Castilleja linariifolia

Castilleja

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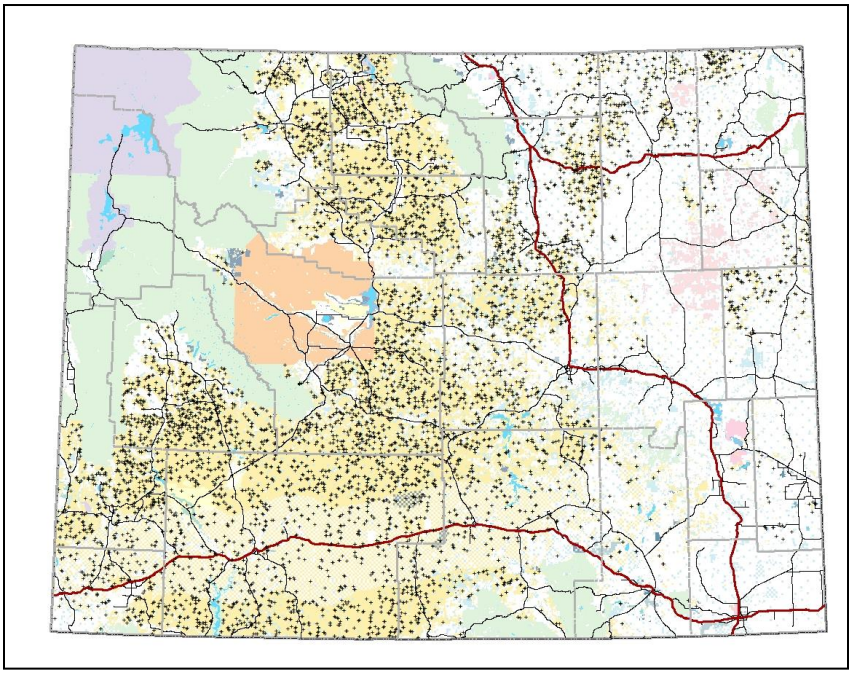


Figure 1. Terrestrial AIM plots across Wyoming

Taking AIM at Understanding Resource Conditions on BLM-managed Lands in Wyoming

James Halperin, BLM Wyoming Office

Every major federal land managing agency in Wyoming has a way of gauging vegetation conditions and the effectiveness of management over time. The Bureau of Land Management has its Assessment, Inventory, and Monitoring Strategy (AIM) that has operated in Wyoming since 2015.

The AIM Strategy provides quantitative data and tools to guide and justify policy actions, land uses, and adaptive management decisions. It consists of five key elements that aid in collecting standardized and defensible monitoring data:

- Structured implementation to guide monitoring program development, implementation, and data use for decision makers,
- Standardized field measurements to allow data comparisons through space and time in support of multiple management decisions,
- Appropriate sample designs to minimize bias and maximize inference of collected data,
- Data management and stewardship to ensure data quality, accessibility, and use,
- Integration with remote sensing to estimate fractional vegetation cover in continuous map products.

This strategy is an umbrella program with an overarching goal to assess vegetation condition and replicate monitoring in five-year cycles to gauge trend. It provides a framework for monitoring terrestrial systems including grassland and steppe; lotic systems including streams and rivers; and riparian and (Cont. p. 4)

In this Issue:

WYNPS News

Time to Vote…and Renew!: A new slate of 2024 candidates is on the ballot, attached to the renewal form. Get the New Year off to a great start through Wyoming Native Plant Society – by mail or online.

Scholarship Application Deadline: All applications for scholarships and small grants are due by 15 Feb. There is one application form that covers both.

WYNPS Board – 2023
President: Vacant
Vice-President: Joyce Evans, Fort Laramie (wyoslp@yahoo.com)
Sec.-Treasurer: Dorothy Tuthill, Laramie (dtuthill@uwyo.edu)
Board-at-large: Heidi Anderson, Gardiner, MT (heidi_anderson@nps.gov) (2023-'24)
Greg Pappas, Laramie (gregory.pappas@usda.gov) (2022-'23)

Other Contacts:
Editor: Bonnie Heidel (bheidel@uwyo.edu)
Webmaster: Dorothy Tuthill (dtuthill@uwyo.edu)
Sublette Chapter: Jill Randall, President (possum1b@yahoo.com)
Teton Plants: Amy Taylor, Treasurer; (tetonplants@gmail.com). Check the chapter homepage (https://tetonplants.org/) for hikes and other events.
General questions: wynps@wynps.org

New members: Please welcome the following new members to WYNPS: Nicholas Ferrauolo, Wallingford, CT; Isabella Norton, Lander.

Treasurer's Report: Balance as of 26 Sept: Scholarship = $2040; General = $10,360; Total = $12,400.

Next issue: Please send articles and announcements for the next issue by 15 Feb:

Wyoming Native Plant Society
P.O. Box 2449
Laramie, WY 82073

Message from the Vice-President:

Happy New Year! We have nearly made it through 2023 and this is my seize-the-moment message.

Recently I coerced the Town of Fort Laramie to install a garden of Native plants. I obtained grants from High Plains Audubon, Goshen County Economic Development and the Wyoming State Forestry Department and used volunteer labor to remove the weeds (mostly but not entirely non-native), design walking paths and plant a 30 x 90-foot section of ground beside our town hall. A generous donation from Piney Island Native Plants in Sheridan allowed us to double the number of plants we placed in the garden.

When planting day came, we had over 20 volunteers, ages 4 to 70 plus. According to some volunteers (mostly older farmers), we just planted a bunch more weeds. A local businesswoman made labels for each plant type, including scientific name, common name, traditional uses and any use that pioneer travelers may have made of the plant. Two summers have now passed and I am faced with culling a profusion of native plants while I continue to battle puncture vine and Russian thistle (Thank Goodness they are not native). We used at least 4 inches of pea gravel as mulch, and that has been perfect for moisture retention, but it also allows those unwanted seeds to find a nursery. I have not watered any plants except the wild bergamot which has a bit higher water requirement.

The best part is helping our local preschoolers see and understand the plants that grew here before they did. Their teacher took them on a walk at the National Historic Site and told me about their excitement when they found some of the same plants growing wild there. What a way to nurture future botanists, or at least informed citizens!

So, plant people, treasure your years and join me in taking a second look at everything each day offers.

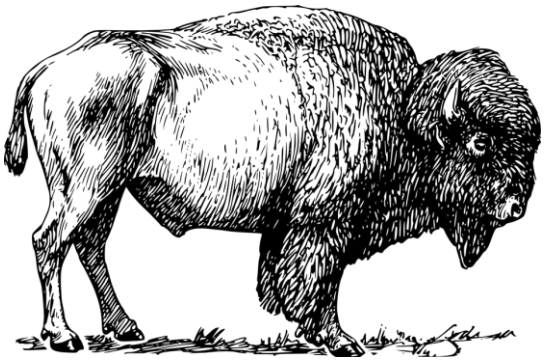
~Joyce Evans

Contributors to this Issue: Joyce Evans, James Halperin, Bonnie Heidel, Meredith Taylor and Dorothy Tuthill.

Announcing: **2024 WYNPS Annual Meeting**

This new year (2024) the WYNPS board has decided to hold our annual meeting in conjunction with the Wyoming BioBlitz!! The 2024 BioBlitz will be held at the Wind River Buffalo Initiative (WRBI) site in Morton, WY. We will be assisting the WRBI in gathering ecological data related to buffalo reintroduction on their current lands and the 17,000 acre expansion area. Learn about the WRBI here: https://windriverbuffalo.org/. The WYNPS expects to contribute substantial botanical knowledge to local researchers and students, to help answer the questions they have identified as of most significance; in addition, we have committed $1000 to help fund this event, making it possible to hold the event cost-free to Wind River Indian Reservation community members.

Many of you have attended past BioBlitzes, and already know how fun, educational, and satisfying these events are. If you are unfamiliar with the Wyoming BioBlitz, see: https://rockies.audubon.org/naturalist/wyoming-bioblitz. We will be joining Audubon Rockies, UW Biodiversity Institute, WY State Parks, WRBI and others to provide this opportunity to explore biodiversity and traditional ecological knowledge on the Wind River Indian Reservation.



The date of the BioBlitz is yet to be set, pending scheduling of important cultural events on the reservation. We will let you know the dates as soon as we know!

New Plant Hardiness Zone Mapping

Gardeners, academics and the public at large took note in November when the U.S. Department of Agriculture released a 2023 update to their "plant hardiness zone map", last updated in 2012. It's the national standard for gardeners and growers to figure out which plants are most likely to survive the coldest winter temperatures in their location. It also chronicles change to the winter temperatures on which it is based. 2023 USDA Plant Hardiness Zone Map | USDA Plant Hardiness Zone Map https://planthardiness.ars.usda.gov/ .

The "prevailing zone" of extreme winter temperatures (i.e., Average Annual Extreme Minimum Temperature) for Wyoming is no longer Zone 4b (-25 to -20 °F), which was widespread across basins, foothills and plains of the state in the 2012 map. It is now Zone 5a (-20 to -15 °F) across much of the same area. The 2023 map is about 2.5 degrees Fahrenheit warmer than the 2012 map across the contiguous U.S., said Chris Daly, director of the PRISM Climate Group at Oregon State University that jointly developed the map with USDA. He said that the new map means about half the country has shifted into a new half zone. The new map offers a zip code search if you want to doublecheck local change.

Wyoming zoologists should also check their zipcode for local change. Research shows that some recent changes to Wyoming vegetation were driven by temperature responses of animals, as is the case with mountain pine beetle. A minimum number of successive days with -30 ° F temperatures are necessary to kill most mountain pine beetles. They spend the winter as larvae under the bark of lodgepole and ponderosa pines, and are specially adapted to survive Rocky Mountain winters.

"The larvae of mountain pine beetles produce a substance in their bodies that's similar to the antifreeze we put in our cars," said Sky Stephens, forest entomologist for the Colorado State Forest Service. "In winter, they also move to the driest part of the tree where they are less likely to freeze. And they expel nearly all the moisture from the inside of their bodies, which lowers the temperature at which they will freeze." But the antifreeze of beetles only works to a point. They are killed by prolonged temperatures of extreme cold and minimum duration. They have outbreaks and kill their host trees if the temperature thresholds and minimum duration of cold temperatures are not met. Similarly, the larvae of other bark beetles, including the spruce beetles now may infest the high-altitude Engelmann spruce of the Central Rockies (www.csfs.colostate.edu).

TAKING AIM, Continued from p. 1

wetland systems to bridge the information gap between terrestrial and lotic areas. This umbrella program provides a rubric for evaluating many related habitat conditions, as with sage grouse habitat requirements, and other key resources.

To date, there are 6,658 terrestrial plots on BLM managed lands in Wyoming (Figure 1; see on p. 1), comprised of 3,712 plots sampled at the Field Office scale and 2,946 plots sampled at a national scale. At the Field Office scale, the first five-year cycle of Terrestrial AIM is now complete; eight of the ten Field Offices just finished year two, while one Field Office finished year three and another finished year one. Summary data for more than 50 indicators is publicly available for each terrestrial AIM plot, including estimates of percent cover and height for perennial grass and forb, annual grass and forb, sagebrush cover and height, bare soil percent, and soil stability. Each plot also includes ecological site information, following the USDA National Ecological Site Handbook methods.

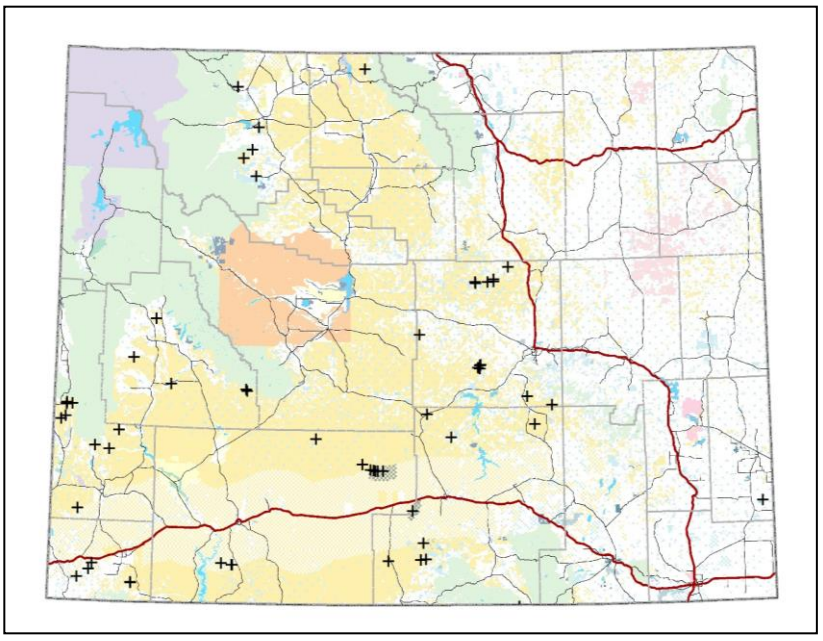


Figure 3. Riparian and wetland AIM plots across Wyoming

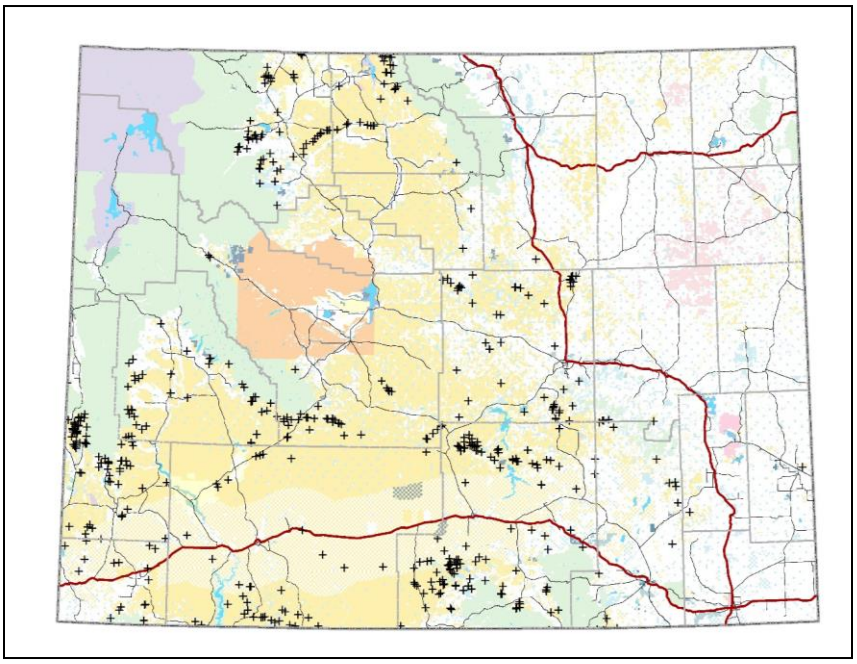


Figure 2. Lotic AIM reaches across Wyoming

Lotic AIM reaches have been sampled at 690 locations across seven Field Offices (Figure 2) and all are in cycle two. Summary data for more than 30 indicators is publicly available for each lotic AIM reach, including information on water quality (e.g., total nitrogen, pH, macroinvertebrate assemblages), hydrologic condition (e.g., channel incision, bankfull height and width, floodplain connectivity), and riparian vegetation (percent bank cover, presence of noxious species).

Since 2021, Riparian and wetland AIM plots have been installed in 137 targeted locations across seven Field Offices (Figure 3). Summary data for more than 40 indicators is publicly available for each wetland AIM site, including vegetation estimates similar to terrestrial AIM, characterizations of surface water, soil types, and disturbance information. Currently there is no sample frame from which to conduct random sampling for riparian and wetland AIM. The BLM will move towards using the updated USFWS National Wetland Inventory (NWI) as a sample frame, when the NWI is finished.

If this sounds complicated, then the overviews and data that are readily available online provide a direct way to gain familiarity. Background information about the methods, design, and data standards for all three AIM resources, as well as a link to publicly accessible data, is available at: www.blm.gov/aim .

A Botanical Merger:

Central Wyoming College Herbarium comes to Rocky Mountain Herbarium

Bonnie Heidel, Wyoming Natural Diversity Database

A fascination with alpine plants led Richard (Dick) Scott[1] to graduate studies in Botany, first at University of Wyoming to document the alpine flora of northwestern Wyoming (Scott 1966) and then at University of Michigan conducting research in Alaska (Scott 1972, 1974). He returned to Wyoming in 1975 to join the faculty at Central Wyoming College (CWC) in Riverton and start the CWC Herbarium.

Now, 48 years and over 42,000 specimens later, the CWC Herbarium is transferred to the Rocky Mountain Herbarium. It signifies a wealth of alpine plant specimens and a biogeographic representation centered in Fremont County, with far-flung contributions from exchange with other herbaria, from students around the country and world, and from Scott's expansive research.

The Alpine Flora of the Rocky Mountains – Middle Rockies (Volume 1) was published by Scott (1995), as supported by his collections and his top-to-bottom review of RM accessions and that of adjoining states – before herbarium records became available online! CWC Herbarium was also used by Scott in his classes on plant taxonomy, ecology, field methods in biology, field botany, and aquatic ecology at CWC, and as part of graduate level field courses for educators. The course labs and student independent research used CWC collections and built upon them.

Richard & Beverly Scott, husband/wife team, also took on major conservation biology challenges under the auspices of the CWC Herbarium, determining the extent and local distribution of state endemic species found on the Beaver Rim and the Wind River Basin and Range. They included Barneby's clover (*Trifolium barnebyi*), Desert yellowhead (*Yermo xanthocephalus*), Fremont's bladderpod (*Physaria fremontii*; syn. *Lesquerella fremontii*) and Porter's wormwood (*Artemisia porteri*); (Scott and Sato 1998, Scott and Scott 2009). He employed cadastral survey techniques and Geographic Positioning Systems (GPS), and the mapping he produced is central to current understanding. He also documented floras, e.g., at the proposed Little Popo Agie Moraine Botanical Area, that remains proposed as the Little Popo Agie Geological Area (USDA Forest Service 2012). Finally, he documented distribution of noxious weeds including species-focused survey of Russian knapweed (also called hardheads; *Acroptilon repens* syn. *Centaurea repens*) across much of western Wyoming in early years of its spread, using a gridded sampling to greatly expand its documentation and collections.

CWC Herbarium moved from the College to the Fremont Weed and Pest District Office in Riverton in 2001 (Scott 2001). The recent 2023 move took place earlier this month, transporting about 30 cabinets and 1000 boxes of CWC specimens to Laramie, made possible with expansion of RM. The process of scanning and integrating CWC specimens into RM is just beginning. We can all look forward to views of these major collections.

References

Scott, R.W. 1966. The alpine flora of northwestern Wyoming. Master Thesis. Department of Botany, University of Wyoming, Laramie, WY.

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Scott, R.W. and B.J. Scott. 2009. *Yermo xanthocephalus* Dorn - A Research Report. Prepared for BLM. Central Wyoming College Herbarium and Scott Environmental Resources, Inc.. Riverton, WY.

USDA Forest Service. 2012. Shoshone National Forest – Analysis of the Management Situation. Posted at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5356003.pdf . This document informed the 2015 Shoshone Natl For. Final plan. Cody, WY.

[1] Scotts are founding members of Wyoming Native Plant Society.

The Endangered Species Act at 50:

ESA Plants in Wyoming

Bonnie Heidel, Wyoming Natural Diversity Database

(Editor's note: *The Endangered Species Act profoundly shapes land-managing agency work and public perception of plants and the botany profession. This article is a sequel to the 40th anniversary article of 2013! There are still just four Threatened and Endangered plants in the state, though the roster has changed.*)

The Endangered Species Act (ESA) turned 50 on December 28, 2023. Bald eagles, Grizzly bears and Wolverines are in the limelight, with Monarchs and Bumblebees getting new attention. …What about plants?

Back in 2013, a celebratory note was struck over the contributions by armies of botanists who, in seeking out the state flora and rare species, generated new information to effectively keep almost 100 plant species out of path of petitioning for delisting (Heidel 2013). A total of 99 species had been run through gauntlets of Endangered Species Act reviews without designation as Threatened or Endangered.

Since then, some plants have made "encore appearances" such as Whitebark pine (*Pinus albicaulis*). It was originally deemed not warranted for ESA protection, only to be petitioned a second time and listed as Threatened in 2020 based on widespread documented decline (USDI FWS 2020).

Not long before designation of Whitebark, Colorado butterfly plant (*Oenothera coloradensis*) was deemed recovered and delisted from Threatened status (U.S. Fish and Wildlife Service 2019).

Starting the same time, review documents were prepared for Desert yellowhead (*Yermo xanthocephalus*) between 2019-2021, the most recent of which laid out a vision for its recovery and delisting from Threatened status if certain metrics are met (USDI FWS 2021).

In 2022, a 5-year status review was prepared for Blowout penstemon (*Penstemon haydenii*), citing data on its decline in both Nebraska and Wyoming (USDI FWS 2022a).

Most recently, in August 2023, Ute ladies'-tresses (*Spiranthes diluvialis*) was addressed in a Species Status Assessment. laying out interpretation that the current distribution data and threats assessment may support its delisting from Threatened status (USDI FWS 2023).

Wyoming has only one petitioned plant species. In 2021, Thickleaf bladderpod (*Physaria pachyphylla*) was petitioned for listing as Threatened based on mining threats to its largest known Montana population. It was described as a new species in 2007 and documented for the first time in Wyoming by vegetation crews working north of Lovell in 2020, the year before it was petitioned. It is currently under review (USDI FWS 2022b). Watch for pending survey information in both Montana and Wyoming.

Readers are referred to the 2013 *Castilleja* article for the history of plant review practices under the ESA in Wyoming (http://www.wynps.org/wp-content/uploads/2023/03/2013-Dec-Newsletter.pdf). We can be sure that the future of Wyoming plants under the ESA will hold surprises, if the past is any indication.

References

Heidel, B. 2013. The Endangered Species Act at 40: a Hundred Reasons to Celebrate. Castilleja 2013(4):1,5-7.

USDI Fish and Wildlife Service. 2019. Endangered and Threatened Wildlife and Plants; Removing *Oenothera coloradensis* (Colorado butterfly plant) from the Federal List of Endangered and Threatened Plants. Federal Register 84: 59570-59588.

USDI Fish and Wildlife Service. 2020. Endangered and Threatened Wildlife and Plants; threatened species status for *Pinus albicaulis* (whitebark pine) with Section 4(d) Rule. FR 85(232):77408-77424.

USDI Fish and Wildlife Service. 2021. Endangered and Threatened Wildlife and Plants; Draft Recovery Plan for *Yermo xanthocephalus* (Desert Yellowhead). FR 76(213):61775-61777.

USDI Fish and Wildlife Service. 2022a. 5-year status review for Blowout penstemon (Penstemon haydenii). Posted at: https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3951.pdf

USDI Fish and Wildlife Service. 2022b. Endangered and Threatened Wildlife and Plants; 90-day findings for three species. Federal Register 87(26): 7079-7083. February 8. [includes *Physaria pachyphylla*]

USDI Fish and Wildlife Service. 2023. Species status assessment report for Ute ladies'-tresses (*Spiranthes diluvialis*). V1. Posted at: https://ecos.fws.gov/ServCat/DownloadFile/235442

Ethnobotany – **Part 8. Bitterroot** (*Lewisia rediviva*)
By Meredith Taylor, Certified Wyoming Naturalist

Bitterroot is exquisitely adapted to the dry habitats that it graces. Photo by Bonnie Heidel.

Bitterroot is found throughout the West from Canada to California and Arizona, including Montana, Wyoming, and Colorado.

Plant description: Bitterroot is a dicotyledonous, perennial plant of the Purslane or Portulacaceae family. Bitterroot is found in dry and semi-dryland steppe where the showy inflorescence hugs the ground. The succulent basal leaves, of ½ - 2" (1-5 cm) length, are seen months before the first sign of buds. and usually wither before or at the time of flowering. The bright pink to white, 1 ½ - 3" (3.5 - 7 cm) blossoms give the plant a total spread of several inches and a height of 1 -2" (1-5 cm). Each flower has 4-9 sepals and 12-18 petals. It occurs at Zone 4-7 and usually blooms June to July.

Native to North America, bitterroot belongs to the genus *Lewisia,* named for Meriwether Lewis by Frederick Pursh, who had been hired by President Thomas Jefferson to receive the specimens sent to Philadelphia from the Lewis and Clark expedition. Lewis had collected the plant in 1806 when the Shoshone Indians identified it for him as a highly desirable edible root. On receipt, the long-dried root of the specimen was broken off and planted; when it grew, the species was named *L. rediviva* as it revived.

Bitterroot has long been considered a highly valuable edible and medicinal plant by the local Indians that Lewis encountered. The roots were dug each spring when they are starchy and can be scraped to remove the bitter skin. The roots were then boiled and eaten. The Indians harvested large quantities where bitterroot grew in abundance to dry and store for future use. Bitterroots were so valuable to the Indians that they allegedly would trade a horse for a sack of them. When bitterroot is harvested today, care should be taken to only take a few roots in areas where they occur widespread and abundant in order to not impact this vulnerable plant. The roots are nutritionally rich and only 50-80 g may be sufficient to sustain a person's daily dietary requirements.

Medicinally, the bitterroot is used as an infusion to treat heart conditions or pleurisy and diabetes and as an anti-inflammatory blood purifier for liver, kidney and digestive systems.

References

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Elpel, Thomas J. 2014. Foraging the Mountain West. Hops Press LLC, Pony, MT.

Phillips, H. Wayne. 2003. *Plants of the Lewis and Clark Expedition.* Lone Pine Publishing Co, MT.

Moerman, Daniel E. 2000. *Native American Ethnobotany.* Timber Press. Portland, OR.

USDA Plants Database. Posted at: https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_arlu.pdf

…Can you imagine an entire book about a single plant? If you would like to read more about bitterroot, consider:

DeSantos, Jerry. 1993. *Bitterroot: Montana State Flower*. Falcon Press Publishing Co., Helena, MT.

This article is for educational purposes and does not condone collecting of plants that readers can't identify with certainty. The ethics of wild plant collecting is to tread softly through the plant's habitat and only pick occasionally to protect plant sustainability, as described at this agency link: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3822046.pdf

Big Picture Botany

The 5th Annual "State of the World's Plants and Fungi" report was released earlier this month, in which global scientists concluded that up to 45% of all plants and fungi could be at risk of disappearing (https://www.kew.org/sites/default/files/2023-10/State%20of%20the%20World%27s%20Plants%20and%20Fungi%202023.pdf).

What does this have to do with Wyoming? A key take-home message of the global report applies everywhere: Plants and fungi form the building blocks of our habitable planet so they are key to halting wider biodiversity loss and restoring Earth's ecosystems to full function.

The supporting checklist cites 350,386 species of known vascular plants in the world—but estimating that there are 100,000 more which have not yet been formally identified. Experts also estimate that 3 in 4 undescribed vascular plants are likely already at risk. The taxonomic progress for fungi is even farther behind. While tropical countries are the global biodiversity hotspots compared to the United States, new Wyoming species continue to be discovered on Wyoming landscapes, as well as in herbarium cabinets.

WYOMING NATIVE PLANT SOCIETY MEMBERSHIP FORM

Date _____

Name _____

Address _____

Email _____

Please check all appropriate boxes:

[ ] New member

[ ] Renewing member

[ ] Check here if this an address change

[ ] Annual membership with email notification of newsletters: $10

[ ] Annual membership with mailed newsletters: $12

[ ] Annual membership with scholarship support and email notification of newsletters: $20

[ ] Annual membership with scholarship support and mailed newsletters: $22

[ ] Life membership with email notification of newsletters: $300

[ ] Life membership with mailed newsletters: $300

In addition to the statewide organization, we have two chapters. Membership in chapters is optional; chapter members must also be members of the statewide organization.

[ ] Teton Plants Chapter annual membership: $5

[ ] Sublette Chapter annual membership: $5

[ ] Additional donation of $_____

Total enclosed: _____

Please write checks to **Wyoming Native Plant Society**

Wyoming Native Plant Society
P.O. Box 2449
Laramie, WY 82073

Wyoming Native Plant Society – Renewal and Ballot for 2024

Return to: Wyoming Native Plant Society – P.O. Box 2449 – Laramie, WY 82073 - **by 19 January!**

Name _____ Date_____
Address _____
Email _____

Please check all appropriate boxes:

[ ] New member
[ ] Renewing member

[ ] Check here if this an address change

[ ] Annual membership with email notification of newsletters: $10
[ ] Annual membership with mailed newsletters: $12
[ ] Annual membership with scholarship support and email notification of newsletters: $20
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[ ] Teton Plants Chapter annual membership: $5
[ ] Sublette Chapter annual membership: $5

[ ] Additional donation of $_____

Total enclosed: _____

Please write checks to:

Wyoming Native Plant Society

2024 WYNPS BALLOT – Please mail for arrival by **January 19** or email your vote to: wynps@wynps.org

Please vote for one person for each Officer position, and for the vacant At-Large position:

Co-Presidents ___ Joyce & Mike Evans (Fort Laramie) Secretary/Treas. ____ Dorothy Tuthill (Laramie)
Vice President ____ Kathy Lichtendahl (Clark) At-Large (1rst year of 2-yr term) ____ Ben Legler (Laramie)

[The second Board member At-Large is on the 2nd year of a 2-yr term, held by Heidi Anderson (Gardiner, MT).]
Write-in candidate: _____ **Thank you** to Greg Pappas for Board contributions in 2023!

Candidate Biographies

Joyce Evans grew up in southern Wyoming, went to UW and became a Speech Language Pathologist. She practiced for 40 years then retired to play with plants and dabble in small-town politics. She has recovered from the latter and is about to do nothing but dabble with plants.
Mike Evans is an Air Force veteran, a UW graduate in Biology, a cattle rancher, and then retired from ranching to work for the National Park Service. The WYNPS newsletter has benefited from his long-standing interest in plants and photography.

Kathy Lichtendahl is a professional conservation photographer based in northwest Wyoming, where she has lived for more than three decades. In 2021 Kathy successfully completed the inaugural Wyoming Naturalist Program and she utilizes her knowledge of the natural world in her work as a guide in Yellowstone National Park and the nearby Beartooth Mountains. Kathy served as co-chair of the 2023 Annual Wildflower Weekend.

Ben Legler is a curator in the Rocky Mountain Herbarium at UW, where he oversees the digital resources and contributes to efforts to study the flora of Wyoming and the Rocky Mountains. Prior to that, Ben served as the Collections Manager for the University of Idaho Stillinger Herbarium, and as the Informatics Specialist at the University of Washington Herbarium. He developed the Consortium of Pacific Northwest Herbaria, was an editor on the revised Flora of the Pacific Northwest, and is an avid plant photographer and collector.

Dorothy Tuthill has been a member of WYNPS for a long time. She has served on the board in several positions, including as secretary/treasurer since 2018. She recently retired from the University of Wyoming; now she has time to pursue her creative and intellectual passions, including as a volunteer at the Rocky Mountain Herbarium.

Wyoming Native Plant Society

2024 MARKOW SCHOLARSHIP/SMALL GRANT

Applications are due February 15, 2024. Awards will be made in April, 2024.

Electronic copies of this application are also posted on the WYNPS homepage at: www.wynps.org

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The Wyoming Native Plant Society promotes appreciation, understanding and conservation of native plants and plant communities through its annual scholarship/small grants program. For scholarships, thesis research may address any aspect of botany including floristics, taxonomy, ecology, genetics, plant geography, range science, paleontology, pollination biology, physiology, and mycology. For small grants, projects such as botany curriculum development, public native plant gardens, and other forms of outreach will be considered. **This competition is open to all grad students who conduct research in Wyoming, residents of Wyoming or members of WYNPS.**

Proposals must pertain to native plants/vegetation of Wyoming. Preference will be given to proposals expected to generate research data or promote public understanding. Up to $1,000 may be covered for a scholarship proposal, and up to $500 for a small grant proposal. *Awards defray direct project costs, excluding labor or conferences*. Eligible expenses include:

1. Direct costs of travel, meals, and lodging for research or education projects.
2. Supply and service expenses used for the sole purpose of the project (e.g., consumable supplies such as laboratory chemicals, soil and nursery stock, and services such as phone and computer time).

The deadline for proposals is February 15. Awards will be announced in April. The proposal should be no longer than three pages and include the following:

- Name, mailing address, telephone number (land &/or cell as appropriate) and email address of the applicant.
- Name, mailing address, contact person's name & phone number for any organization that will be directly involved with the applicant when executing the proposal.
- Short abstract of the study or project (2-5 sentences).
- Description of the study or project: objectives, methods, description of final product, and short description of past similar work (if applicable). Garden proposals should include plant lists, an educational component, and explicitly address long-term maintenance plans.
- Description of how the study or project will benefit native plants or plant conservation in Wyoming.
- Overall budget showing amount requested from WYNPS ($1,000 or less), the intended purpose of the funding, and other funding sources.
- Timeline for completion of the major components of the study or project.
- Brief statement of applicant's qualifications or biography.
- Name, address, email address or phone number of two people as references.

Successful scholarship or grant recipients will be required to submit a final report (due no later than February 15, 2025) as an article about the study or project, printed in our *Castilleja* newsletter.

Please send completed applications to: Wyoming Native Plant Society, P.O. Box 2449, Laramie, WY 82073; or wynps@wynps.org .