Following is the Draft State of Washington Natural Heritage Plan for internal review. This draft is to be forwarded to the Natural Heritage Advisory Council in December and is subject to their comments and recommendation during the January 2018 Council meeting. Publication design to follow.

STATE OF WASHINGTON
NATURAL HERITAGE PLAN
2017

"It is, therefore, the public policy of the State of Washington to secure for the people of present and future generations the benefit of an enduring resource of natural areas by establishing a system of natural area preserves, and to provide for the protection of these natural areas."

Revised Code of Washington, Chapter 79.70; Natural Area Preserves Act

1. Introduction

Washington has a tremendous diversity of landscapes, ecosystems, and species. The beauty and diversity of Washington defines the state. Washington is home to more than 3,100 vascular plant species, 140 mammals, 470 freshwater and marine fishes, 341 birds, 25 amphibians, 21 reptiles, thousands of mosses, lichens, liverworts, and fungi, and tens of thousands of invertebrates. Some of these species occur nowhere else on earth, for example 86 plant species are unique to the state.

Although Washington is rich in biodiversity, we cannot take the continued existence of that diversity for granted. Many of our native species and ecosystems are facing stresses from a number of factors, including conversion of land for agricultural, residential, and commercial uses, invasion by exotic species, and the impacts of climate change.

In passing the Natural Area Preserves Act in 1972, the Washington State Legislature recognized the need for, and benefits of, permanently designating areas explicitly for conservation. These benefits included, among others, providing habitat for rare and vanishing species and ecosystems, and ensuring the availability of places for scientific research and education. The act authorized the Washington State Department of Natural Resources (DNR) to work with federal, state and local agencies and private organizations to establish and manage a statewide system of natural areas. Today, this system consists of lands managed by numerous federal and state agencies and private conservation organizations.

In 1981, the legislature amended the Natural Area Preserves Act and established the Natural Heritage Program within DNR. The Natural Heritage Program was developed specifically to provide an objective basis for establishing priorities for conservation actions. The Natural Heritage Program mandate was to:

- maintain a classification of the state's natural heritage resources
- maintain an inventory of the locations of these resources
- share this information with agencies, organizations and individuals for environmental assessment and land management purposes, and
- assist with the nomination and selection of sites for inclusion within the statewide system of natural areas.

Today, the Natural Heritage Program continues to connect conservation science with conservation action by collecting, maintaining, and distributing data on rare species and ecosystems, as well as providing a number of other services and products in support of conservation in Washington.

The 1981 amendment to the act also required the Natural Heritage Program to develop the State of Washington Natural Heritage Plan ("Plan") to provide the framework for a statewide system of natural areas by:

- identifying the criteria and process by which natural areas are selected
- identifying priority ecosystems and species for protection
- outlining methods of protection, and
- identifying the roles of agencies / organizations in natural area protection.

The first Plan was completed in 1983. The basic criteria and process by which natural areas are selected have not significantly changed since that first edition; they are described in Section 2.3.1 of this document. Natural area selection is driven by the presence of priority ecosystems and species. Current lists of these priorities are available on the Natural Heritage Program's website (https://www.dnr.wa.gov/NHPconservation).

Although the basic criteria and process for selecting natural areas remains the same, the science of conservation biology has changed significantly since the completion of the first Plan. Our understanding of what it takes to truly conserve our native species and ecosystems has improved; we are paying more attention to how landscape context might affect the viability of the priority species and ecosystems present within a potential natural area. Climate change is expected to amplify the challenges of ensuring conservation of species and ecosystems within natural areas. These changes – that we are already beginning to experience – include

WHAT YOU WILL FIND IN THIS PLAN

- The processes of assigning priorities to species and ecosystems and selecting sites for addition to the statewide system of natural areas
- Information about the statewide systems of natural areas including the different types of land included in the system.
- Efforts by the DNR Natural Heritage and Natural Areas Programs to expand the impact of the Natural Area Preserves and Natural Resources Conservation Area Acts

increased spread of some invasive weeds, increased chance of catastrophic wildfire, increased ocean acidity, and reduced climate suitability.

There are also many more agencies and organizations involved in conservation today than there were in the early 1980s. By building new and strengthening existing partnerships, we have the opportunity to improve our knowledge about what is already protected on conserved lands, provide enhanced access for education and recreation, and improve the effectiveness and efficiency of conservation

This 2018 edition of the *State of Washington Natural Heritage Plan* reflects current conservation science as well as new approaches to most effectively achieve conservation success.

Natural areas provide ecosystem services

"Ecosystem services" can be thought of as "benefits of nature." The ecosystem services provided by Washington's natural areas include greenhouse gas and climate regulation, water regulation, nutrient filtration, habitat for pollinators, fish, and other wildlife, and opportunities for recreation and aesthetic appreciation.

The value of the ecosystem services provided by Washington's natural areas have not been quantified, but it is expected to be substantial. For example, it has been estimated that at a minimum, the ecosystems within Thurston County provide $608 million (Flores and others 2012) and the open spaces in the Central Puget Sound region provide $11.4 to $25.2 billion (Chadsey and others 2015) in economic benefits to the regional economy every year

2. Implementing the Natural Area Preserves Act

The Washington Natural Heritage Program was established specifically to bring objectivity to setting conservation priorities and the process of selecting sites for potential natural areas designation.

The Natural Heritage Program's approach to conservation addresses three questions:

- Classification: What are the components of biodiversity that are of conservation concern?
- Inventory: Where do the various components occur?
- Conservation Planning: What needs to be done to protect the individual components?

These questions are addressed by Natural Heritage Program staff in an ongoing and iterative manner. Each step—classification, inventory, and conservation planning—is repeated as more information is gathered, stressors and threats develop, and/or conservation actions take place. Thus, both the understanding of biodiversity conservation and the outcome of conservation actions improve over time. In addition, by evaluating areas for conservation action based on an objective standard, the efficiency of conservation is increased by prioritizing areas of highest conservation value. For more detail on this approach, visit https://www.dnr.wa.gov/NHPmethods.

The Washington natural Heritage Program is part of a network of more than 80 natural heritage programs located in the U.S., Canada, Latin America, and the Caribbean. This network is known as NatureServe (http://www.natureserve.org). Information about species and ecosystems can be readily shared across the network because similar methodologies and data management standards are used by all network members, which increases the accuracy and utility of conservation data and, ultimately, the effectiveness and efficiency of conservation actions.

2.1. Classification: What are the components of biodiversity that are of conservation concern?

Establishing clear priorities for species and ecosystems is critical to successful conservation. The Natural Heritage Program uses the global and state ranking system developed by NatureServe and used by its member natural heritage programs to determine the conservation status of species and ecosystems (see http://www.dnr.wa.gov/NHPmethods). This rank is then used to set targeted priorities for building the statewide system of natural areas according to criteria described in this section of the Plan. This process produces a shorter list of species and ecosystems to most efficiently achieve conservation goals.

2.1.1. Species

The Natural Heritage Program applies the following considerations to specify priority levels for conservation of species:

- Is the species suspected of being more widespread than the data indicate?
- Does the distribution pattern convey concern? For example, more concern would apply to species that are locally endemic (occurring nowhere else), and populations that are peripheral (on the edge of the species' distribution), or disjunct (widely separated from other populations of the same species).
- Are demographic issues significant? These issues include small population size, declining population size, poor reproduction, etc.
- Are habitat issues significant? This considers factors such as whether the amount of habitat is declining, if maintenance of the habitat is dependent on regular disturbance such as fire or flood, and if the habitat is restricted to a small geographic area.

Natural Heritage Program staff, with input from external experts, rigorously review the lists of priority species. The lists can be found at https://www.dnr.wa.gov/NHPspecies.

NATURAL HERITAGE PLAN SPECIES PRIORITY RANKINGS[1]

Priority 1
These species are in danger of extinction across their range, including Washington. Their populations are critically low or their habitats are significantly degraded or reduced.

Priority 2
These species may become endangered across their range or in Washington if factors contributing to their decline or habitat loss continue.

Priority 3
These species are vulnerable or declining and could become endangered or threatened throughout their range without active management or removal of threats to their existence.

[1]For ecosystems, priorities are based on how well each is represented within existing natural areas, rarity, and degree of threat.

2.1.1.1. Changes in the list of priority plant species

Every two years, a statewide community of botanists helps to review the rare plant list by contributing sighting records, suggesting changes or additions, and sharing their professional judgment. In 2017, there were 113 changes to the list of priority plant species.

2.1.1.2. Changes in the list of priority lichen and moss species

Based on a review in 2011 by Northwest Lichenologists, the Natural Heritage Program has identified 52 priority species of lichens and five priority species of mosses in Washington. This Plan is the first to include priority lists of nonvascular species. These lists are likely incomplete because few experts on the organisms exist, and relatively little is known about the abundance and distribution of many of the species. The Natural Heritage Program will continue to pursue opportunities to partner with others to update these lists.

2.1.1.3. Changes in the list of priority animal species

The list of priority animals for conservation action is complete for vertebrate species and partially complete for invertebrate species. The primary factor limiting the evaluation of invertebrates is a lack of information on the abundance and distribution of many species. In 2017, there were 31 changes to the priority ranks of animal species. In addition, there were taxonomic changes to two species, without changes in priority.

Why did the priority ranks change?

Plants removed as a priority:
- change in taxonomy: 1 species
- improved status: 1 species
- improved knowledge: 2 species

Plants lowered in priority:
- change in taxonomy: 2 species
- improved status: 2 species
- improved knowledge: 2 species

Plants added as a priority:
- improved knowledge: 13 species
- declining status: 4 species

Plants elevated in priority:
- improved knowledge: 1 species
- declining status: 3 species

Animals removed as a priority:
- change in taxonomy: 1 species
- improved status: 1 species
- improved knowledge: 2 species

Animals lowered in priority:
- change in taxonomy: 2 species
- improved status: 2 species
- improved knowledge: 2 species

Animals added as a priority:
- improved knowledge: 13 species
- declining status: 4 species

Animals elevated in priority:
- improved knowledge: 1 species
- declining status: 3 species

More complete explanations of the changes for each species are available in the lists available at https://www.dnr.wa.gov/NHPspecies

2.1.2. Ecosystems

Similar to species, several factors are considered when establishing the statewide priorities for ecosystem conservation. These include:

- How adequately is the ecosystem type represented in the natural areas system?
- How rare is the ecosystem type?
- What is the degree of threat to the ecosystem type?

The list of priority ecosystems can be found at https://www.dnr.wa.gov/NHPconservation. Ecosystems are assigned a priority rank for each ecoregion in which they are found. Within an ecosystem type, the priority rank may differ between ecoregions due to different levels of rarity and/or protection of that type within the ecoregions. Since the last printed update of the Plan in 2011, the Natural Heritage Program has added two Priority 1 ecosystems and elevated the level of another ecosystem in each of the ecoregions in which it is found.

Washington's ecosystems are classified according to three separate systems: marine and estuarine (Dethier 1997), wetland (Kunze 1994), and upland (US Natural Vegetation Classification). Using three different systems creates challenges due to differences in the scale considered for classification units and gaps in classification for some ecosystems in Washington. Using these three methods also creates nearly 1,400 classification units, which is not practical for reviewing in order to set priorities.

To address the lack of consistency and improve the effectiveness of ecosystem conservation, the Natural Heritage Program is developing a simplified, unified classification that applies to all ecosystems in the state, reduces the overall number of classification units, maintains enough resolution to capture biodiversity patterns, and reflects contemporary taxonomy. This new classification system is intended to be available for the next edition of the Plan.

In addition, the Natural Heritage Program is updating the programmatic approach to determining ecosystem priorities. While the current approach considers rarity and overall condition of an ecosystem (i.e., conservation significance), it also emphasizes how well represented an ecosystem is in the statewide system of natural areas. Future versions of the plan will clearly separate conservation and representation priorities.

Ecoregions

The Natural Heritage Program uses the concept of ecoregions to help identify conservation priorities within Washington. Ecoregions reflect broad ecological patterns occurring on the landscape. In general, each ecoregion has a distinctive composition and patterns of plant and animal species distribution. The ecoregion boundaries used by the Natural Heritage Program have been modified slightly from those developed by the U.S. Environmental Protection Agency (2000) to better reflect local conditions. For more information on Washington's ecoregions, visit http://www.dnr.wa.gov/natural-heritage-program

Changes to the list of priority ecosystems

- Added Raised Bog as Priority 1 in Pacific Coast ecoregion
- Added Calciferous Wetland as Priority 1 in Canadian Rockies ecoregion
- Elevated Low Elevation Freshwater Wetland to priority 1 in Pacific Coast ecoregion
- Elevated Low Elevation Freshwater Wetland to priority 1 in 7 ecoregions, and priority 2 in 2 ecoregions

2.2. Inventory: Where do the priority species and ecosystems occur?

Gathering, managing and sharing ecological information and applying it to conservation planning is fundamental to establishing a statewide system of natural areas. The Natural Heritage Program was created specifically to provide an objective basis for establishing priorities for a broad array of conservation actions. To do this, the program inventories the state's ecosystems and species, and gathers other scientific data that can be synthesized into usable information to help inform conservation decisions and actions by individuals, government agencies, and conservation organizations.

The Washington Natural Heritage Program currently tracks nearly 4,000 locations of more than 365 rare plant species. In an effort to keep the information as current as possible, the Natural Heritage Program partners with the Rare Care program at the University of Washington's Center for Urban Horticulture. Trained volunteers revisit known populations, monitor their overall condition, and provide updated information to the Natural Heritage Program. Since several of the state's rarest plant species are listed or being considered for listing under the federal Endangered Species Act, the Natural Heritage Program coordinates with the US Fish and Wildlife Service to prioritize species for inventory, monitoring, and research projects.

Data collection by the Natural Heritage Program zoologist complements efforts by the Washington Department of Fish and Wildlife. Recent projects include determining the extent of populations of the sand-verbena moth, a candidate for listing under the Endangered Species Act, and diversity and distribution of fairy shrimp throughout the state.

The Natural Heritage Program also collects information on the distribution, abundance, condition, threats, and trends of rare and high quality ecosystems. The program currently tracks the location of 1,092 wetland and riparian communities and 1,348 upland communities. Data on the locations of these communities come from a variety of sources, including projects focused on specific community types and information provided by private, non-profit, and government collaborators.

Washington Natural Heritage Program data are available in various formats, including a Map Viewer of Rare and High Quality Wetlands of Washington State. More information can be found at https://www.dnr.wa.gov/NHPdata.

2.3. Conservation Planning: What needs to be done to protect species and ecosystems? What are the conservation tools?

There are a variety of tools that can be used to provide protection for rare species and rare and high quality ecosystems. This Plan focuses on acquisition of land to build a statewide system of natural areas, as established in the Natural Area Preserves Act (RCW 79.70) and the Natural Resources Conservation Areas Act (RCW79.71). Some of the other tools the Natural Heritage and Natural Areas Programs support, including providing data to support land-management policies, and providing opportunities for education and research are described in *Section 4 - Extending the reach.*

2.3.1. How are potential new natural areas identified?

The species and ecosystem priorities established by the Natural Heritage Program guide the selection of potential additions to the statewide system of natural areas, and inform the identification of key conservation acquisitions funded through the Washington Wildlife and Recreation Program.

A site generally becomes a candidate for designation as a natural area upon the discovery of a place that is in remarkably good ecological condition or extremely valuable for the continued existence of a rare species. Some discoveries are made by Natural Heritage Program scientists during the course of their field work investigating priority species and ecosystems. In other cases, a Natural Heritage Program scientist verifies a lead provided by other state or federal agency employees, academic faculty or researchers, private conservation groups, or individuals.

Once a prospective natural area has been identified, it is assessed from two different standpoints: the occurrence of priority species and ecosystems within the site, and the integrity of the site as a whole.

2.3.1.1. Species and ecosystem occurrence analysis

Occurrences of priority species or ecosystems within a prospective site are assessed considering their overall condition and viability. For rare species and ecosystems, the goal of designating a natural area is to make a significant contribution to the overall conservation of those species and ecosystems. For common ecosystems, the goal of designating natural areas is to provide protection for the best remaining, least-modified examples. To that end, the degree to which the occurrence is a representative example of that ecosystem type is also assessed. Factors considered during the species and/or ecosystem occurrence analysis include:

- Size: population size for rare species, or for ecosystems, the area occupied.
- Condition: the appropriateness or quality of habitat for a species, the species composition of the ecosystem or habitat, the functioning of natural processes within the ecosystem, and the relative maturity of ecosystem development.
- Landscape context: the condition of the landscape surrounding and affecting the occurrence.

Most prospective natural areas have more than one priority species or ecosystem. It is clearly a more efficient use of public and private resources to select sites with more than one priority feature, thereby potentially reducing the total number of sites necessary to adequately protect biodiversity and

ecosystem functions. However, in some cases, a single species or ecosystem may be sufficient to warrant establishment of a natural area.

Types of Natural Areas Recognized in the Plan

[include map of natural areas]

In passing the Natural Area Preserves Act, the legislature emphasized that all lands within the state are "…subject to alteration by human activity…" except those lands that "…are expressly dedicated by law for preservation and protection in their natural condition…"(RCW 79.70.010). The ***statewide system of natural areas*** includes Natural Area Preserves, Natural Resources Conservation Areas, Research Natural Areas, Areas of Critical Environmental Concern, and Biological Study Areas. Referred to in this Plan as ***natural areas***, these sites emphasize conservation and scientific and educational use, and include federal, state, and private lands.

Natural Area Preserves protect the best remaining examples of many ecological communities including rare plant and animal habitats and provide opportunities for research and education; Natural Area Preserves are managed by DNR, Washington Department of Fish and Wildlife, Washington State Parks and Recreation Commission ("State Parks"), and some non-profit land trusts.

Natural Resources Conservation Area is a designation unique to DNR and may involve other conservation partners. These areas provide the potential for development of low-impact recreation in addition to providing protection for priority species and ecosystems and opportunities for research and education.

The ***Research Natural Area (RNA)*** designation is used by the U.S. Forest Service, U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Department of Energy, and the Department of Defense; ***Areas of Critical Environmental Concern (ACEC)*** are designated by the Bureau of Land Management; and the ***Biological Study Area (BSA)*** designation is used by universities in Washington. RNAs, ACECs, and BSAs are established to protect important historical, cultural, and scenic values, fish and wildlife, or other natural resources and are strictly managed for research and education. Thus, these areas provide a high degree of protection and are similar to state Natural Area Preserves.

Many other land-use designations can contribute to the conservation of native species and ecosystems. National parks and wilderness areas, for example, are places where human-related impacts are minimized and native species and ecosystems are maintained in good ecological condition. However, such areas may have significant levels of recreation and other historical land uses, such as mining and grazing, and thus are not considered part of the statewide system of natural areas. See *Section 4 - Extending the reach.*

2.3.1.2. Site analysis

The site analysis for potential natural areas emphasizes ecological quality, diversity, and ecological viability as characteristics of the site as a whole. The primary question that must be satisfactorily answered is: if designated, could the natural area be successfully managed through time to maintain the primary species and/or ecosystems? Factors assessed include:

- How fragmented is the landscape? How isolated is the potential natural area from other reasonably intact ecosystems?
- Are natural processes disrupted by site isolation or other factors? Can management activities be used to mimic natural processes such as fire?
- Is the site susceptible to effects from changing land uses on nearby lands? Would development of nearby lands have a significant negative impact, and if so, could this be avoided through site boundary design?
- What are the known management issues for the site? Is the control of invasive species a current or anticipated challenge in maintaining the site? Does current human use of the site create or introduce negative impacts to the site's conservation value?

2.3.2. What is the process of approval?

The three state agencies that manage natural areas (DNR, State Parks and Department of Fish and Wildlife) follow similar processes to establish new natural areas. This process is described briefly, below.

Each federal agency and private non-profit organization has its own process for establishing new natural areas, which are not described in this Plan.

2.3.2.1. The role of the Natural Heritage Advisory Council

The Natural Heritage Advisory Council ("Council") was established by RCW 79.70.070 to advise the land managing state agencies on implementation of the Natural Area Preserves Act. The Council has 15 members, including five state agency representatives who serve in an ex-officio non-voting capacity. Ten members are appointed by the Commissioner of Public Lands and serve four-year terms. Five of the ten members must be recognized experts in the ecology of natural areas. Of the remaining five members, at least one must be or represent a private forest landowner and at least one must be or represent a private agricultural landowner. The five Council members representing state agencies include the directors (or designees) of the Department of Ecology, Department of Fish and Wildlife, Department of Natural Resources, Recreation and Conservation Office, and State Parks.

One of the primary functions of the Council is review of potential natural area preserves. Based on the criteria for

There are 3 primary functions of the Natural Heritage Advisory Council:

1. Review of potential natural areas.
2. Providing guidance on management of natural areas.
3. Providing guidance on revisions to the Natural Heritage Plan.

analysis described above, the Council may recommend approval or reject a proposal as recommended by staff. The council may also modify a proposal by adjusting the boundary or through a change in natural area category (e.g. recommending designation as a natural resources conservation area or combined natural area preserve/natural resources conservation area).

2.3.2.2. Public Hearings

For natural areas that are proposed to be designated and acquired by DNR, a public hearing is held in the county in which the area is located, and local elected officials, neighboring landowners, and other stakeholders are provided an opportunity to comment on the proposal.

2.3.2.3. Natural Area Approval

If supported by the Council, the recommendation for natural area designation and information gained from the public hearing is forwarded to the appropriate state agency head (the Commissioner of Public Lands, Director of the Department of Fish and Wildlife, or Director of the State Parks and Recreation Commission) for review and potential approval of the natural area boundary.

Once a site boundary has been approved, funding is sought to acquire properties within the natural area boundary. Purchases are made only from willing sellers and the purchase price is based on market value appraisals. If land is transferred out of state trust land status, the trust is compensated for the asset value and replacement land is purchased to provide ongoing income for the trust.

3. DNR natural areas

In addition to setting the priorities for the development of the statewide system of natural areas, DNR plays a major role by managing Natural Area Preserves and Natural Resources Conservation Areas. DNR is the largest conservator of native ecosystems, plant communities, and habitat for rare species in Washington, protecting and managing 161,000 acres of natural areas as of June 2017. In addition, the Natural Heritage Program cooperates with federal, state and local agencies, private organizations, and individuals to recognize conservation efforts through the Register of Natural Areas.

3.1. Management of DNR natural areas

The DNR Natural Areas Program conserves Washington's native species and ecosystems, today and for future generations by:

Healthy ecosystems: using science-based management and restoration techniques to prevent damage to healthy ecosystems and restore degraded ecosystems.

Biodiversity: protecting Washington's native biodiversity by controlling invasive species, monitoring rare native species, and managing for the recovery of rare species populations.

Valuing nature: strengthening public appreciation of nature by promoting environmental education, exploration, and scientific research on natural areas.

Fostering partnerships: innovating ways to care for natural areas through community engagement and partnerships.

Management of Natural Area Preserves:

- site-specific management plans: 10 sites
- interim management plans: 29 sites
- without a management plan, but management is guided by the needs of the species and ecosystems for which the natural areas preserves were designated: 17 sites

Management of Natural Resources Conservation Areas:

- site-specific management plans: 8 sites
- management under the 1992 Statewide Management Plan: 29 sites

DNR currently manages 56 natural area preserves and 37 natural resources conservation areas. DNR staff throughout the state are responsible for regular management of these sites. Natural Areas Program staff based in Olympia provide guidance and scientific expertise and ensure consistency of management. When major management issues arise (e.g., reintroduction of a rare species to a site), they are brought before the Natural Heritage Advisory Council. You can learn more about DNR's natural areas at http://www.dnr.wa.gov/managed-lands/natural-areas.

DNR Natural Area Preserves and Natural Resources Conservation Areas

Natural area preserves are acquired for the protection of the priority species and ecosystems they contain; management is primarily meant to ensure the viability of those species and ecosystems. For example,Upper Dry Gulch Natural Area Preserve in Chelan County protects the largest known population of Whited's milkvetch, a state-listed endangered plant species that is only found within a 3-square-mile area; it is found nowhere else in the world. Research and education are other primary intended uses of natural area preserves. A few preserves also have developed trail access.

Natural resources conservation areas often contain priority species or ecosystems and offer opportunities for research and education. They are also meant to also provide the potential for development of low-impact recreation such as hiking, backcountry camping, and scenic photography. For example, Table Mountain Natural Resources Conservation Area contains relatively undisturbed examples of upland and wetland forests, mountain meadows, and rare plant populations. It not only contains the largest known population of Howell's daisy, a state-threatened plant that is only found in a small part of the Columbia Gorge, but a segment of the Pacific Crest Trail traverses the site offering amazing vistas of both Washington and Oregon.

Some sites have both natural area preserve and natural resources conservation area status. For example, Cypress Island, one of the first sites established under the Natural Resources Conservation Areas Act, is the largest relatively undeveloped island in the San Juan Island archipelago. Cypress Island protects more than 5,100 acres of high quality forest, wetland and grassland communities, and state-owned tidelands, as well as low-elevation serpentine forest. The areas on the island designated as natural area preserve comprise about 1,100 acres, and protect rare examples of grasslands underlain by basalt bedrock, and other plant communities and wetlands underlain by serpentine bedrock. The areas of the island designated as natural resources conservation area also protect important ecological features, and additionally provide low-impact recreation opportunities such as hiking and camping.

3.2. Register of Natural Areas

One of ways the state of Washington legislature envisioned building the statewide system of natural areas was to maintain a state register of lands that contain significant natural heritage resources. Many occurrences of federally listed and candidate plant species, and other high priority species, are on private lands where no formal protections are currently in place. Sites on the Washington Register of Natural Areas receive voluntary protection; the landowner(s) manage the sites with conservation of the species in mind. However, the program is strictly voluntary and the landowner can opt out of the register at any time. For many rare species, these sites are potentially significant for the species' long-term conservation. The Register may also be used to recognize government-managed lands besides those described above that protect occurrences of priority species or ecosystems. The Washington Natural Heritage Program is in the process of reinvigorating the register.

4. Extending the reach

The Natural Area Preserves and Natural Resources Conservation Acts focused on the establishment of natural areas as a mechanism to conserve Washington's natural heritage. However, this is just one of many conservation tools available. The Natural Heritage and Natural Areas Programs engage in many other efforts intended to conserve rare species and ecosystems, including providing support for other agencies, organizations, and individuals. A few of these are described below.

4.1. Conservation Land Designations

Several land-use designations make significant contributions to the conservation of native species and ecosystems, but are not considered part of the statewide system of natural areas. Some of these lands may provide protection of species and ecosystems, but are also managed for land-uses such as timber production or grazing, and/or relatively high levels of recreation, which may not be consistent with long-term conservation values. Other protected lands lack priority species and ecosystems, but still provide important conservation value. The Natural Heritage Program is developing a process by which these other conserved lands can be recognized for the conservation value they provide, including contributing to connectivity and landscape-level resiliency to climate change, providing ecosystem services, connecting high quality habitat areas, and serving as areas for recreation and connection with nature.

The impact of Washington's land trusts on conservation has increased dramatically since the last Natural Heritage Plan was released. By 2015, Washington's land trusts either owned or held easements on 224,430 acres, a 38% increase since 2010 (Land Trust Alliance 2016). Collaborations with the state's land trusts increase DNR's effectiveness and efficiency of conservation. For example, the Natural Heritage Program worked with the Columbia Land Trust to develop Ecological Integrity Assessment methodology for upland habitats and conduct assessments on the land trust's stewardship units (https://www.columbialandtrust.org/land-with-integrity/) and the Natural Areas Program collaborates with the Whidbey-Camano Land Trust to protect the Admiralty Inlet Natural Area Preserve (http://www.wclt.org/projects/admiralty-inlet-preserve/).

4.2. Support for policies, laws, and regulations

The Natural Heritage Program has no direct regulatory authority. However, the data maintained by the Natural Heritage Program are used in the application of policies, laws, and regulations. Because natural heritage programs in all 50 states use the same ranking system, the policies, laws, and regulations based on natural heritage data can be applied consistently throughout the country. For example:

Federal sensitive species policies. The Natural Heritage Program provides the US Forest Service and US Bureau of Land Management with rare species data and documentation to support the global and state ranks assigned to each species. Both agencies use our global and state ranking to develop their sensitive species lists.

Forestry Certification Standards. The conservation status assigned to Washington's ecosystems by the Natural Heritage Program is used by the forest products industry to identify areas for protection under forest certification standards, such as the Sustainable Forestry Initiative.

Endangered Species Act. The US Fish and Wildlife Service uses information provided by the Natural Heritage Program in listing and recovery decisions under the Endangered Species Act. Much of the information about locations and threats to species (particularly for plant species) originates with the Natural Heritage Program, and our scientists serve on species recovery teams.

4.3. Natural Heritage Conservation in Education

Natural areas can provide ideal outdoor classrooms – places to teach students about natural ecosystems, including the species and processes that make them special; apply lessons from fields as diverse as science, math, and art; and become exposed to different types of science-based and management careers. Particularly through collaboration with other organizations—there is an opportunity to increase the educational use of DNR-managed natural areas. Ultimately, these activities are expected to increase the understanding and appreciation of the role of natural areas in relation to biodiversity, native ecosystems, ecosystem services, and traditional and current human uses. Many of Washington's natural areas also provide an opportunity to connect people from different backgrounds to the cultural history of our landscape.

In 2017, DNR hosted an event at Mima Mounds Natural Area Preserve where members from nine different tribes harvested camas, a native food plant, and shared cultural stories with a diverse group representing universities, non-profits, industry, and government agencies. This information is being used to develop teaching modules and guidelines for the most productive approach to implementing cultural and ecological conservation across camas prairies. http://conservation.uw.edu/current-work/camas-prairie-cultural-ecosystems-incubator/

The Natural Heritage Program and Natural Areas Program are exploring opportunities to increase the educational use of natural areas. These activities are likely to include working with land trusts to align language around the many values of natural areas, creating partnerships between natural areas and local K-12 schools to serve as models for future efforts, and developing a process for teachers at all levels to connect with natural areas.

4.4. Providing opportunities for research

Scientists in the Natural Heritage and Natural Areas Programs conduct research projects and also provide information and technical expertise to support other scientific research. The research conducted by program staff and others provides a better understanding of Washington's native species and ecosystems, and provides insight into the best ways to effectively and efficiently achieve conservation goals.

Natural areas and the data managed by the Natural Heritage Program provide multiple opportunities for research. To date, more than 400 research projects have been conducted in natural areas managed by DNR. This research has included rare species monitoring and inventory; development of techniques to recover rare species populations and restore habitats; and investigations of geologic history and cultural resources. The high quality of natural area preserves in particular provides a valuable opportunity to understand the structure and function of relatively intact ecosystems – increasingly important given the

stresses of climate change, land use change, and invasive species. Potential uses of Natural Heritage Program data include investigating how species abundance and distribution have changed through time.

4.5. Improving outreach

Surveys of visitors to eight DNR natural areas during the summer of 2017 overwhelmingly showed that the natural areas met or exceeded visitor expectations (96% of 118 people surveyed). However, only 64% of these visitors were aware of the natural area designation, and fewer than half (47%) were aware that the natural area was managed by DNR, or even by state government. A communication strategy is needed to promote awareness of natural areas, promote understanding of ecology, and ultimately, foster an enduring commitment to biodiversity conservation.

An important aspect of this strategy will be to identify opportunities to collaborate with communities beyond those traditionally engaged in conservation activities. By including practitioners in the social sciences, arts, and humanities, it may be possible to generate innovative pathways by which people can connect with natural areas, tackle the most complex challenges in conservation, and create sustainable communities.

The Natural Heritage and Natural Areas Programs are in the process of developing a communications strategy that will address the relationships between our audiences, messages, activities, and materials and ensure that we are reaching out to our stakeholders and constituencies effectively.

FOSTERING RESILIENT LANDSCAPES AND BUILDING RESILIENT COMMUNITIES

The statewide system of natural areas has grown steadily from the first designations of Sand Island and Goose Island as natural area preserves in 1973. Today, there are 211 natural areas in the statewide system, including 68 in federal ownership, 108 in state ownership, and 35 in private conservancy. Washington's natural areas protect critical habitat areas, provide important ecosystem services that benefit our communities, and provide opportunities for education, research, and recreation. By taking bold steps, guided by sound policy and science, and in partnership with others throughout the state, it will be possible to fulfill the vision articulated in the Natural Area Preserves Act, and create a statewide system of natural areas for the benefit of current and future generations.

5. Citations

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