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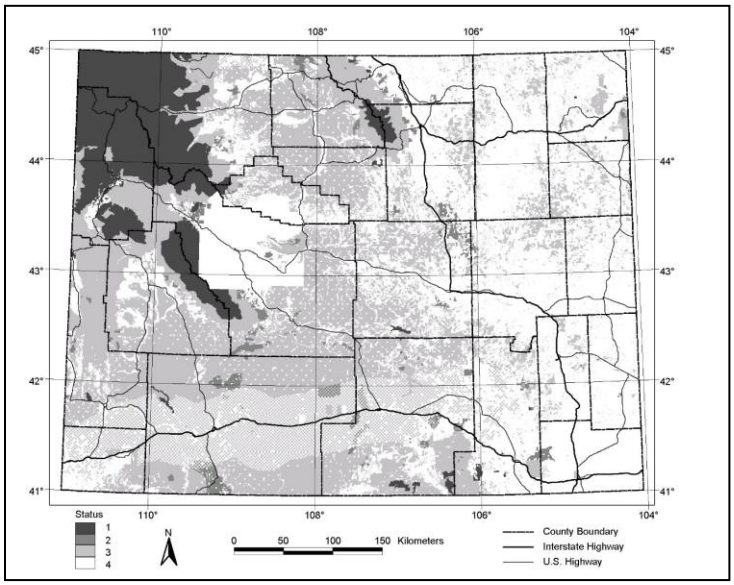

Figure 1. Gap land status map of Wyoming, from Fertig et al. (2002). *Land status is defined in Table 1.*

How Well are Plant Species Protected in Wyoming? Paying Attention to the Gaps

By Walter Fertig, Collections Manager, Marion Ownbey Herbarium, Washington State University

Introduction

One of the oldest, and still most effective, methods for conserving species is to afford them protection. But what does 'protection' actually mean, especially as applied to plant species? And how can protection be quantified?

Protection can come in two forms. Legal protection, such as being listed under the US Endangered Species Act or other federal or state statutes, imposes fines or restrictions on direct harm to the listed species, such as poaching, over-harvest, or illicit trade. Relatively few plant species receive legal protection, and those that do are often only protected on public lands. Unlike free-ranging animals, sessile plants historically have been treated as private property under the legal system. The Endangered Species Act of 1973 was revolutionary in extending government protection to listed plant species, but these protections are limited to populations on federal lands and those plants of interstate and international commerce.

Habitat protection, through the designation and management of lands as nature preserves, is the most significant tool for conservation of both rare and common plant species. In the United States, formal protection of lands for their natural and biological values dates to the late 19th Century with the establishment of national parks in Yellowstone and Yosemite. In the last 150 years, a network of protected lands has been established across the country in the form of National Wildlife Refuges, National Parks and Monuments, congressionally-designated Wilderness Areas, US Forest Service Research Natural Areas and Special Interest Areas, state parks and wildlife areas, private nature preserves, and other formally protected sites.

Ideally, these reserves would have been selected systematically to capture areas of high species richness (alpha diversity), endemism, and complementarity (beta diversity) and with an eye towards landscape heterogeneity and connecting corridors to facilitate species responses to future climate change. In reality, most of these areas were set aside for their aesthetic appeal or historical and recreational values, rather than the conservation of plant species or overall biological diversity. As a result, there is often a mismatch between existing protected lands (which are often high elevation sites of low economic utility to humans) and habitats of high significance for plant and animal species. This is especially true for rare species with small ranges or specialized habitat requirements. (Cont. p. 4)

In this Issue:

WYNPS News

2024 Annual Meeting: We are meeting jointly with the Wyoming Bioblitz and Wind River Tribal Buffalo Initiative in Morton, June 13-16, on the Wind River Reservation – next page. Meals are provided all 3 days. *Please register at* https://buff.ly/3Jp7V67*!*

New members: Please welcome the following new members to WYNPS: New members: Doug Brown, Jackson; Brot Coburn, Wilson; Carol Dean, Powell; Kristen Hershock, Jackson; Deborah Morley, Pinedale.

WYNPS Board – 2024
Co-Presidents: Joyce Evans (wyoslp@yahoo.com) and Mike Evans (iroxranch@yahoo.com), Fort Laramie
Vice-President: Kathy Lichtendal, Clark (kathylich@yahoo.com)
Sec.-Treasurer: Dorothy Tuthill, Laramie (dtuthill@uwyo.edu)
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Board-at-large: Heidi Anderson, Gardiner, MT (heidi_anderson@nps.gov) (2023-'24)

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

Check out the schedules of Chapter event, including those for Teton Plants (https://tetonplants.org/), and for the Sublette Chapter (below):
-June 11 Water Wise Garden maintenance
-June 29, 10:00 Butterfly walk near Little Soda Lake, in coord. with BOCES
-July 9 Water Wise Garden Maintenance
-July 18, 5:00 A-Frame/Elkhart trailhead vicinity walk, park @ BOCES
-August 15, Boulder Basin or Upper Green (depending on plant/moisture conditions)

Treasurer's Report: Balance as of 29 April: Scholarship = $2,528; General = $9,130.36; Total = $11,658.36.

Message from the Co-Presidents!

Spring is springing and it is an exciting time for plants, especially weeds. It is interesting to muse over weeds and try to trace the invaders back to their sources. It is even more interesting to think about those weeds that are natives and how "weeds" are defined. When we had volunteer help as we designed and planted our native plant area in Fort Laramie one of the seasoned farmers that contributed physical labor concluded, "All this work to plant a bunch of weeds!" And plant, we did. Now I have to cull the over-successful reproducers and try to trim back their exuberance. Since I am a poor pruner and worse puller of healthy plants, we have quite a selection of interesting specimens.

We are hoping for an equally exuberant and healthy group of native plant enthusiasts to join us for our annual meeting in June. What a great opportunity to pursue our interest in plants and to share information among people with a wide range of interests. We will teach and learn as a group and we will make valuable connections that extend beyond our own organizations. And, we will produce some good science. See you there!

~Joyce & Mike Evans

Next issue: Please send articles and announcements for the next newsletter by 15 Sept to:

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

Contributors to this Issue: Joyce and Mike Evans, Walter Fertig, Bonnie Heidel, Meredith Taylor, Dorothy Tuthill.

Announcing:

Special opportunity to explore our flora, June 13-15

June 13 at 1:00 pm - June 15 at 1:00 pm
Wind River Reservation, 10929 US Hwy 26, Morton[1], WY 82516

Join us this June for a WYNPS Annual Meeting like no other! This year, we will camp and explore Wind River Tribal Buffalo Initiative Land on the Wind River Reservation. For more than a century, buffalo were absent from the Wind River Indian Reservation. The Wind River Tribal Buffalo Initiative and their partners are working to bring them back. At our annual gathering, together with the BioBlitz, you can be part of this homecoming by helping survey the plants, animals, and fungi on the land. Learn more and register at https://buff.ly/3Jp7V67!

Thursday afternoon offers exciting workshops and Friday morning through Saturday morning offer an array of surveys. See the schedule at: https://rockies.audubon.org/sites/default/files/bioblitz_2024_schedule.pdf . Wyoming Native Plant Society will join the early birds in holding our annual meeting on Saturday morning, June 15 @ 7 am.

We will be using the Wind River Tribal Buffalo Initiative Headquarters as our registration and camping site. Meals will be provided all three days. Please describe any dietary restrictions you have when you register. Primitive camping is included with registration. Running water is available but you will need to bring reusable water bottles and other containers for your water use. Bathrooms are available on-site.

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. Make tracks to Wind River Indian Reservation.[2]

American Bison

Poster winners have been chosen!

In celebration of Wyoming Native Plant Month in April 2024, the Wyoming Native Plant Society received many lovely posters from 6th-8th grade students across the state. The theme of the contest was "Help Wildlife: Grow Native Plants." The four winners each received $250 and their teacher also got $250. Winners are:

- Claire S (Casper homeschooled student) and her teacher, Jody Scott;
- Violet P of Powell Middle School and her teacher, Kix Carter;
- Eva B of Torrington Middle School and her teacher, Morgan Von Lintel;
- Isla B of Pinedale Middle School and her teacher, Kandase Youtz.

Honorable mentions go to;

- Aiden W from Hulett High School (Tom Maupin, teacher);
- Ana L from Moorcroft Secondary School (Kasey Stroud, teacher);
- Bailey G from Rocky Mountain Middle School (Berta Newton, teacher);
- Ismael M from Pinedale Middle School (Kandase Youtz, teacher)
- Kaya S from Clear Creek Middle School (Aaron Kessler, teacher);
- Lottie S from Mountain View Elementary School (Randi Egley, teacher)
- Marcus B from Douglas Middle School (Emily Jensen, teacher);
- Molly D from Encampment K-12 School (Daniel Greenwood teacher).

A collages of all entries can be viewed on the WYNPS homepage: http://www.wynps.org/wp-content/uploads/2024/04/Collages.pdf

[1] 24.3 miles west of Riverton; or 31.4 miles north of Lander

[2] Participants are asked to wear clothes and shoes that have not been worn near or during handling of cattle and sheep. These two species can carry diseases such as *Mycoplasma bovis* and malignant catarrhal fever (MCF) that are fatal to buffalo.

Continued from p. 1
protected lands (which are often high elevation sites of low economic utility to humans) and habitats of high significance for plant and animal species. This is especially true for rare species with small ranges or specialized habitat requirements.

Gap Analysis: From Birds to Plants

In the 1980s, ornithologists in Hawaii conducted a study to assess how well endangered native birds were represented in existing protected areas on the Big Island. They applied early Geographic Information System (GIS) software to the question, intersecting modeled distribution of rare bird species with the location of national parks and other protected areas. The researchers were surprised to learn that most of the rare bird species were restricted to high elevation forest habitats and did not occur in the lower elevation parks (many of which were established for their active volcanic features). The "gaps" between the locations of the birds and the parks gave rise to the new field of Gap Analysis.

Gap Analysis is a strategy for quantifying the biological diversity present (or absent) within a reserve network. Typically, this is done by overlaying distribution data of an element of interest (either a species or vegetation type) onto a state or regional map depicting land ownership and management status. Lands are assigned a management status using a four-level rating scheme (Table 1) that ranges from permanently protected with an emphasis on biodiversity (gap status 1) to unprotected (gap status 4). Species or vegetation types found in gap status 1 or 2 lands are generally considered "protected" in terms of management intention (whether existing management is actually benefiting the target element can only be determined on a case by case basis). Those targets occurring in gap status 3 or 4 areas are not. Although there is little consensus as to the minimum amount of area or number of populations of a target that need to be protected to be considered adequate, gap data can provide important information for conservation planners to determine where specific holes in the protected network exist.

Initially, gap studies focused on terrestrial vertebrate species (especially birds and mammals) and major vegetation types because data were readily available and they were presumed to be adequate surrogates for overall biological diversity. In recent years, the pool of species used in gap analyses has expanded to include fish, butterflies, ants, snails, and other invertebrates. Vascular plants have also been incorporated into some gap assessments. Plants offer several advantages for gap work because of their high species richness (relative to vertebrates, at least!) and the availability of robust GIS datasets from digitized herbarium specimens, natural heritage programs, citizen science websites (like iNaturalist), and annotated species checklists.

Table 1. Gap land status categories (adapted from Merrill et al. 1996).

Gap Category	Definition
1	An area having permanent protection from conversion of natural land cover and a mandated management plan to maintain a natural state within which disturbance events of natural type, frequency, and intensity are allowed to proceed without interference, or are mimicked through management. Examples: designated Wilderness Areas, National Parks and Monuments, National Wildlife Refuges, Nature Conservancy preserves, and Research Natural Areas.
2	An area having permanent protection from conversion of natural land cover and a mandated management plan in operation to maintain a primarily natural state, but which may receive use or management practices that degrade the quality of existing natural communities. Examples: Bureau of Land Management Areas of Critical Environmental Concern, National Park Service managed Natural Recreation Areas, state Wildlife Habitat Management Areas, Nature Conservancy conservation easements.
3	An area having permanent protection from conversion of natural land cover for the majority of the area, but subject to extractive uses of either a broad, low intensity type or localized intense type. Examples: BLM, US Forest Service, and state park lands managed under multiple use mandates.
4	An area that lacks an irrevocable easement or mandate to prevent conversion of natural habitat types to anthropogenic habitat types and allows for intensive use throughout the tract, or existence of such restrictions is not known. Examples: private, state, and tribal lands.

Gap studies have rarely addressed differences in geographic distribution and abundance patterns within taxonomic groups. Species diversity is not distributed randomly or evenly in nature, as individual taxa typically respond independently to environmental factors. Nonetheless, plant geographers have long recognized general patterns in co-distribution of species at regional scales and across major biomes. Differences in the representation of species in the protected area network based on their geographic distribution or biome affinity may be useful for identifying specific areas to target for future conservation attention. Likewise, differences in the degree of representation in protected areas between abundant and rare species can help planners focus on missed "fine filter" components (individual uncommon species).

Conducting a Gap Analysis of the Flora of Wyoming

As part of my doctoral dissertation at the University of Wyoming in the early 2000s, I received funding from the National Gap Program to conduct the first gap assessment of the entire vascular flora of the state. This effort was greatly facilitated by the comprehensive sampling of Wyoming by Ron Hartman and Ernie Nelson of the Rocky Mountain Herbarium (RM) and their cadre of graduate students over a 35-year period, starting in the early 1980s. Using RM's digital specimen database and other location information from the Wyoming Natural Diversity Database and species checklists for some protected areas (such as Yellowstone National Park), I compiled nearly 210,000 location records for 2,835 native and introduced vascular plant species from Wyoming. These data points were overlaid onto the state gap land status coverage developed for the original Wyoming Gap Analysis Project (see Merrill et al. 1996) to determine the number and percentage of locations for each species in the four gap land status categories (Figure 1, Table 1). I also categorized each of the native plant species according to their state abundance, geographic distribution pattern (e.g. endemic, disjunct, peripheral, widespread), conservation priority, major biomes, and ecoregions (See Fertig 2011 for more details).

Protection of Wyoming's Native Flora

Following the establishment of Yellowstone National Park in 1872, at least 10.6% of the land area of Wyoming has been protected (Figure 1). This figure is close to the worldwide average of 12% and exceeds the goal of 10% set by the Fourth World Congress on National Parks and Protected Areas in 1992. Conservation biologists have questioned whether 12% is really sufficient to protect relevant examples of all biodiversity on Earth. In 2022, the United Nations Biodiversity Conference in Montreal recommended a global target of 30%. The recent America the Beautiful Initiative set a goal of managing 30% of lands in the United States with an emphasis on biodiversity by 2030.

Wyoming's reserve network contains at least one occurrence for 84% of the native vascular plant species found in the state. This number supports the widely held (but rarely quantified) conservation axiom that the "coarse filter" should capture 85-90% of all species in a given area. The underlying premise of the coarse filter is that a high percentage of species richness can be protected in a reserve system that contains a representative cross-section of the primary natural plant communities of a region. Wyoming's network of protected areas is arguably not a true coarse filter in that 75% of the major land cover types are absent or inadequately represented according to Merrill et al. (1996). Overall, the state's reserve system is strongly biased towards high elevation alpine and montane communities with 90% of protected acreage within national parks and wilderness areas in northwestern Wyoming.

Less than 15% of the state's native plant species are not currently represented in Wyoming's preserve network. Almost one-quarter of these are local or regional endemics with their range centered in Wyoming. Attaining full representation of all native species will necessitate targeting specific taxa and their habitats that are falling through the reserve safety net-- the so-called "fine filter" approach (see Groves et al. 2002). In Wyoming, unprotected species are disproportionately comprised of historical, extremely rare, and rare taxa with geographically restricted ranges (state or regionally endemic, disjunct, sparse, or peripheral). Indeed, rare and endemic plant species are 2-4 times more likely to be inadequately protected as common and widespread taxa Unprotected plant species occur throughout the state but are especially prevalent in the floras of the Great Plains grasslands, Intermountain desert steppe, and Eastern deciduous forest biomes and in the Black Hills, Northern Great Plains, Central Shortgrass Prairie, and Wyoming Basins ecoregions. These are precisely the habitats and geographic regions that are under-represented in Wyoming's protected area network.

Table 2. Protection status of the flora of Wyoming based on a threshold of 10% of all populations or a minimum of 5 populations in gap status 1 or 2 lands.

Category	Unprotected	Inadequately Protected	Adequately Protected	No Data	Total
A. All Species					
Total Flora	506	386	1943	40	2875
Native Taxa	365	344	1742	32	2483
Non-Native Taxa	141	42	201	8	392
B. State Abundance (native taxa only)					
Historical	27	0	13	0	40
Reported	0	0	0	25	25
Extremely Rare	189	0	209	2	400
Rare	122	61	413	1	597
Local or Uncommon	26	223	443	4	696
Somewhat Common	1	57	357	0	415
Very Common	0	3	307	0	310
C. Geographic Distribution Pattern (native taxa only)					
Local Endemic	11	5	28	2	46
Regional Endemic	55	45	139	3	242
Disjunct	33	4	79	6	122
Peripheral	195	16	284	15	510
Sparse	21	8	52	1	82
Widespread	50	266	1160	5	1481
D. Conservation Priority (native taxa only)					
Extremely High	6	1	6	0	13
High	11	3	19	0	33
Watch	39	5	41	1	86
Medium	160	7	263	1	431
Low	132	326	1396	5	1859
Need Data	17	2	17	25	61
E. Biome (native taxa only). Numbers in parentheses are for species unique to that biome					
Alpine	3 (1)	1 (0)	415 (121)	7 (6)	426 (128)
Disturbed Areas	12 (1)	25 (0)	60 (3)	0 (0)	97 (4)
Eastern Deciduous Forest	20 (15)	13 (1)	71 (32)	2 (2)	106 (50)
Great Plains Grasslands	108 (81)	161 (72)	272 (49)	2 (1)	543 (203)
Intermtn. Desert Steppe	103 (79)	146 (72)	405 (98)	6 (5)	660 (254)
Rocky Mountain Forest	94 (73)	73 (36)	913 (344)	11 (10)	1091 (463)
Wetlands	76 (65)	67 (41)	568 (374)	6 (6)	717 (486)
F. Ecoregion (native taxa only). Numbers in parentheses are for species unique to that ecoregion					
Black Hills	95 (43)	179 (2)	650 (36)	4 (1)	928 (82)
Northern Great Plains	114 (38)	224 (1)	574 (9)	2 (0)	914 (48)
C. Shortgrass Prairie	52 (10)	144 (1)	278 (1)	2 (2)	476 (14)
Wyoming Basins	143 (83)	255 (46)	872 (64)	6 (6)	1276 (199)
Utah-Wyoming Rocky Mountains	62 (28)	124 (4)	1480 (379)	12 (7)	1678 (418)
S. Rocky Mountains	92 (36)	145 (14)	1013 (35)	10 (5)	1260 (90)

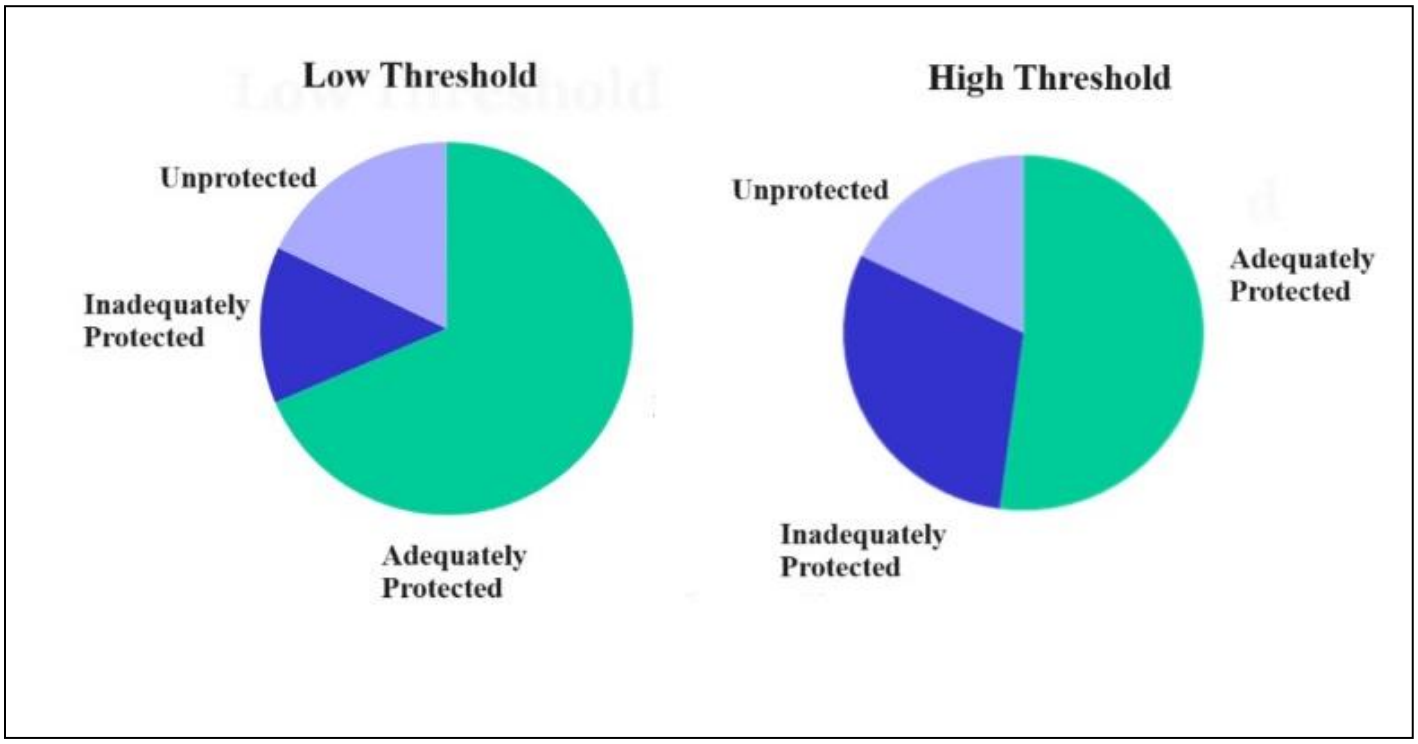

Figure 2. Adequacy of Protection of Wyoming Vascular Plants based on two thresholds: Low (species are adequately protected if at least 5 populations or >10% of all populations are present in gap status 1 or 2 lands) or High (species are adequately protected if at least 10 populations or >20% of all populations are present in gap status 1 or 2 lands).

Conservation biologists acknowledge that mere representation within a reserve network is insufficient to ensure the long term persistence of a species in the face of natural succession, anthropogenic disturbance, climate change, or stochastic events. Including multiple occurrences of each species (redundancy) in a protected area system acts as an insurance policy in case any individual population is lost. Unfortunately, no consensus has been reached on the ideal number or percentage of populations that should be replicated in a reserve network. Practitioners working with rare species generally advocate numeric population targets for conservation since the total number of populations for these species is, by definition, quite limited. Several studies have suggested five populations as a practical target for securing adequate genetic representation for rare plants. Percentage-based targets have been used most frequently to identify areas necessary to preserve biological diversity across political units. A goal of 10-12% representation of land area or populations has been widely applied global conservation efforts.

In Wyoming, 344 native plant taxa (nearly 14% of the indigenous flora) known from the protected area network have fewer than 5 protected occurrences or less than 10% of all populations in gap status 1 or 2 lands (Table 2). These inadequately protected species tend to be rare or local to uncommon, but are often more widespread and of lower conservation priority than the 365 completely unprotected species. Inadequately protected plant taxa are also most likely to be from Great Plains grasslands and Intermountain desert steppe biomes and the Central Shortgrass Prairie, Northern Great Plains, Wyoming Basins, and Black Hills ecoregions.

Recently the 10-12% objective has been sharply criticized as inadequate in light of growing evidence that protection of 30-50% or more of a species' range may be required for long term persistence (see Svancara et al. 2005). Doubling the lower threshold for adequate protection to 20% of all populations or 10 total populations, the number of inadequately protected native plant taxa in Wyoming more than doubles to 742 species (Figure 2). For most of the rare, restricted, and higher conservation priority species the number or percentage of protected occurrences tends to be either zero or more than 20%, which is probably due to their relatively low overall number of populations. The number of

inadequately protected species more than doubled for all biomes and ecoregions at the upper threshold, with even higher rates of increase for the more "well-protected" Rocky Mountain forest, wetland, and alpine biomes and Utah-Wyoming and Southern Rocky Mountains ecoregions. The number of unprotected species unique to a single biome or ecoregion also doubled using the higher protection cutoff.

Some Final Thoughts

Once specific plant taxa, habitats, and geographic areas that are missing or inadequately represented in the reserve network have been identified, conservation practitioners can begin identifying new sites that might fill those holes. Enough common and widespread species are still under-protected in low elevation grasslands, wetlands, and desert basin areas of eastern and southern Wyoming that a coarse-filter approach would probably be sufficient to capture a large number of missing species. Opportunities for coarse-filter conservation also exist in under-represented areas of the Black Hills, Sierra Madre, northern Laramie Range, Uinta Mountains, and Salt River/Wyoming ranges. More finely-targeted assessments would be needed for the rarer and more locally distributed species; though these frequently do co-occur in rare and unusual habitats that could themselves be a focus for conservation.

The results gained from using the entire flora of Wyoming for gap analysis corroborate many of the findings for terrestrial vertebrates and land cover types. In both studies, species and vegetation types from low elevation desert basin and grassland habitats of eastern and southern Wyoming were more likely to be missing or poorly represented in the state's protected area system than alpine and montane forest and wetland areas of the northwestern part of the state. Similarly, plant and animal species of limited geographic area (particularly ones at the periphery of their range) were more likely to be under-protected than more widely distributed taxa.

Not all protected areas have been adequately surveyed, especially remote wilderness areas, wildlife habitat management areas, Nature Conservancy easements, or BLM ACECs, and so some species may be better protected than currently known. Likewise, private and tribal lands ranked as gap status 4 tend to be greatly under-sampled and thus the number or percentage of unprotected populations may be underestimated.

Over the long term, filling gaps in the protected area network will be complicated by climate change and our limited knowledge of how individual species will respond. There is an emerging consensus that species ranges are likely to shift over the next several decades or century, just as they have done in the late Pleistocene and early to mid Holocene. The species composition of currently protected areas will not be immune to these changes, as some taxa become locally extirpated and others arrive by migration. Gap analyses will need to be repeated periodically to reassess which species are missing or inadequately represented in the protected area network as the distribution of the flora changes.

As this case study from Wyoming demonstrates, vascular plants can be employed as effectively as vertebrate taxa or land cover types for gap analysis. Vascular plants are particularly useful barometers of an area's total biodiversity because of their high species richness (especially of endemic and rare taxa). The availability of large point location datasets for plants in areas like Wyoming makes it possible to assess the gap status of an entire flora without resorting to time and labor-intensive correlational modeling. Assessing the gap status of plant species according to their abundance, geographic distribution, conservation priority status, biome affinity, and ecoregional range helps identify particular species groups, regions, and habitats that are poorly represented in the reserve network. Used alone or in conjunction with vertebrates and land cover, gap analysis of vascular plant floras improves the effectiveness of conservation planning by focusing on those elements of biological diversity most in need of protection.

Practitioners of conservation biology often lament that conservation planning must take place in the absence of thorough data on the abundance, distribution, and composition of local biotas. This has resulted in the use of surrogates (usually well-studied and relatively large-bodied organisms, such as mammals, birds, or trees) or a coarse-filter of land cover types to represent all species. The advantage of applying gap methods to a large data set of diverse species, such as an entire flora, is that much guesswork is eliminated: we know which specific taxa are missing or poorly represented and which specific geographic areas and biomes need better protection. This kind of "biological bookkeeping" is vital if scarce conservation resources are to be expended wisely.

References – Posted on the WYNPS homepage

Ethnobotany - Part 10.
Oregon grape (*Mahonia repens*)

By Meredith Taylor, Certified Wyoming Naturalist

Mahonia repens
by Robert and Jane Dorn
(https://www.wyndd.org/gallery/)

Found in the forest or montane grassland ecosystem throughout the foothills of Wyoming and the West, Oregon grape (also called creeping barberry) is an abundant native low growing plant.

Plant description- Oregon grape is a dicotyledonous, perennial plant of the Berberidaceae or Barberry family. Native to Wyoming and the Rocky Mountain West, it grows as a low shrub of about 1 ft (0.3 m). Small stems support alternate, broad, pinnately compound leaves with spiny, holly-like teeth. The clusters of yellow flowers bloom in the spring with 6 petals and 6 sepals which mature to blue, fleshy, edible, tart berries that are anti-oxidant.

Oregon grape has many ethnobotanical uses as a medicinal tea of the whole plant to prevent gallbladder and kidney stones, as an intestinal tract tonic, as well as an antipyretic for fever. It is considered an important plant in traditional Chinese medicine to treat tuberculosis, dysentery and wounds. The author used the root as a potent ingredient with other medicinal plants, such as *Artemisia* (mentioned in an earlier column) to successfully cure Lyme's Disease in her husband after he developed the bulls-eye reaction from a deer tick bite.

The Oregon grape's blue berries are edible raw as well as in preparation of tangy fruit jam and serve as an important resource for native wildlife. Oregon grape may be harvested sustainably by snapping off a small branch of leaves and berries at the main stem rather than pulling or digging up the roots. This method of harvest leaves the roots of the plant to continue growing sustainably in the future. The mature berries may be gathered easily by shaking them in a bag leaving the plant in place.

References:

Dorn, Robert, 2001, Vascular Plants of Wyoming, 3rd ed. Mountain West Publishing, Cheyenne, WY.
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.
USDA Plants Database, https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_arlu.pdf

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 the occasional leaf or flower to protect plant sustainability. *Check directly with the agency about their policy if you want to harvest native plants on public land.*

Reminder:

GROWING NATIVES

Are you thinking about growing native plants this year? Our homepage (www.wynps.org) has a searchable spreadsheet with links to 40 original articles by Robert Dorn! Go to "Resources/ Gardening with Natives" to get the spreadsheet, searchable by plant name or categories of interest.

Announcing:

Wyoming Species of Concern List Update

A Draft Wyoming Plant Species of Concern List is available to Wyoming botanists for review. It presents additions and deletions since the 2018 list. It also cross-references existing federal agency designations. It's available by contacting Bonnie Heidel, Wyoming Natural Diversity Database (WYNDD) at: bheidel@uwyo.edu or https://www.uwyo.edu/wyndd/ .

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