnership, could initiate to complete, lead, or participate in implementing a conservation objective for which they feel motivated and possess the skills, time, ability, and/or resources to work on.

Future developments of Part I include:

- Completing Part 1 by organizing appropriate working groups to write conservation profiles specific to any of the remaining Plant Species, Unique Habitats, or Plant Communities of GCN.
- Implementing any of the conservation objectives identified in Part 1 of the *Strategy*.
- Developing a tracking system or ways that actions and accomplishments of the *Strategy* could be reported.
- Reviewing and revising the 2024 list of Plant Species, Unique Habitats, and Plant Communities of GCN; conservation profiles in Appendices A, B, and C; or conservation objectives presented in Part 1 of the *Strategy*.

Future parts of the *Strategy* would involve the development of new components, such as for non-vascular taxa (e.g., mosses, lichens, fungi) and the addition of a new element (e.g., plant genetics; plant education strategy) not previously addressed in the conservation of plants, fungi, and algae<sup>1</sup>.

We envision the Montana Native Plant Conservation Conference, which is sponsored by the Montana Native Plant Society and meets biennially, as a possible venue for the Strategy Stewards to convene, engage with the botanical network, and conduct business relative to the *Strategy*. We also envision that the Strategy Stewards could hold a summer retreat to meet, brainstorm, revise, or develop new plans. We recognize that the Strategy Stewards may want to meet more frequently or through other platforms.

<sup>1</sup> Montana Native Plant Conservation Strategy, Part 1 defines plant to include vascular, moss, liverwort, and hornwort species; fungus to include lichenized and non-lichenized fungal species; and algae to include diatom, cyanobacterium, and brown and green alga species.

<sup>3</sup> Montana Natural Heritage Program: <https://mtnhp.mt.gov/>



their rarity or prominence on the landscape coupled with known direct or indirect threats and other factors puts their long-term persistence into question (Montana Rare Plant Strategy Steering Committee 2019; Montana Native Plant Strategy ‘Criteria, Species, and Habitat’ Subcommittee 2021). This *Strategy* develops voluntary conservation objectives at two levels: 1) overarching conservation objectives that apply to most, if not all, Plant Species, Unique Habitats, and Plant Communities of GCN; and 2) species-, habitat-, and plant community-specific conservation objectives in stand-alone conservation profiles (Box 1-1).

### Audience

The primary audience of this *Strategy* are all the members of the larger partnership, and also federal and state public land managers (e.g., biologists, botanists, and rangeland specialists), non-government conservation organizations (e.g., conservation practitioners, plant societies, bird societies), academia (e.g., researchers,

professors, herbaria collection managers), decision-makers (e.g., USFS District Rangers, BLM Field Office Managers, university and college administrators, non-government organization (NGO) executive directors and managers), and Tribal nations (e.g., Elders, traditionalists, plant gatherers, biologists, cultural directors, and administrators). The secondary audience includes relevant federal, state, and local government officials (e.g., Montana Governor and General Assembly, USFS Region 1 Forester, USFWS Mountain Prairie Regional Director, BLM State Director, local elected officials), public school educators, private landowners, private landowner groups (e.g., grazing associations, land trusts, private timber companies), Tribal members, and other stakeholders. To these audiences, this *Strategy* serves as an explanation of the challenges and the solutions proposed by the partnership to conserve and advance stewardship of Montana’s vascular plant species, unique habitats, and plant communities of GCN.



Photo Credit: Taira Luna

Photo 1-2. Common Camas (*Camassia quamash*), American Bistort (*Polygonum bistortoides*), and Field Chickweed (*Cerastium arvense*) along the Rocky Mountain Front in Glacier County, Montana.

## WHY NATIVE PLANTS MATTER

Native plants are an integral component of our Nation's biological diversity, functional ecosystems, cultural heritage, and economic sustainability (Neely et al. 2009). Nearly all life, including humankind, is sustained through the powerful process of photosynthesis, whereby plants take in water, sunlight, and carbon dioxide and produce oxygen and carbohydrates. This reciprocal exchange of carbon dioxide and oxygen between plants and animals fuels our living planet. Plants also fuel our economy and sustain our basic needs for food and shelter, as well as medicine and numerous products like rope and rubber. Most other animals, directly or indirectly, rely on plants to provide food, shelter, and habitats for resting and rearing young. It is the unique assemblages of native plants that characterize Montana's western forested mountains, Rocky Mountain Front, eastern rolling grasslands, high alpine elevations, low valley bottoms, and the arid, riparian, wetland, and aquatic habitats found throughout the state. These native plant species and habitats form the places where we live, work, and recreate.

Native plants and the ways they sustain us are indispensable (Tallamy 2009); however, our Nation is at risk of losing significant portions of our wild heritage and the ecological resilience that comes with plant diversity (Stein and Gravuer 2008). An estimated 34% of vascular plants are at-risk of extinction in the United States (US), including more than 33,000 species of trees, grasses, orchids, cacti, ferns, and forbs (NatureServe 2023). Approximately 41% of terrestrial and wetland ecosystems are at risk of range-wide collapse in the US due to extensive land-cover conversion (NatureServe 2023). Among the most threatened ecosystems are the temperate grasslands (NatureServe 2023), which makes up two-thirds of Montana's land base. While it may seem that

***"In some Native languages the term for plants translates to 'those who take care of us.'"***

~Robin Wall Kimmerer, author of *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants* (2020)

***"We are related to all living things which includes plants. They are us and we are them."***

~Keith Gopher, Rocky Boy Tribe (2024)

***"Native Plants heal us, provide Holistic well-being, and are living beings. We are part of the same life force, and therefore, give respect by praying and offering tobacco."***

~Dennis Longknife Jr, Fort Belknap Indian Community (2024)

few people are aware of or concerned about the fates of plants, the extensive decline of Whitebark Pine (*Pinus albicaulis*), decline of Sweetgrass (*Anthoxanthum hirtum*) in the Bear Paw Mountains, and elevated awareness of the danger posed to Green Ash (*Fraxinus pennsylvanica*) from the Emerald Ash Borer (*Agrilus planipennis*) remind us of the significant ecological, cultural, and economic benefits native plants provide (Photo 1-3).

Under Montana's big sky, there is a growing concern on how to retain our State's rich native plant diversity and genetics, rare species, unique habitats, and iconic plant communities. Despite the importance of native plants, conservationists, naturalists, educators, biologists, agricultural producers,

Indigenous people, and others continue to face the tremendous challenge of encouraging humanity to understand, respect, and care for Montana’s native plants and habitats. The pressures on our native plants and habitats call for a proactive, coordinated approach to help avoid further losses of species and prevent more federal listings of endangered and threatened plants. The human population of Earth reached 8 billion in late 2022 and is expected to exceed nearly 10 billion people by the year 2050 (United Nations 2024). Given all we know about human reliance on native plant life for sustenance, healthcare, and recreation, it will always be in our best interest as a species to understand and preserve their existence.

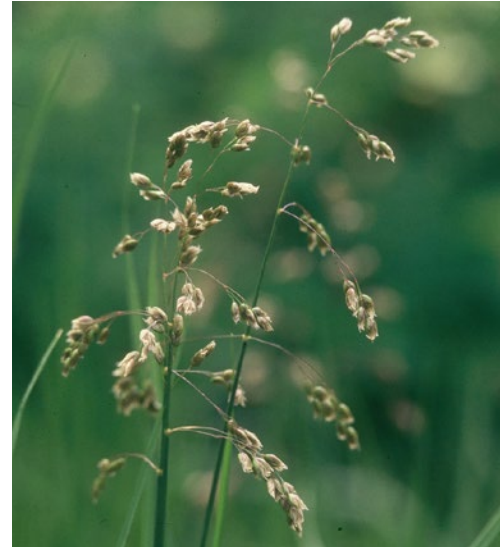


Photo Credit: Tara Luna

Photo 1-3. Northern Sweetgrass (*Anthoxanthum hirtum*) is an aromatic grass of cultural significance that is exhibiting declines in some areas.

## NEED FOR A STATEWIDE NATIVE PLANT CONSERVATION STRATEGY

The need for a *Montana Native Plant Conservation Strategy* arises from five constraints that have hampered plant conservation efforts in the state:

- 1) Insufficient current data and mapping of native plant populations, habitats, and communities
- 2) Declining recognition for botanical expertise and appreciation for native plants
- 3) Limited funding allocated to native plant conservation
- 4) Inadequacy of regulatory mechanisms to manage native plants and habitats
- 5) Increasing threats to native plants, habitats, and communities

The *Strategy* aims to provide a statewide framework to address these needs and identifies an array of conservation opportunities and actions to reverse these constraints. Here we briefly discuss each need to better understand the problems and work toward solutions that reverse these five constraints:

### 1) Insufficient Current Data and Mapping of Native Plant Populations, Habitats, and Communities

The application of western science<sup>4</sup>, advances in technology, and emphasis on inventorying species led to innovative ways in documenting, storing, sharing, and using information on Montana’s flora. From the 1970s to early 2000s, many federal land management agencies focused on conducting rare plant inventories and defining, describing, and mapping habitat types and plant communities. This generated significant plant and habitat data, deposited plant specimens into agency and university herbaria, and contributed to the need for creating the Montana Natural Heritage Program (MTNHP). Since 1985, the MTNHP has served as a central repository for information on our state’s flora, fauna, and biological communities. The development of a statewide plant observation database has facilitated processes to refine state plant checklists, map species distributions, determine a species’ origin and rarity, and

<sup>4</sup> Western science is defined as the scientific enquiry done in Greek, Latin, or Arabic (Wallace 1992).

evaluate a species' status - all of which can be important to inform land use decisions. However, plant inventories generate data relevant to the time period. While the data remains relevant for tracking species and population trends, it becomes outdated for use in land management project and planning efforts. A large portion of Montana's plant-related data is now old, incomplete, and/or imprecisely mapped for Plant Species, Unique Habitats, and Plant Communities of GCN.

Today, Montana needs another period of extensive surveys, this time focused on revisiting existing rare plant occurrences and targeting unique habitats and plant communities. Current information is needed to evaluate specific population sizes, assess the presence of threats, quantify habitat characteristics, and precisely map species, habitat, and community locations. Comparing new information against older baseline conditions will help to determine or revise state ranks, state threat scores, Species of Concern lists, and population trends. Determining or revising state ranks and their status is necessary to inform agency listings, direct management actions, and ensure that management decisions are based on current and accurate information.

There is also a need to take into consideration cultural values when providing information for stewardship or conducting status assessments. Currently, there has been a failure to integrate western science methods with Indigenous Knowledge<sup>5</sup> and cultural values in many status assessments, information resources, and management plans. Improving government-to-government relationships between the State of Montana and the Tribes could facilitate the ability to integrate cultural values into these status assessments, information resources, and management plans, making plant-related data

more comprehensive, and enhancing statewide conservation for particularly important species.

## 2) *Declining Recognition for Botanical Expertise and Appreciation for Plants*

Botanical knowledge and science education are essential to the application of “best” land management practices, sound conservation decision-making, and having an engaged, environmentally literate society (Havens et al. 2014). Declines in botanical degree programs, a shortage of government employed botanists, and an under-appreciation of plants continue to hinder plant conservation efforts (EMNRD-Forestry Division 2017; Balding and Williams 2016; Kramer et al. 2013; Deng 2015). From 1988 to 2015, shifting academic priorities caused at least 18 of the 50 top-funded universities in the United States to stop offering advanced degrees in botany (Deng 2015; Kramer et al. 2013). The Montana University System (MUS) has taken a similar path. Traditional degrees in botany have been retired or re-tooled into various flavors of biology, environmental studies, and other MUS degree programs. This *Strategy* takes no position and makes no judgement on the degrees offered by the MUS; it simply acknowledges the fact that today fewer plant identification, plant ecology, and other botanical courses



Photo Credit: Andrea Pipp

Photo 1-4. Botanical skills are needed in many disciplines, such as in restoring riparian habitat along the Clark Fork River in Montana.

<sup>5</sup> Also, ITEK, TEK, and TK. Refer to footnote 2, Section 1 and to the glossary.

are offered in Montana. Fewer courses and trainings contribute to the phenomena of plant blindness, which is “the inability to see or notice the plants in one’s own environment” which often leads “to the inability to recognize the importance of plants in the biosphere and in human affairs” (Wandersee and Schussler 1999; Balding and Williams 2016).

Overlapping this academic trend is the consolidation of government botany positions into range, wildlife, and other natural resource job classifications (Kramer et al. 2013; Deng 2015). Management and research staff with botanical degrees are in short supply, and this is particularly pronounced in agencies responsible for stewarding our public lands (Kramer et al. 2013). In the federal government, workloads for botanists are often greater than those for wildlife biologists yet are matched with comparatively lower salaries (Kramer et al. 2013). Fortunately, in Montana there has been an upward trend since 2021 in the number of professional botanists hired by the USFS-Region 1 and Montana/Dakotas BLM (Pipp 2024). However, many professional positions in Montana combine botany with other disciplines.

For Indigenous peoples the decline of botanical knowledge is rooted in other causes. Legacies of colonialism, forced assimilation, upheaval and repression of Native economic systems, and loss of ancestral lands, languages, natural resources, and discrimination have contributed to a loss in botanical knowledge, including Traditional Knowledge, in Montana (Whyte et al. 2021). Tribes continue to address the effects of this historical trauma using their own systems of governance that have norms of behavior for land use and land care (Whyte et al. 2021). Traditional societies and key people within each Tribe have strived to pass on traditional plant knowledge to the next generation. During the past few decades, there has been a resurgence in traditional

plant knowledge and practices, in part due to the recognition that this knowledge could potentially be lost by the rapid conversion to technology, from environmental changes, and most recently, from the pandemic. During the pandemic, the Tribal communities lost many elders; when a Tribal or Indigenous Elder passes, so does vast amounts of knowledge (Longknife 2024). The future of each Tribal nation rests solely in each Tribe’s successive generation and their individual ability to protect culturally significant plants and vegetation (Grant 2024).

Despite these challenges, there continues to be a great need for botanical expertise and a better societal appreciation for Montana’s native plants. Given the rise in new plant invaders, the continual spread of exotic plants, the increase in the number of imperiled native plants, and the large acreages of lost or degraded habitats that are in need of restoration or remediation, the evidence is clear that botanical expertise and traditional knowledge is imperative (Kramer et al. 2013).

### 3) *Limited Funding Allocated to Native Plant Conservation*

Plant conservation efforts are less funded than wildlife conservation at federal and state levels (Kramer et al. 2013; EMNRD-Forestry Division 2017). The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 et seq.) provides evidence. Of the 2,281 species listed as threatened or endangered, roughly 41% (944) are plants (Havens et al. 2014). Yet, plants often receive less than 4% of the funding allocated through ESA legislation (Havens et al. 2014). Region 6 of the USFWS, which includes Montana, allocates ESA-Section 6 funding for plants and animals across 8 states through a competitive grant process. The USFWS has occasionally tried to improve funding opportunities for plant conservation, as with the now-defunct Small Grants for

Plants. In 2000, Congress enacted the Wildlife Conservation and Restoration Program, whereby states with approved State Wildlife Action Plans (SWAP) receive significant amounts of federal funding to support non-game animal species (Stein and Gravuer 2008). These federal funds are managed by the USFWS through the State Wildlife Grants Program, which is the only federal program that has an explicit goal of preventing listings of animal species under the ESA (Stein and Gravuer 2008). Currently this funding cannot be used for the conservation of state rare or federally-listed threatened and endangered plants (USFWS 2010). Since 2021, attempts to correct this shortfall have been made in Congress with annual introductions of the bill, Recovering America's Wildlife Act (RAWA). Passage of RAWA would provide funding to states that include plants in their SWAP and to tribes to implement collaborative plant-focused and other wildlife conservation efforts (RAWA 2021; RAWA 2022).

At the State level, grants that fund plant-focused projects are few, and usually tied directly to wildlife, fisheries, or wetland habitats and invasive and noxious plant

projects. The 2015 Montana SWAP (Montana's SWAP 2015) does not include Plant Species of GCN, which means there is no funding mechanism to address state-designated Species of Concern (SOC) or Potential Species of Concern (PSOC) plants or lichens (Box 1-3). However, future funding opportunities could become available for Plant Species of GCN in Montana. Montana Fish, Wildlife, and Parks is slated to add the list of Plant Species of GCN to the 2025 revision of Montana's SWAP (Szcodronski 2023). If coupled with approved congressional funding through RAWA, cooperating partners with MFWP and Tribal nations would have funding opportunities to carry out plant and wildlife conservation projects and education (S.2372 RAWA of 2022). Investing directly in the conservation of Plant Species of GCN using state and federal funding mechanisms is the most cost-effective way to aid their persistence (Stein and Gravuer 2008). Furthering the persistence of Plant Species, Unique Habitats, and Plant Communities of GCN contributes to the protection and improvement under Article IX Environment and Natural Resources in The Constitution of the State of Montana (Mont. Const. of 1972, art. IX).

**Box 1-3. State of Montana designations for native vascular plants, mosses, and lichens.**

**Species of Concern (SOC)**

Native taxa that are at risk of extirpation due to declining population trends, threats to their habitats, a restricted distribution, and/or other factors. Montana has 369 vascular plant, 50 moss, and 32 lichen SOC (MTNHP 2024).

**Potential Species of Concern (PSOC)**

Native taxa for which current, often limited, information suggests a potential for vulnerability to extirpation in the state. Montana has 63 vascular plant, 18 moss, and 8 lichen PSOC (MTNHP 2024).

**Plant Species of Greatest Conservation Need (GCN)**

A vascular plant designated either as SOC or 'of management concern' that is well-documented in the state and faces significant direct or indirect threats to its persistence or its habitat. Some plants are also in need of inventory. The 109 Vascular Plant Species of GCN were identified by the Montana Native Plant Strategy 'Criteria, Species, and Habitat' Subcommittee (2021).

#### 4) *Inadequacy of Regulatory Mechanisms to Manage Native Plants and Habitats*

The inadequacy of regulatory mechanisms and laws to protect ESA-listed threatened and endangered plants and State of Montana SOC and PSOC (including Plant Species of GCN), and Unique Habitats and Plant Communities of GCN, is a major concern hampering the conservation of Montana’s native flora. Federal laws have the strongest level of protection, but only apply to ESA-threatened plant species on federal lands or to federally-funded projects or to ESA-endangered plants on federal, state, and private lands; to Regional Forester Sensitive Species (USDA 2023) and Species of Conservation Concern (USDA 2019, 2020a, and 2020b) designated by the USFS-Region 1; and to Sensitive species designated by the Montana/Dakotas Bureau of Land Management (MT/Dakotas BLM 2008). Designated USFS-Region 1 and MT/Dakotas BLM species are managed in accordance with agency-specific policies that vary greatly by national forest or field office and apply only to the lands they administer. While these federal regulations and policies are beneficial and must be fully supported, they also fall short of actively conserving most Plant Species of GCN, SOC, or PSOC.

Patterned after NEPA and enacted in 1971, the Montana Environmental Policy Act (MEPA) is a procedural process intended to provide for adequate review of state actions that affect the quality of the human environment<sup>6</sup> (Stockwell 2021). Each state agency (with few exceptions) adopts the MEPA model rules (aka administrative rules) through its own individual rulemaking procedures; therefore, state agencies differ in their policies and rulemaking abilities to address, conduct environmental reviews, and/or manage Montana SOC and PSOC plants (Stockwell

2021). The MTNHP was established under the Montana State Library “to be a comprehensive program for the acquisition, storage, and retrieval of existing data relating to the natural resources of Montana” (MCA 90-15-301). Federal, state, and local government agencies, private consulting firms, NGOs, and others acquire data on native and exotic plants, biological communities, and animals from the MTNHP databases for their proposed projects and planning efforts. Because very few state laws or policies specifically address or protect rare plants, conservation of these species is mostly left to the individual land management agency and landowner.

Privately owned lands make up nearly 63% of Montana’s land base, and their management is important to the conservation of Montana’s rare plants. With very few exceptions, federal and state laws do not govern rare plants on private lands. A plant protection program supported by state government with broad involvement by stakeholders at all levels is needed to ensure the long-term conservation and stewardship of Montana’s Plant Species, Unique Habitats, and Plant Communities of GCN.



Photo Credit: Graham Johnson

Photo 1-5. *Missoula Phlox* (*Phlox missouliensis*) is only known from Missoula County, Montana where its habitat intersects with city parks and utility corridors.

<sup>6</sup> ‘Human environment’ includes but is not limited to biological, physical, social, economic, cultural, and aesthetic factors that interrelate to form the environment” (Stockwell 2021).

## 5) Increasing Threats to Native Plants

Montana's Plant Species of GCN, and other rare plant species, are rooted in place and cannot avoid impending threats that interrupt their growth or life cycle. They often inhabit specific habitat types, geology, or soils, are found in few places, or are few in number.

Many of Montana's rare plants are facing increasing threats from multiple vectors (MTNHP Threat Assessment 2021). They can be negatively impacted by naturally occurring events, human actions, or an accumulation of natural factors exacerbated by human actions (Box 1-4). How a rare plant species responds

### Box 1-4. What is a threat?

Threat: The proximate activity or process that has caused, is causing, or may cause destruction, degradation, and/or impairment to the target plant.

Threats may be related to human activities or may be natural.

~ Master et al. 2012  
NatureServe Conservation Status Assessments: Factors for Evaluating Species and Ecosystem Risk

to a particular threat - depends upon its biology, population size, reproductive rate, factors of stress or resiliency in the habitat, and other environmental conditions. The timing and severity of a threat event or action also greatly influences a native plant species' response. Types of threats that commonly occur in Montana and can harm native plant species, depending upon the species and local conditions include, but are not limited to:

- climate change
- invasive non-native (exotic) plant or animal species
- altered hydrological regimes
- altered fire regimes
- changes in land use or habitat conversion
- excessive ungulate herbivory (ecologically incompatible grazing)
- lack of ecological disturbances, such as lack of fire, cultural burning, flooding, grazing, browsing, or others

For a better understanding of threat types and the factors that can benefit or harm Plant Species of GCN, please read Section 4-Plant Species of GCN, subsection *Challenges Faced by Plant Species of Greatest Conservation Need*.

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