DRAFT Washington Shrubsteppe Restoration and Resiliency Initiative

Long-Term Strategy 2024 - 2054

Fostering resilient wildlife and human communities in the face of wildfire in the shrubsteppe landscape.

Updated
January 2024

Acknowledgments

The Steering Committee extends our heartfelt thanks to everyone involved in the Washington Shrubsteppe Restoration and Resiliency Initiative (WSRRI). This initiative, which commenced even before the Legislature and Governor finalized the initial proviso funding, stands as a testament to the commitment to collaboration between the Department of Fish & Wildlife, Department of Natural Resources, and State Conservation Commission and among Tribes and partners in the shrubsteppe landscape. The steadfast commitment and hard work of staff and leadership from all entities has been fundamental to our collective progress. We are deeply grateful to our Advisory Group, which include public partners such as Conservation Districts, Grant County, Pasco Fire Department, and US Fish and Wildlife Service, private organizations such as Audubon Washington, Conservation Northwest, and the Cattleman's Association, and private landowners for their expertise in wildlife and habitat management, wildland fire management, working lands, and community engagement, all of which have greatly shaped our comprehensive strategy. We also wish to acknowledge our working groups and focus table participants, whose collective wisdom and insights have been vital in formulating the actionable elements of our approach. A special note of appreciation is extended to TerrAdapt for their spatial analysis work, significantly enriching our understanding and planning efforts. We want to recognize the invaluable contributions and deep-rooted wisdom of the Eastern Washington tribes, whose perspectives and knowledge have been essential in guiding our efforts towards a respectful and effective approach to land and wildlife management. The dedication and insights of all our participants are the bedrock of WSRRI's ongoing success.

Cover Photo:

Sunset over shrubsteppe, with Chopaka Mountain in the distance, on the Charles and Mary Eder Wildlife Area Unit

Justin Haug

Report produced by Triangle Associates, Inc.

Table of Contents

Notes to reader:

Please see the document glossary on page 97 through 101 for commonly used or technical terms throughout the document.

Acronyms are spelled out on their first occurrence throughout the document. A list of all acronyms is located on page 102.

Table of Tables

Table of Figures

1. Executive Summary

Initiated in 2021 with a $2.35 million biennial allocation from the Washington State Legislature, the Washington Shrubsteppe Restoration and Resiliency Initiative (WSRRI) is a collaborative and focused effort to conserve and restore wildlife habitats, enhance wildfire preparedness and response, and support working lands in Eastern Washington's shrubsteppe landscape. This funding, part of a legislative proviso, is directed to the Washington Department of Fish and Wildlife (WDFW) and is supplemented by an additional $1.5 million for the replacement of fences with wildlife-friendly alternatives. The initiative is a targeted response to the Labor Day wildfires in 2020 and unique ecological challenges faced by shrubsteppe habitats, wildlife, and human communities within the Columbia Plateau.

Spanning over ten million acres, the shrubsteppe landscape is vital for a variety of wildlife and plant species, some endemic to the region such as Columbia Basin pygmy rabbits. It is a critical area for habitat protection and conservation for species of greatest conservation need amid increasing threats from invasive species, wildfires, land use conversion, and other impacts. WSRRI seeks to address wildlife habitat protection and restoration challenges while also supporting working lands and communities in the face of wildland fire. Wildland fire preparedness, response, and recovery are important components of this effort.

WSRRI's Long-Term Strategy, set for a 30-year period, includes five key elements focused on community engagement, habitat protection, habitat restoration, species management, and fire management. It emphasizes a strategic conservation approach, encapsulated in the "Defend the Core, Grow the Core, Connect the Core" principle. The initiative leverages advanced remote sensing and TerrAdapt's data models for effective landscape-scale mapping and monitoring, for identifying spatial priorities for habitat protection and conservation.

Organizational structure is vital to WSRRI's effective implementation. The initiative is overseen by a Steering Committee that includes representatives from WDFW, the Washington Department of Natural Resources (WDNR), and the Washington State Conservation Commission (WSCC). An Advisory Group representing the diverse interests of the shrubsteppe landscape is envisioned to inform and help guide the implementation of WSRRI Long-Term Strategy, working closely with Regional Implementation Teams to align regional activities under the overarching strategy. A Program Manager coordinates capacity and resources to achieve priority actions and ensures communication coordination between the Regional Implementation Teams, Advisory Group, and Steering Committee.

Emphasizing environmental justice (EJ) principles, the initiative commits to practices that are equitable and inclusive, particularly for Tribes, underserved, highly impacted, vulnerable, and overburdened communities. In the context of this strategy, Environmental Justice means addressing historical and ongoing inequities that result in disparities in the distribution of conservation efforts and their impacts across the shrubsteppe landscape. This strategy lays the groundwork for the development of actions to further assess and integrate EJ principles into the work framed by WSRRI.

Currently, WSRRI is updating and refining the process and procedure for coordinating resources and capacity towards project work on the ground, an integral part of its strategy to enhance fire resilience and habitat restoration, particularly focusing on Species of Greatest Conservation Need. This transparent and equitable process will prioritize effort and assistance to projects in Core Areas, Growth Opportunity Areas, and Corridors.

Central to the initiative is the Monitoring and Adaptive Management Plan, which employs adaptive management strategies to make informed decisions in uncertain conditions. This plan focuses on key metrics across Participation, Spatial, Habitat, and Wildlife categories and includes regular updates and assessments to adapt to social, cultural, scientific, and ecological changes.

In essence, WSRRI, fueled by legislative support and a tri-agency steering committee at the helm, is committed to preserving and revitalizing the unique shrubsteppe landscape of Washington State for the wildlife and human communities that call this unique landscape home. By balancing strategic wildlife habitat protection and restoration with sustainable working lands management and engaging a broad range of shrubsteppe communities, stakeholders and Tribes, the initiative seeks to foster a wildfire resilient and thriving landscape.

2. WSRRI Coordination with Sovereign Tribal Nations in the Shrubsteppe Landscape

Indigenous People have been stewards of the shrubsteppe landscape since time immemorial. There are five federally recognized Tribes with usual and accustomed territory in the Columbia Plateau, and each one has a unique history and connection to the shrubsteppe landscape. This Strategy recognizes that cooperation with these tribal nations is fundamental to the on-going stewardship and management of the shrubsteppe ecosystem. WDFW, WDNR, and WSCC, who together make up the WSRRI steering committee, recognize the sovereignty of these tribal nations and respect their rights, titles, and treaties. The three agencies that lead the WSRRI are committed to partnering with these tribal nations to conserve, restore, and protect the health and integrity of Washington's shrubsteppe ecosystems and wildlife species.

Columbia Plateau Tribal representatives have helped craft the development of this Strategy. The WSRRI Steering Committee recognizes that this Strategy represents the beginning of the restoration and protection work, and involving tribal nations to help develop and implement a long-term strategy for the conservation and restoration of the shrubsteppe landscape will be essential to its success.

3. Introduction

Washington's shrubsteppe landscape sits at the northwestern edge of the sagebrush biome, which extends across several Western states, within the Columbia Plateau ecoregion (Figure 1). The ecoregion was formed by basaltic lava floods followed by the great Missoula floods which scraped away loess soils and created the channeled scablands (Sleeter et al. 2012). Average annual precipitation ranges from 6 to 30 inches, half of which is stored as ice and snow and becomes accessible to the land as spring arrives (Washington Department of Ecology, n.d.), with the interior portion of the ecoregion getting the least precipitation. The climate is typically characterized by cold winters and hot, dry summers.

As a wildlife habitat, dry or arid shrubsteppe is characterized by a mix of shrubs, grasses, and forbs; various sagebrush species, hopsage, greasewood, and bitterbrush, are intermixed with perennial bunchgrasses and wildflowers (Condon et al., 1998). Cryptobiotic soil crusts not only protect against soil erosion but also play a vital role in preventing the establishment of invasive plant species (Belnap & Eldridge, 2003). The ecoregion's geological history coupled with it's climate have resulted in a very diverse landscape, with large expanses of these arid mixed shrub and grasslands, surrounding scattered permanent and seasonal wetlands, riparian areas, sand dunes, and basalt cliffs and talus. These collectively support unique biological diversity, providing habitat for a wide range of wildlife species, including birds, mammals, reptiles, amphibians, and insects, as well as plants, some of which only occur here. Forty-three of these species are currently designated as Species of Greatest Conservation Need (SGCN) in the State Wildlife Action Plan (WDFW 2015), and many of these are federally- or state-listed as endangered or threatened or are candidates for listing.

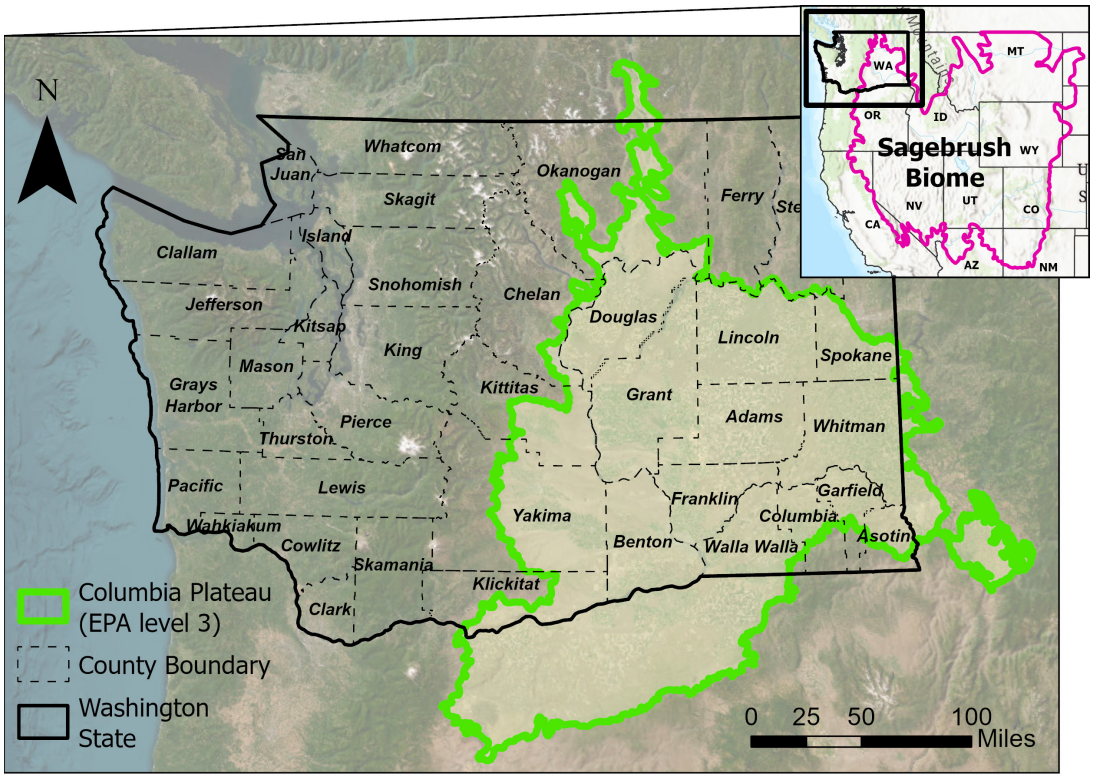


Figure 1. The Columbia Plateau Ecoregion (EPA level 3) across the PNW and Eastern Washington with the inset map displaying the rangewide sagebrush biome data (Jeffries and Finn 2019 (USGS)) used in WAFWA's Sagebrush Conservation Strategy publication.

Once covering more than 10 million acres in Eastern Washington, a significant portion of the shrubsteppe landscape has been lost or degraded (Figure 2). Private land ownership by white settlers displaced Indigenous communities and significantly altered the landscape, through introduction of horses and livestock, development of an engineered irrigation network and then hydro-electric power production, through the Columbia Basin Project, and conversion to agricultural uses (Sleeter et al., 2012). . Even during the mid-1990s, WDFW estimated that nearly 60% of the original shrubsteppe habitat in Washington had been converted to other landcover (Dobler et al., 1996); based on 1970 data (Küchler, 1970), in 2011 Miller et al. (2011) estimated that 76.3% of historical sagebrush distribution in Washington had been lost. Developing estimates of shrubsteppe loss are difficult as assessments of historical presence are likely inaccurate and estimate methodologies vary (M. Schroeder, person communication, December 17, 2023).

***Fire severity**, or burn severity, refers to the degree of consumption of combustible biomass and surface soil organic matter after a fire, reflecting the impact on ecosystems.*

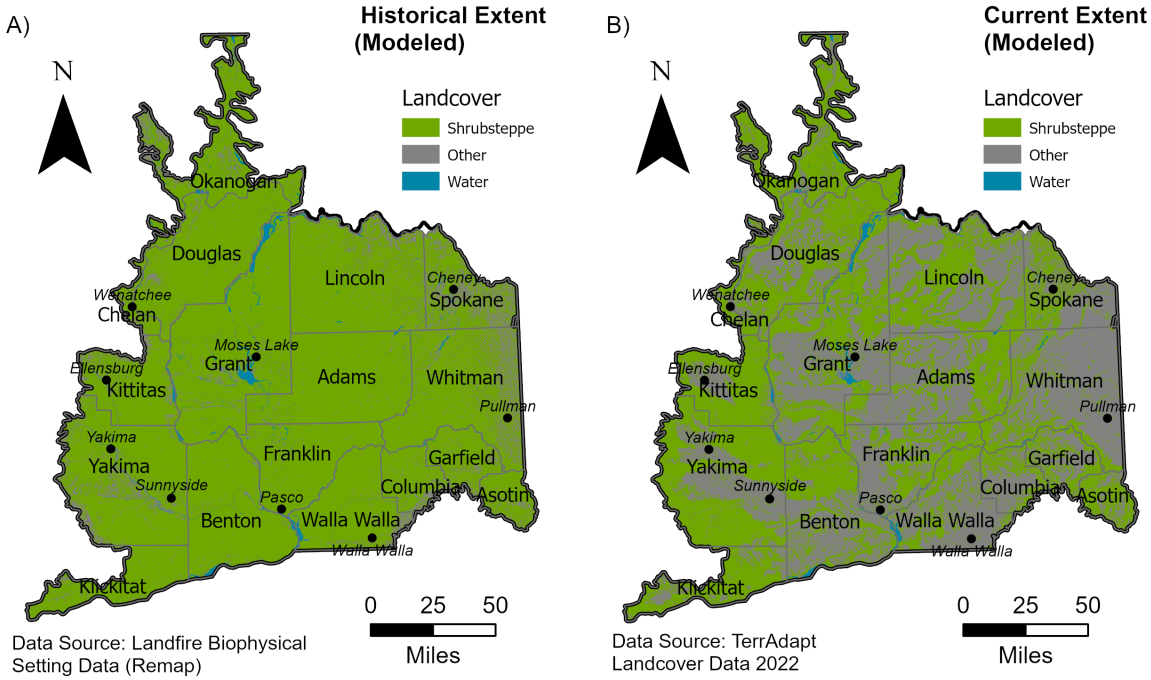


Figure 2. The historical (A) and current (B) estimates of shrubsteppe habitat. The data sources vary (Land - fire Biophysical Setting (A) versus TerrAdapt.org(B)), but in both cases, the landcover types associated with natural shrublands or natural grasslands were combined to map shrubsteppe habitat.

What little remains of our state's native shrubsteppe habitat is under threat due to the unprecedented extent, frequency, and severity of wildland fire, invasion of non-native annual grasses, a rapidly changing climate, and increased human pressure. Conserving and restoring shrubsteppe habitats to create a more resilient landscape is essential for native wildlife as well as the human communities that live and work in the Columbia Plateau.

4. 2020 Wildfires Prompting the Legislative Proviso

Fire is a natural and important part of shrubsteppe ecosystems, historically playing a large role in creating a mosaic of stands of different sizes in various seral conditions (Remington et al., 2021, West 1999; Knick et al. 2005). In recent decades, the increasing extent, frequency, and severity of wildland fire, paired with the loss of wildlife habitat and increase in human uses has, resulted in catastrophic impacts to shrubsteppe habitats, wildlife, and people. No year illustrates this trend in Washington more so than 2020. The largest wildfire in Washington State recorded history, the Cold Springs Canyon/Pearl Hill fire, burned over 410,000 acres of shrubsteppe habitats in early September 2020, moving with enough speed to jump a quarter-mile wide reach of the Columbia River from Okanogan County to Douglas County. Also in 2020, the Whitney fire impacted an additional 127,400 acres of shrubsteppe habitat in Lincoln County. The damage caused by these wildfires was particularly severe due to the extent of the areas impacted, the speed at which the fires moved, and the intensity at which the fires burned. The combination of these factors had not only immediate impacts to habitat and wildlife, but also severe long-term impacts resulting from the loss of vegetation, the conversion of shrub-dominated habitats to grass-dominated ones, and the expansion of invasive species into these habitats. One particularly poignant example of the degree of the impact from the wildfires of 2020 is that they had a larger effect on Greater Sage-grouse habitat in Washington State than any other wildfires in recorded history. In addition, the 2020 wildfires eliminated one of three pygmy rabbit recovery areas, considerably setting back conservation progress.

> ***Fire intensity*** *is the amount of energy or heat given off by a fire at a specific point in time, or the energy output from fire.*

In response to the 2020 wildfires, the Washington State Legislature directed WDFW to collaborate to restore shrubsteppe habitat and associated wildlife impacted by wildland fire. This budget proviso, or language directing funding for a specific purpose, allocated $2.35 million in ongoing funding in the 2021-23 biennium to WDFW from the State General Fund as part of the operating budget (Washington State Legislature, 2021; full proviso language in Appendix A). Accompanying the Operating Budget investment, $1.5 million of Capital funds were made available to replace burned livestock fences with wildlife-friendly versions across the shrubsteppe landscape. Subsequently, the Legislature has reinvested in wildlife-friendly fences, appropriating an additional $1.5 million to the State Conservation Commission in the 2023-25 Capital budget.

The proviso includes two key elements -

1. Implementation of restoration actions on public and private lands, which may include species-specific recovery actions; increasing the availability of native plant materials; increasing the number of certified and trained personnel for implementation at scale; supporting the replacement of burned fences with wildlife-friendly fencing versions; and providing support for private landowners/ranchers to defer wildland grazing and allow natural habitat regeneration.
2. Formation of a collaborative group process including diverse stakeholders and facilitated by a neutral third-party to develop a long-term strategy for shrubsteppe conservation and fire preparedness, response, and restoration to meet the needs of the state's shrubsteppe wildlife and human communities. The long-term strategy should address the restoration actions described in element one, spatial priorities for shrubsteppe conservation, gaps in fire coverage, management tools to reduce fire-prone conditions, and identify and make recommendations on any other threats.

WSRRI was built from the foundation of this Legislative proviso. WSRRI's primary objective is to enhance the well-being of Washington's shrubsteppe wildlife and habitat with an emphasis on addressing the escalating extent, frequency, and severity of wildland fires. WSRRI also addresses the needs of human communities that live and work in Washington's shrubsteppe ecosystems and that benefit from healthy and resilient landscapes, habitat, and wildlife populations. WSRRI is a collaborative effort, led by a Steering Committee comprised of three state agencies – WDFW, WSCC, and WDNR. WSRRI is closely informed and guided by an advisory group comprised of Tribal Nations and diverse stakeholders with a vested interest in Washington's shrubsteppe landscape, including various public and private partners. More information on WSSRI's formation to date can be found in Appendix B, and proposed future Organization and Governance is described in Section 8.

4.1. Proviso Element One – Implementing Restoration Actions

Because planning takes time and the needs on the landscape were urgent, it was necessary to begin implementing restoration actions well before our long-term strategy process was completed. While the proviso established the foundational framework, numerous details still needed careful consideration to transform proviso element one into actionable and operational steps. The Steering Committee convened a Near-Term Action Advisory Group and six Technical Teams comprised of a diverse spectrum of interests, including local, state, federal, agricultural, and conservation organizations. Their diverse backgrounds and expertise ensured a well-rounded perspective. This group identified species-specific recovery actions that could be immediately implemented to bolster populations impacted by the fires, how to expand on-the-ground personnel and cultural resources capacity, selected which native plants to produce and an approach for their production, created a definition for wildlife-friendly fencing and an approach to deliver that program, and put together a process for offering assistance to ranchers to support limiting grazing to allow habitat time to recover after fire. Together, this work allowed WSRRI to move forward, putting the proviso dollars to work and laying the essential building blocks for components of our long-term strategy.

WSRRI's approach has been to build restoration capacity by delivering resources and services, rather than solely distributing the proviso funding as grants to implement projects. WSRRI aims to remove barriers and bottlenecks to implementing landscape-scale habitat restoration by increasing the availability of resources needed to implement restoration; to date, WSRRI has provided cultural resource reviews, technical personnel and labor needed to implement project work, native seeds, and plants, fencing materials for wildlife-friendly versions, and funding to compensate livestock producers for deferring grazing after a wildfire to allow for habitat recovery.

Coordinating this effort at a landscape scale allows WSRRI to strategically focus investments on re-establishing native and perennial plant communities where they have been lost, expanding their presence in areas where they still exist, and providing the capacity and speed needed to deliver resources to immediate needs when wildfires occur. There is often a relatively short ecological window of time immediately following a fire when specific restoration actions are needed and will be most effective, such as installing native plants or seeds and herbicide application to manage the spread of invasive vegetation. Having crews and native plants available to quickly focus attention to priority burned areas, irrespective of political boundary or land ownership, is extremely valuable and was a capacity gap clearly identified just after the 2020 wildfires. WSRRI aims to fill this capacity gap and remain flexible at the landscape scale by coordinating and sharing resources and services across ownerships.

Initial WSRRI efforts to expand resource and service capacity have included –

- **Personnel**
  Hiring of a shrubsteppe landscape restoration coordinator; engaging crews, such as Washington Conservation Corps; contracting local restoration professionals; directing agency staff investments to WSRRI efforts (e.g., archeologist); and funding conservation districts to provide enhanced technical assistance to landowners.

- **Native plant materials**
  Contracting with local professional growers to purchase native perennial grass seed, and partnering with the Sustainability in Prisons Project (SPP) to grow locally sourced sagebrush plugs and seeds. SPP also benefits and supports participating incarcerated technicians by providing shrubsteppe landscape educational and training programs.

- **Supplies and Equipment**
  Purchasing equipment to enable large-scale restoration, including specialized items (e.g., seed drill modified for native seeds); purchased supplies necessary to implement projects such as herbicide, fence markers, and tools for crews.

WSSRI leveraged our partnership network, worked directly with landowners and land managers, and issued broad public solicitations to collect project proposals to capitalize on these available resources. To date, WSRRI has allocated resources and services, as well as limited funding awards, toward the following actions –

- **Shrubsteppe Habitat Restoration**
  The WSRRI restoration coordinator has worked with Tribal, public, and private landowners, and conservation districts to implement restoration actions.

- **Riparian Restoration**
  Partners developed a collaborative project to restore riparian function to East Foster Creek using beaver dam analogs and post-assisted log structures.

- **Wildlife Friendly Fence**
  Conservation districts have facilitated the delivery of burned fence replacements and retrofits with wildlife-friendly versions, including the piloting of virtual fence in Washington. In addition, WSRRI crews have removed many miles of burned fence, reducing this hazard on the landscape.

- **Deferred Wildland Grazing**
  WSSRI has delivered cost-share through conservation districts to participating landowners opting to defer wildland grazing while habitat recovers from wildfire.

- **Bolstering Species Populations**
  In the first year of implementation, WSSRI supported the Columbia Basin pygmy rabbit reintroduction project and a research project aimed at understanding wildlife use of various shrubsteppe habitat conditions. As other funding sources have become available to support species-specific work (e.g., 2023 legislative investment in biological diversity), WSRRI has refocused investments toward restoration and working lands components.

Expanding capacity and delivering resources and services on the ground in a coordinated and collaborative way to recover wildlife, restore habitat, and support working landowners has been WSRRI's primary effort to date. With the development of our long-term strategy, we're setting a vision and approach to expand on that effort and making recommendations to put in place the resources and infrastructure necessary to prepare, respond, and recover from wildland fire in the shrubsteppe.

4.2. Proviso Element Two: Long-Term Strategy for Shrubsteppe Conservation

WSRRI's Long-Term Strategy for Shrubsteppe Conservation (Strategy) is the product of the second proviso element. It arises from the urgent need to act in a holistic, strategic, collaborative, and sustained effort to safeguard and restore this ecosystem. The Strategy builds on the work of proviso element one to take immediate actions to restore habitat, bolster species populations, and support working lands. The Strategy significantly expands on its scope to include proposed longer-term actions in the areas of habitat protection, wildland fire management, and community engagement.

The Strategy takes a holistic approach to achieving shrubsteppe conservation, while being cognizant to not duplicate efforts already underway. For example, the Strategy does not focus on actions aimed specifically at recovering salmon species, nor does it try to explicitly guide the siting of new solar energy projects. Both of those efforts are coordinated and carried out by partners in other forums. Instead, the Strategy emphasizes actions that need increased attention, coordination, and collaboration.

This document is intended to serve the following purposes –

- **Charting the Course**
  Taking a holistic, long-sighted, landscape-scale view to delineate the path forward, outlining the actions required at present to achieve long-term goals in the coming decades.
- **Supporting Coordinated Efforts**
  Supporting a wide spectrum of conservation, restoration, and infrastructure investments, ensuring that resources are allocated efficiently.
- **Ensuring Accountability**
  Set forth a vision for what must be achieved, how these achievements can be realized, and how the lead agencies can uphold accountability to ensure that progress is continually made.

5. Strategy Design

5.1. Vision, Mission, and Guiding Principles:

This Mission and Vision, underpinned by the Guiding Principles, is a blueprint for realizing a resilient and thriving shrubsteppe ecosystem in Washington State.

VISION

A resilient shrubsteppe ecosystem, achieved through collaborative partnerships for the benefit of wildlife and human communities.

MISSION

Collaboratively develop a long-term strategy for shrubsteppe conservation and wildland fire preparedness, response, and recovery to meet the needs of the state's shrubsteppe wildlife and human communities.

GUIDING PRINCIPLES

The Steering Committee and collaborators followed these Guiding Principles in developing the Strategy:

1. **Focus on Shrubsteppe Wildlife and Habitat Conservation**
   The central reason for the Strategy is the urgent need to address the catastrophic loss of shrubsteppe wildlife and their habitats in Washington State.

2. **Support for Working Lands and Rural Communities**
   We recognize the essential role of working lands and rural communities to steward and conserve shrubsteppe habitats. The Strategy identifies support and opportunities for their sustained well-being

3. **Strategically Target Investments**
   We employ a spatial conservation design that geographically identifies "Core" areas with high concentrations of high-quality and intact habitat. Through conservation investment, Core areas should be defended from conversion and degradation, expanded to build more functioning and intact habitats, and connected to facilitate wildlife movement and migration.

4. **Support and Build Upon Existing Efforts and Capacity**
   WSRRI is founded upon the principles of collaboration, synergy, and efficiency. The Strategy seeks to identify existing efforts and capacity, build upon and support them, and fill gaps to achieve the goal of shrubsteppe landscape conservation and restoration.

5. **Incorporate Diverse and Traditional Perspectives**
   WSRRI aims to engage and collaborate with people from all walks of life, welcoming diverse voices and traditional knowledge and wisdom into our collective work to protect and conserve the shrubsteppe landscape for future generations.

6. **Accelerate the Pace and Scale**
   We are committed to expediting the pace and scale of conservation efforts, ensuring that our initiatives effectively address the challenges at hand.

7. **Proactively Addressing Equity and Environmental Justice**
   Several human communities within the Columbia Plateau are highly impacted and overburdened by ecosystem degradation. Many of these communities were historically and are currently underserved with respect to wildland fire protection, natural resource management, and ecological restoration. We include actions designed to reduce these impacts and improve community wildland fire resilience and ecosystem health.

8. **Ongoing Monitoring and Adaptive Strategies**
   We are committed to monitoring our progress and maintaining the flexibility to adapt as needed, striving for continued success in our conservation efforts.

Highly impacted
A community designated by the department of health based on cumulative impact analyses in RCW 19.405.140 or a community located in census tracts that are fully or partially on "Indian country" as defined in 18 U.S.C. Sec. 1151.

Overburdened
A geographic area where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020.

5.2. Committing to Equity and Environmental Justice in the Strategy

Environmental Justice (EJ) and Equity are concepts rooted in the belief that everyone, regardless of their socio-economic status, race, ability, or background, has the right to live in a healthy and safe environment. These concepts recognize that marginalized communities often bear a disproportionate burden of environmental challenges, including the impacts of habitat degradation, land use changes, and ecosystem restoration. In the context of this strategy, Environmental Justice means addressing historical and ongoing inequities that result in disparities in the distribution of efforts to address environmental challenges and their impacts across the shrubsteppe landscape; in Washington, these inequities are in part a result of historic and ongoing discrimination, structural racism, and poverty, first resulting in and stemming from the physical and cultural removal of Indigenous communities from the landscape in the 19th century through the Indian Removal Act of 1830 and the Homestead Act of 1862 (Dunbar-Ortiz, 2014). Today, we continue to see inequities in Eastern Washington, such as limited access by underserved communities to information and personal protection to address smoke and heat exposure from wildfire. Counties in central and eastern Washington were exposed to the highest level of PM2.5 (airborne particulates with a diameter of 2.5 µm or less), during the wildfires of 2020, and they have a large number of underserved communities and outdoor

Vulnerable populations
Population groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to:

(i) Adverse socioeconomic factors, such as unemployment, high housing and transportation costs relative to income, limited access to nutritious food and adequate health care, linguistic isolation, and other factors that negatively affect health outcomes and increase vulnerability to the effects of environmental harms; and

(ii) sensitivity factors, such as low birth weight and higher rates of hospitalization.

workers (Liu et al., 2021)). Austin et al. (2020) found that Washington's largest agricultural populations tend to be located in counties with the greatest high heat and PM2.5 , and these exposures tend to coincide with the harvest season months in which the highest number of agricultural workers on the landscape, and yet the state has no occupational exposure rules specific to PM2.5 during wildfire smoke events.

Addressing such inequities, where possible through our implementation of this Long-term Strategy, requires meaningful involvement with underserved, highly impacted, overburdened, and vulnerable populations across Washington's shrubsteppe landscape, and prioritization of their needs. WSRRI is committed to these fundamental principles, and this strategy lays the groundwork for developing actions to further assess and integrate EJ and Equity principles into the shrubsteppe conservation and wildland fire preparedness, response and recovery.

(Adapted from Sharma 2019)

Environment Justice
as a goal requires just and fair treatment and involvement of all people of all communities in implementation and development of environmental laws, rules and policies regardless of origin, race, class, and nationality; this goal is achieved when everyone enjoys the same degree of protection against environmental hazards and access to environmental benefits, and each individual has a role in decision making around protecting the environment.

Environmental Equity
is the equitable distribution of the environmental burden, disaster hazards & pollution on all forms of social, economic and political communities. This concept evolves on the premises that no single community should have privilege over other communities in facing environmental disturbances or crisis. Environmental Equity is based on the principle that all people in this world are equal and deserve equal rights and opportunities to enjoy the benefits of the environment around us regardless of any disparity.

5.3. Strategically Targeting Investments – Defend the Core, Grow the Core, Connect the Core

Given the extent of habitat loss across the shrubsteppe landscape, all remaining habitat has conservation value. Yet, there is a need for a way to prioritize action to realize the best conservation outcomes over time. In this Strategy, the approach to strategically target collaborative conservation investments, including funding, capacity, and action application, generally follows a recently developed proactive conceptual model applied throughout shrubsteppe landscapes in the American West, to "Defend the Core, Grow the Core, Mitigate Impacts" (WGA 2020; NRCS 2021; Doherty et al. 2022). This framework requires a landscape-level assessment of habitat quality. It then serves to focus conservation investments in and around high-quality 'core areas' where they are most likely to be effective and cost efficient, and away from more degraded areas where they may be highly costly and ineffective. Across the west, this proactive approach has helped change the conservation narrative into one that begins with protecting healthy landscapes that have no threats or low-level threats and expands outwards towards more threatened and impaired areas (Doherty et al. 2022). WSRRI expands this framework to include connecting the core; maintaining connectivity between areas of high-quality habitat is critical in Washington due to fragmentation across our shrubsteppe landscape.

Defend the Core

Defending high-quality core habitat from encroachment of threats, like development, conversion, loss due to wildland fire, and invasive annual grasses, must be the highest priority for WSRRI. Aggressive action to keep core areas intact and healthy is paramount to building ***resistance*** and resilience in these places.

> ***Resistance***
> *The ability of a system to retain its structure and function when confronted with disturbance, stress, or invasive species (Chambers et al., 2019).*

Grow the Core

While cores are being defended, action should also be taken in lesser quality habitat surrounding and adjacent to core areas, to expand the footprint of high-quality habitat. While defending our existing core areas is essential, growing the core is a necessity for long-term conservation and recovery of shrubsteppe habitats and wildlife.

Connect the Core

Connecting the core requires action to maintain, over time, open and viable linkages between core areas so that wildlife can continue to move across the landscape and access high-quality habitat. Such action allows for effective demographic and genetic exchange between populations, increasing the resilience and viability of the regional network of habitats.

Beyond defending, growing, and connecting the core across the shrubsteppe landscape, the need will remain to mitigate threats to habitats, wildlife, and human communities. Mitigation actions that will be important everywhere include containment and control of invasive annuals and wildland fire suppression and recovery.

To target WSRRI investments strategically and geographically and facilitate the collective approach to Defend the Core, Grow the Core, and Connect the Core, WSRRI partnered with TerrAdapt, a non-profit organization, to implement a collaborative process to identify spatial priorities for Washington. TerrAdapt uses remote sensing and Google Earth Engine to dynamically monitor habitat and connectivity, project future conditions given future climate and land-use scenarios, and prioritize areas for conservation actions to increase resilience.

To facilitate a strategic approach for targeting investment, we mapped Core Areas, Growth Opportunity Areas, Corridors, and Other Habitat.

Core areas (Cores)

Core areas are those with the highest quality habitat across the shrubsteppe landscape. Actions targeted in core areas should include protection, as protecting intact high-quality habitat is more efficient than restoring it after disturbance or degradation, as well as threat prevention and abatement. Where disturbances occur in core areas despite protection measures, restoration or enhancements should be high priorities to quickly recover habitat quality.

Growth Opportunity Areas (GOAs)

GOAs are areas with significant amounts of habitat remaining that are more degraded than habitat in core areas. Through restoration, habitat quality could increase, thus growing the core. Restored areas within GOAs should be protected from further threats to protect our investments over time.

Corridors

Corridors provide paths for wildlife that are relatively free of movement barriers; these paths connect the network of cores and GOAs across the landscape. Further barrier development (e.g., road construction, significant habitat conversion, and development) should be avoided in corridors to maintain their ability to connect high-quality habitat.

Other Habitat

These areas still include remaining habitat, but that habitat is too highly degraded, due to patch size or isolation, to be included in core areas, GOAs, or corridors. For long-term conservation of shrubsteppe habitats and species, these areas are critical to maintain as habitat and, if and where resources allow, their condition improved over time.

The WSRRI spatial priorities can be readily viewed in the TerrAdapt tool online at https://terradapt.org/regions/cascadia_wsrri/?map. Additional information is available in Appendix D. Supplemental Information on WSRRI's Spatial Priorities, including –

- *A brief summary and comparison of already existing maps within the Columbia Plateau, which were assessed for potential use and application to WSRRI;*
- *Detailed methods to define and model WSRRI spatial priorities; and*
- *A Spatial Priorities User Guide for directions on navigating the spatial priorities and other data sets in the TerrAdapt Tool.*

WSRRI's spatial priorities address three different conservation targets, including 1) the dry (xeric) ecosystem), and 2) the wet (mesic) ecosystem, which collectively encompass the breadth of natural habitat types within the shrubsteppe landscape. In addition, spatial priorities for 3) the Greater Sage-grouse identify core areas, GOAs and corridors for this species, which may have been undervalued in the ecosystem targets alone.

1. Dry (Xeric) ecosystem

In WSRRI's spatial priority setting, this ecosystem includes drier environments where sagebrush and perennial grasslands predominate (Figure 3). Spatial priorities for this ecosystem (Figure 4) are a generalization of the needs for many species associated with these drier environments in the shrubsteppe landscape. Xeric cores represent the largest blocks of native grasslands and shrublands in the region. They contain abundant perennial grass and forb cover, comparatively low amounts of invasive annual grasses, low human footprint, and often at least some sagebrush cover.

2. Wet (Mesic)

In WSRRI's spatial priority setting, this ecosystem represents the wetter environments of the region where wetlands, wet meadows, and riparian habitats predominate (e.g., Figure 5). Spatial priorities for this ecosystem (Figure 5) are a generalization of the needs for many species associated with these habitat types. Mesic cores represent the largest concentration of mesic habitats (wetlands, meadows, and riparian vegetation) with the lowest human footprint. Mesic cores include not only

3. Greater sage-grouse

The Greater Sage-grouse (Figure 5) spatial priorities (Figure 6) reflect the species' unique life-history and are based largely on empirical data used to model sage-grouse habitat quality and habitat connectivity. Greater Sage-grouse core areas are not necessarily occupied now, but they contain abundant habitat and correspond well to the recent range of species in the region. Sage-grouse GOAs have less habitat and/or lower quality habitat and are therefore less likely to be occupied. However, many have seen occasional use and with additional restoration may help expand the occupied range.

Figure 3. Example of Dry (Xeric) Ecosystem in WSRRI Spatial Priority Modeling.

Figure 4. Example of Wet (Mesic) Ecosystem in WSRRI Spatial Priority Modeling.

Figure 5. Greater Sage-grouse.

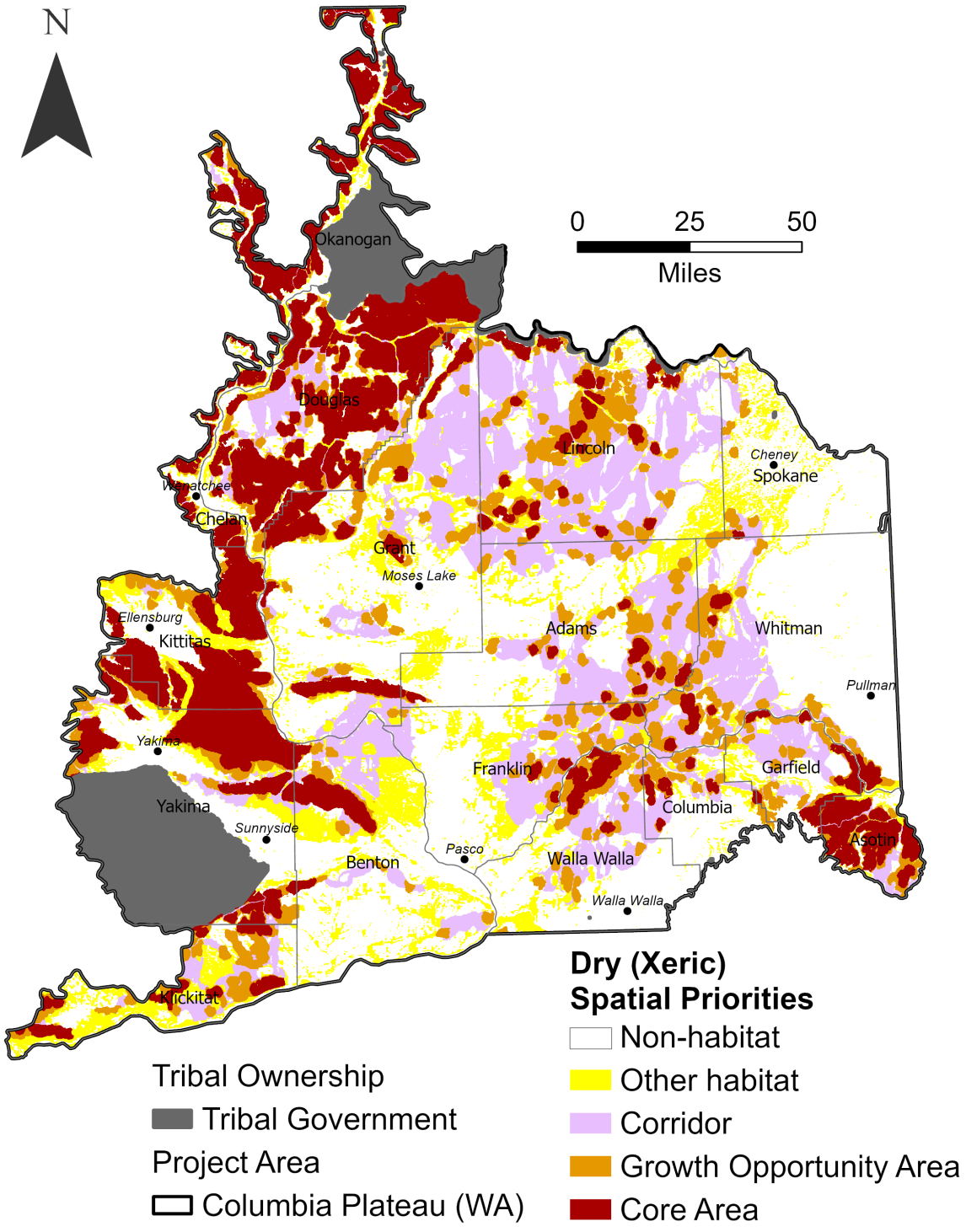


Figure 6. WSRRI's Dry (Xeric) spatial priorities. These priorities were created through a collaborative process utilizing a variety of satellite derived landcover products. This data and other data related Dry (Xeric) spatial priorities can be interactively viewed and analyzed at TerrAdapt.org. See appendix C for more on the methods.

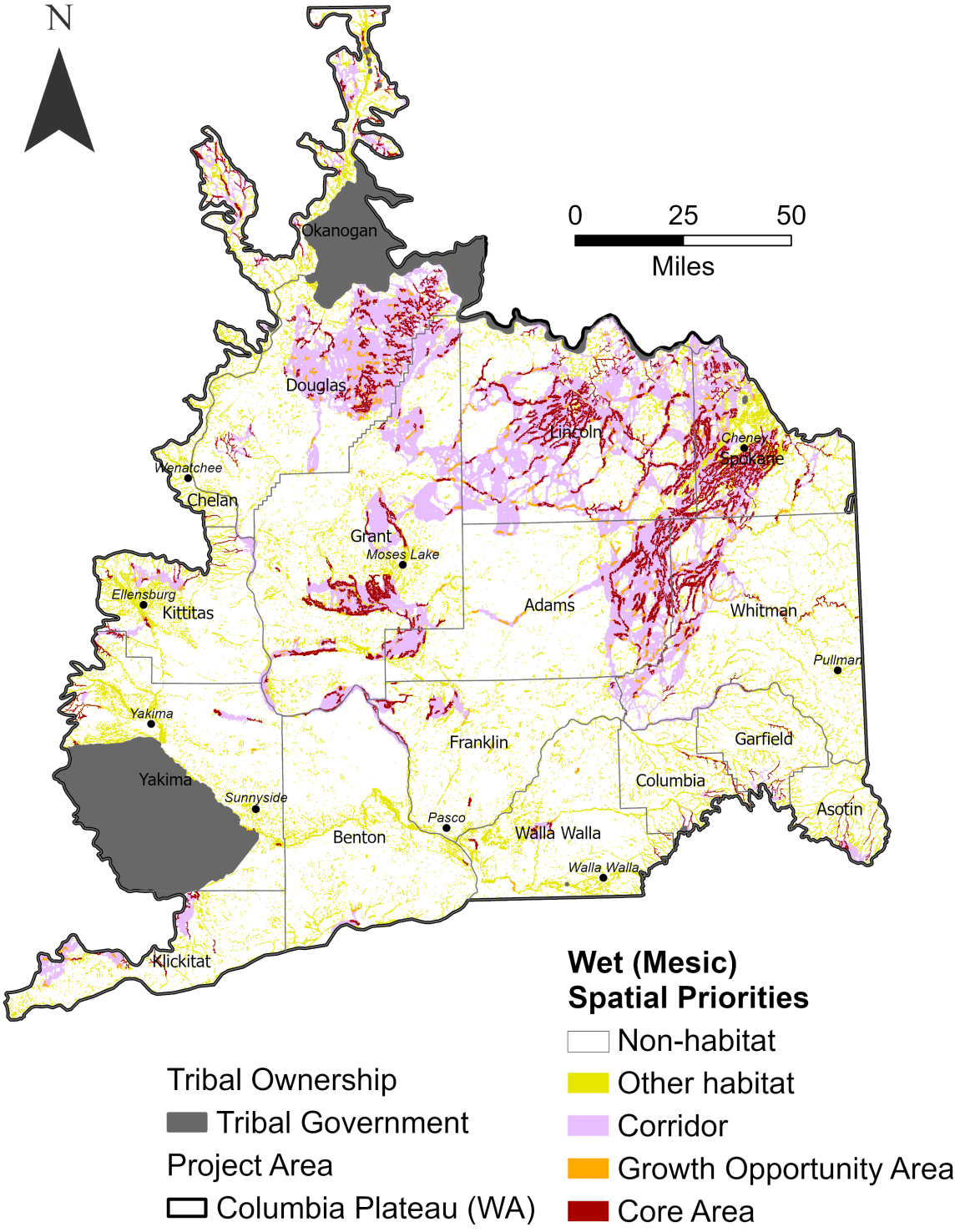


Figure 7. WSRRI's Wet (Mesic) spatial priorities. These priorities were created through a collaborative process utilizing a variety of satellite derived landcover products. This data and other data related Wet (Mesic) spatial priorities can be interactively viewed and analyzed at TerrAdapt.org. See appendix C for more on the methods.

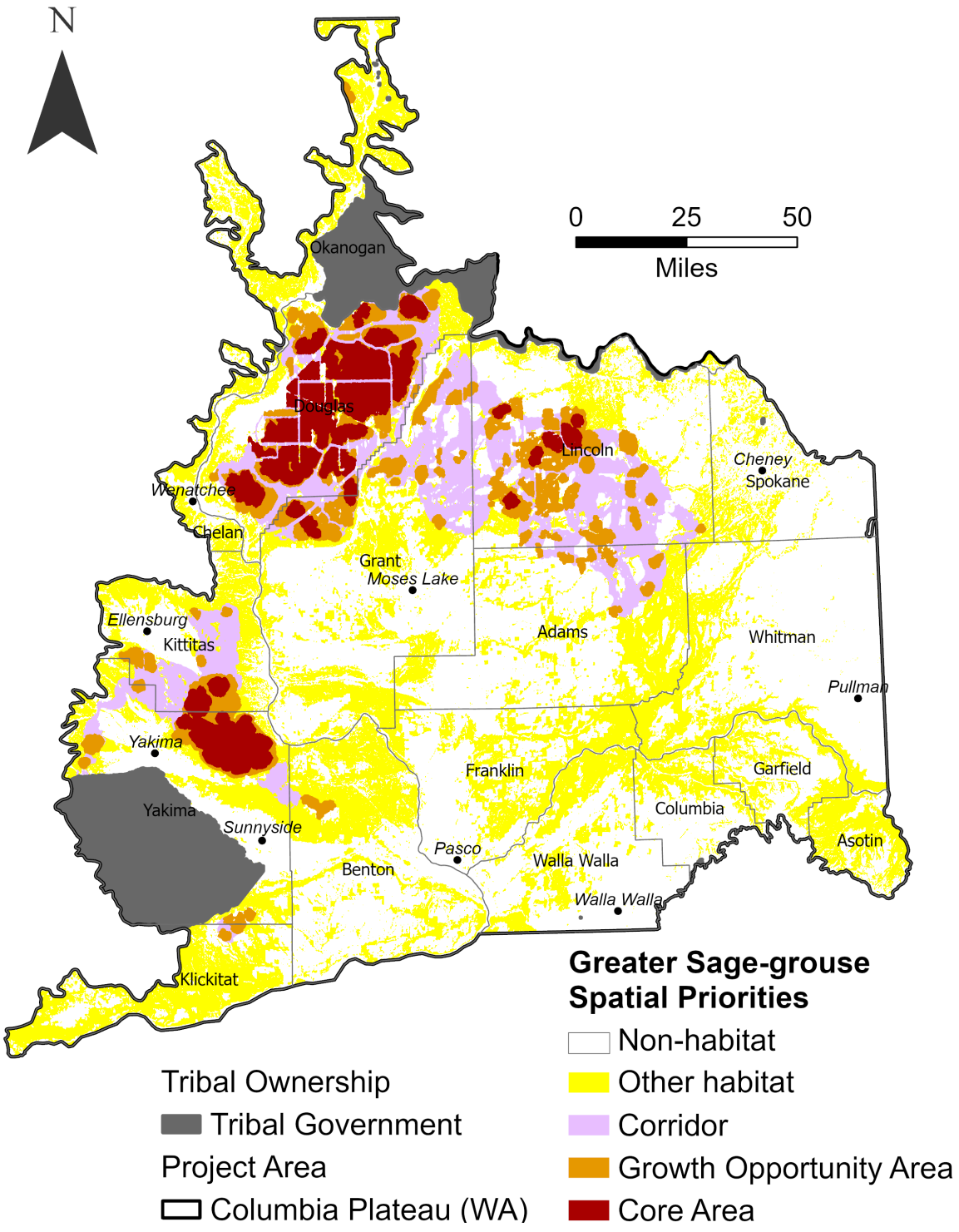


Figure 8. Greater Sage-grouse Spatial Priorities.

6. Goals, Objectives, and Threats

The Strategy presents a multi-faceted approach to conservation that outlines clear goals and measurable objectives, identifies key threats, and proposes strategic actions for sustainable management of shrubsteppe ecosystems. The measurable objectives outlined in this strategy vary in specificity based on current information and will be periodically updated to reflect new insights and developments in conservation.

6.1. Goals and Objectives

GOAL #1

Human communities in the shrubsteppe landscape are better protected, prepared, and resilient to wildland fire, engaged in shrubsteppe conservation, and economically viable.

- **Objective 1 – Community Fire Resistance and Resilience**
  Ensure all human communities in the shrubsteppe landscape are engaged in, aware of, and planning for fire resistance, resilience, and recovery by 2029.

- **Objective 2 – Community Damage**
  Reduce the present-day adjusted dollar amount of damage, number of structures burned, and families displaced resulting from wildland fires in the shrubsteppe landscape below the 10-year average by 5% for 10 consecutive years beginning in 2029.

> ***Fire resistance** is related to pre-fire strategies and actions taken prior to fire occurring to improve the capacity of better protect ecosystems, habitat, species, communities and or other values at risk from incurring significant damage from wildland fire if it occurs.*

- **Objective 3 – Landowner Engagement**
  Establish a baseline and increase the number of local landowners and communities engaged in conservation efforts across the shrubsteppe landscape, aiming for a 15% increase by 2029.

- **Objective 4 – Working Lands**
  Increase support for working lands to enhance contribution to shrubsteppe wildlife conservation while remaining economically viable.

- **Objective 5 – Underserved, Highly Impacted, Overburdened, or English as a Second Language (ESL) Communities**
  Identify underserved, highly impacted, overburdened, or ESL communities located within the shrubsteppe landscape and prioritize them for assistance to become more resistant and resilient to wildland fire.

GOAL #2

The extent, frequency, and severity of wildland fire in the shrubsteppe landscape are similar to pre-1800s fire return intervals, while taking into consideration changes in land use, climate, and other modern factors.

Objective 1 – Fire Frequency

Identify the likely pre-1800 fire return intervals on all core and growth shrubsteppe habitat areas and manage planned and respond to unplanned fire to achieve this frequency in these landscapes by 2053.

Objective 2 – Fire Severity/Extent

By 2053, reduce ecological impact from fire by (1) reducing high severity fire to 1% or less of total acres burned in shrubsteppe Core Areas and (2) reducing high severity fire to 5% or less of total acres burned in Growth Opportunity Areas

Objective 3 – Human-caused wildfire starts

Reduce the number of human-caused starts annually in the planning area to less than 25% of the current 10-year average by 2029.

Objective 4 – Ecological Damage

Reduce the extent of core areas burned at high-severity by 5% of the 10-year average per year, for 10 consecutive years beginning in 2029.

GOAL #3

Habitat quantity and quality is increased to support healthy wildlife populations and communities.

Objective 1 – Core Areas

Through management, grow core areas to achieve a net increase of total core area representation across the Columbia Plateau for each of the conservation targets by 2054:

- Dry (xeric) – Increase core area extent to exceed 21.32% baseline;
- Wet (mesic) – Increase core area extent to exceed 4.66% baseline; and
- Greater Sage-grouse – Increase core area extent to exceed 4.62% baseline.

Objective 2 – Growth Opportunity Areas

Manage growth opportunity areas to increase core areas and avoid net loss of growth opportunity areas through a) conversion to land uses that do not provide wildlife habitat (e.g., development), and b) degradation of growth opportunity areas to other habitat for each conservation target by 2054:

- Dry (xeric) – Avoid loss below 10.39% baseline to sources (a) and (b);
- Wet (mesic) – Avoid loss below 0.95% baseline to sources (a) and (b); and
- Greater Sage-grouse – Avoid loss below 5.30% baseline to sources (a) and (b).

Transition of growth opportunity areas to core areas would reflect progress towards Objective 1.

Objective 3 – Other Habitat

Manage other habitat to increase growth opportunity areas and core areas and avoid net loss of other habitat through conversion to land uses that do not provide wildlife habitat by 2054:

- Dry (xeric) – Avoid loss below 11.25% baseline;
- Wet (mesic) – Avoid loss below 9.78% baseline; and
- Greater Sage-grouse – Avoid loss below 32.00% baseline.

Transition of other habitat to growth opportunity areas and core areas would reflect progress towards Objectives 1 and 2.

Objective 4 – Connectivity

Avoid net loss of corridor area extent through conversion to land uses that do not provide wildlife habitat, and for each of the conservation targets, manage corridors to maintain or improve connectivity function.

Objective 5 – Unique Habitats

Avoid net loss of unique habitats and features, such as sand dune, talus, Palouse prairie, vernal pools, and others, through conversion to land uses that do not provide wildlife habitat, to support associated Species of Greatest Conservation Need and other wildlife.

WSRRI's spatial priority mapping establishes baseline values against which our progress towards meeting objectives 1-4 can be measured.

All baseline landscape-extent values for each spatial priority designation and conservation target are provided below. While 21.32% of the landscape is currently considered core area for the dry (xeric) habitats, only 4.66% and 4.62% of the landscape is core area the wet (mesic) habitats and Greater Sage-grouse, respectively. As habitat is managed to increase the extent of core area across the landscape (through defending and growing the core), ecological integrity (i.e., habitat quality) also increases, tying back to the language in Goal 3. The spatial priorities were mapped based on summarizing a time series of past annual assessments (5-10 years depending on the conservation target) of the landscape, so it is important to note that parts of core areas, growth opportunity areas, and corridors may not be in good condition today, as very recent fires or conversion likely impacted habitat. TerrAdapt provides additional data (e.g., annual fractional vegetation cover, human footprint) to help WSRRI and partners understand *current* conditions in these areas. This additional data will allow further prioritization within and among priority areas for where to implement conservation actions like habitat protection, restoration, and barrier mitigation efforts, to meet our objectives.

Relative to Objective 4, while baselines are provided in the table below, landscape extent of corridor is not a good measure of connectivity. Rather, Objective 4 focuses on maintaining connectivity (measured as cost-distance, where increasing cost-distance is a loss of connectivity) in existing corridors and improving connectivity in key corridors across the landscape where they are valuable to important cores. Important cores and associated corridors will be identified in WSRRI's year-one workplan in association with development of the Washington Connectivity Action Plan.

Conservation Target	Dry Xeric		Wet Mesic		Greater Sage-grouse		Conservation Targets Combined	
Spatial Priority	Acres	% of CP	Acres	% of CP	Acres	% of CP	Acres	% of CP
Non-habitat	6,241,902	40.99%	10,822,898	71.08%	7,696,853	50.55%	4,496,093	29.53%
Other	1,713,679	11.25%	1,488,993	9.78%	4,872,935	32.00%	2,184,621	14.35%
Corridor	2,444,342	16.05%	2,011,677	13.21%	1,144,899	7.52%	3,552,631	23.33%
Growth Opp	1,581,422	10.39%	144,586	0.95%	807,144	5.30%	1,105,846	7.26%
Core	3,245,560	21.32%	709,223	4.66%	703,730	4.62%	3,913,829	25.70%

To Objective 5, currently, our existing maps and estimates of unique habitats, and processes to reflect change in extent of unique habitats over time, are inadequate to measure success towards Objective 5. This will also be addressed in WSRRI's year-one workplan to ensure we have the means to measure progress towards avoiding net loss of unique habitats for the duration of the Long-Term Strategy.

GOAL #4

Populations of species of greatest conservation need and other species are - representative, ensuring they can adapt to changing conditions; resilient so they are able to persist despite disturbance; and redundant, such that they
can withstand catastrophic events.

- ### Objective 1 – State Listed Species

  Achieve a positive trend toward State Recovery Plan objectives for state listed species by 2050.

- ### Objective 2 – Species of Greatest Conservation Need Species

  Stabilize and improve population status of unlisted SGCN species by 2050, as indicated by appropriate demographic and/or habitat indicators (e.g., occupancy, distribution, abundance; the extent and quality of habitat).

*The species goal guides us to achieve species populations that are **Resilient**, **Representative**, and **Redundant**, which are principles of conservation biology that are used to describe a species' recovered state. Excerpt, 2016 US Fish and Wildlife Service Framework for Species Status Assessments (2016)*

- ***Resiliency***
  describes the ability of a species to withstand stochastic disturbance. Resiliency is positively related to population size and growth rate and may be influenced by connectivity among populations. Generally speaking, populations need abundant individuals within habitat patches of adequate area and quality to maintain survival and reproduction in spite of disturbance.

- ***Representation***
  describes the ability of a species to adapt to changing environmental conditions over time. It is characterized by the breadth of genetic and environmental diversity within and among populations. Measures may include the number of varied niches occupied, the gene diversity, heterozygosity or alleles per locus.

- ***Redundancy***
  describes the ability of a species to withstand catastrophic events; it's about spreading risk among multiple populations to minimize the potential loss of the species from catastrophic.

6.2. Critical Threats

The table below describes some of the key threats facing shrubsteppe habitat in the Columbia Plateau and includes some of the driving factors behind each threat as well as associated impacts and landscape context. Threats were initially identified using the rangewide Sagebrush Conservation Strategy (Remington et al. 2021) and adapted, collaboratively, to be specific to Washington. The Strategies and Actions described in the sections that follow are designed to address these threats.

Table 1. Threats to the shrubsteppe and Factors Influencing Current Conditions

Threats	Factors Contributing to Threat	Impacts to Wildlife and Human Communities	Geographic extent within Columbia Plateau
Altered Wildland Fire Regimes	Fire suppression; large-scale nonnative annual grass invasives; climate change and resulting hotter and drier conditions; , human-caused ignitions; greater human pressure, siting of development	Loss and degradation of habitat through conversion from native shrub-perennial grass communities to fire-prone, nonnative, annual grass communities; loss of wildlife and plant individuals and species; loss of prey resources; loss of life and property, ; loss of ecosystem services; health and economic impacts due to poor air quality and increased costs for services for human health and survival; loss of recreation opportunities; loss of cultural traditions and sites;	landscape-wide, most severe at low-altitudes where environments are hot and dry.
Altered Hydrology	Agricultural and municipal surface and groundwater demand and diversion; historical land use and farming practices; dams; climate change; loss of beavers	Loss and degradation of wetlands and riparian areas, drying of waterbodies and streams, loss of habitat, incision of water courses, degradation of water quality, drought, changes in groundwater	landscape-wide, some site-specific areas–- such as species impacts at Potholes Reservoir
Invasive Plant Species	Ground disturbance, transport vectors and development activities, seed sources, introduction and spread by humans and animals, environmental conditions like climate and water availability, impoverished native plant communities	Degraded habitat through alteration of plant community structure and composition; competition with native plant species; contribution to altered wildland fire regimes; changes in ecosystem services (e.g., as forage for pollinators); changes to ecosystem functions (e.g., carbon and water cycles; changes in habitat/range productivity, reducing forage for wildlife and livestock	Landscape-wide, some site-specific areas

Threats	Factors Contributing to Threat	Impacts to Wildlife and Human Communities	Geographic extent within Columbia Plateau
Climate Change	Extreme weather events, such as unusually intense storms, heatwaves, and prolonged droughts exacerbated by human-induced climate change resulting from increased greenhouse gases.	Loss and degradation of habitat and food resources, increased temperature, altered hydrology- changes in runoff timing and flooding, drought, increased fire risk, severe weather, changing winter/seasonal conditions that may favor invasive vs. native species	Landscape-wide
Wild and Free Roaming Horses	Free roaming horses	Loss and degradation of habitat and ecosystem function; trampling of sensitive plants; introduction and spread of invasive plants; reduction of forage and water availability and access for wildlife and livestock; soil erosion where animals congregate,	Specific Tribal lands, federal lands, state lands, and private lands
Incompatible Grazing	Poorly managed domestic livestock	Loss and degradation of habitat; trampling of sensitive plants; introduction and spread of invasive species; reduction for forage and water availability for wildlife; soil erosion where animals congregate; degradation of riparian areas around water sources	Landscape-wide, some site-specific areas
Mining and Energy Development	Solar and wind development, mining, transmission lines	Direct habitat removal or fragmentation; introduction of invasive plant species; impacts on surface and groundwater; disruption of habitat connectivity and wildlife movement and migration, as well as increased direct mortality due to increased hazards (e.g., due to increased presence of fences, roads, transmission lines)	Landscape-wide, some site-specific areas
Land Use and Development	Land ownership patterns (e.g., checkerboard ownership), land management, zoning and policies, roads, fences, economics (e.g., crop prices), conversion to agriculture, development, population increases, military exercises, recreation	Loss and degradation of habitat, loss of prey resources, isolation of populations, habitat fragmentation, pollution, habitat disturbance, hazards for wildlife (e.g., roads, fences) introduction and spread of invasive species, increased fire risk, reduced seasonal migration patterns	Landscape-wide, some site-specific areas

Threats	Factors Contributing to Threat	Impacts to Wildlife and Human Communities	Geographic extent within Columbia Plateau
Small Wildlife Population Size	Habitat loss and degradation, loss of food resources, predation, disease, the separation of wildlife populations into smaller, isolated groups	Increased risk of extinction, inbreeding, reduced variety in the genetic makeup of species, decreased ability to disperse, decreased ability to withstand predation rates or other natural mortality factors, inability to recover from stochastic or catastrophic events such as droughts or disease outbreaks, (reduced population resilience) or adapt to changing conditions (reduced population representation)	Population-specific
Human-associated Predators	Habitat loss, degradation, and alteration are significant issues that contribute to increased abundance of generalist predators benefiting from human-alteration of habitat.	Mortality, increased risk of disease transmission, increased predation risk, higher rates of predation, which further contribute to the reduction in genetic diversity and fragmentation of animal populations into smaller, isolated groups.	Landscape-wide
Direct Human Resource Use and Disturbance	Illegal shooting, poisoning, trapping, collecting, recreation (e.g., off-road use), spreading of invasive weed seeds, disturbance of wildlife and habitat.	Mortality and disturbance	Landscape-wide, some site-specific areas

7. Enabling Conditions, Strategies, and Actions

7.1. Enabling Conditions

In developing the Long-Term Strategy, subject matter experts were asked to consider specific mechanisms, structures, and processes necessary to facilitate action implementation and affect change. These are referred to as the "enabling conditions," which are listed below. Within the Strategies, each Action is listed with the primary enabling condition associated, but most Actions will require multiple enabling conditions to be in place to be successful.

Table 2. Enabling conditions for the Long-Term Strategy

	**Information and Planning** A robust foundation of data and knowledge is essential to inform the Actions. Access to comprehensive, current information about shrubsteppe ecosystems, their dynamics, and the threats they face is key for success. .
	**Science and Monitoring** Access to existing and development of new ecological and social data and analytical tools is essential for conserving shrubsteppe habitats, understanding of both threats and the efficacy of actions, and effectively tracking ecological changes over time.
	**Organization and Governance** Effective organization and governance structures, such as involving relevant agencies, community groups, and conservation organizations, create a framework for collaboration and decision-making.
	**Policy and Permitting** Clear and supportive policies and permitting processes are essential for navigating the legal aspects of implementation.
	**Resources and Equipment** Adequate resources and specialized equipment are necessary for fieldwork, research, and implementation of conservation actions.
	**Capacity and Training** Building the capacity of individuals and organizations involved in training and skill development ensures that the right expertise is available to implement.
	**Outreach and Education** Effective outreach and education efforts engage the broader community, fostering understanding and support for shrubsteppe landscape conservation and community wildfire resiliency. Likewise, the public and partners inform our understanding of threats, needs, and opportunities.
	**Funding** Sustained and streamlined funding will be necessary for success.

7.2. WSRRI Key Strategies and Corresponding Actions

WSRRI's Key Strategies are Community Engagement, Habitat Protection, Habitat Restoration, Species Management, and Fire Management (Figure 9). Actions are grouped into these key strategies and are designed to achieve the Goals and Objectives and address the Threats. Actions are detailed in the following section.

Figure 9. WSRRI Enabling Conditions and Key Strategies.

ACTIONS

The Actions outlined for each key strategy in this section represent the long-term efforts recommended, spanning a 30-year horizon, to achieve the goals and objectives described above. Actions slated for the short term will be documented in regularly updated Implementation Workplans (refer to Appendix F).

Because this Strategy is a living document, the Actions represent the current understanding for how to best achieve the Goals and Objectives. The Actions below are recommended for long-term management and conservation of the shrubsteppe landscape with the understanding that updates will follow in the coming years.

7.2.1. Community Engagement Strategy

Community engagement is vital to the success of shrubsteppe protection and conservation to benefit wildlife and human communities in the face of wildland fire. Human behavior and values can have significant positive or negative impacts on the quantity and quality of wildlife habitat for numerous sensitive species in this landscape. It is essential to the success of this Long-Term Strategy that meaningful community engagement is the bookend to all other actions taken. Without local community commitment, the goals and objectives to protect and conserve Washington's shrubsteppe landscape cannot be achieved.

COMMUNITY ENGAGEMENT ACTIONS

Table 3. Community Engagement Action and Enabling Conditions.

COMMUNITY ENGAGEMENT STRATEGY			
	Understand Human Values, Perceptions, and Needs		
	CE1	**Include social science input** Bolster state agency applied science teams to inform community engagement by evaluating research on behaviors, motivators, barriers, public communications methods, and engagement. Incorporating social science insights will ensure well-informed and effective engagement approaches.	Policy and Permitting
	Strategic Communication Actions		
	CE2	**Engage with communities in the shrubsteppe landscape through social science** Engage with and inform communities in the shrubsteppe landscape about wildlife habitat and wildland fire preparedness, employ applied social science on human behavior, motivation, barriers, and communication.	Outreach and Education
	CE3	**Create a joint-agency communications plan** Collaboratively create a comprehensive communications plan involving multiple agencies, including WDFW, WSCC, WDNR and others. Develop customized and consistent messaging for varying aspects of engagement with communities in the shrubsteppe landscape. Develop a Tribal Engagement Plan in cooperation with Tribal nations to ensure strong communication and coordination regarding stewardship of the shrubsteppe landscape.	Organization and Governance
	CE4	**Tailor community engagement and raise awareness** Enhance public perception of the value of shrubsteppe habitats for both humans and wildlife. Develop customized approaches of community engagement based on specific local needs and priorities.	Information and Planning
	CE5	**Establish a resource library** Develop a comprehensive resource library, available to agencies and partners, housing tools and resources related to community outreach such as workshop curriculum or WSRRI fact sheets.	Information and Planning

COMMUNITY ENGAGEMENT STRATEGY

Sustained and Amplified Engagement		
CE6	**Partner with a variety of local organizations representing all communities to amplify engagement** Leverage and model engagement endeavors of organizations that equitably build networks and provide education to their local communities on wildland fire risk and the importance of wildlife in the shrubsteppe landscape.	 Information and Planning
CE7	**Build upon existing resources for information sharing** Build upon existing initiatives by utilizing effective community engagement campaigns, partnering with trusted Community Based Organizations (CBOs) for information dissemination and open dialogue, and collaborating with conservation districts (CDs) for assistance with outreach tools and data related to landowners and communities in the shrubsteppe landscape. Minimize redundancy in information collection and outreach efforts.	 Information and Planning
CE8	**Ensure and welcome diverse participation** Emphasize engagement to support underserved, highly impacted, overburdened, vulnerable, and/or English as a Second Language (ESL) communities to encourage participation in shrubsteppe habitat conservation. Find opportunities to break down barriers to engagement, such as financially supporting individuals and communities to participate. ▶ Partner with the Sustainability in Prisons Project (SPP) to provide outreach, education, and job training for the conservation field to incarcerated populations, while also achieving conservation objectives of native plant production.	 Outreach and Education
Build and Support Capacity		
CE9	**Support Local Organizations with Outreach and Engagement** Collaboratively identify and support capacity building and training opportunities for local agencies and organizations, especially conservation districts and non-profit organizations.	 Capacity and Training
CE10	**Support Local Organizations to Implement Community Wildfire Protection Plans (CWPPs)** Support local organizations and jurisdictions to facilitate coordinated implementation of priority work identified in Community Wildfire Protection Plans.	 Capacity and Training
CE11	**Enhance Agencies' Public Communications and Engagement** Conduct comprehensive training sessions for agencies to enhance their skills in public communications and engagement with communities in the shrubsteppe landscape.	 Capacity and Training
Grazing and Working Lands Outreach & Education		
CE12	**Develop and Maintain a WSRRI Grazing Management Webpage and Companion Handbook** Provide audience-appropriate information on geography-specific general technical rangeland management recommendations. Include contact information for local agency and resource personnel, public agency missions, conservation programs, emergency programs, and other resources helpful to livestock producers.	 Resources and Equipment
CE13	**Promote Rangeland Educational Opportunities** Promote programs such as the Young Ranchers Program, Future Farmers of America, 4-H, Envirothon, and others.	 Outreach and Education

7.2.2. Habitat Protection Strategy

Private lands constitute approximately 75% of the Columbia Plateau in Washington, making private landowners key partners in shrubsteppe habitat protection and restoration. Government influence of private land management is achieved through both regulatory means and voluntary incentive programs. WSRRI's interest is to inform, enhance, and accelerate coordinated action on the ground, whether that action is driven by voluntary programs or regulation. Strategic conservation will require targeted and dedicated application and improvement of regulatory and voluntary approaches. Further, our success will require the full strength of our diverse partnerships to effectively work with landowners and producers to bring those benefits to bear. Multiple partners are actively building and maintaining relationships with landowners to influence habitat protection and management. The Strategy is intended to provide a pathway to improve habitat protection programs and increase opportunities, while strengthening partnerships by increasing capacity and coordination to better work with landowners and capitalize on habitat protection opportunities.

Washington's Growth Management Act

Washington's Growth Management Act (GMA) requires cities and counties to develop a comprehensive plan to manage population growth. Under GMA, all jurisdictions are required to adopt critical areas regulations; these regulations help preserve the natural environment, maintain fish and wildlife habitat, protect drinking water, and protect the public from geological hazards and flooding. As defined in RCW 36.70A.030(6): "Critical areas" include the following areas and ecosystems - (a) wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas (FWHCAs); (d) frequently flooded areas; and (e) geologically hazardous areas. Cities and counties are required to include the best available science in developing policies and development regulations to protect the functions and values of critical areas (RCW 36.70A.172).

To "protect" a critical area means to provide for "no net loss of ecosystem functions and values" (no net loss), providing habitat sufficient for fish and wildlife populations to persist in the long-term and avoiding isolated subpopulations. The GMA requires that, after avoiding and minimizing effects to the extent possible, unavoidable disturbance and loss of ecosystem function must be offset with adequate and appropriate restoration. Protecting critical areas involves a variety of strategies taken by cities and counties, from the adoption of conservation policies in comprehensive plans to the adoption of local regulations through Critical Area Ordinances (CAO), which provide the administrative review and approval process for regulating land uses that may impact critical areas (Ousley et al. 2007). Once adopted, a Critical Area Ordinance's standards apply to individual permits rather than the underlying GMA requirements. Every decade, cities and counties are required to update their Critical Area Ordinances to incorporate new best available science. The GMA (RCW 36.70A.020) also requires jurisdictions to... "maintain and enhance natural resource-based industries, including productive timber, agricultural, and fisheries industries. Encourage the conservation of productive forestlands and productive agricultural lands and discourage incompatible land uses." Jurisdictions have a great deal of responsibility for managing land uses and protections under the GMA through land use designations and protection of both habitat and agricultural lands.

> ***No net loss** is a principle commonly applied in environmental management and conservation policy aiming to balance the loss of biodiversitybiological diversity or ecosystems in one area with the restoration, enhancement, or preservation of biodiversity in another, so that the overall quantity and quality remain unchanged.*

Voluntary Stewardship Program

In 2011, the Legislature amended the GMA and established the Voluntary Stewardship Program (VSP). VSP provides an alternative approach to protecting Critical Areas within agricultural lands to support agricultural viability and environmental protection. In participating counties, agricultural landowners can enroll in VSP through their county or conservation district and receive technical assistance to improve their operation and advance stewardship of Critical Areas. Examples of VSP projects could include implementing best management practices such as hardscape manure storage, planting riparian vegetation buffers, installing livestock exclusion fencing around waterways, using low or no-till practices, and more. The program allows agricultural landowners to leverage federal and state funding to implement best management practices that support their operations and a sustainable environment. VSP is operated locally by counties or conservation districts with participation from local stakeholders who serve on advisory boards.

Other Voluntary Incentive Programs

In addition to VSP, multiple state agencies offer non-regulatory voluntary incentive programs that are meant to protect habitat or preserve agricultural land (e.g., conservation easements) or can influence and improve habitat management through practice implementation and practice improvement. At the federal level, incentive programs funded through the Farm Bill (e.g., Conservation Reserve Program [CRP], Environmental Quality Incentives Program [EQIP], etc.,) enhance habitat value in Washington's shrubsteppe landscape. Each program provides different incentive types, such as technical assistance to plan practices, financial assistance for practice implementation, and easement acquisition funding. Many of these incentive programs have, to date, been important for the conservation of shrubsteppe wildlife (e.g., Schroeder and Vander Haegen 2006).

Data, tools, and recommendations to inform land protection

WDFW's Priority Habitats and Species (PHS) Program is the agency's primary means of transferring fish and wildlife information from resource experts to local jurisdictions, landowners, and others who use it to inform programs and actions to protect and restore habitat. The Washington Administrative Code refers to PHS in sections dealing with Critical Area Ordinances, Shoreline Master Programs, and the Essential Facilities Siting Evaluation Council, and PHS information is used primarily by local jurisdictions to implement and update land use plans and development regulations under the Growth Management Act and Shoreline Management Act. However, PHS is also a valuable resource in non-regulatory contexts and can and has been used to inform voluntary, incentive-based programs.

By providing lists, maps, and management recommendations, PHS addresses four central questions:

1. Which species and habitats are priorities for management and conservation?
2. Where are these habitats and species located?
3. What should be done to protect these resources when land use decisions are made?
4. How effective are current efforts at conservation of these resources?

Change to achieve net habitat gain

As stated above, WSRRI is designed to inform and enhance both state regulatory and voluntary programs to accomplish the defense, growth and connection of core areas. While GMA does require no net loss through protection of critical areas, it does not require restoration. Because such a large percentage of the shrubsteppe landscape in Washington has already been lost, mitigation through further no net loss alone will be insufficient for habitat and species recovery in this landscape. Rather, a focus on regenerating habitat through restoration and improvement of management practices, facilitated through multiple programs, could result in net habitat gain across the landscape. To achieve this important work, trade-offs and compromises will be necessary to protect ecosystem function on private lands.

The actions in this section collectively address both the execution of GMA and the implementation of voluntary incentive programs, to enhance the benefits that both bring to wildlife and human communities across the shrubsteppe landscape. Actions are organized as follows -

1. Improving data, tools, and recommendations to inform land protection;
2. Supporting local jurisdictions in GMA implementation;
3. Increasing participation in voluntary incentive programs;
4. Increasing innovative approaches and funding support;
5. Improving application of conservation easements;
6. Supporting partners to deliver incentives;
7. Developing local grazing networks; and
8. Enhancing Grazing Management Programs.

HABITAT PROTECTION ACTIONS

Table 4. Habitat protection actions and enabling conditions.

HABITAT PROTECTION STRATEGY			
	Improving data, tools, and recommendations to inform land protection		
	HP1	**Identify and address data gaps** Identify and rectify gaps in the extent and quality of geospatial data to facilitate effective, long-term monitoring of land use impacts and ensure that counties achieve no net loss. Collaborate across data managers to identify changes in vegetation cover and land use to enhance monitoring and analysis capabilities.	Science and Monitoring
	HP2	**Complete PHS Management Recommendations for all Priority Habitats** Support local jurisdictions in protecting FWHCAs and others engaging in voluntary, incentive-based conservation, by completing PHS management recommendations for all Priority Habitats in the shrubsteppe landscape, including for Biodiversity Areas and Corridors.	Information and Planning
	HP3	**Develop guidance and tools for offsetting mitigation** Expand PHS management recommendations to include guidance on locations, quantities, and types of offsetting mitigation recommended for Priority Habitats and Species to inform FWHCA conservation and land use in general. Work with local jurisdictions and project proponents to incorporate baseline conditions, monitoring, and recommended mitigation ratios for unavoidable impacts. Establish or increase mitigation ratios for PHS Priority Habitats across the shrubsteppe landscape to emphasize the relative significance and value of shrubsteppe landscapes and associated habitats and facilitate defending, growing, and connecting the core.	Information and Planning
	HP4	**Integrate climate resiliency in planning** Account for changing climate factors, including severe weather events, climate patterns, and landscape conditions, during all habitat conservation and land use planning, especially during the periodic update cycle. To develop adaptive management strategies and integrate climate resilience, provide climate resiliency data to and collaborate with local jurisdictions and partners to conduct risk assessments, incorporate climate data and projections, and continually monitor and update local conservation plans.	Information and Planning
	HP5	**Explore use of WSRRI spatial priorities to inform Critical Area Ordinance updates** Determine the best application of WSRRI Spatial Priorities to GMA planning and implementation, including Critical Area Ordinance periodic updates. If determined to be applicable and prudent, incorporate WSRRI Spatial Priorities into WDFW data, tools, and recommendations to guide decisions on the application of avoidance and minimization, such as low-density zoning, incentive programs, and higher compensatory mitigation ratios.	Information and Planning
	Supporting Local Jurisdictions in GMA Implementation		
	HP6	**Enhance technical assistance to local jurisdictions** Provide technical assistance to local jurisdictions seeking support in updating and implementing plans and regulations for FWHCA designation and protection. Equip agency staff providing technical assistance with the necessary training and resources, including updated reference planning documents and management recommendations based on BAS. Provide support to local jurisdictions' Information Technology and Geographic Information Systems staff in receiving and integrating spatial data useful for informing FWHCA designation and protection.	Capacity and Training

HABITAT PROTECTION STRATEGY	HP7	**Enhance planning tools and data access for local jurisdictions** Provide local jurisdictions with improved planning tools, high-quality data, management recommendations, and other supporting documents to support designation and protection of FWHCA. Update the Critical Areas checklist. Develop or reference model CAOs for local jurisdictions to utilize in designation and protection efforts. Make this information publicly available and easily accessible to promote transparency and utilize various means of communication and information dissemination to increase planners' and elected officials' awareness and use of available tools and data.	 Information and Planning
	HP8	**Increase long-term monitoring and adaptive management of Critical Area Ordinances** Support local jurisdictions in existing programs and encourage new programs to increase long-term monitoring and adaptive management of CAOs to assess the success of achieving NNL. Partner with volunteer jurisdictions to pilot new monitoring and adaptive management programs.	 Science and Monitoring
	HP9	**Boost local jurisdiction capacity to designate and protect FWHCAs** Increase the funding and capacity of local jurisdictions to designate and protect FWHCAs in their land use plans and regulations to allow for more comprehensive integration of planning tools and data available. Support increased funding and capacity for jurisdictions specifically to upgrade Information Technology and Geographic Information Systems to effectively leverage data provided by state agencies and hire consultants to provide technical support during periodic updates.	 Capacity and Training
	HP10	**Encourage local jurisdictions to influence green energy development** Work with local jurisdictions to utilize their energy permitting authority to influence the siting and development of energy projects to minimize impacts on Priority Habitats and Species. Effectively convey to each jurisdiction Priority Habitats and Species data through updates to GMA plans and regulations, including periodic updates. Engage with local jurisdictions to amend land use maps, zoning codes, CAOs, and other development regulations to better protect, restore, and enhance ecological functions.	 Policy and Permitting
	HP11	**Integrate habitat protection and restoration in local planning and tax incentives** Engage with local planning departments and policymakers to encourage the inclusion of habitat protection and restoration considerations in land-use plans and zoning regulations. Explore property tax incentives tailored to encourage habitat protection and restoration and evaluate potential tax benefits for landowners engaged in these actions.	 Information and Planning
	HP12	**Expand options to achieve no net loss** Establish methods for achieving no net loss of ecosystem function. Explore tools like compensatory mitigation banks and in-lieu fee programs, learning from those in place for wetlands, to conserve shrubsteppe habitats. Such options would be the highest priority, especially in Core, Growth Opportunity Areas, and Corridors.	 Organization and Governance

HABITAT PROTECTION STRATEGY

Increasing participation in voluntary incentive programs		
HP13	**Conduct comprehensive evaluations of existing incentive programs** Thoroughly evaluate existing voluntary incentive programs to identify gaps and areas for improvement; assess both barriers to and motivators for landowner participation; and establish ways to enhance their effectiveness in addressing the needs of shrubsteppe habitat and working lands conservation.	 Information and Planning
HP14	**Disseminate Best Management Practices (BMPs) associated with existing incentive programs** Create a comprehensive catalogue of existing voluntary incentive programs and associated BMPs to clearly define the practices supported by individual programs while ensuring those BMPs are accessible, user-friendly, and adaptable, where possible, to meet the varied needs of potential program participants. Regularly update and disseminate BMPs to participants, program staff, landowners, and other relevant stakeholders to foster consistent understanding and application. Offer training workshops, webinars, or one-on-one consultations to address landowner's questions and provide practical guidance throughout their participation in the programs. Provide resources, such as educational materials and online tools, to help landowners understand the requirements of the incentive programs.	 Outreach and Education  Information and Planning
HP15	**Streamline incentive programs to increase enrollment** Apply lessons learned through comprehensive evaluations of existing incentive programs to coordinate, streamline, and inform landowners of opportunities, ensuring they can make full use of available programs. Enhance landowner access and enrollment by simplifying the application process, providing clear information about available programs, and offering guidance to navigate these programs effectively. Tailor support services to address the unique needs and challenges faced by private landowners in participating in the programs.	 Outreach and Education
HP16	**Support farm succession planning and land ownership transition planning** Provide resources to farmers and landowners interested in developing succession plans for agricultural operations and/or land ownership transitions. Develop opportunities to incorporate conservation incentives and encourage habitat protection.	 Outreach and Education
Increasing innovative approaches and funding support		
HP17	**Strategically target delivery of Voluntary Incentive Programs** Prioritize, where possible, incentive delivery in Core Areas, Growth Opportunity Areas, and Corridors, to effectively protect and restore shrubsteppe habitats. Provide clear and informative materials that highlight the benefits and opportunities associated with participating in incentive programs. Effectively communicate the goals, objectives, and requirements of the incentive programs to ensure understanding and awareness.	 Outreach and Education
HP18	**Quantify and value ecosystem services** Utilize economic models and other methods to quantify and financially value ecosystem benefits in the shrubsteppe landscape, such as carbon sequestration. Incorporate the methodology and results as appropriate into incentive programs.	 Information and Planning

HABITAT PROTECTION STRATEGY	HP19	**Adequately fund existing programs and streamline funding procedures** Ensure that conservation programs for agricultural producers and landowners are well-funded and supported, accessible, and efficient by leveraging state and federal initiatives and capitalizing on existing relationships from national programs like the Farm Bill. Support state-funded voluntary incentive-based programs that already protect wildlife habitat, like the VSP. Ensure comprehensive funding at project initiation to prevent delays and ensure smooth implementation. Consider funding multiple projects on a single site within a biennium to amplify conservation outcomes.	 Funding
	HP20	**Create and fund a Washington State-funded incentive program modeled after and intended to complement the Federal Conservation Reserve Program** Establish a comprehensive and effective framework of state-funded voluntary, incentive-based approaches that are tailored to Washington needs, and encourage private landowners to actively participate in land conservation, for the conservation of wildlife habitat, enhancement of biological diversity, and promotion of sustainable land management practices. Collaboratively and clearly define the program's development steps, goals, and eligibility criteria. Publicize the program widely through a comprehensive and targeted communication strategy that communicates the benefits and incentives available under the program, emphasizing its value to landowners and its contribution to wildlife conservation and habitat preservation.	 Organization and Governance
	HP21	**Create a WSRRI Habitat Protection Investment Account to support sustainable funding for shrubsteppe habitat protection** Develop a dedicated program specifically tailored to shrubsteppe protection, recognizing the potential for such a program to signal the importance of this habitat, attract additional funding, and garner public support. Assess the viability of a dedicated program versus integration with existing initiatives. Optimize outcomes by considering benefits and limitations.	 Organization and Governance
	HP22	**Engage in Federal Farm Bill development to improve delivery and outcomes in Washington** Engage in the development of the Federal Farm Bill to preserve and enhance programs vital for wildlife conservation, including the State Acres for Wildlife Enhancement (SAFE) program within CRP, and improve their delivery and application in Washington State. Collaborate closely with Federal Legislators, national and regional associations (e.g., the Association of Fish and Wildlife Agencies and its regional counterparts), and other states, as well as State Legislators and the Governor's Office, to secure sufficient federal funding for applicable Farm Bill programs and address administrative barriers to their conservation effectiveness (e.g., the cap on acreage enrollments in Douglas County).	 Policy and Permitting
	HP23	**Enhance and promote increased utilization of the Public Benefit Rating System (PBRS) and Conservation Futures Programs** Incentivize counties to adopt the rating system, a voluntary land conservation mechanism available to local governments under the Open Space Tax Act, more widely. Encourage counties to adopt local conservation futures programs to conserve open space lands. Create and convey best practices and model language for these programs.	 Policy and Permitting
	HP24	**Promote conservation contiguity** Offer bonus incentives for habitat protection and restoration on private lands adjacent to each other, or private lands adjacent to public lands, to increase the size of contiguous habitat blocks.	 Policy and Permitting

HABITAT PROTECTION STRATEGY

HP25	**Promote "Buy, Protect, Sell" programs** Increase and promote 'buy, protect, sell programs like the Farm Protection Land Access Program at WSCC's Office of Farmland Preservation.	Outreach and Education
HP26	**Bring additional federal incentives to Washington's shrubsteppe** Work with federal partners, including the Natural Resources Conservation Service (NRCS), the Bureau of Land Management (BLM), and U.S. Fish and Wildlife Service (USFWS), to bring financial resources associated with the Bipartisan Infrastructure Law and other current and future federal funding streams to compliment WSRRI state funding and implement strategic actions.	Funding
Improving Application of Conservation Easements		
HP27	**Establish a dedicated conservation easement program for the shrubsteppe landscape** Tailor a new voluntary easement program to address multiple threats facing the shrubsteppe landscape, allowing for both perpetual and term easements to meet landowner and conservation needs. Develop model conservation easement conditions specifically designed for shrubsteppe habitat protection, as well as for working lands that serve as habitat. Incorporate practices that promote economic viability while preserving and enhancing habitat, ensuring both conservation and working lands sustainability.	Organization and Governance
HP28	**Improve easement stewardship cost estimates and include these costs in program funding** Include ongoing stewardship funding as part of the program to ensure effective easement management and desired conservation outcomes. Analyze stewardship costs and utilize existing templates to create effective workplans. Develop accurate calculations for resource-intensive stewardship activities on large properties to ensure sustainable conservation.	Information and Planning
HP29	**Bolster conservation easement programs through specialized technical assistance** Engage specialists in ecosystem health and grazing management in conducting comprehensive assessments of properties to inform easement management and monitoring. Support and increase easement holder capacity by establishing third-party specialists they can work with to develop grazing management plans and to perform grazing monitoring and assessments.	Capacity and Training
HP30	**Fill geographic gaps in capacity to hold and manage conservation easements** Address partner gaps by identifying areas where a strong local partner does not exist to hold conservation easements for habitat, rangeland, and agricultural lands, and explore solutions to fill these gaps. Focus on refining coordination and capacity to streamline processes, seize opportunities for collaboration, and enable actionable measures.	Capacity and Training
Empowering partners to deliver incentives		
HP31	**Enhance and empower land trust capacity to realize significant contributions to shrubsteppe conservation** Increase Land Trust Involvement by 1) leveraging land trusts to manage privately-owned shrubsteppe parcels; 2) providing resources to support land trust efforts to conserve shrubsteppe ecosystems; 3) exploring land transfer options for long-lasting protection and outlining perpetual preservation plans, and 4) consult with and support the Shrubsteppe Affinity Group within the Washington Association of Land Trusts, to facilitate collaboration among land trusts and partners working in the shrubsteppe landscape.	Capacity and Training

HABITAT PROTECTION STRATEGY	HP32	**Partner with other organizations and entities that influence and inform shrubsteppe and working lands conservation and management** Explore potential partnerships and collaborations with other organizations and entities that influence and inform shrubsteppe and working lands conservation and management, to leverage resources and expertise and meet shared priorities to mutual landowner and conservation benefit. Examples include the Arid Lands Initiative (https://aridlandsinitiative.org/) and Responsible Recreation Initiative (https://www.recreateresponsibly.org/). Implement joint initiatives that integrate habitat conservation and working lands preservation.	Capacity and Training
	HP33	**Increase staff capacity to provide technical assistance** Allocate resources for dedicated agency and partner staff to implement habitat protection and restoration programs. Fund additional technical staff within agencies and partners to increase their collective ability to work directly with landowners on site to increase effective management of working lands to benefit the landowner and wildlife. Necessary technical expertise includes grazing management, habitat restoration for various species and groups (e.g., grouse, pollinators), and monitoring and evaluation.	Capacity and Training
	HP34	**Enhance support services across partners to strengthen engagement of private landowners** Collaborate with relevant organizations, agencies, and land trusts to enhance support available to private landowners, promote knowledge sharing, facilitate access to funding opportunities, and enhance the capacity of private landowners to participate in and benefit from incentive programs. Pool resources, expertise, and networks to offer a comprehensive range of support, including financial assistance, technical expertise, and ongoing monitoring and evaluation. Ensure adequate capacity at the local level to be responsive to landowner requests for information and assistance. Coordinate the efforts of agencies and partners providing technical assistance, standardizing training to facilitate effective collaboration and ease the enrollment process for landowners.	Capacity and Training
	Developing Local Grazing Networks		
	HP35	**Establish centralized and coordinated regional local grazing networks to assist livestock producers** Networks will be structured forums for local collaboration among professionals and livestock producers to 1) be a learning and support network and 2) provide support and coordination during times of emergency. These networks will build upon existing groups and set up a pilot grazing network within Core Areas at the local or Regional Implementation Team level (see Organization and Governance; Section 8).	Organization and Governance
	HP36	**Create cohorts of learners to build community and deepen learning experiences** Through the Local Grazing Networks, promote shared learning and community development around rangeland management for conservation. Hold workshops and field tours on emerging rangeland management topics on a consistent basis.	Organization and Governance

HABITAT PROTECTION STRATEGY

Enhancing Grazing Management Programs		
HP37	**Explore the implementation of voluntary incentive based grazing management programs that align with WSRRI goals and objectives** Leverage, utilize, adapt, and form voluntary and incentive-based grazing management programs for WSRRI core areas and GOAs, in collaboration with grazing subject matter experts, to support native plant communities and working lands viability.	Policy and Permitting
HP38	**Develop understanding of Conservation Reserve Program (CRP) grazing policies during emergencies** Explore potential changes to federal policy to establish wildland fires as emergencies and allow for adaptive management and flexibility to incorporate compatible grazing on CRP-enrolled lands under an approved grazing management or conservation plan that will maintain and enhance wildlife habitat while allowing for temporary grazing while burned grazing lands recover. Work with NRCS and the Farm Services Agency (FSA) to define standards and guidelines for such flexibility.	Policy and Permitting
HP39	**Incorporate principles of adaptive management in grazing management programs to maintain and enhance shrubsteppe habitat** Explore policy changes to grazing programs, such as the Federal Emergency Deferred Grazing Program, to incorporate adaptive management and greater flexibility, allowing producers to access grasses when ready and where such access would not impair wildlife habitat, or extending deferment where habitat recovery is slow.	Policy and Permitting
HP40	**Explore barriers and opportunities of state and federal contracts for all public agency grazing management lease program requirements** Explore policy changes to develop more user-friendly contracts and better alignment between contracts in federal and state grazing management lease programs.	Policy and Permitting
HP41	**Support technical assistance resources for "Do-It-Yourselfers"** Fund programs to create tours, workshops, booklets, and other resources for producers who work on fencing, plantings, fence markers, and other things without contracted assistance.	Policy and Permitting
HP42	**Support innovative approaches to grazing management** Use emerging technologies and innovative techniques to support grazing management, such as virtual fencing.	Information and Planning
HP43	**Maintain funding for Wildlife-Friendly Fencing Program** Assess wildlife-friendly fencing needs and develop a request for funding from the state legislature or explore grant funding based on this assessment. Prioritize wildlife-friendly fencing in wildlife movement areas and migration paths.	Funding
HP44	**Better understand relationships between grazing, wildland fire, and fire resiliency actions** Conduct research and track current grazing practices to better understand how grazing management intersects with wildland fire and actions to increase resiliency, such as fuels reduction and prescribed burning.	Information and Planning

HABITAT PROTECTION STRATEGY	**HP45**	**Establish dedicated capacity to support grazing programs** Create a part- or full-time position to lead WSRRI Grazing Programs and ensure that rangeland programs and resources are supported, consistently updated, and available to producers and communities.	Capacity and Training
	HP46	**Invest in collaborative grazing and infrastructure enhancement** Invest in infrastructure needs such as fencing or watering facilities, to support effective rotational grazing to ensure habitat protection. Identify funding sources and allocate resources for critical improvements, particularly for areas under Multiple-Use Category ownership with grazing activities and established conservation easements.	Policy and Permitting
	HP47	**Promote collaborative grazing management** Leverage the potential of collaboration with neighboring landowners who share an interest in coordinated grazing and habitat preservation. Facilitate partnerships with those adjacent to WDNR or public grazing landscapes, pooling resources, and expertise to maximize the impact of protection initiatives.	Organization and Governance
	HP48	**Partner with grazing management professionals for monitoring enhancement** Recognizing the significance of grazing management and the challenges associated with monitoring, explore collaboration with grazing management professionals to enhance monitoring efforts. This could involve establishing a partnership with conservation districts to ensure comprehensive and effective monitoring through techniques such as photo points and measurements.	Capacity and Training

7.2.3. Habitat Restoration Strategy

Habitat restoration efforts have been underway for decades on private and public lands throughout the shrubsteppe landscape. However, these efforts had not been coordinated in a cohesive way across that landscape. When the 2020 wildfires burned, the collective ability of landowners and land managers to respond at the scope and scale of the impact was limited because we lacked collective and coordinated capacity and resources to respond effectively. Key resources were missing such as a coordinated clearinghouse that could deploy trained on-the-ground personnel to high need areas, and adequate native plant materials available to restore burned areas during the critical ecological window that occurs immediately following wildfire and before the ground freezes. Expanding partners', landowners', and land managers' collective capacity to implement restoration, in turn creates our shared ability to pivot resources to burned areas at an appropriate scale and within a limited timeframe, as needed in response to fire.

The shrubsteppe habitat restoration key strategy is action-oriented, focusing on collaborative efforts and best practice sharing among WSRRI partners to restore vitality to these landscapes. Key actions include restoring degraded habitats with native vegetation to enhance pre- and post-wildfire resistance and resilience, strategically controlling invasive species like cheatgrass, and significantly scaling up planning and implementation capacity for widespread restoration. The strategy is also focused on protecting cultural resources through well-supported review processes, sourcing locally adapted native plant materials for restoration and employing adaptive management to continuously refine these actions based on evolving knowledge. Through these actions, we aim to provide habitat to ensure the long-term health and sustainability of wildlife and people that inhabit the shrubsteppe landscape.

The WSRRI approach is aimed at building restoration capacity across the landscape and focusing the shared use of that capacity toward priority areas, irrespective of land ownership. By sharing expanded resources and services, WSRRI can be responsive to restoring habitats impacted by wildfires while also creating more resilient conditions in non-fire years.

Successful habitat restoration in the shrubsteppe will include actions in the following areas -

Collaboration and Information Sharing

Actions focus on organization and support of collaboration among WSRRI partners, sharing of best practices, and development of shared strategies and projects.

Restore Degraded Habitat

Promotion of integrated methods to replace non-native vegetation with native plant communities that are adapted to fire and that consequently can regenerate naturally after fire. This restoration strategy mimics succession; first re-establishing or enhancing native perennial grasses, followed by augmenting with native forbs and shrubs as needed, and as is practical.

Invasive Plant Control

Suppression of invasive plants is a key component of habitat restoration efforts. Invasive plants compete with native plants, interfering during restoration with establishment of native seedlings, which are slow-growing and easily overwhelmed especially by annual grass weeds. Further, the annual grass such as cheatgrass is transforming the shrubsteppe landscape providing carpets of fine fuels that drive a feedback loop of increasing wildland fire scale and frequency.

Restoration Implementation Capacity

A vast increase of planning and especially implementation capacity is needed to achieve landscape scale habitat restoration objectives. Actions outline several paths to scale-up existing capacity to meet these needs in Washington's shrubsteppe landscape.

Cultural Review Processes

Careful, clear, and supported processes and adequate capacity are essential to ensure that cultural resources are protected during the pursuit of wildlife habitat restoration.

Native Plant Materials

Native plant ecotypes that are adapted to Washington conditions are critical for persistence on the landscape and to support locally adapted native wildlife species.

Evaluate Habitat Conditions and Expand Knowledge Base

Promote the integration of adaptive management principles and ongoing learning into action implementation.

HABITAT RESTORATION ACTIONS

Table 5. Habitat Restoration Actions and Enabling Conditions.

HABITAT RESTORATION STRATEGY	**Collaboration and Information Sharing**		
	HR1	**Delineate WSRRI management regions within the shrubsteppe landscape** As needed to match capacity increases, phase in the establishment and use of defined management regions to optimize restoration and weed management efforts, streamline resources, and enhance collaboration. Align regions with distribution of Core Areas, Growth Opportunity Areas, and Corridors, seed zones, and other pertinent considerations.	Information and Planning
	HR2	**Form and support a structured expert collaboration forum and network of habitat restoration practitioners** Collaboration can streamline resources, allow for information exchange, and optimize funding allocation. Foster continuous interaction among restorationists by hosting and facilitating WSRRI-sponsored and supported working groups, workshops, and field visits where partners can share best practices, data, and insights on habitat restoration and invasive weed management. Use these forums to elevate collaborative project development, to cultivate and implement projects eligible for WSRRI support.	Organization and Governance
	HR3	**Host and maintain an informative webpage** Create a comprehensive webpage as a central repository for Washington-relevant shrubsteppe restoration information such as up-to-date resources, restoration manuals, best practices, and local case studies. Connect to existing biome-wide resources such as those of the Intermountain West Joint Venture and Western Association of Fish and Wildlife Agencies.	Information and Planning
	HR4	**Define restoration techniques and goals** Outline a comprehensive restoration framework by delineating restoration techniques and objectives across various project types and habitats including post-fire recovery, invasive grass management, shallow-soils, riparian restoration, CRP-type field restoration, and wet meadows. Ensure each uses an ecologically informed approach to elicit natural succession and guided plant community recovery. Additionally, compile reference conditions and site data to define targeted ecosystem vegetation goals, such as at Natural Area Preserves. **Use sound ecological principles and incorporate valuable insights and resources** Integrate lessons from implementation of Farm Bill programs such as Conservation Reserve Program State Acres For Wildlife Enhancement (CRP SAFE), Tribal insights, cultural/NEPA guidance, and existing land-use plans—to synergize WSRRI restoration initiatives	Information and Planning

HABITAT RESTORATION STRATEGY

Restore Degraded Habitat		
HR5	**Resource and service delivery** Utilize and vastly increase WSRRI base funding to deliver and share resources and services such as project design, on-the-ground personnel, native plants, and cultural resources review capacity to restore habitat in priority places to benefit wildlife and people. **Project solicitation and generation** Strengthen WSRRI project solicitation and generation processes to be clear, transparent, and approachable to increase landowners' access to and use of WSRRI resources and services. Ensure accountability and input from local stakeholders. Provide WSSRI capacity to support landowners in proposal development and project design.	Organization and Governance
HR6	**Pre-fire restoration** Improve ecological integrity, wildfire resistance and resiliency, and habitat suitability for target SGCN. Strategically focus restoration efforts in Core Areas, Growth Opportunity Areas, and Corridors with aim to replace non-native with native vegetation, emphasizing establishment of foundational native bunch grasses. Add native shrubs and forbs as desired and as is practical. **Post-fire restoration** Create a distinct post-wildfire response fund that utilizes WSRRI-enhanced restoration capacity to address immediate needs post-wildfire in Core Areas, Growth Opportunity Areas, and Corridors.	Resources and Equipment Funding
HR7	**Funding** Pursue additional funding for WSRRI supported pre-fire resiliency restoration and post-fire restoration programs through Washington state legislature, federal partners such as Bureau of Land Management (BLM), Bureau of Reclamation (BOR), US Fish and Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS), Farm Services Agency (FSA), and other grants programs and entities.	Funding
HR8	**Improve lands not enrolled in incentive programs** Work with landowners and producers to improve habitat for wildlife by converting non-native plant communities to native bunchgrass and forb communities. Explore opportunities as private lands come out of incentive programs, such as through contract expiration.	Policy and Permitting
HR9	**Create new funding options to protect and restore degraded lands** Expand state acquisition and easement funding opportunities to allow for consideration of lands that though highly degraded, have restoration potential and are strategically located adjacent to high quality habitat in Core Areas, Growth Opportunity Areas, and Corridors. Prioritize restoration on lands protected through these new funding options, to increase habitat availability and effectively grow the Core through both protection and restoration.	

HABITAT RESTORATION STRATEGY

Restoration Implementation Capacity		
HR10	**Establish and support regional restoration teams (Figure 10, Tables 6 and 7)** Create dedicated regional teams of expert coordinators, technicians, and crews, strategically aligning placements with WSRRI management regions, as they become established, and adapting team size to region-specific factors such as size, geography, and travel demands. ▶ **Expand professional restoration capacity within WSRRI partners** Hire and train restoration practitioners committed to expanding and improving shrubsteppe habitats. Retain their expertise by promoting them as they become increasingly skilled. Explore potential for shared positions. ▶ **Resource pooling** Explore opportunities to pool resources, such as equipment, expertise, or funding, to collectively address restoration needs and invasive plant infestations. Ensure adequate equipment is available, stored securely, appropriately maintained, and staged across the landscape to facilitate efficient implementation of projects by regional teams.	 Capacity and Training
HR11	**Facilitate restoration training opportunities** Enhance restoration expertise through participation in established training programs and informal educational trainings and information exchange by experienced professionals. Consider bringing trainers from Great Basin to Washington for targeted training to ensure comprehensive knowledge transfer.	 Capacity and Training  Resources and Equipment
HR12	**Engage professional restoration contractors** Support local economy and incentivize marketplace by demonstrating need and creating reliable stream of restoration projects. Build relationships with local agricultural and weed management contractors; facilitate expansion into habitat restoration services.	 Capacity and Training
HR13	**Explore creative partnerships with landowners to implement habitat restoration activities across ownerships** Develop working relationships with landowners and producers skilled in habitat restoration actions. Develop contracts, where possible, to utilize those skills to implement actions across ownerships.	 Capacity and Training

HABITAT RESTORATION STRATEGY			
	Cultural Resources Review		
	HR14	**Develop and implement cultural resource consultation documents and processes** Enhance cultural resource consultation for habitat restoration by developing comprehensive documentation and processes that encompass specific restoration actions, clear workflows, designated points of contact, historical land use documentation, informed communication with tribal members about areas treated with herbicide, efficient batch consultations, and thorough project documentation.	 Policy and Permitting
	HR15	**Establish programmatic agreements with DAHP and Tribes** Develop programmatic agreements, where possible and desirable, with the Department of Archaeology and Historic Preservation (DAHP) and Tribes for WSRRI-funded activities. Draw insights from existing examples, such as agreements between US Fish and Wildlife Services (USFWS) and State Historic Preservation Office (SHPO).	 Policy and Permitting
	HR16	**Conduct pre-emptive cultural surveys** Implement a proactive cultural resource assessment strategy by collaborating with restoration practitioners to identify priority restoration areas in Core Areas, Growth Opportunity Areas, and Corridors. Conduct extensive desktop reviews to identify areas with documented cultural resources of restoration impact concern, engage in Tribal outreach, potentially involving ethnographic research and consultation with elders to ensure recognition of traditional cultural sites.	 Policy and Permitting
	HR17	**Expand archeological capacity** Increase archeological capacity at entities that implement habitat restoration including leveraging opportunities to share archeologist staff and resources between entities. Ensure appropriate training for field staff such as inadvertent discovery training. Address capacity gaps, if possible and desired, within Tribes and at DAHP.	 Capacity and Training

HABITAT RESTORATION STRATEGY

Invasive Plant Control		
HR18	**Use a data-driven approach to manage the spread of invasive plant species** Emphasize the importance of data and evidence-based decision-making in securing funding. Demonstrating the economic and ecological impacts of effective weed management can help justify investment in long-term monitoring and adaptive management. ▶ **Understand invasion sources and pathways** Animal dispersal, roads, human movement, and other pathways are all vector considerations for invasion management. ▶ **Prioritize core areas for protection and treatment** Focus efforts on safeguarding Core Areas while addressing identified invasion sources and pathways to effectively control and mitigate the spread of invasive plant species. ▶ **Use standardized prioritization metrics** Develop a set of standardized criteria and metrics for assessing the severity and impact of invasive plants within each county or WSSRI Region. This will enable a consistent and data-driven approach to prioritizing management efforts. ▶ **Ensure data sharing and integration** Coordinate with weed boards and Invasive Species Council to use a shared database or GIS platform to store and analyze invasive species data. Ensure data compatibility and integration among counties, WSRRI partners, and TerrAdapt for a comprehensive regional perspective. ▶ Use modern systems for efficient data collection, sharing, customization, and analysis (such as ArcGIS or Survey123) to enhance decision-making and collaboration while ensuring data governance and continuous improvement.	Information and Planning
HR19	**Assess funding models and mechanisms** Conduct a comprehensive assessment of how different entities, such as counties and conservation districts, set up funding structures for noxious weed boards. This analysis should consider the specific legal frameworks, like RCW 17.10 , and the historical evolution of these funding mechanisms, including shifts from enforcement to education. Understanding these variations will provide insights into how to effectively interact with these entities to leverage and secure additional support.	Funding
HR20	**Policy influence** Promote policies at the county, state, and federal levels that prioritize invasive and noxious weed management and provide resources for ongoing efforts. Collaborate with lawmakers and agencies to shape legislation that addresses funding gaps.	Policy and Permitting
HR21	**Local capacity building** Establish and strengthen local teams dedicated to building capacity for invasive weed management, ensuring that they are well-equipped with the necessary skills and resources to manage and control invasive species. Additionally, explore opportunities for collaboration with Cooperative Weed Management Areas (CWMA) across the state to leverage their expertise and resources for enhanced invasive weed control efforts.	Capacity and Training

HABITAT RESTORATION STRATEGY

Native Plant Materials

HR23	**Develop shrubsteppe native seed strategy** Compile information about provenance and currently available supply of native plant ecotypes. Conduct gap analysis of what is available and what is needed and identify seed zones to use as framework to guide production investments. Develop and include recommended habitat restoration seed mix prescriptions that establish appropriate plant communities and provide wildlife species benefit (e.g., Greater Sage-grouse preferred forbs, pollinator nectar and host plants) while maximizing establishment probability and minimizing cost.	 Information and Planning
HR24	**Enhance availability of desirable local ecotypes and mixes** ▶ Engage with existing native grass seed propagators to secure rows of plantings with yield dedicated to WSRRI projects. ▶ Create marketplace demand for local ecotype forb production; explore opportunities to subsidize costs to develop production protocols for species not currently in production. ▶ Facilitate and ease contracting processes such as through exploring use of Indefinite Delivery Indefinite Quantity (IDIQ) contract types and utilizing state master contracts. ▶ Continue partnership with Sustainability in Prisons Program (SPP) to provide Washington-sourced sagebrush seeds and plugs while providing educational opportunities for incarcerated communities. Assess need for plug production and expand as appropriate with additional producers. ▶ Facilitate expansion of landscape-scale shrub planting approaches using locally sourced seed by expanding the supply of such seed. Explore new ways to produce shrub seed like the sagebrush seed orchard pilot project with SPP. As appropriate, expand seed orchard efforts into the wild landscape and include other shrub species such as bitterbrush, rabbit brush, and other sources of sagebrush to encompass a wide breadth of local ecotypes and subspecies. ▶ Use WSRRI-supported crews and volunteers to wild-collect seed for propagation. Expert restoration coordinators should guide the collection locations, species, and ecotypes to be collected.	 Resources and Equipment
HR25	**Maintain a ready supply of seed** Establish agreements with existing storage facilities to have a supply of seed available to respond after fire in Core Areas, Growth Opportunity Areas, and Corridors. Expand seed storage capacity in alignment with increasing personnel and equipment capacity to deploy and utilize seed in restoration and fire-response projects.	 Resources and Equipment
HR26	**Enhance collaboration and personnel capacity** Hire or contract shrubsteppe seed coordinator. Participate in regional and national seed collaboratives.	 Capacity and Training

HABITAT RESTORATION STRATEGY			
	Evaluate Habitat Conditions		
	HR27	**Monitor restoration efficacy** As appropriate, develop and utilize standardized monitoring protocols and data collection templates to assess project success and ecosystem health that allows for comparison between projects, sites, and various partner-led efforts.	 Information and Planning
	HR28	**Expand remote sensing and field-based monitoring** Use emerging technologies in remote sensing and cloud computing (e.g., TerrAdapt) to dynamically monitor temporal dynamics of the regional landscape, including invasive species, native grasses, shrubs, and other indicators of habitat quality. Complement the satellite-based monitoring data with robust field-based monitoring that can be used to help train and validate remotely sensed data and verify site conditions prior to implementation of measures like habitat restoration or invasive species control.	 Science and Monitoring
	HR29	**Evaluate habitat restoration needs post-fire** Establish quick reaction teams to respond immediately after a fire to conduct assessments of wildfire severity and restoration opportunity on the ground. Ensure that WSRRI teams don't duplicate existing efforts; assess NRCS, BLM, WDNR programs and design WSRRI efforts to fill gaps (e.g., wildlife habitat conditions).	 Information and Planning
	Expand the Knowledge Base		
	HR30	**Conduct applied research to refine restoration and weed management techniques** As feasible, incorporate management trials and experimental design into active restoration and weed control efforts. Encourage academic and other researchers to develop weed management and habitat restoration research projects that align with WSRRI needs and priorities. Provide guidance and support in proposal development including objective setting, budget, and project design.	 Information and Planning
	HR31	**Research how restoration and weed management treatments affect fire severity, fire response, and post-fire recovery**	 Information and Planning

Table 6. WSRRI Habitat Restoration Staffing Structure

WSRRI Habitat Restoration Team Staffing Structure			
Position type/ title	**Position function**	**Skills/qualifications**	**Structure**
Expert Restoration Coordinator	Sets strategic vision; Identifies shared goals with partners; Coordinates with other program leads to achieve shared goals; Designs, plans, and consults on restoration projects; Guides and mentors technical staff and crews; Navigates and ensures necessary permitting is in place;	Expert level applied ecological restoration knowledge; experience leading teams; demonstrated follow-through; creative thinking and problem-solving; strong communication and organizational skills; knowledge of permitting requirements	Dedicated full time positions; Can be dispersed among different entities, but if dispersed requires commitment to the collaborative work; at least three positions in identified WSRRI regions
Skilled Restoration Technician	Leads and guides actions of restoration crews and volunteers. Conducts on-the-ground habitat restoration actions such as seeding, planting, weed spraying, fence marking, fence building, fence removal. Conducts vegetation assessment, vegetation monitoring.	Land management experience including operating large equipment such as tractors, seed drills, etc. Ability to identify common vegetation; weed certification; commercial driver's license	Dedicated full time positions supervised by and within the region/entity as expert restoration coordinators; two FTE per region.
Restoration Crew	Conducts on-the-ground habitat restoration actions such as seeding, planting, weed spraying, fence marking, fence building, fence removal.	Ability to self-motivate, follow direction, work in inclement weather, interest in land management and restoration.	Temporary surge crews to be hired/used for peak times of year. Typically, 4-6 individuals per crew. Could be WCC, ACE, Americorps, Vetcorps, seasonal crews, or others.
Volunteers	Conducts on-the-ground restoration actions such as planting, fence marking, seed collection.	Interest in conservation and restoration	Project specific needs. Ideally coordination and facilitation led by a separate entity

Table 7. WSRRI Habitat Restoration Equipment Needs

WSRRI Habitat Restoration Team Equipment Needs		
	Equipment	**Structure**
Minimum threshold	Staff vehicles, ATV, spray set-up, tractor, pneumatic/ hydraulic fence post pounder, trailer, hand-tools, foam markers, portable air compressor, auxiliary fuel tanks	Duplicated in each region
Regular, specialized need	Seed drill + trailer, large capacity vehicle capable of towing equipment, heavy-tined harrows, coil-packers, broadcast seeders, harrow seeders, weed wicks, UTVs, tractor mounted plug-planters, ripping shank for tractors, disc tiller, fabric mulch application machine, bulk herbicide tank, hand-planting shovels and seedling tote bags, skid steer with hydraulic fence post pounder, folding-deck mower	Shared among regions/entities.
Specialized, infrequent need	Air-seeders, rubber-track tractors, aerial application services	Rented as needed

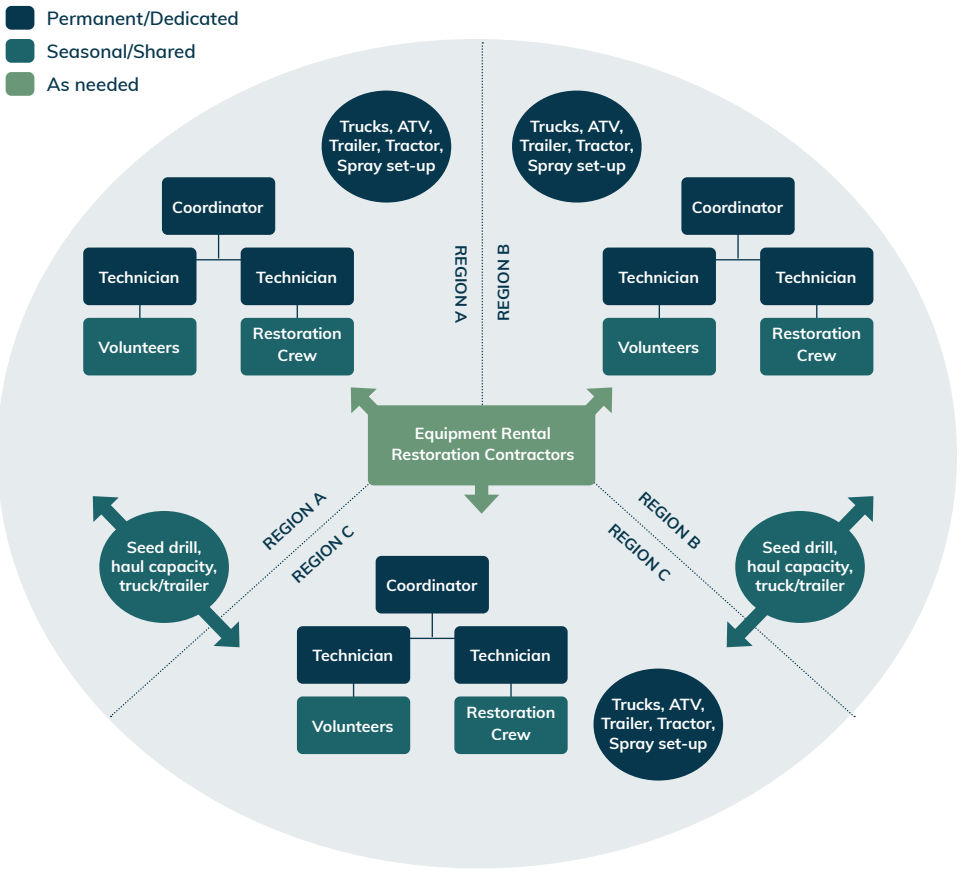


Figure 10. Conceptual design outlining restoration teams within WSRRI management regions

7.2.4. Species Management Strategy

The Species Management Strategy actions are meant to complement the Habitat Protection, Community Engagement, Fire Management, and Habitat Restoration actions that we expect to broadly benefit all wildlife species, including both game and non-game, and both common and rare. The Species Management Strategy actions are focused on SGCN and may be duplicative of actions in other species conservation plans such as the Washington State Wildlife Action Plan (SWAP; WDFW 2015) or species-specific Recovery Plans. Here, we aim to amplify programmatic actions that support shrubsteppe wildlife and identify those things that are needed to bolster populations in addition to actions necessary in the other strategies. For a fuller breadth of actions for individual SGCN, refer to the SWAP and/or species-specific recovery plans.

WSRRI species management strategy focuses primarily on wildlife that occur in terrestrial environments, inclusive of birds and amphibians using mesic (wet) habitats within the shrubsteppe landscape. Salmonids and other fish are not a primary focus.

SPECIES MANAGEMENT ACTIONS

Table 8. Species Management Actions and Enabling Conditions.

SPECIES MANAGEMENT STRATEGY			
Survey and Monitor Species of Greatest Conservation Need			
	SM1	**Prioritize and implement baseline surveys for shrubsteppe SGCN** Initial surveys are a needed first step to establish baseline information about species distribution, habitat occupancy, and other considerations. Each biennium, a set of species should be targeted for baseline surveys efforts. This may include the development and piloting of new survey protocols. Initial survey protocols should consider future needed monitoring in their design and make recommendations for monitoring frequency and approach. As of 2024 the following SGCN wildlife from the 2015 State Wildlife Action Plan require baseline surveys. Future survey needs may expand to additional species, including plants, as guided by newer iterations of the State Wildlife Action Plan. ▶ Burrowing owl *(Athene cunicularia)* ▶ Loggerhead shrike *(Lanius ludovicianus)* ▶ Sandhill crane *(Antigone canadensis)* ▶ Night snake *(Hypsiglena ochrorhyncha)* ▶ Ringneck snake (Diadophis punctatus) ▶ Sagebrush lizard *(Sceloporus graciosus)* ▶ Sharp-tailed snake *(Contia tenuis)* ▶ Short-horned lizard *(Phrynosoma hernandesi)* ▶ Striped whipsnake *(Masticophis taeniatus)* ▶ Tiger salamander *(Ambystoma tigrinum)* ▶ Woodhouse's toad *(Anaxyrus woodhousii)* ▶ Black-tailed jackrabbit *(Lepus californicus)* ▶ White-tailed jackrabbit *(Lepus townsendii)* ▶ Badger *(Taxidea taxus)* ▶ Merriam's shrew *(Sorex merriami)* ▶ Hoary bat *(Lasiurus cinereus)* ▶ Silver haired bat *(Lasionycteris noctivagans)* ▶ Spotted bat *(Euderma maculatum)* ▶ Townsend's big eared bat *(Corynorhinus townsendii)* ▶ Monarch butterfly *(Danaus plexippus)* ▶ Morrison's bumble bee *(Bombus morrisoni)* ▶ all other shrubsteppe SGCN invertebrates	Information and Planning

SPECIES MANAGEMENT STRATEGY	**SM2**	**Conduct regular monitoring of SGCN populations to assess status and trend** Tracking population health is a critical to understanding how threats and conservation measures are affecting species. Building from baseline survey information, develop and implement efficient and regular monitoring strategies for each SGCN, grouping species together as appropriate for efficiency. As of 2024, baseline surveys have occurred for the following species, and some have established regular monitoring protocols being implemented. Continue and expand monitoring ▶ Ferruginous hawk *(Buteo regalis)* ▶ Golden eagle *(Aquila chrysaetos)* ▶ Greater Sage-grouse *(Centrocercus urophasianus)* ▶ Columbian sharp-tailed grouse *(Tympanuchus phasianellus columbianus)* ▶ Sage thrasher *(Oreoscoptes montanus)* ▶ Sagebrush sparrow *(Artemisiospiza nevadensis)* ▶ Brewer's sparrow *(Spizella breweri)* ▶ Cinnamon teal *(Anas cyanoptera)* ▶ Northern leopard frog *(Lithobates pipiens)* ▶ Columbia Basin pygmy rabbit *(Brachylagus idahoensis)* ▶ Washington ground squirrel *(Urocitellus washingtoni)* ▶ Townsend's ground squirrel *(Urocitellus townsendii)*	Information and Planning
	SM3	**Increase capacity for Community Science** Implement Community Science programs by partnering with local organizations and recruiting volunteers to actively participate in species data collection and project coordination. Increase capacity in agencies and other entities to hire dedicated positions to train and direct volunteers to opportunities on public lands, coordinate with biologists to facilitate volunteer engagement in survey and monitoring efforts and develop data collection and management tools to support project implementation.	Capacity and Training
	Develop a Comprehensive Approach to Disease Management		
	SM4	**Conduct comprehensive assessments** Perform thorough assessments and execute suitable measures to manage diseases where feasible and appropriate, ensuring the protection of Species of Greatest Conservation Need (SGCN).	Information and Planning
	SM5	**Disease mitigation focus** When feasible, implement strategies to minimize impact from various diseases including but not limited to tularemia, plague, chronic wasting disease, highly pathogenic avian influenza, and rabbit hemorrhagic disease. Strategies may include implementing vaccination programs to protect Columbia Basin pygmy rabbits from the latter.	Resources and Equipment

SPECIES MANAGEMENT STRATEGY

Conduct Conservation Translocations as Needed

SM6

Evaluate and plan for species reintroductions and augmentations

Conservation translocations (e.g., reintroduction, augmentation) are an important, yet inherently costly and risky conservation tool used to recover populations of species at-risk. Prior to and adaptively throughout implementation use International Union for the Conservation of Nature (IUCN) guidelines to ensure a full suite of considerations including biological, ecological, social, cultural, and regulatory effects of translocations are incorporated into feasibility and implementation plans.

Information and Planning

SM7

Implement reintroductions and augmentations

Conduct and evaluate the effectiveness of Columbia Basin pygmy rabbit, Columbian sharp-tailed grouse, and northern leopard frog conservation translocation programs. Assess the effectiveness of previous Greater Sage-grouse conservation translocation efforts and determine the need for future efforts. Where feasible, conduct conservation translocations for black-tailed jackrabbits, white-tailed jackrabbits, Washington's ground squirrel, Townsend's ground squirrel, and burrowing owls. Additional species may be identified as candidates for conservation translocations in the future.

Minimize SGCN Impact from Non-Native and Human-Associated Predators

SM8

Minimize threats to SGCN amphibians from non-native aquatic species

- Remove non-native fish from SGCN-inhabited wetlands and waterbodies. Develop and prioritize waterbodies to target for removal by considering SGCN status, threats, and recovery efforts; removal feasibility and cost; and likelihood of reinvasion.
- Reduce or eliminate fish stocking in prioritized SGCN-occupied waterbodies while identifying and promoting alternative sites for recreational opportunities.
- Strategically manage bullfrog populations to support the recovery of northern leopard frogs, particularly in areas where new populations of northern leopard frogs are being established.

Resources and Equipment

SM9

Manage human-associated terrestrial predators impacting SGCN populations

- Develop and implement a comprehensive raven monitoring and management plan to benefit Greater Sage-grouse, Columbian sharp-tailed grouse, and other shrubsteppe SGCN populations.
- Establish a targeted outreach program directed at key audiences concerning generalist predator threats (e.g., common ravens and coyotes) and methods to diminish their impact to SGCN by reducing their proximity and presence on the landscape. Methods include removing perches and food subsidies such as carcass piles and trash.
- Reduce perches for avian predators in proximity to Greater Sage-grouse and Columbian sharp-tailed grouse leks. When feasible, bury power and transmission lines and use virtual fencing. Remove abandoned farm equipment.

Information and Planning

Outreach and Education

SPECIES MANAGEMENT STRATEGY

Minimize Impact to SGCN individuals from Built Infrastructure		
SM10	**Best Management Practices** Collaboratively develop and actively implement Best Management Practices (BMPs) to minimize the impact of large-scale human infrastructure on Species of Greatest Conservation Need (SGCN). These BMPs should encompass a broad suite of built infrastructure, including energy and agriculture, and be strategically designed to address specific threats to SGCN. Examples include minimizing impact from operation of wind and solar energy generation, irrigation canals, and fencing.	 Information and Planning
SM11	**Minimize bird and bat mortality** Implement measures to reduce mortality among bats, raptors, and other birds due to human infrastructure, notably wind turbines. This includes conducting research on bat and bird migration patterns to inform effective minimization strategies.	 Resources and Equipment
SM12	**Enhance water management** Strengthen water management strategies, particularly in areas used for nesting and breeding animals like sandhill cranes and northern leopard frogs. These strategies should focus on mitigating vulnerabilities that affect vital life stages, such as fluctuating water levels during breeding windows that can flood or strand eggs and nests.	 Resources and Equipment
SM13	**Facilitate natural movement and minimize mortality from barriers** Construct wildlife crossings in areas of high wildlife-vehicle collisions. Create crossings and exit strategies for water canal barriers.	 Resources and Equipment
SM14	**Facilitate natural movement by removing or easing fencing** Work with willing landowners to replace or retrofit traditional fencing on the landscape with wildlife friendly versions such as those with smooth wire or with virtual fencing. In proximity to grouse leks, ensure fences are marked to minimize collisions. Explore opportunities to install virtual fence towers on public lands, thereby providing coverage for surrounding landscape and incentivizing landowner use of virtual fence technology.	 Resources and Equipment
Minimize impact from Human Actions and Disturbance		
SM15	**Mitigate threats from lead ammunition** Address threats to raptors and other scavengers stemming from lead contamination by minimizing the presence of lead in the environment. Work with North American Non-Lead Partnership to collaboratively minimize the unintended impacts of lead ammunition on wildlife.	 Outreach and Education
SM16	**Minimize impact from pesticides** Reduce pesticide spraying in agricultural fields and along roadsides that have adverse effects to SGCN such as adjacent to foraging and roosting sites of Townsend's big-eared bats or to native milkweed habitat for monarch butterflies. Neonicotinoid-based pesticides can be very harmful and have direct impacts to seed-eating birds and pollinators, and indirect impacts by reducing invertebrates that are the base of the food chain. Minimize use of rodenticides to reduce impact to ferruginous hawks, golden eagles, and burrowing owls preying on small mammals.	 Policy and Permitting
SM17	**Minimize lethal control** Decrease lethal removal of SGCN such as jackrabbits, badgers, and ground squirrels by measures such as using outreach to promote non-lethal alternatives or by restricting shooting and poisoning methods.	 Policy and Permitting
SM18	**Identify and minimize or eliminate recreational disturbance to vulnerable SGCN sites such as off-road vehicle use of SGCN breeding sites or hibernacula.**	 Outreach and Education

SPECIES MANAGEMENT STRATEGY

Explicitly Link Species-Specific Considerations in Habitat Protection and Restoration Efforts		
SM19	**Conduct habitat suitability assessments** Conduct thorough assessments to define and map suitable habitat for SGCN by developing species-specific habitat suitability models. Analyze factors such as vegetation types, terrain features, and ecological conditions to create precise habitat suitability maps using GIS tools.	 Science and Monitoring
SM20	**Prioritize habitat protection and restoration efforts** Apply habitat suitability data to prioritize habitat restoration and protection efforts within Core and Growth Opportunity Areas and Corridors. Direct resources to areas where SGCN are most likely to thrive, ensuring efficient conservation allocation.	 Science and Monitoring
SM21	**Consider SGCN in restoration planning and implementation** Integrate necessary specific SGCN habitat features (e.g., nectar and other food plants for pollinators; vegetation structure important for nesting or cover from predation; rocks, substrate, or other unique features) to overall plans for shrubsteppe ecological restoration. Collaborate with stakeholders to implement these plans, monitor progress, and make necessary adjustments for the long-term conservation of SGCN and their ecosystems.	 Information and Planning
SM22	**Conduct outreach to communicate SGCN life history and conservation needs to restoration practitioners, landowners, and land managers.**	 Outreach and Education
Conduct Strategic Research for SGCN Conservation		
SM23	**Conduct research necessary to conserve and restore SGCN populations, with particular emphasis on applied research questions with management implications** ▶ Examples include demographic research to identify sources of mortality and vulnerable life stages; improving understanding of habitat needs, seasonal movements, and dispersal; intra-specific competitive interactions.	 Information and Planning

7.2.5. Wildland Fire Management Strategy

WILDLAND FIRE IN THE SHRUBSTEPPE ECOSYSTEM

Wildland fires have played a significant role in shaping the shrubsteppe ecosystem for millions of years. Fire has been a natural part of this landscape, and it is known to be important as a key driver of fundamental ecological processes that create and maintain productive shrubsteppe ecosystems. It is understood to play a role in regulating plant and animal communities, regulating the cycles of plant and animal diseases, cycling nutrients, as well as other ecological processes (Miller & Rose, 1999). In addition to naturally occurring fire, Indigenous Peoples in Washington and throughout the United States, prescriptively set fires to "promote specific species and a diversity of species that are culturally important for food, medicinal, fiber, forage for wildlife, as well as other purposes", further shaping the historical shrubsteppe ecosystem (Boyd, 1999).

One of the challenges in understanding the historical fire regimes in the shrubsteppe landscape is the scarcity of concrete evidence of past fire scars. A lack of fire scars is common in sagebrush-dominated ecosystems (Brunson & Carter, 1992) since sagebrush does not tolerate fire well and often does not persist after. Inferences have been drawn from fire scars of long-lived trees along forested ecotones (Remington et al. 2021), but such inferences probably have limited applicability to more open shrubsteppe habitat. Estimates of fire return intervals range from a few decades in colder-moister shrubsteppe near those forested ecotones (Miller and Heyrdahl 2008) to hundreds of years in hotter-drier systems (Bukowski and Baker 2013).

Over the last century, there has been extensive fire suppression and prohibition of Indigenous burning practices (Miller, Bates, & Svejcar, 2005) due to social and political changes that have prioritized suppressing all wildland fires as soon as they occur. During the last few decades, several factors, including fire suppression, land-use changes, the spread of invasive grass species, and prolonged drought, have led to an increase in fire size and severity across the shrubsteppe landscape (Balch et al., 2013; Remington et al. 2021; Smith, 2023). This altered fire regime has resulted in the transformation of native shrub-perennial grass communities into fire-prone, nonnative annual plant communities, creating a positive feedback loop that results in heightened fire severity and an accelerated fire cycle (D'Antonio & Vitousek, 1992). Invasion by nonnative, annual grasses creates a more continuous fuel bed than native bunchgrass systems, facilitating the spread of fire and increasing the extent, frequency and severity. Further, the rapid proliferation of nonnative invasive grass species like cheatgrass, which can dominate bare soil postfire and provide enough fuel for another fire within two years. (Pilliod et al., 2017). Cheatgrass also cures earlier than native grasses, providing receptive fuel for fire earlier in the year, contributing to extending the period in which fires are likely to occur in this landscape. Consequently, this transition to non-native annuals has contributed to movement further away from pre-1800 fire return intervals, even in the last 25 years (Figure 11).

While wildfire is a natural disturbance in the shrubsteppe ecosystem, the recent alteration of fire regimes is unprecedented. Longer fire seasons are occurring with increasing fire extent, frequency, and severity (Remington et al., 2021; Brooks et al., 2015; Baker 2013). Wildland fire cycles have accelerated and extended to a point where postfire recovery struggles to keep pace (Baker, 2006). The result in recent years is a shrubsteppe ecosystem faced with wildland fires with greater extent, frequency and severity and a transformation into fire-prone nonnative communities.

The Strategy calls for, where feasible and appropriate, restoring fire regimes that are like those that were occurring prior to the 1800's when widespread fire suppression policies and practices were instituted. To accomplish this, the Strategy recommends the strategic use of prescribed fire as a tool for managing fuels to reduce the extent, frequency, and severity of wildland fire, restore habitat and wildlife populations, and protect sensitive wildlife species and human communities. It is explicitly recognized that current conditions must be

considered first when applying prescribed fire as a tool, taking into consideration current land uses, the condition of the landscape, wildlife populations, climate, and other factors. Another consideration is that it is often the case that other vegetation management tools such as grazing, mowing, discing, and herbicidal treatments must be used in concert with, and frequently before, the use of prescribed fire in, order to achieve the desired management outcomes. Lastly, it's recognized that there is still much to learn and understand concerning the use of prescribed fire as a management tool, as is the case with most aspects of ecological management and restoration. As such, employing an adaptive management approach is recognized as critical, prioritizing ongoing evaluation and improvement of management practices involving the use of prescribed fire.

COORDINATION WITH THE WASHINGTON STATE WILDLAND FIRE PROTECTION 10-YEAR STRATEGIC PLAN

The Washington State Wildland Fire Protection 10-Year Strategic Plan (WDNR, 2019) provides a blueprint for effective wildland fire protection in Washington and informs wildland fire policy and resource decisions in Washington State. The plan is part of an overall strategy to fundamentally change the future trajectory of wildland fire in Washington. This plan is anchored in the National Cohesive Wildland Fire Management Strategy (WFLC, 2014) and aligned with the state's 20-Year Forest Health Strategic Plan - Eastern Washington (WDNR, 2018). It focuses on building resilient landscapes, fire-adapted communities, and safe, effective wildfire response. The plan also focuses on wildfire prevention, reducing human-caused ignitions, and post-fire recovery. The WSRRI Long Term Strategy, wildland fire management strategy applies and tailors the principles and approaches identified in these foundational plans to the specific needs of shrubsteppe conservation and restoration.

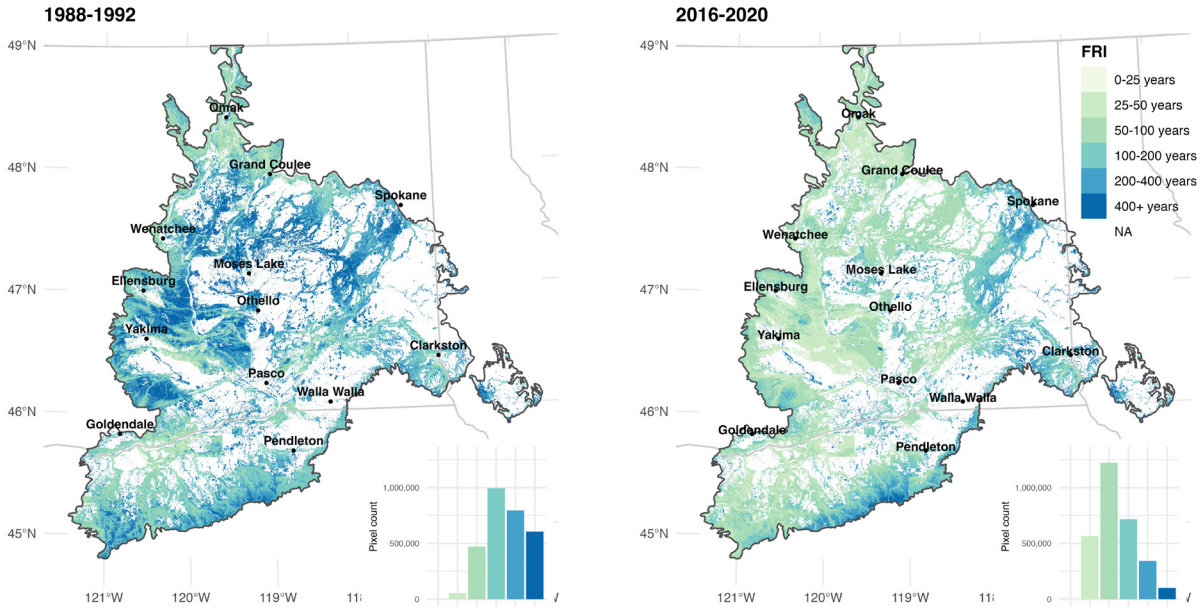


Figure 11. Estimated Fire Return Intervals (FRI) Calculated from Burn Probabilities Averaged over the 1988-1992 Fire Seasons (left) and the 2016-2020 Fire Seasons (right). Note that these estimates of the FRI are considered slightly overestimated (Smith 2023).

Further, WSRRI wildland fire management strategy also builds upon the work of the Wildland Fire Advisory Committee's SHB 2561 Report (WFAC, 2019). This report lays out recommendations for protecting "unprotected lands" in Washington State, 358,000 acres of largely shrubsteppe landscape that are not under the jurisdiction of any fire protection agency. It also builds upon the recommendations for strengthening community programs for helping homeowners engage in mitigating the risks from wildland fire and recommendations for better protecting non-English speaking residents during wildland fire emergencies.

WILDLAND FIRE MANAGEMENT

Successful wildland fire management in the shrubsteppe hinges on a series of integrated actions that include effective pre-fire response planning and preparation, response and mitigation, strategic fuel reduction, and reestablishing more natural fire regimes, while supporting the overarching goal of restoring ecological functions and processes that result in a healthy shrubsteppe ecosystem. Research by Smith (2023) highlights that non-native annual grasses and forbs are the primary wildfire risk indicators in Washington's shrubsteppe because they introduce continuous and highly flammable fuel conditions to what is naturally a landscape that is characterized by discontinuous fuels, and as a result, naturally fire resistant. While native shrubs like sagebrush and bitterbrush also burn intensely, they are less consistent predictors of wildfire risk, and it is the presence of a continuous grass fuel bed that increases wildfire risk. With the pervasive growth of annual grasses, fires can spread rapidly and intensely. Since shrubs are essential for many Species of Greatest Conservation Need (SGCN), including the Greater Sage-grouse and Columbia Basin pygmy rabbit, fuel reduction efforts should focus on decreasing annual grasses while encouraging native perennials. Strategies for invasive grass reduction include grazing, mechanical and chemical treatments, prescribed fire, which must be followed by the essential step of planting native grass, forb, and shrub communities. Strategies that remove biomass, like grazing, are helpful for providing short-term reductions in fuels, but strategies that address preventing seed set and emptying the soil seed bank of their seed provide longer term benefits and can ultimately be a more sustainable and effective strategy. Strategic creation of fuel breaks can be an effective tool for mitigating negative impacts of wildfire but should be completed within the context of landscape-scale ecosystem management.

POTENTIAL OPERATIONAL DELINEATIONS

One key planning tool identified for effectively managing wildland fire in the shrubsteppe is the development of Potential Operational Delineations (PODs). "PODs are spatial units or containers defined by potential control features, such as roads and ridge tops, within which relevant information on (landscape) conditions, ecology, and fire potential can be summarized. PODs combine local fire knowledge with advanced spatial analytics to help managers develop a common understanding of risks, management opportunities, and desired outcomes to determine fire management objectives" (Potential Operational Delineations, USDA Rocky Mountain Research Station, 2023). Applications for PODs figure prominently in the strategies and actions developed here for wildland fire management in the shrubsteppe.

THE FIRE REHABILITATION PROCESS

An important component of the national wildland fire response system is the wildfire rehabilitation process. Though largely focused on federal lands currently, the process is applicable to all lands and to post fire restoration in the Washington shrubsteppe landscape. There are three phases of rehabilitation following wildfires identified in the national system, including Fire Suppression Damage Repair, Emergency Stabilization – Burned Area Emergency Response (BAER), and Long-Term Recovery and Restoration.

- **Fire Suppression Damage Repair**
  involves immediate post-fire actions taken to repair damages and minimize potential soil erosion and impacts resulting from fire suppression activities and usually begins before the fire is contained, and before the demobilization of an Incident Management Team. This work repairs the hand and bulldozer lines, roads, trails, staging areas, safety zones, and drop points used during fire suppression efforts.

Emergency Stabilization

Burned Area Emergency Response involves a rapid assessment of burned watersheds by the BAER team to identify imminent post-wildfire threats to human life and safety, property, and critical natural or cultural resources on federal lands and take immediate actions to implement emergency stabilization measures before the first major storms. Fires result in loss of vegetation, exposure of soil to erosion, and increased water runoff that may lead to flooding, increased sediment, debris flow, and damage to critical natural and cultural resources. BAER actions such as - seeding, mulching, installation of erosion and water run-off control structures, temporary barriers to protect recovering areas, and installation of warning signs may be implemented. BAER work may also replace safety related facilities; remove safety hazards; prevent permanent loss of habitat for threatened and endangered species; prevent the spread of noxious weeds and protect critical cultural resources.

Long-Term Recovery and Burned Area Rehabilitation

includes longer term restoration efforts, often taking place for many years after a wildfire. Burned Area Rehabilitation (BAR) supports the healing process and provides a “bridge” to long-term recovery. Allocation of BAR funds involves a rigorous and competitive process to evaluate projects to ensure the most critical areas receive treatment first. This phase utilizes non-emergency actions to improve fire-damaged lands that are unlikely to recover naturally and to repair or replace facilities damaged by fire that are not critical to life and safety. This phase may include restoring burned habitat, reforestation, other planting or seeding, monitoring fire effects, replacing burned fences, interpreting cultural sites, treating noxious weed infestations, and installing interpretive signs. (Post Fire Recovery, National Interagency Fire Center, 2023).

WILDLAND FIRE MANAGEMENT ACTIONS

Table 9. Wildland Fire Management Actions and Enabling Conditions.

WILDLAND FIRE MANAGEMENT STRATEGY			
Fire Response and Mitigation Actions			
	WF1	**Develop Potential Operational Delineations (PODs) and Potential Control Lines (PCLs)** Develop PODs and PCLs across the shrubsteppe landscape for fire response planning and ensure collaboration and understanding across agencies. Prioritize completing this in landscapes with Core Areas, Growth Opportunity Areas, and Corridors first and landscapes that are adjacent next. ▶ Identify shrubsteppe Core Areas, GOAs, and Corridors for protection when developing PODs. ▶ Identify priority shrubsteppe cultural values and resources when developing PODs. ▶ Use the Washington Natural Heritage, Priority Habitat and Species, and NRCS Ecological Site Descriptions (ESD) databases to identify ecological values at risk when developing PODs. ▶ Ensure important species and habitat restoration sites are identified as priority areas to protect when unplanned ignitions occur, a fire is inconsistent with current management actions, and plans are in place to provide rapid initial attack and sustained protection efforts. ▶ Prioritize assigning resource advisors to work with fire suppression and management crews when activities are occurring around Core Areas and species and habitat restoration sites. ▶ Engage with fire districts, landowners, and other stakeholders to identify PCLs. ▶ Incorporate data from the Quantitative Wildfire Risk Assessment (QWRA) for the region. Also contribute input to the development of the next QWRA update regarding identification of Highly Valued Risks and Assets (HVRAs) associated with priority shrubsteppe habitat areas as well as relevant POD data.	Information and Planning
	WF2	**Collect and maintain data on fire occurrence, ignition source, extent, fire severity, and fire response, in the shrubsteppe to inform future response efforts and landscape management** ▶ Identify WDNR as a primary data manager for wildland fire in shrubsteppe landscapes, develop policies and practices for improving multi-agency sharing of fire data with WDNR and build WDNR capacity to collect and maintain data on fires. ▶ Refine and coordinate methods among state and federal agencies for mapping fire severity in the shrubsteppe, complete mapping after all fires in shrubsteppe landscapes, compile fire severity maps annually, and report total acres burned by severity class, habitat classification (core, growth, connective), and trends. ▶ Collect, analyze, and report spatial cross-jurisdictional fire ignition source data for use in refining strategies and actions to reduce human ignitions and support strategic placement and maintenance of PCLs.	Information and Planning

WILDLAND FIRE MANAGEMENT STRATEGY	WF3	**Improve ability to forecast wildfires** ▶ Forecast probabilities via fire weather and fuel forecasting at meaningful spatial and temporal management scales across the shrubsteppe to better inform proactive management/mitigation actions (e.g., fire restrictions) during periods where high severity fires are likely. ▶ Use existing fire risk modeling in forecasting for shrubsteppe landscapes. ▶ Increase the number of Remote Automatic Weather Station (RAWS) sites in the shrubsteppe landscape to better inform management to achieve WSRRI goals and objectives; maintain/calibrate RAWS stations.	 Information and Planning
	WF4	**Improve inter-agency communication during fire response** ▶ Develop systems to ensure all fires in the shrubsteppe are reported to a dispatch center, documented, and mapped appropriately. ▶ Support better integration of radio frequencies among fire response agencies and aircraft operating on responses in the shrubsteppe landscape that are often served by rural fire districts with limited radio capacity and may have limited radio tower coverage.	 Information and Planning
	WF5	**Improve multi-agency fire data sharing** Develop and implement policies for improving sharing of fire data across agencies, including through the NIFC Enterprise Geospatial Portal (EGP) and WDNR. Ensure fire data reporting and sharing practices are included in wildland fire response-related inter-agency agreements.	 Policy and Permitting
	WF6	**Expand fire management coverage on currently unprotected and under-protected lands which are largely in the shrubsteppe landscape** ▶ Ensure that all lands in Washington's shrubsteppe have an assigned fire response entity with the mandate, jurisdiction, authority, and capacity to respond to wildland fire. ▶ Assign WDNR response authority to protect currently unprotected lands and have WDNR identify and develop contracts / agreements with local fire protection agencies to provide initial attack response where possible.	 Policy and Permitting
	WF7	**Facilitate the development of policies within land management agencies with jurisdiction over shrubsteppe landscapes** for incorporating fire management and restoration actions consistent with WSRRI Long-Term Strategy into delegations of authority to incident management teams managing fires on their lands ▶ Expand the actions taken during Fire Suppression Damage Repair to include actions that support shrubsteppe restoration where feasible. ▶ Avoid actions in Fire Suppression Damage Repair that may negatively impact shrubsteppe restoration. ▶ Determine if changes to current Washington law are needed to facilitate inclusion of ecological restoration activities in Fire Suppression Damage Repair phase and make recommendations if changes are needed.	 Policy and Permitting
	WF8	**Facilitate the development of policies within land management agencies with jurisdiction over shrubsteppe landscapes for incorporating fire management and assessments for restoration actions consistent with WSRRI Long-term Strategy into the Burned Area Emergency Response assessment Emergency Stabilization, and analogous state assessment and recovery processes.**	 Policy and Permitting

WILDLAND FIRE MANAGEMENT STRATEGY	**WF9**	**Facilitate consistent coordination among all entities implementing fire planning and response in the shrubsteppe landscape** ▶ Develop agreements between and among federal/state agencies and local/county fire districts to facilitate funding and implementation across the shrubsteppe. ▶ Establish a work group to coordinate fire detection and reporting between agencies. ▶ Ensure collaboration and understanding across agencies in implementation of PODS, including during pre-season meetings, trainings, and fire response team in-briefings.	 Organization and Governance
	WF10	**Increase capacity to plan and respond to wildfire in the shrubsteppe** ▶ Prioritize increasing initial and sustained attack capacity that provides protection for Core Areas and species and habitat restoration sites. ▶ Build WDNR capacity to protect currently unprotected lands. ▶ Increase capabilities for detecting fire starts in the shrubsteppe, such as deploying detection camera systems. ▶ Increase fire management capacity to reduce initial attack response time to less than 1 hour for first resource on scene. ▶ Enhance abilities and capacities of local and rural fire districts to respond to fire in the shrubsteppe. ▶ Increase capacity to collect data related to fire to support planning and response (see above).	 Capacity and Training
	WF11	**Provide learning opportunities for fire managers related to –** ▶ WSRRI Spatial Priorities (Core Areas, Growth Opportunity Areas, Corridors, and Other Habitat); ▶ Identified species critical habitat (federal, local jurisdiction); ▶ PODs; ▶ Fire response specific to shrubsteppe environments for WDNR and rural fire districts serving shrubsteppe landscapes; and ▶ Training on planning and implementing fire ignitions during suppression activities in the shrubsteppe that minimize detrimental impacts to shrubsteppe ecosystems and support the goals of conservation and restoration.	 Capacity and Training
	WF12	**Develop and provide Burned Area Emergency Response (BAER) teams with specific guidance for shrubsteppe restoration and conservation after fire.**	 Capacity and Training

WILDLAND FIRE MANAGEMENT STRATEGY	WF13	**Reduce the number of human-caused fire starts in shrubsteppe landscapes through outreach and education** ▶ Increase enforcement and engagement for corrective actions (e.g., burning during a burn ban) ▶ Conduct regular public awareness campaigns regarding the risk of fire in the shrubsteppe. ▶ Engage transportation departments, electric utilities/transmission line operations, and railroads to ensure fire preventative best practices along rights-of-ways in shrubsteppe landscapes. ▶ Review fire ignition source data annually to refine ignition prevention outreach and engagement strategies specific to shrubsteppe landscapes.	Outreach and Education
	WF14	**Increase awareness of shrubsteppe fire risk and ecology** ▶ Work with all participating partners to amplify outreach and education impact with landowners, managers, and visiting public.	Outreach and Education
	Pre-Fire Fuels Reduction Actions		
	WF15	**Develop the necessary information and guidance for managing fuels to reduce the risk of unplanned, high severity fires, consistent with ecosystem management objectives, and support the use of prescribed and managed fire, in addition to other fuels management approaches, in shrubsteppe landscapes** ▶ Map priority shrubsteppe lands where fire return intervals can be restored to more natural regimes and areas where it currently cannot. Update this regularly. ▶ Identify and prioritize areas in need of pre-fire fuels reduction. ▶ Identify areas where cheatgrass is dominant and prioritize treatment	Information and Planning
	WF16	**Use PODs for fuels mitigation planning** ▶ Establish and implement a holistic, landscape scale vegetation management plan that manages age class, and distribution of shrub species across the shrubsteppe landscape. ▶ Restore natural fire return intervals using prescribed and unplanned ignitions on priority shrubsteppe lands where it is appropriate.	Information and Planning
	WF17	**Where consistent with ecosystem and wildlife habitat goals, promote and incentivize fuels management and fire resilience practices on private lands** Promote these practices in federal incentive programs, such as the Conservation Reserve Program, where they are consistent with ecosystem management goals. Provide incentives for these practices on private lands where management would not result in loss of important wildlife habitat.	Policy and Permitting
	WF18	**Work collaboratively with ranching NGOs and livestock producers to support and provide incentives for the use of prescribed fire and other fuels management tools on grazing lands** ▶ Provide BMPs and other technical support to NGOs and livestock producers for employing prescribed fire.	Policy and Permitting
	WF19	**Clarify regulations, policies, and planning steps for the use of prescribed and managed fire** ▶ Clarify burn plan development and implementation process with permitting agencies, practitioners, and land managers.	Policy and Permitting

WILDLAND FIRE MANAGEMENT STRATEGY	**WF20**	**Develop model agreements appropriate for shrubsteppe landscapes** for WDNR, local, federal, and non-profit partners to put into place to ensure resources are readily accessible and interoperable when conditions are right for prescribed fire.	Policy and Permitting
	WF21	**Establish crews with capacity to implement fuels mitigation with specific training for implementation in shrubsteppe environments** ▶ Work with the Washington Prescribed Fire Council to set up crews to implement pre-fire action in the shrubsteppe.	Capacity and Training
	WF22	**Build capacity for post-fire vegetation management (see Restoration Strategy).**	Capacity and Training
	WF23	**Increase coordination in landscape level prescribed fire (Rx) planning in the shrubsteppe** ▶ Increase training to ensure a competent interoperable Rx practitioner workforce. ▶ Increase and coordinate regional National Wildfire Coordinating Group (NWCG) training opportunities. ▶ Build on the WDNR certified burner program. ▶ As appropriate, support participating and holding Prescribed Fire Training Exchanges (TREX) or having burn sites where TREX could support or implement in shrubsteppe landscapes. ▶ Research and identify potential interest and development of Prescribed Burn Association's (PBA's). PBAs could be used as a mechanism to support private landowners helping each other to safely use Rx fire to meet mutual objectives. .	Capacity and Training
	WF24	**Establish equipment pool available for use by agricultural lands owners for fuels treatment work.**	Resources and Equipment
	WF25	**Increase social acceptance of Rx fire in communities located in the shrubsteppe.**	Outreach and Education

WILDLAND FIRE MANAGEMENT STRATEGY	Community Fire Protection		
	WF26	**Implement Potential Operational Delineations (PODs) and Potential Control Lines (PCLs) for fuels management, wildland fire preparedness, and wildland fire response planning and ensure collaboration and understanding across agencies.** ▶ Use Potential Operational Delineations (PODs) for supporting prioritization of community protection actions. ▶ Further refine identification and prioritization of values at risk. ▶ Identify and prioritize various fuel treatments and maintenance schedules. ▶ Further refine identification and prioritization of areas for treatment to improve structure resistance to wildland fire. ▶ Integrate across planning efforts to increase coordination, efficiency, and effectiveness.	 Information and Planning
	WF27	**Complete an assessment of existing Community Wildfire Protection Plan (CWPP) coverage** to identify communities within the shrubsteppe that do not have a current plan. Identify which of these are classified as Underserved, Highly Impacted, or ESL.	 Information and Planning
	WF28	**Collect information to support community fire planning** ▶ Identify a database structure to track community fire planning and resistance/resilience actions across the shrubsteppe and connect with the Forest Health Tracker. ▶ Identify which communities/towns within the shrubsteppe need support with CWPPs or the wildfire section of a fire hazard plan and other FAC planning and communicate this to the WDNR Community Resiliency Program and the WSCC. ▶ Track fire response time data in the shrubsteppe ▶ Identify and develop central contact list for Community Emergency Managers within the shrubsteppe. ▶ Identify and collect information on underserved, highly impacted, overburdened, vulnerable, or ESL communities within or near the wildland fire urban interface to identify local priorities and effective communication and engagement strategies.	 Information and Planning

WILDLAND FIRE MANAGEMENT STRATEGY	**WF29**	**Support and expand Community Wildfire Protection Planning within the shrubsteppe landscape**
		▶ Effectively message public awareness of the need for taking individual responsibility for improving safety and preparedness for wildland fire.
		▶ Identify and prioritize communities in the shrubsteppe that need fire planning support and communicate this to the WDNR Community Resiliency Program and WSCC.
		▶ Ensure 100 % communities in the shrubsteppe are planning for fire resistance and resilience and have community wildfire protection plans (CWPPs) current to the last 5 years at a county level by 2029. CWPPs should include -
		  ▶ Plans and capacity for community fire protection coordination and implementation.
		  ▶ Areas prioritized for fuels reduction
		  ▶ Areas prioritized for treatment of structural ignitability.
		▶ Increase the total number of communities [or a percentage] in the shrubsteppe that are managing flammable vegetation around the community and in the WUI and participating actively as Firewise USA Sites.
		▶ Increase support for shrubsteppe community participation in the Washington Fire Adapted Community Network. Develop and support shrubsteppe community focused program initiative.
		▶ Identify opportunities for communities to engage with fire suppression organizations in their planning.
		▶ Identify opportunities for communities to engage in post-fire planning and implementation.
		▶ Support planning by Community Organizations Acting in Disasters (COADs). Identify which provides services for communities classified as underserved, highly impacted, overburdened, vulnerable, or ESL, and prioritize them for support.
		▶ Increase participation of local municipal parties in planning.
			
			Information and Planning

	WF30	**Improve data collection during fire response** ▶ Develop systems to ensure all fires in the shrubsteppe are reported to a dispatch center, documented, and mapped appropriately.	 Information and Planning
	WF31	**Define and develop dedicated, initiative-wide, and local coordinating capacity to support implementation of community fire protection actions and address implementation needs** ▶ Identify existing capacity via agencies, organizations, and community groups across the shrubsteppe landscape. ▶ Define appropriate organization structure and framework to support implementation of existing plans related to community fire protection.	 Organization and Governance
	WF32	**Support development and continued work of organizations that support community fire protection planning and implementation** ▶ Community Organizations Acting in Disasters ▶ Conservation districts ▶ Non-governmental Organizations ▶ Resource Conservation and Development Council	 Organization and Governance

WILDLAND FIRE MANAGEMENT STRATEGY	WF33	**Strengthen application of Washington's Wildland Urban Interface code** Encourage local planning departments and municipalities to adhere to the Wildlife Urban Interface code. Develop statewide zoning requirements for wildland fire protection for home development and construction in the wildland urban interface specific to the shrubsteppe.	Policy and Permitting
	WF34	**Increase state resources for local governments, conservation districts, fire districts, and community organizations to work with private landowners and communities** to reduce flammable vegetation, harden structures, and create defensible zones around structures. Increase emphasis on aiding those serving communities classified as Underserved, Highly Impacted, or ESL ▶ Identify which communities/towns need support with CWPPs and other FAC planning and communicate this to the WDNR Community Resiliency Program ▶ Support communities in accessing funding programs for resilience and resistance actions (e.g., community Wildfire Defense Grants, FEMA funding, Wildfire defense fund). ▶ Include information concerning shrubsteppe habitat protection priorities in educational materials and training concerning fuels reduction measures.	Resources and Equipment
	WF35	**Increase grant opportunities**, and increase support for participation in existing grant programs, for wildfire preparedness by residents of communities within the shrubsteppe landscape. Prioritize aiding organizations that provide support for communities classified as underserved, Highly Impacted, Overburdened, Vulnerable or ESL.	Resources and Equipment
	WF36	**Increase funding for the creation of informational materials, education and engagement.**	Funding
	WF37	**Increase available resources for home hardening inspections and for recommended updates and modifications to improve homes to increase fire resiliency.**	Resources and Equipment
	WF38	**Increase capacity and staff support for effective planning and implementation CWPPs** Increase capacity for CWPP planning, preparing updates, and implementing actions identified in CWPPs. Increase availability of crews (such as Washington Conservation Corps and WDNR Camp Crews) available for vegetation or fuels management and community preparedness projects. Provide training to crews and others to implement actions prescribed in CWPPs.	Capacity and Training
	WF39	**Provide effective community training to increase preparedness** Reach and train community members to increase fire preparedness using tools such as Fire Adapted Communities, Firewise USA sites, Wildfire mitigation best management practices, and Wildfire ready neighbors. Increase community engagement in training opportunities by increasing the number of bilingual educators and practitioners for training and implementation.	Capacity and Training

WILDLAND FIRE MANAGEMENT STRATEGY			
	WF40	**Increase awareness and education about community fire protection** ▶ Create materials specific to shrubsteppe wildfire preparedness. ▶ Partner with schools, NGOs, agencies, and local fire districts to educate people about the shrubsteppe ecosystem, how to protect homes/communities from wildland fire, and the costs and benefits of prescribed fire. ▶ Create K-12 programs on community fire protection that meet state learning standards and adult education programs. ▶ Support local partners such as fire districts and others to implement fire prevention programs. ▶ Dedicate resources to expand existing programs by organizations that are already active in communities located within the shrubsteppe, particularly those in communities classified as underserved, highly impacted, overburdened, vulnerable, or ESL, to educate community members about how to prepare before during and after fire. ▶ Identify and support trusted community partners to help engage communities and provide education. ▶ Provide resources to work with community leaders to prepare them to educate them on this topic.	 Outreach and Education
	WF41	**Create outreach and education materials** using information from Fire Adapted Communities, Firewise USA sites, Wildfire mitigation best management practices, Wildfire ready neighbors. ▶ Implement outreach on resources for home improvement and wildfire ready neighbor assessments.	 Outreach and Education
	Emergency & Post-Disaster Recovery Response Resources for Working Lands		
	WF42	**Improve and better coordinate emergency services for working lands communities in the shrubsteppe** Include working lands and agricultural communities in emergency planning efforts, including plans for emergency grazing, livestock evacuation, and sharing of recovery resources. Develop and maintain pre-disaster emergency plans for livestock producers within the shrubsteppe landscape. Include a plan for livestock evacuation and staging areas in each pre-disaster emergency plan.	 Organization and Governance
	WF43	**Establish a centralized communication mechanism during emergencies** Establish a clearinghouse resource during emergencies – a “one-stop shop” to increase accessibility of information for livestock producers and farmers. Identify a person within pilot grazing network or community to serve as the coordinating point of contact during emergencies, and to serve as liaison to consolidate available resources, develop informational materials, and connect livestock producers with federal, state, and local assistance resources.	 Organization and Governance
	WF44	**Establish clear emergency grazing resources** Develop a grass banking plan in each pre-disaster emergency plan,, with identified potential locations livestock producers can take animals to temporarily access grazing while resting burned pastures to allow for recovery (i.e., CRP, cover crop, cropland, neighbors).	 Information and Planning
	WF45	**Develop training and counseling resources for natural resource professionals** Provide trauma training or counseling for natural resource agency personnel on how to interact with those in emergencies for those points of contact, ease the mental health burden for natural resource professionals when assisting victims in emergencies, possibly through partners like the Red Cross.	 Capacity and Training

8. Organization and Governance Plan

The Washington State Shrubsteppe Restoration and Resiliency Initiative's (WSRRI) Organization and Governance plan provides a structural blueprint for realizing the conservation goals of the Strategy. It is important for effective oversight and execution of the plan. Below is a detailed diagram and description of a conceptual comprehensive governance and management structures, including Regional Implementation Teams, Statewide Advisory Group, and Steering Committee. Together, these elements, bolstered by WSRRI's technical, resource, and financial support, form the backbone of the efforts to conserve, provide fire protection, and restore shrubsteppe to meet the needs of the state's shrubsteppe wildlife and human communities. We envision that the conceptual structure will mature through time, adjusting and changing to meet the needs of the partners and communities it aims to support.

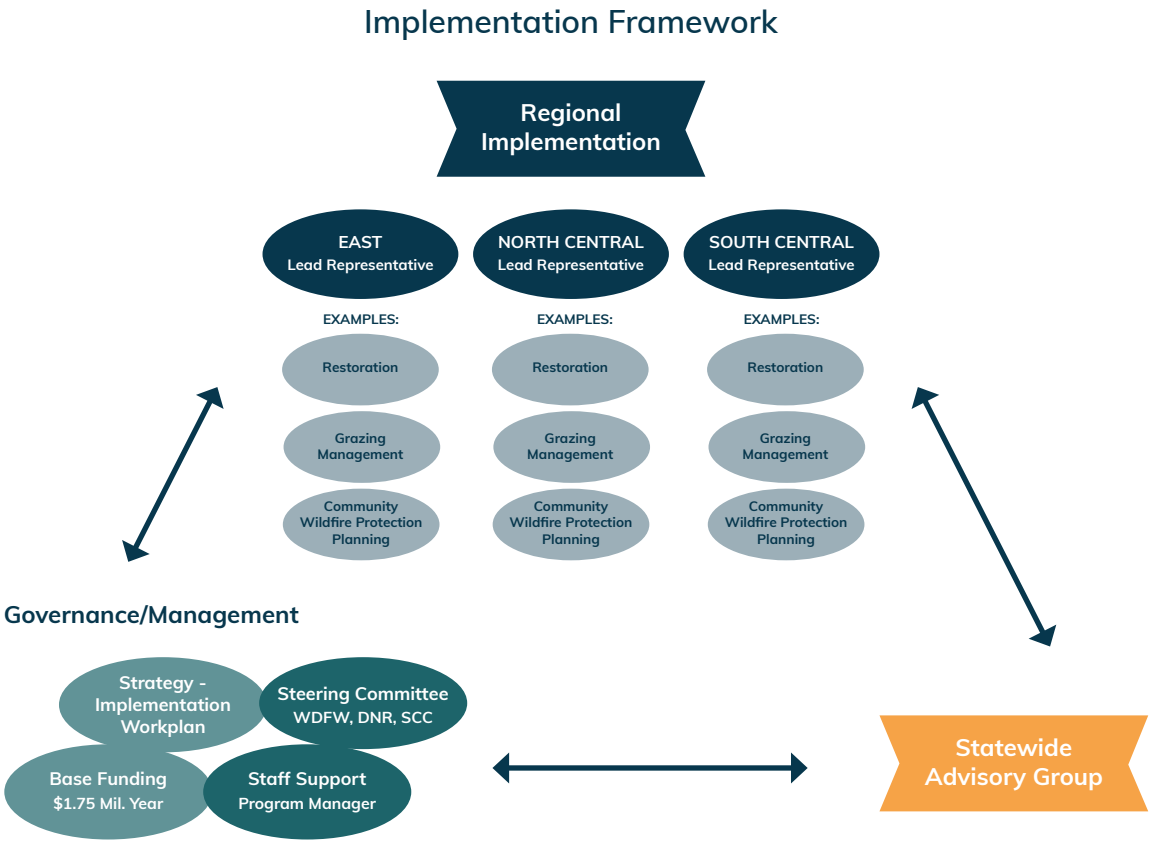


Figure 12. Conceptual Washington Shrubsteppe Restoration and Resiliency Initiative (WSRRI) Implementation Framework

WSRRI 30-YEAR VISION

The WSRRI Strategy outlines a comprehensive 30-year vision for the conservation, restoration, and resilience of shrubsteppe wildlife and communities in Washington State. It serves as the overarching framework guiding all efforts and actions aimed at achieving the initiative's goals.

STRATEGY: IMPLEMENTATION WORKPLAN

To complement and facilitate implementation of WSRRI's overarching 30-year vision, iterative and regularly updated implementation workplans will be developed to delineate specific actions and near-term steps that must be taken as well as designating responsible actors. The implementation workplan will ensure that the strategic objectives for the conservation, restoration, and resilience of Washington State's shrubsteppe wildlife and ecosystems are translated into specific actionable steps.

Workplans will be developed by March of the first fiscal year of each biennium to ensure there is adequate time for identified priorities to be integrated into agency legislative request development processes for the subsequent biennium. To achieve this outcome the workplan will be developed every 2 years (due in March of first fiscal year of biennium) and will span a three-year duration (second fiscal year of first biennium + both fiscal years of subsequent biennium; e.g., July 2025 – June 2028). Every 2 years, the current workplan will be revisited with the third year updated as year one of the next three-year plan.

WSRRI STEERING COMMITTEE (WDFW, DNR, SCC)

The Steering Committee is comprised of representatives from the Washington Department of Fish and Wildlife, the Department of Natural Resources (DNR), and the State Conservation Commission (SCC). It plays a pivotal role in providing strategic direction and decision making regarding the implementation of the WSRRI Strategy. This committee ensures WSRRIs work remains true to the original spirit and intent of the collaboration of the three agencies and the investment by the Washington Legislature in this important work. The Steering Committee is further responsible to collaborate to find ways to align WSRRI priorities with state agencies, Tribes, and other partners responsible for natural resource conservation and wildland fire resiliency in the shrubsteppe. This includes the integration of WSRRI considerations into agency Legislative requests based on implementation workplans and the approval of programmatic priorities, processes, and procedures. The Steering Committee also serves as the governing body ensuring that timely adaptive management of WSRRI Long-Term Strategy occurs.

STAFF SUPPORT: WSRRI PROGRAM MANAGER

The WSRRI Program Manager holds a central role within WSRRI, overseeing various critical functions. This includes collaborating with Regional Implementation Teams and the Advisory Group to establish current priority actions, processes and procedures, addressing landscape-wide conservation and restoration needs, monitoring and reporting on WSRRI progress, and managing overall communications, including developing website content. Additionally, the Program Manager facilitates and supports the development of implementation workplans in alignment with WSRRI Strategy, engages in grant development and management, facilitates design of monitoring and adaptive management plans, and discussions within the Advisory Group. This role may also include facilitating topical forum discussions to encourage collaboration and effective problem-solving. The Program Manager plays an essential role in advancing WSRRI's objectives and ensuring seamless implementation coordination.

STATEWIDE ADVISORY GROUP

The Statewide Advisory Group, a diverse body comprising representatives from state and federal agencies, Tribes, community members, agricultural interests, funding organizations, subject matter experts (SMEs), and other various stakeholders, plays a pivotal role in implementing and adaptively managing the Strategy. Their primary function is to provide valuable input, expertise, and feedback, ensuring a comprehensive and inclusive perspective in advancing WSRRI's objectives. This entails advising the WSRRI Program Manager and Steering Committee on current priorities, processes and procedures, which are formulated

based on implementation workplans. Additionally, the Advisory Group can assist with securing funding, recommend priorities and criteria for allocating resources within WSRRI, and can provide input into Regional Implementation Team and recommend policy changes to the Steering Committee. The Advisory Group's collective wisdom and collaborative efforts are instrumental in guiding WSRRI towards its conservation and restoration goals.

REGIONAL IMPLEMENTATION TEAMS

The Regional Implementation Teams, integral to the WSRRI Strategy, will comprise key partners from existing conservation frameworks involved in shrubsteppe management like agencies and Tribes, NGOs, Conservation Districts, Voluntary Stewardship Program groups, and the USDA Natural Resources Conservation Service. The establishment of these regional groups, representing the East, North Central, and South Central areas, may be phased in over time. Their important role includes creating regional implementation work plans, securing funding for area-specific needs, implementing restoration and wildland fire resiliency projects and outreach, working with landowners and community members, and additional activities tailored to the distinct characteristics of each region, all in line with overarching WSRRI goals and objectives. These teams, in close collaboration with local stakeholders, Tribes, landowners, and communities are vital in driving effective on-the-ground conservation and restoration, ensuring the success of WSRRI.

LEAD REPRESENTATIVES

The role of a Lead Representative within the Regional Implementation Teams (RITs) is essential to fostering collaboration, coordination, innovation, and inclusivity in WSRRI. These representatives serve as dedicated points of contact for each region, ensuring that key practitioners are well-represented, and their priorities and expertise are channeled effectively into the development and implementation of implementation workplans.

The primary responsibilities of Lead Representatives may include convening and facilitating the exchange of information concerning their Region, bringing together Tribes, stakeholders, experts, and practitioners to exchange insights and recommendations. In some cases, the role of Lead Representatives may be fulfilled by a member or members of already existing forums. They collaborate closely with the WSRRI Program Manager to align the Region's priorities with the overarching strategy, ensuring that regional needs and priorities are well integrated into the broader framework.

Lead Representatives play a vital role in enhancing communication and coordination between regional stakeholders, Tribes, landowners, and communities. Their commitment to regular engagement in work with topics or in areas such as habitat restoration (including invasive plants), habitat protection incentives, grazing, and community wildfire resiliency and maintaining effective communication with the Program Manager, fosters a dynamic feedback loop, allowing for timely adjustments and improvements to implementation of the initiative's strategies.

TOPICAL FORUMS

Topical Forums, a dynamic and essential component of WSRRI bring together a group of subject matter experts. These experts convene in an ad hoc manner to address specific topics, whether they pertain to research, technical intricacies, or logistical matters critical for the effective implementation of the WSRRI strategy. Topical Forums work in tandem with the Regional Implementation Teams and other implementing bodies to navigate complex challenges and harness specialized knowledge in a targeted and efficient manner. By uniting experts with diverse perspectives and expertise, Topical Forums play a pivotal role in ensuring that WSRRI's efforts remain cutting-edge, adaptable, and informed by the latest advancements and insights in the field.

ACTIONS:

To develop an effective governance structure for the WSRRI, the following actionable steps should be considered:

1. **Steering Committee Consolidation and Empowerment:**
   - Formalize the roles and responsibilities of the Steering Committee members in an agency Memorandum of Agreement/Understanding between WDFW, DNR, and SCC.
   - Streamline regular meetings and decision-making processes.
   - Ensure mechanism exists between the three agencies for shared resources efficiency.
   - Work with the WSRRI Program Manager to develop a mechanism for soliciting and integrating input from the Statewide Advisory Group and Regional Implementation Teams.
   - Establish a multi-agency communications plan for WSRRI implementation.
2. **Operationalizing the WSRRI Program Manager Role:**
   - Define the Program Manager's responsibilities, including liaison roles, programmatic oversight, and communication management.
   - Establish protocols for collaboration with the Steering Committee, Advisory Group, Regional Teams, and other staff.
   - Implement a system for monitoring and reporting progress towards goals and objectives.
3. **Establishing the Statewide Advisory Group:**
   - Formalize the roles and responsibilities of the Statewide Advisory Group through development of a group charter.
   - Define the selection criteria for diverse representatives, considering fostering environmental justice and equity.
   - Develop a framework for the Advisory Group to provide input into WSSRI Implementation as appropriate per Advisory Group charter.
   - Facilitate regular interaction between the Advisory Group and the Steering Committee.
4. **Forming Regional Implementation Teams:**
   - Establish criteria and a process for selection of RIT Lead Representative, guidance for assembling RIT composition, ensuring representation of local interests, expertise, and environmental justice and equity.
   - Develop a structured approach for creating implementation work plans.
   - Implement a process for securing and allocating funding for region-specific projects.
   - Initiate a comprehensive assessment to identify regions with the most urgent conservation needs and readiness for action. Prioritize these areas based on factors like ecological significance, stakeholder engagement, and potential for impactful outcomes.
   - Develop and implement a phased rollout plan. This plan should be flexible, allowing for adjustments based on evolving environmental conditions, stakeholder feedback, and the success of early implementations.
   - Establish a dynamic feedback mechanism to continuously evaluate and adapt the phasing strategy, leveraging insights gained from initial rollouts to inform the expansion to other regions.

5. **Integrating Lead Representatives in Regional Teams:**
   - Define the selection process for Lead Representatives in each region.
   - Establish a communication protocol (see WSRRI-wide communication plan) between Lead Representatives, the Program Manager, Tribes, and other stakeholders.
   - Create an efficient mechanism for regular reporting and feedback to the Program Manager from Lead Representatives.
6. **Convening Topical Forums:**
   - Identify critical topics requiring specialized attention on an ongoing basis as WSRRI LTS implementation moves forward.
   - Integrate insights from Topical Forums into the broader WSRRI strategy as part of both implementation of the LTS and to inform adaptive management cycles.
7. **Enhancing WDFW, WDNR, and WSCC Agency Support:**
   - Tailor support teams and resources to the specific needs of WSRRI regions.
   - Where appropriate, develop a flexible deployment strategy for expert coordinators, technicians, and field crews.
   - Regularly evaluate the effectiveness of support provided and adjust as necessary.
8. **Securing and Managing Funding:**
   - Outline a clear funding strategy, including sources, allocation, and management.
   - Develop a transparent process for soliciting, reviewing, and allocating funds and resources (see below).
   - Implement a robust monitoring and reporting system to track funding utilization and impact.
9. **Continuous Review and Adaptation:**
   - Establish a regular review process for the entire governance structure.
   - Implement a feedback mechanism to incorporate learnings and adapt strategies.
   - Ensure that governance adaptations align with the overarching 30-year vision of WSRRI.
10. **Collaboration with Tribes:**
   - Nurture communication pathways to ensure strong collaboration opportunities.
   - Establish forum for regular information sharing on updates, successes, and challenges.
   - Work together to solve problems and achieve shared goals.
11. **Stakeholder Engagement and Communication:**
   - Develop a comprehensive communication plan to engage all stakeholders.
   - Create platforms for sharing information, updates, and successes of WSRRI.
   - Foster a culture of transparency, inclusivity, and collaboration.

PROGRAMMATIC WSRRI PROJECT IDENTIFICATION PROCESS

We have mostly identified projects by solicitation during WSRRI's initial two years, in each instance with one solicitation for fencing and grazing deferment projects separate from the solicitation for habitat restoration projects. Moving forward, in addition to general solicitations for project proposals, and particularly for habitat restoration, WSRRI will take an active approach to identify projects in strategic parts of the shrubsteppe landscape, plan them in concert with landowners, and solicit stakeholder input to ensure that the projects are poised to be effective. Then, WSRRI must take a lead role in implementing those projects.

Key steps to develop such an approach:

1. Establish a Clear Process for Project-based Resource and Service Delivery:

- Develop clear criteria for identifying and developing projects, including criteria for prioritizing what kinds of projects will have the highest priority. These should align with WSRRI long-term goals, focusing on habitat protection, restoration, species management, fire management, working lands support, and community engagement.
- Prioritize projects with the greatest potential contribution to shrubsteppe restoration and conservation, with emphasis on delivering value to wildlife, especially to Species of Greatest Conservation Need (SGCN).
- Ensure that WSRRI projects follow spatial priorities, but also allow for flexibility to respond quickly to new wildfires.

2. Engage Existing Capacity to Identify, Plan, and Execute Projects:

- Collaborate widely to convene teams of public employees and other WSRRI partners to generate complete projects that align with WSRRI priorities as above.
- Ensure that as new positions join WSRRI, they immediately are assigned roles within project teams.
- Seek to diversify expertise within these teams to facilitate robust, comprehensive project designs that are likely to succeed.

3. Develop a Transparent Project Review Process:

- Assemble groups of shrubsteppe stakeholders to review projects, ensuring that WSRRI's resources are spent wisely. Strive for wide participation that includes natural resource scientists, public employees of WSRRI, private landowners, Tribes, conservation groups, and community organizations.
- Require clear, measurable outcomes for projects. Support stakeholder review groups by carefully facilitating group meetings so they are organized and efficient.

4. Facilitate Collaboration and Leverage Additional Funding Sources:

- Encourage projects that bring together multiple stakeholders, leveraging additional funding sources and in-kind contributions to maximize impact.
- Expand WSRRI's capacity by identifying and securing supplementary funding sources, including government grants, private donations, and public-private partnerships.

5. Regularly Review and Adapt the Project Generation Process:

- Establish a regular review mechanism to evaluate the effectiveness of the project generation process and the impact of supported projects.
- Remain adaptable, updating the project generation strategy as needed to respond to changing conditions in the shrubsteppe ecosystem and evolving conservation priorities.

The proposal solicitation and generation process will be refined to encourage contributions from diverse groups and individuals seeking innovative and impactful projects that align with ecosystem goals. Local communities, ecological experts, and conservation groups will be key contributors, with coordinators and partners aiding in designing effective proposals.

DATA MANAGEMENT PLANNING

WSRRI plans to develop a comprehensive Data Management Plan focused on the systematic collection and integration, support, and stewardship of ecological data. This plan will utilize TerrAdapt's spatial analysis tools to gather detailed information about the shrubsteppe environment, encompassing habitat conditions, and environmental changes.

Key aspects of the plan may include standardized data handling protocols to ensure accuracy and consistency, and regular data analysis for monitoring progress and shaping future conservation strategies. The plan will be adaptable, allowing for adjustments in response to new data and evolving conditions in the shrubsteppe ecosystem. Additionally, WSRRI will provide training in data management and the use of TerrAdapt tools, enhancing the user's capability in contributing to and using the data system. Stakeholder and Tribal engagement and feedback will be integral in the ongoing development and refinement of the data management strategies, ensuring the plan remains aligned with changing conservation needs.

9. Monitoring and Adaptive Management Plan

The actions in the WSRRI Long-Term strategy will be implemented over a 30-year period in the face of uncertain climate conditions, natural disturbances, socio-economic changes, and shifting demands on natural resources. Monitoring the implementation and effectiveness of these actions is essential to ensure that conservation partners meet our collective management objectives. Adaptive management is an approach to management that emphasizes structured learning through decision making for situations where knowledge is incomplete, and managers must act despite uncertainty regarding management outcomes (Walters 1986).

The Adaptive Management process (Figure 12) is often depicted as a cycle and uses a set of steps to evaluate a problem and integrate monitoring and evaluation into management, often as an iterative process (Leffler and Sheley 2012, Allen et al. 2017). Adaptive management focuses on learning and adapting through partnerships of managers, scientists, and other stakeholders who learn together how to create and maintain sustainable resource systems. A big part of the adaptive management cycle is dependent on reliable data to inform evaluation and adjusting this strategy's conservation actions. Therefore, for each major goal and associated objectives, metrics have been proposed to track progress towards achieving the goals.

Work Plan updates are currently scheduled for every three years (see the Organization and Governance section for more details). Appendix F describes the first Work Plan (2024-2026). In addition, Monitoring and Adaptive Management Plan reviews will take place every six years. During these planned check-ins, metrics will be evaluated relative to objectives and scientific advancements and lessons learned will be incorporated into planning efforts. If needed, actions and strategies will be adjusted.

Adaptive Management Process

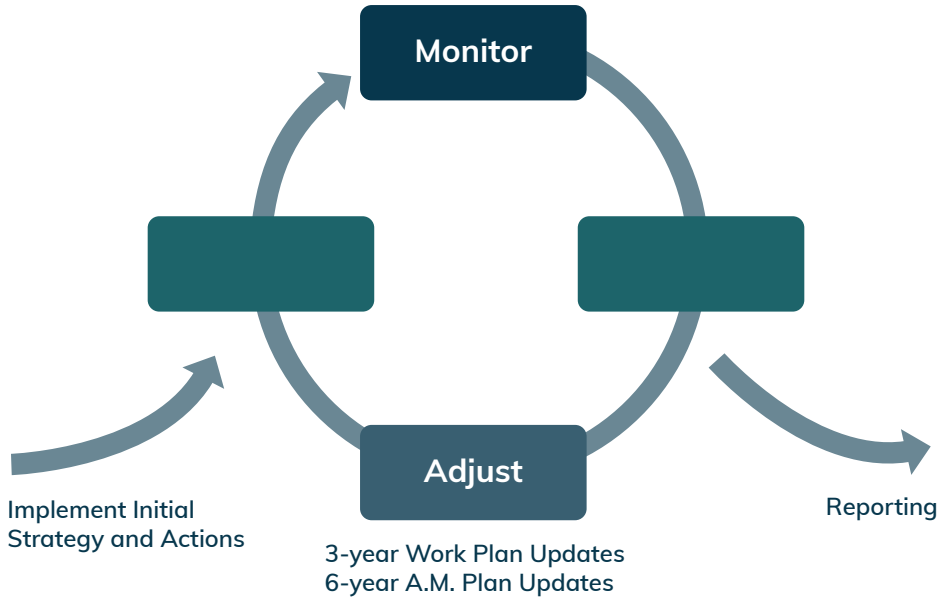


Figure 13. Adaptive Management Process. Workplan and adaptive management plan updates represent opportunities to adjust during implementation.

The purposes of this monitoring and adaptive management section are to:

1. Introduce metrics, their various spatial and temporal qualities, and the metric types that WSRRI will use for tracking progress toward objectives;
2. Provide, to the reader, the full suite of potential metrics discussed for WSRRI application; and
3. Identify next steps for developing a full monitoring and adaptive management plan and formally adopting metrics.

METRICS

Potential metrics for WSRRI are included in Table 8. These metrics were identified through the collaborative strategy development.

Metrics are used to evaluate progress toward achieving the goals and objectives and whether the actions have the desired effect. Metrics were defined for each objective in the Strategy, with a particular focus on leveraging existing, on-going monitoring within agency programs that also addresses the needs of this plan. Metrics can be measured at multiple spatial and temporal scales.

Spatial Scale

Most metrics will be tracked at the landscape scale (i.e., one measure for the Columbia Plateau or shrubsteppe landscape as a whole). In some cases, where appropriate, county-scale or other scale smaller (e.g., Mule Deer Management Zone [MDMZ]) than landscape will be applied.

Temporal scale

While most metrics can be tracked on an annual basis, some metrics require longer time scales to assess actual outcomes. Shrubsteppe and rangeland systems are dynamic systems influenced by multiple disturbances, and metrics will not necessarily trend in a linear fashion from year to year, and longer temporal scales are advised (Allen et al. 2017). Monitoring frequency will be explicit to each selected metric.

The potential WSRRI metrics fall into 4 broad categories:

1. **Participation:**
   These metrics assess landowner, community, and partner engagement in programs important for shrubsteppe conservation, planning and wildfire resilience. Participation metrics can be used to assess if enough programs are being utilized.
2. **Spatial:**
   These metrics track the implementation of conservation practices across the landscape, with an emphasis on where practices have been implemented. Programmatic metrics are often paired with Participation metrics. To the extent possible, implementation data should be made spatially explicit– in other words, where are these conservation efforts taking place on the landscape? In addition, spatially explicit implementation data will allow staff using TerrAdapt spatial assessments to test if they can detect a response of management actions using remote sensing data.

3. **Habitat:**

These metrics track changes in habitat or ecological quality. Metrics may be appropriate at both site and landscapes site scales and dependent on the land management action and specific strategy objective. Metrics may come from a variety of sources such as on the ground field sampling or remote sensing data sources (e.g., aerial imagery or satellite imagery).

a. **Landscape:**

TerrAdapt can measure changes in the ecological integrity score (Dry-Xeric and Wet-Mesic) and habitat suitability (Sage grouse) across Core Areas, Growth Opportunity Areas, Corridors, and Other Habitat for each of the three conservation targets (sage grouse, xeric, mesic). TerrAdapt as well as other satellite products (e.g., Monitoring Trends in Burn Severity (MTBS)) can also provide estimates on important plant functional groups related to habitat and fire risk such as sage-brush cover or annual grasses. These metrics will be used to help demonstrate our effort to "defend the core, grow the core, and connect the core."

b. **Sub-Landscape:**

TerrAdapt, and other remotely sensed products, as well as field data, can provide estimates across large areas (tens of thousands of acres) within the project boundary (e.g., county, watershed, wildlife area scale). By providing metrics within specific geographies within the Columbia Plateau a clearer understanding about how the system may be responding to different strategy actions.

c. **Site:**

Field data and/or higher resolution imagery (e.g., NAIP, drone data) can measure habitat and ecological attributes associated with specific conservation and restoration action. For example, monitoring vegetation recovery after prescribed fire, monitoring restoration or weed treatment effectiveness.

d. **Field validation data:**

With many ecological metrics the decision-making framework should allow for and rely on multiple lines of evidence. Using both remotely sensed and on the ground data (i.e. NRI, AIM), as well as each dataset's uncertainty and bias are important to guide the adaptive management cycle. Additionally, field data can help to validate and improve remotely sensed data products over time.

5. **Wildlife:**

These metrics track the success of the Species Management strategy by tracking status of species populations. Recognizing that habitat is a key factor influencing wildlife populations, the above habitat metrics are also informative for species management. WDFW performs a status review for state-listed species every 5 years that includes recommendations for status classifications, including uplisting, downlisting, and delisting. WSRRI uses these changes in classification as a metric for tracking progress towards achieving recovery goals. For Species of Greatest Conservation Need (SGCN) that are not state listed, WDFW prepares a new State Wildlife Action Plan (SWAP) every 10 years that provides a qualitative assessment of the species status; the latest SWAP was conducted in 2015. Finally, species-specific metrics may apply such as appropriate demographic and/or habitat indicators such as occupancy, distribution, abundance, the extent and quality of habitat.

Table 10. Potential metrics for each goal and objective.

Objective	Outcomes	Potential Metrics
GOAL #1: Human communities in the shrubsteppe are better protected, prepared, and resilient to wildland fire, engaged in shrubsteppe conservation, and economically viable.		
Objective 1 - Community Wildland Fire Resistance and Resilience	Ensure all human communities in the shrubsteppe are engaged in, aware of, and planning for fire resistance, resilience, and recovery by 2029.	Percent of counties have county-wide CWPPs by 2029. Currently all but two counties have CWPPS, but some are >10 years old.
		Percent of projects/actions identified in county-wide CWPPs that have been completed (i.e. fire lines and fuel treatments).
		Number of wildfire education actions executed under CWPPs including informational events, youth programs, developing response plans, and fire-resistant landscaping education.
Objective 2 - Community Damage	Reduce the present day adjusted dollar amount of damage, number of structures burned, and families displaced resulting from wildland fires in the shrubsteppe below the 10-year average by 5 % for 10 consecutive years beginning in 2029.	Annual damage in dollar value from WDNR damage/fire reports, USDA damage assessments, and from insurance industry reports (10-year average).
		Number of structures burned (10-year average).
		Number of families displaced (10-year average).
Objective 3 - Landowner Engagement	Establish a baseline and increase the number of local landowners engaged in conservation efforts across the shrubsteppe aiming for 15 % increase by 2029.	Percent of acres of private land where Core Areas exist for each conservation target (Sage Grouse, Dry-Xeric ecosystem, Mesic-Wet ecosystem, and Combined).
		Number of landowners and acres actively engaged in long-term protection measures through voluntary incentive programs.
		Total acres of private land protected through conservation easements.
Objective 4 - Working Lands	Increase support for working lands to enhance contribution to shrubsteppe wildlife conservation while remaining economically viable.	Acres of public and private "working lands" where Core and Growth Opportunity Areas exist for each conservation target (sage Grouse, dry-xeric ecosystem, mesic-wet ecosystem, and combined).
		Number of landowners who receive assistance in implementing deferred grazing practices.
		Total acres of land that has undergone deferred grazing after wildland fires.
		Total acres (public or private) covered by grazing management plans.
		Acres of land actively utilized for farming or ranching (gets to ability to note loss of working lands and/or farmers/ranchers)
		Dollars of damage to agricultural businesses and operations (farming and ranching) that is reported to USDA/FSA is reduced over time.

Objective	Outcomes	Potential Metrics
Objective 5 - Underserved, Highly Impacted, Overburdened, or English as a Second Language (ESL) Communities	Identify underserved, highly impacted, overburdened, or ESL communities located within the shrubsteppe landscape and prioritize them for assistance to become more resistant and resilient to wildland fire.	Number of engagement events held and attendance. Events can be held as standalone by agencies (i.e. the conservation districts) or in partnership with CAFÉ and Nuestra Casa.
		Number of underserved, highly impacted, overburdened or ESL individuals provided with assistance for projects that increase community fire resistance and resilience.
GOAL #2: The extent, frequency, and severity of wildland fire in the shrubsteppe landscape are similar to pre-1800s fire return intervals, while taking into consideration changes in land use, climate, and other modern factors.		
Objective 1- Fire Frequency	Identify the likely pre-1800 fire return intervals on all core and growth shrubsteppe habitat areas and manage planned and respond to unplanned fire to achieve this frequency in these landscapes by 2053.	Metrics could include the fire return intervals in years for Replacement Fires (High Severity >75 % of canopy burned) and Mixed Fires (Lower Severity <25 %). Track internals in combined prioritization area for the 3 conservation targets and only look at Core Areas and GOAs.
Objective 2 - Fire Severity/ Extent	By 2053, high severity fire is (1) reduced to 1 % or less of total acres burned in Core Areas and (2) reduced to 5 % or less of total acres burned in Growth Opportunity Areas.	10-year average of high severity burn area as percent of total burned acres in Cores and GOAs.
Objective 3 - Human-caused wildfire starts	Reduce the number of human-caused starts annually in the planning area to less than 25 percent of the 10-year average by 2029.	10-year average of human caused starts as a percent of total wildfire starts.
Objective 4 - Ecological Damage	Reduce the extent of Core Areas burned at high-severity by 5 % of the 10-year average per year, for 10 consecutive years beginning in 2029.	10-year average of high severity burn area as percent of total acres burned in Core Areas and GOAs.
GOAL #3: Habitat quantity and quality is increased to support healthy wildlife populations and communities.		
Objective 1 - Core Areas	Through management, grow core areas to achieve a net increase of total core area representation across the Columbia Plateau for each of the conservation targets by 2054: ▶ Dry (xeric) - Increase core area extent to exceed 21.32% baseline; ▶ Wet (mesic) - Increase core area extent to exceed 4.66% baseline; and ▶ Greater Sage-grouse - Increase core area extent to exceed 4.62% baseline. Protect, expand, and enhance Core Areas to increase habitat function by 2050.	Acres of Core Area for each conservation target (sage grouse, dry-xeric ecosystem, mesic-wet ecosystem, and combined).
		Mean habitat suitability score or ecological integrity score for Core Areas for each conservation target should be increasing over 10-year timeframe. Note TerrAdapt classifies habitat as Low, Medium and High suitability.
		Acres of GOA that have transitioned to Core for each conservation target.

Objective	Outcomes	Potential Metrics
Objective 2 - Growth Opportunity Areas (GOA)	Manage growth opportunity areas to increase core areas and avoid net loss of growth opportunity areas through a) conversion to land uses that do not provide wildlife habitat (e.g., development), and b) degradation of growth opportunity areas to other habitat for each conservation target by 2054: ▶ Dry (xeric) - Avoid loss below 10.39% baseline to sources (a) and (b); ▶ Wet (mesic) - Avoid loss below 0.95% baseline to sources (a) and (b); and ▶ Greater Sage-grouse - Avoid loss below 5.30% baseline to sources (a) and (b). Transition of growth opportunity areas to core areas would reflect progress towards Objective 1.	Total acres of GOA for each conservation target. Mean habitat suitability score or ecological integrity score for GOAs for each conservation target should be increasing over 10-year timeframe. Percentage of the GOAs relative to the overall xeric-dry and mesic-wet ecosystems.
Objective 3 - Other Shrubsteppe Areas	Manage other habitat to increase growth opportunity areas and core areas and avoid net loss of other habitat through conversion to land uses that do not provide wildlife habitat by 2054: ▶ Dry (xeric) - Avoid loss below 11.25% baseline; ▶ Wet (mesic) -Avoid loss below 9.78% baseline; and ▶ Greater Sage-grouse - Avoid loss below 32.00% baseline. Transition of other habitat to growth opportunity areas and core areas would reflect progress towards Objectives 1 and 2.	Acres of Other shrubsteppe habitat for each conservation target.

Objective	Outcomes	Potential Metrics
Objective 4 - Connectivity	Avoid a net loss of connectivity in all corridors and improve connectivity in key corridors that are central and valuable to the larger network of cores.	Connectivity, Fragmentation and Resistance metrics calculated by TerrAdapt to monitor the overall connectivity within the Shrubsteppe ecosystem. These assessment metrics considers factors like habitat quality, distance between Core Areas, and the presence of corridors. Connectivity metric should be increasing, while Fragmentation and Resistance metrics should be decreasing over time.
		Presence or absence of designated connectivity corridors and their overall health and functionality.
		Acres of corridor with new conservation efforts for each conservation target.
		Mean habitat suitability score or ecological integrity score for corridors for each conservation target should be increasing over 10-year timeframe.
		Wildlife Movement Monitoring: Employ advanced tracking technology (e.g., GPS collars) to monitor the movement of key species and assess their ability to traverse connectivity corridors.
Objective 5 - Unique Habitats	Avoid net loss of unique habitats and features, such as sand dune, talus, Palouse prairie, vernal pools, and others, through conversion to land uses that do not provide wildlife habitat, to support associated Species of Greatest Conservation Need and other wildlife.	Change in area of extent of inland sand dunes in PHS mapping.
		Change in area of extent of talus slope and cliff areas in PHS mapping.
		Habitat Suitability score or ecological integrity score change within Unique habitats areas as mapped by PHS.

Objective	Outcomes	Potential Metrics
GOAL #4: Populations and communities of wildlife and plant species of greatest conservation need and other species are: representative ensuring they can adapt to changing conditions; resilient so they are able to persist in spite of disturbance; and redundant such that they can withstand catastrophic occurrences.		
Objective 1- Achieve a positive trend toward State Recovery Plan objectives for state listed species by 2050	Columbian Sharp-tail Grouse (*Tympanuchus phasianellus columbianus*): Have at least one population averaging >2,000 birds for a 10-year period, and when the statewide population averages >3,200 birds for a 10-year period.	Population Number (10-year average)
		Acres enrolled in sharp tailed grouse SAFE/CRP program.
	Greater Sage-grouse (*Centrocercus urophasianus*): Breeding season population averages ≥3,200 birds in Washington for a 10-year period, with active lek complexes in 6 or more Management Units.	Breeding Season Population Number (10-year average)
		Number of management units with active leks.
		Acres of Sage Grouse Core and GOA
		Acres enrolled in sage grouse SAFE/CRP program.
	Pygmy Rabbit (*Brachylagus idahoensis*): Minimum population of 1400 adult pygmy rabbits comprised of at least two areas supporting at least 500 adult pygmy rabbits and four additional areas that support at least 100 adult pygmy rabbits.	Population Number (5-year average) in designated Recovery Areas: Sagebrush Flat and Beezly Hills.
		percent Sagebrush Landcover that overlays species potential range.
		Acres enrolled in Pygmy Rabbit SAFE/CRP program.
	Ferruginous Hawk (*Buteo regalis*): Sufficient shrubsteppe and native grassland must be preserved and disturbance to nesting areas must be reduced or eliminated. A 5-year average of 60 breeding pairs is distributed to reflect probable historic conditions.	5-year average of breeding pairs
		Acres enrolled in Ferruginous Hawk SAFE/CRP program.
	Sandhill Crane (*Canadensis tabida*) – A breeding population of ≥65 territorial pairs of sandhill cranes, with at least 15 of these at sites outside the Glenwood Valley, with an average annual recruitment rate of >8 % for the 5-year period prior to down-listing.	Population Estimate of breeding pairs.
		Annual recruitment percent
		Mesic habitat suitability within Species Potential Range.
	Northern Leopard Frog (*Lithobates [Rana] pipiens*)- Positive trend in species status (currently no State Recovery Plan objective).	Expert opinion of status by WDFW.
		Mesic habitat suitability within Species Potential Range.

Objective	Outcomes	Potential Metrics
Objective 2- Species of Greatest Conservation Need (SGCN)	Stabilize and improve population status of SGCN species by 2050, as indicated by appropriate demographic and/or habitat indicators (e.g., occupancy, distribution, abundance; the extent and quality of habitat).	Track trend in appropriate demographic or habitat indicator such as population size, distribution, occupancy, extent and quality of habitat.
		Number of SGCN with a state conservation plan.
Objective 3 - Mule Deer	Stabilize or increase populations of mule deer *(Odocoileus hemionus hemionus)*, as indicated by demographic indicators. By 2027, within each mule deer management zone maintain or improve the quality of at least 10 % of the seasonal habitats that support mule deer populations.	Estimated mule deer abundance should be staying the same or increasing per game management zone.
		Mean habitat suitability score of shrubsteppe landcover within management zones (MDMZ) should be increasing. Compare Winter and Summer Range per WDFW mapping.
		Areas of Core and Growth Opportunity Area in Mesic conservation target. Compare Winter and Summer Range per WDFW mapping.

Literature Cited

- Allen, C. R., Angeler, D. G., Fontaine, J. J., Garmestani, A. S., Hart, N. M., Pope, K. L., & Twidwell, D. (2017). Adaptive management of rangeland systems. Rangeland Systems, 373-394. Springer series on environmental management. Springer, Cham.
- Austin, E., Kasner, E., Seto, E., & Spector, J. (2020). Combined burden of heat and particulate matter air quality in WA agriculture. Journal of Agromedicine, 1–10. 10.1080/1059924x.2020.1795032 [PMC free article]
- Baker, W. L., & O'Leary, J. F. (1997). Sagebrush-grass vegetation: An endangered ecosystem in the Great Basin. In M. Vavra, W. A. Laycock, & R. D. Pieper (Eds.), Ecological implications of livestock herbivory in the West, 237-260. Society for Range Management.
- Baker, W. L. (2006). Fire and restoration of sagebrush ecosystems. Wildlife Society Bulletin, 34(1), 177-185.
- Baker, W.L. (2013). Is wildland fire increasing in sagebrush landscapes of the western United States?: Annals of the Association of American Geographers,103(1) 5–19. [Also available at https://doi.org/10.1080/00045608.2012.732483.]
- Balch, J. K., Bradley, B. A., D'Antonio, C. M., & Gómez-Dans, J. (2013). Introduced annual grass increases regional fire activity across the arid western USA (1980–2009). Global Change Biology, 19(1), 173-183.
- Belnap, J., & Eldridge, D. (2003). Disturbance and recovery of biological soil crusts. In J. Belnap & O. L. Lange (Eds.), Biological soil crusts: Structure, function, and management (pp. 363-383). Springer.
- Boyd, Robert T. (1999). Indians, fire, and the land in the Pacific Northwest. Anthropology faculty publications and presentations. Retrieved from: http://archives.pdx.edu/ds/psu/25175
- Brooks, M.L., Matchett, J.R., Shinneman, D.J., & Coates, P.S. (2015). Fire patterns in the range of the greater sage-grouse, 1984–2013: Implications for conservation and management: U.S. Geological Survey Open-File Report 2015–1167. Retrieved from: https://doi.org/10.3133/ofr20151167.
- Brunson, M. W.,& Carter, J. L. (1992). Historical perspectives of range burning. Rangelands, 14(2), 94-97.
- Bukowski, B.E., and Baker, W.L., 2013, Historical fire regimes, reconstructed from land-survey data, led to complexity and fluctuation in sagebrush landscapes: Ecological Applications, v. 23, no. 3, p. 546–564. [Also available at https://doi.org/10.1890/12-0844.1.]
- Chambers, J. C., Craig, A. R., & Cushman, S. A. (2019). Operationalizing ecological resilience concepts for managing species and ecosystems at risk. Frontiers in Ecology and Evolution, 7:241. Doi: 10.3389/fevo.2019.00241.
- Condon, L. A., Pyke, D. A., & Newton, M. (1998). Plant species richness in the sagebrush steppe of eastern Oregon. Northwest Science, 72(3), 195-207.
- D'Antonio, C. M., and Vitousek, P. M. (1992). Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecology and Systematics, 23, 63-87.
- Dobler, F. C., J. Eby, C. Perry, S. Richardson, and M. Vander Haegen (1996). Status of Washington's shrub-steppe ecosystem: Extent, ownership, and wildlife/vegetation relationships. Wash. Dept. Fish and Wildlife., Olympia. 39pp.

- Doherty, K. E., Naugle, D. E., & Walker, B. L. (2010). Greater sage-grouse nesting habitat: The importance of managing at multiple scales. The Journal of Wildlife Management, 74(7), 1544-1553. doi:10.1111/j.1937-2817.2010.tb01284.x
- Doherty, K., Theobald, D.M., Bradford, J.B., Wiechman, L.A., Bedrosian, G., Boyd, C.S., Cahill, M., Coates, P.S., Creutzburg, M.K., Crist, M.R., Finn, S.P., Kumar, A.V., Littlefield, C.E., Maestas, J.D., Prentice, K.L., Prochazka, B.G., Remington, T.E., Sparklin, W.D., Tull, J.C., Wurtzebach, Z., & Zeller, K.A. (2022). A sagebrush conservation design to proactively restore America's sagebrush biome: U.S. Geological Survey Open-File Report 2022–1081, 38 p.
- Dugger, K. M., Coates, P. S., & Olson, G. S. (2005). Greater sage-grouse (Centrocercus urophasianus) ecology and conservation: A landscape species and Its habitats. Studies in Avian Biology, 29, 249-262.
- Dunbar-Ortiz, R. (2014). An Indigenous Peoples' History of the United States. Beacon Press Books.
- Executive Office of the President (2022). Guidance for Federal Departments and Agencies on Indigenous Knowledge. Retrieved from: https://www.whitehouse.gov/wp-content/uploads/2022/12/OSTP-CEQ-IK-Guidance.pdf
- Hann, W. J. (1986). Late quaternary paleoclimates of the Columbia Basin. Northwest Science, 60(3), 159-170.
- Jeffries, M.I., & Finn, S.P. (2019). The sagebrush biome range extent, as derived from classified landsat imagery: U.S. Geological Survey data release, accessed May 13, 2019, at https://doi.org/10.5066/P950H8HS.
- Keeley Jon E. (2009) Fire intensity, fire severity and burn severity: a brief review and suggested usage. International Journal of Wildland Fire 18, 116-126.
- Knick, S. T., Connelly, J. W., Schroeder, M. A., and Young, J. R. (2003). Greater sage-grouse: Ecology and Conservation of a Landscape Species and Its Habitats. Studies in Avian Biology, 27, 1-29.
- Knick, S. T., Holmes, A.L., & Miller, R. F. (2005). The role of fire in structuring sagebrush habitats and bird communities. Studies in Avian Biology. 30, 63–75.
- Kuchler, A W. (1970). Potential natural vegetation [map]. 1:7,500,000. In: U.S. Department of the Interior, Geological Survey. The national atlas of the United States of America. Washington, DC: U.S. Government Printing Office, 89-92.
- Leffler, A. J., and Sheley, R. L. (2012). Adaptive management in EBIPM. Rangelands 34:44-48.
- Lelmini, M.R., Hopkins, T.E., Mayer, K.E., Goodwin, K., Boyd, C., Mealor, B., Pellant, M., & T. Christiansen. (2015). Invasive plant management and greater sage-grouse conservation: A review and status report with strategic recommendations for improvement. Western Association of Fish and Wildlife Agencies. Cheyenne, Wyoming. 47 pp.
- Liu, Y., Austin, E., Xiang, J., Gould, T., Larson, T., & Seto, E. (2021). Health impact assessment of the 2020 Washington State wildfire smoke episode: Excess health burden attributable to increased PM2.5 exposures and potential exposure reductions. GeoHealth, 5, e2020GH000359. https://doi.org/10.1029/2020GH000359
- Miller, R. F., & Rose, J. A. (1999). Historic expansion of Juniperus occidentalis (western juniper) in southeastern Oregon. Great Basin Naturalist, 59(1), 37-45.
- Miller, R. F., Bates, J. D., & Svejcar, T. (2005). Ecology and management of sage-grouse and sage-grouse habitat. Journal of Range Management, 58(1), 2-19.
- Miller, R.F., & Heyerdahl, E.K. (2008). Fine-scale variation of historical fire regimes in sagebrush-steppe and juniper woodland: An example from California, USA. International Journal of Wildland Fire, 17(2) 245–254. Available at https://doi.org/10.1071/WF07016.

- Miller, R. F., Knick, S. T., Pyke, D. A., Meinke, C. W., Hanser, S. E., Wisdom, M. J., & Hild, A. L. (2011). Characteristics of sagebrush habitats and limitations to long-term conservation. In S. T. Knick and J. W. Connelly (eds). Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology, 38, 145–184. University of California Press, Berkeley, CA.
- National Interagency Fire Center. (n.d.). Post fire recovery. https://www.nifc.gov/programs/post-fire-recovery#:~:text=There%20are%20three%20phases%20of,Burned%20Area%20Emergency%20Response%20(BAER)
- Natural Resources Conservation Service [NRCS] (2021). A framework for conservation action in the sagebrush biome: Working lands for wildlife. Washington, D.C., U.S. Department of Agriculture.
- Noss, R. F., LaRoe, E. T., & Scott, J. M. (1995). Endangered ecosystems of the United States: A preliminary assessment of loss and degradation. [National Biological Service Report].
- Ousley, N. K., Bauer, L., Parsons, C., Robison, R. R., Peters, D., & Unwin, J. (2007). Critical areas assistance handbook: Protecting critical areas within the framework of the Washington Growth Management Act. Washington State Department of Community, Trade and Economic Development.
- Pilliod, D. S., Welty, J. L., & Arkle, R. S. (2017). Refining the cheatgrass-fire cycle in the Great Basin: Precipitation timing and fine fuel composition predict wildfire trends. Ecology and Evolution, 7(19), 8126-8151. https://doi.org/10.1002/ece3.3414``oaicite:0``.
- Remington, T.E., Deibert, P.A., Hanser, S.E., Davis, D.M., Robb, L.A., & Welty, J.L. (2021). Sagebrush conservation strategy: Challenges to sagebrush conservation. U.S. Geological Survey Open-File Report 2020–1125, 327 p., https://doi.org/10.3133/ofr20201125.
- Sayre, N.F. (2023). A History of North American rangelands. In McNew, L.B., Dahlgren, D.K., Beck, J.L. (eds) Rangeland wildlife ecology and conservation. Springer, Cham. https://doi.org/10.1007/978-3-031-34037-6_3
- Schroeder, M. A., & Vander Haegen, W. M. (2006). Use of conservation reserve program fields by greater sage-grouse and other shrubsteppe-associated wildlife in Washington state. Technical report prepared for US Department of Agriculture Farm Service Agency. Washington Department of Fish and Wildlife, Olympia, WA.
- Sharma, Y. (2019). Environmental equity v/s environmental justice: justice movements in India. Law Circa. https://lawcirca.com/environmental-equity-v-s-environment-justice-justice-movements-in-india/
- Sleeter, B.M., Wilson, T.S., & Acevedo, W. (Eds.). (2012). Status and trends of land change in the Western United States—1973 to 2000: U.S. Geological Survey Professional Paper 1794–A, .
- Smith, J. (2023). Dynamic wildfire risk forecasting in the Columbia Plateau. Report submitted to Washington Department of Fish and Wildlife, June 30, 2023.
- Tscharntke, T., Klein, A. M., Kruess, A., Steffan-Dewenter, I., & Thies, C. (2002). Landscape perspectives on agricultural intensification and biodiversity: Ecosystem service management. Ecology Letters, 5(3), 299–312. In Bumble Bee Fauna of Palouse Prairie: Survey of Native Bee Pollinators. (www.ncbi.nlm.nih.gov)
- UCLA Law Review. (2018). By force of expectation: Colonization, public lands, and the property relation. UCLA Law Review. Retrieved from https://www.uclalawreview.org/?s=by+force+of+Expectation
- University of Washington. (2018). Mattawa farm workers under the smoke. UW Environmental & Occupational Health Sciences. Retrieved from: https://deohs.washington.edu/pnash/sites/deohs.washington.edu.pnash/files/WildfireSmoke-2018-sf.pdf

- University of Washington. (2018). The changing world of Pacific Northwest Indians. UW Environmental & Occupational Health Sciences. Retrieved from: https://www.washington.edu/uwired/outreach/cspn/Website/Classroom%20Materials/Pacific%20Northwest%20History/Lessons/Lesson%207/7.html
- U.S. Environmental Protection Agency. (2018). Level III and IV ecoregions of the continental United States. Retrieved from https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states
- U.S. Fish and Wildlife Service (2011). Traditional ecological knowledge for application by Service scientists. Retrieved from: https://www.fws.gov/sites/default/files/documents/TEK-Fact-Sheet.pdf
- U.S. Fish and Wildlife Service. (2016). USFWS Species Status Assessment Framework: an integrated analytical framework for conservation. Version 3.4 dated August 2016.
- U.S. National Archives and Records Administration. (n/d). American Indian Urban Relocation. Retrieved from: https://www.archives.gov/education/lessons/indian-relocation.html
- Walters, C.J. (1986). Adaptive management of renewable resources. New York, NY: McMillan. ———. (2007). Is adaptive management helping to solve fisheries problems? Ambio: A journal of the Human Environment 36:304–307
- Washington Department of Ecology. (n.d.). Washington's climate. Retrieved from https://ecology.wa.gov/Research-Data/Scientific-information/Climate-change/Climate-impacts/Introduction
- Washington Department of Fish and Wildlife [WDFW]. (2015). Washington's State wildlife action plan [SWAP]: 2015 update. Washington Department of Fish and Wildlife, Olympia, WA. https://wdfw.wa.gov/species-habitats/at-risk/swap
- Washington Department of Natural Resources. (2018). 20-Year forest health strategic plan: Eastern Washington. Retrieved from: https://www.dnr.wa.gov/ForestHealthPlan
- Washington Department of Natural Resources. (2019). The Washington State Wildland Fire Protection 10-Year Strategic Plan. Retrieved from: https://www.dnr.wa.gov/publications/rp_wildfire_strategic_plan.pdf
- Washington Fire Adapted Communities. (2019). SHB 2561 Report. Retrieved from: https://www.dnr.wa.gov/publications/rp_fire_advisory_committee_report.pdf
- Washington State Legislature. (2021). Senate Bill 5097 - 2021-22. Washington State Legislature guided Washington Department of Fish and Wildlife to restore Shrubsteppe habitat and associated wildlife impacted by wildland fire through a budget proviso in the 2021-23 biennium. Retrieved from https://app.leg.wa.gov/billsummary?BillNumber=5097&Year=2021&Initiative=False
- Washington State University. (2023). Least-Conflict Solar Siting on the Columbia Plateau. Retrieved from https://www.energy.wsu.edu/documents/Least-Conflict_Solar_Siting_Report-WSUEP23-04--6-29.pdf
- West, Neil E. (2000). Synecology and disturbance regimes of sagebrush steppe ecosystems. Proceedings of the Sagebrush Steppe Ecosystems Symposium: 2000. Boise, ID, USA: USDI Bureau of Land Management
- Western Governors' Association [WGA] (2020). A toolkit for invasive annual grass management in the West: Denver, Colo., Western Governors' Association, 7 p.
- Wildland Fire Leadership Council. (2014). National Cohesive Wildland Fire Management Strategy. Retrieved from: https://www.forestsandrangelands.gov/strategy/

Glossary

Actions
Actions serve as the more detailed level of implementation in the long-term plan. These are the specific types of activities that implementers will pursue associated with accomplishing the strategies.

Biome Impacts
A biome is a large ecological area with distinct flora, fauna, and climate. Biome impacts are those that affect the entire biome, like climate change, which can alter temperature and precipitation patterns across the entire shrubsteppe biome, impacting its overall health and biological diversity.

Columbia Plateau
An ecoregion located in eastern Washington and northern Oregon, characterized by shrubsteppe habitats and grasslands with extensive areas of dryland farming and irrigated agriculture (Sleeter et al., 2012). Used interchangeably in the Strategy with shrubsteppe landscape.

Communities
Human communities can be defined in many ways, but often implies a connection to place, including geographical space that people value.

Ecological communities refer to a group of species that are commonly found occupying the same geographical area at the same time.

Conservation Easement
A conservation easement is a legal agreement between a landowner and a land trust or government agency that limits uses of the land to protect its conservation values in perpetuity or for a defined duration.

Core Areas/Core
Those areas with significant local amounts of high-quality habitat for one of the conservation targets. Habitat within core areas is highly connected.

Corridors
The most efficient connections between Core Areas, and between Growth Opportunity Areas, following routes that minimize exposure to unsuitable habitats and movement barriers.

Corvid
A member of the bird family Corvidae including crows, ravens, jays, and magpies.

Ecological Integrity
The ability of an ecosystem to support and maintain a community of organisms comparable to those of natural and/or undisturbed habitats.

Ecosystem function
Ecosystem function refers to the intrinsic ecological processes and the resultant services that are carried out within an ecosystem. These include biological, geochemical, and physical processes that are critical for the survival of living organisms and the maintenance of biodiversity.

Fire Damage

Fire Damage measured by Annual damage in dollar value by selected reporting agency (e.g., Insurance Industry Reports).

Fire Recovery

Human-led efforts to repair and restore property and natural resources after a fire.

Fuel Management

As defined by the Western Association of Fish and Wildlife Agencies (WAFWA), refers to the strategic manipulation and reduction of combustible materials in forests and wildland areas, such as vegetation and organic matter, that can feed wildfires.

Fire Intensity

Fire intensity is the amount of energy or heat given off by a fire at a specific point in time, or the energy output from fire.

Goals

The high-level descriptors of the outcome you wish to create or produce. Qualitative in nature. Describe more of the “what” and “why”, versus the quantitative and measurable “how” statement. All Goals clearly relate to and deliver on the Vision Statement.

Growth Opportunity Areas

Areas with significant local amounts of habitat but in a more degraded condition compared to Core Areas. Habitat within Growth Opportunity Areas is highly connected.

Highly impacted community

A community designated by the department of health based on cumulative impact analyses in RCW 19.405.140 or a community located in census tracts that are fully or partially on "Indian country" as defined in 18 U.S.C. Sec. 1151.

Implementation Work Plan

These are the specific tasks or activities that implementers of the plan will pursue associated with accomplishing the strategy. These should all be very specific, measurable, time-bound, and clearly deliverable.

Landscape Impacts

These refer to changes or disturbances that affect large areas of land, spanning multiple ecosystems or habitats. Landscape impacts often involve alterations in land use, such as urban development or large-scale agriculture, that significantly modify the natural landscape patterns and ecological processes.

Low-income

Household incomes as defined by the department or commission, provided that the definition may not exceed the higher of eighty percent of area median household income or two hundred percent of the federal poverty level, adjusted for household size.

Mesic

An environment or habitat containing a moderate or well-balanced supply of moisture throughout the growing season. In WSRRI’s spatial priority setting, the mesic ecosystem represents the wetter environments of the region where wetlands, wet meadows, and riparian habitats predominate.

No net loss

No net loss is a principle commonly applied in environmental management and conservation policy aiming to balance the loss of biological diversity or ecosystems in one area with the restoration, enhancement, or preservation of biodiversity in another, so that the overall quantity and quality remain unchanged.

Objectives

An objective is a specific outcome that defines the goal. Objectives lead to quantitative metrics that allow one to measure and track progress to success. More specifically, this is the quantitative WHAT that makes high-level goals more attainable and actionable. Objectives are generally written to be "SMART" – Specific, Measurable, Attainable, Relevant, and Timely.

Other Shrubsteppe Areas

Areas of native habitat that are not otherwise included within the boundaries of Core Areas, Growth Opportunity Areas, or Corridors. These areas have not been converted but are likely degraded (e.g., by high human footprint or invasive species).

Over-burdened community

A geographic area where vulnerable populations face combined, multiple environmental harms and health impacts, and includes, but is not limited to, highly impacted communities as defined in RCW 19.405.020.

Protection

Any action or actions that prevent incompatible land uses that cause loss of habitat. Possible actions include land acquisition, conservation easements, land swaps, and management. Protection actions can also be used to allow for restoration of previously degraded habitat.

Redundancy

The ability of a species to withstand catastrophic events, characterized by having multiple, resilient populations distributed within the species' ecological settings and across the species' range. It can be measured by population number, resiliency, spatial extent, and degree of connectivity. (USFWS 2016)

Representation

The ability of a species to adapt to changing environmental conditions over time. It is characterized by the breadth of genetic and environmental diversity within and among populations. (USFWS 2016)

Resilience

Ecological Resilience

is a measure of the capacity of an ecosystem to recover to a desired state (Chambers et al., 2019)

Species Resilience

describes the ability of a species to withstand stochastic disturbance. Resiliency is positively related to population size and growth rate and may be influenced by connectivity among populations. Generally speaking, populations need abundant individuals within habitat patches of adequate area and quality to maintain survival and reproduction in spite of disturbance (USFWS 2016).

Fire Resilience

is related to strategies and actions taken before, during and after a fire to improve the capacity of ecosystems, habitat, species, communities, and other values at risk to mitigate negative impacts and damage from wildland fire and recover quickly.

Resistance

Ecological Resistance

The ability of a system to retain its structure and function when confronted with disturbance, stress, or invasive species (Chambers et al., 2019).

Fire Resistance

is related to pre-fire strategies and actions taken prior to fire occurring to improve the capacity of better protect ecosystems, habitat, species, communities and or other values at risk from incurring significant damage from wildland fire if it occurs.

Restoration

Returning shrubsteppe ecosystems to those dominated by native species (e.g., perennial grasses, shrubs, forbs). In this plan we use restoration synonymously with enhancement, rehabilitation, creation, or improvement to mean the manipulation of the physical or biological characteristics of a site with the goal of returning natural functions to the lost or degraded native habitat and improving ecosystem resilience.

Site-Specific Impacts

These are localized impacts that occur at a specific site within a larger landscape or biome. They might include localized pollution, specific construction projects, or targeted land management practices that directly affect a particular area of the shrubsteppe ecosystem."

Severity

Fire severity, or burn severity, refers to the degree of consumption of combustible biomass and surface soil organic matter after a fire, reflecting the impact on ecosystems.

Shrubsteppe Landscape

Used interchangeably with Columbia Plateau to describe the ecoregion. See Columbia Plateau for definition.

Shrubsteppe Habitats or Ecosystems

Species of Greatest Conservation Need (SGCN)

State list of species identified in State Wildlife Action Plan (SWAP). SGCN is a non-regulatory designation chosen to bring attention to the species before they become more rare or costly to conserve and inclusive of species with protected and classified statuses (e.g., listed species).

State Wildlife Action Plan (SWAP)

The SWAP identifies Washington's wildlife and habitats needing conservation attention, the key problems they face, and outlines actions needed to conserve them over the long-term. SWAPs are updated every 10 years. Washington's next SWAP update will be published in 2025.

Stewardship

Responsible use, management, and protection of the natural environment through conservation and sustainable practices.

Strategies

Strategies serve as an actionable roadmap. They provide a high-level plan to achieve goals and objectives. Strategies describe HOW you plan to carry out your plan and are the highest level or organizing your actions.

Under-represented

People who come from communities that have experienced exclusion from opportunity or have been disadvantaged because of discrimination or prejudice against a group to which they belong.

Vulnerable populations

Population groups that are more likely to be at higher risk for poor health outcomes in response to environmental harms, due to: (i) Adverse socioeconomic factors, such as unemployment, high housing and transportation costs relative to income, limited access to nutritious food and adequate health care, linguistic isolation, and other factors that negatively affect health outcomes and increase vulnerability to the effects of environmental harms; and (ii) sensitivity factors, such as low birth weight and higher rates of hospitalization.

(b) "Vulnerable populations" includes, but is not limited to:

- (i) Racial or ethnic minorities;
- (ii) Low-income populations;
- (iii) Populations disproportionately impacted by environmental harms; and
- (iv) Populations of workers experiencing environmental harms.

Working lands

Lands used for farming or grazing

Xeric

An environment or habitat containing little moisture; very dry. In WSRRI's spatial priority setting, the xeric ecosystem includes drier environments where sagebrush and perennial grasslands predominate.

List of Acronyms

ACEP	Agricultural Conservation Easement Program
BAER	Burned Area Emergency Response
BAR	Burned Area Rehabilitation
BAS	Best Available Science
BLM	Bureau of Land Management
BMP	Best Management Practices
BOR	Bureau of Reclamation
CAO	Critical Area Ordinance
CBO	Community Based Organization
CD	Conservation District
COAD	Community Organizations Acting in Disasters
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWMA	Cooperative Weed Management Areas
CWPP	Community Wildfire Protection Plan
DAHP	Department of Archaeology and Historic Preservation
EGP	Enterprise Geospatial Portal
EJ	Environmental Justice
ENCS	Emergency Natural Resources Conservation Service
ESD	NRCS Ecological Site Descriptions
ESL	English as a Second Language
FSA	Farm Services Agency
FWHCA	Fish and Wildlife Habitat Conservation Areas
GOA	Growth Opportunity Area
GMA	Growth Management Act
HVRA	Highly Valued Resources and Assets
IDIQ	Indefinite Delivery Indefinite Quantity
IUCN	International Union for the Conservation of Nature
NIFC	National Interagency Fire Center
NNL	No Net Loss
NRCS	Natural Resources Conservation Service
PBA	Prescribed Burn Association's
PBRS	Public Benefit Rating System
PHS	Priority Habitats and Species
PODs	Potential Operational Delineations
PCL	Potential Control Lines
QWRA	Quantitative Wildfire Risk Assessment
RIT	Regional Implementation Teams
SAFE	State Acres for Fish and Wildlife Program
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SME	Subject Matter Expert
SPP	Sustainability in Prisons Program
SWAP	Washington State Wildlife Action Plan
TEK	Traditional Ecological Knowledge
TREX	Prescribed Fire Training Exchanges
USFWS	U.S. Fish and Wildlife Service
VSP	Voluntary Stewardship Program
WDNR	Washington Department of Natural Resources
WDFW	Washington Department of Fish and Wildlife
WSRRI	Washington Shrubsteppe Restoration and Resiliency Initiative
WSCC	Washington State Conservation Commission

Appendix A. Proviso Language

(25) $1,175,000 of the general fund—state appropriation for fiscal year 2022 and $1,175,000 of the general fund—state appropriation for fiscal year 2023 are provided solely for the department to restore shrubsteppe habitat and associated wildlife impacted by wildfires.

(a) This funding is intended for the restoration of habitat on public lands as well as private lands by landowners who are willing to participate. The restoration effort must be coordinated with other natural resource agencies and interested stakeholders.

(b) Restoration actions may include - (i) Increasing the availability of native plant materials; (ii) increasing the number of certified and trained personnel for implementation at scale; (iii) support for wildlife-friendly fencing replacement; (iv) support for private landowners/ranchers to defer wildland grazing and allow natural habitat regeneration; and (v) species specific recovery actions.

(c) The department must submit a progress report to the appropriate committees of the legislature on the investments made under this subsection by December 1, 2022, with a final report submitted by September 1, 2023.

(d) Within the amounts provided in this subsection, $250,000 must be used by the department to form a collaborative group process representing diverse stakeholders and facilitated by a neutral third party to develop a long-term strategy for shrubsteppe conservation and fire preparedness, response, and restoration to meet the needs of the state's shrubsteppe wildlife and human communities. The collaborative may serve as providing expertise and advice to the wildland fire advisory committee administered by the department of natural resources and build from the wildland fire 10-year strategic plan. Components to be addressed by the collaborative include the restoration actions described in (b) of this subsection and on spatial priorities for shrubsteppe conservation, filling gaps in fire coverage, management tools to reduce fire-prone conditions on public and private lands and identifying and making recommendations on any other threats. Any reports and findings resulting from the collaborative may be included in the report specified in (c) of this subsection.

Appendix B. WSRRI Long-Term Strategy Planning Process

WSRRI was formed under the leadership of a three-state agency coalition comprised of the WDFW WSCC, and WDNR. To develop the WSRRI Long-Term Strategy (Strategy), a planning approach was implemented to establish a repeatable, systematic, and well-documented method for developing goals and objectives, identifying threats, defining necessary actions, and constructing an implementation workplan. This process was guided by a key strategic direction to identify spatial priorities through an assessment of ecological integrity, primary threats to shrubsteppe in Washington and develop strategies to 'defend the core, grow the core, and connect the core' shrubsteppe habitats within the context of the Legislative Proviso and Mission and Goals of WSRRI. The Strategy has been developed through a stepwise process outlined below (Figure B1).

Figure B1. Six Step Planning Process to develop the Strategy

The six-step process centered on establishing Goals and Objectives with a focus on the protection and restoration of wildlife habitats, the effective management of fire within the landscape, and the support of communities and compatible land uses. Within this framework, Critical Threats were identified and prioritized for targeted mitigation in pursuit of the defined Objectives. The plan identifies six Strategies and integrated specific and measurable Actions to accomplish these goals, address identified threats, and ensure the achievement of objectives through implementation of a comprehensive Monitoring and Adaptive Management approach. At the heart of this Strategy is the mapping of ecological integrity across the Columbia Plateau, which enables identification of the Spatial Priorities of Core Areas, Growth Opportunity Areas, and Corridors. The relationship between Goals, Objectives, Strategies, and Actions is described in the table below (Table B2).

Table B2. Structure of the Strategy - goals, objectives, strategies, and actions.

	"WHAT?"	"HOW?"
Less Detail	GOALS	STRATEGIES
More Detail	OBJECTIVES	ACTIONS

SHAPING THE STRATEGY - A COLLECTIVE EFFORT

WSRRI Strategy development process was informed by diverse perspectives and a broad range of stakeholders with vested interests in Washington's shrubsteppe landscape, as well as Tribes and various public and private partners. The initial stages of shaping WSRRI Long-Term Strategy involved conducting assessment interviews with representatives from over 20 different organizations who provided invaluable feedback to form the Strategy's development process.

The operational structure included multiple groups, such as the Steering Committee, the Long-Term Strategy Advisory Group (LTSAG), the Wildlife Habitat Workgroup, the Wildland Fire Workgroup, the Spatial Workgroup, and several topic-specific discussions referred to as Focus Tables. Collaborative efforts among WSRRI advisors, work group participants, and Focus Table members were instrumental in constructing a comprehensive long-term strategy for shrubsteppe conservation. As directed by the Legislative proviso, this strategy addresses spatial priorities, establishes a wildlife habitat restoration program, enhances coordination and resource sharing at the landscape level, bolsters wildland fire preparedness, protection and response measures, supports working lands, and addresses other threats to the shrubsteppe landscape.

The Strategy development groups included -

Steering Committee

The leadership of WSRRI consists of a state agency coalition, with active engagement from the WDFW, WSCC, and WDNR. Together, these agencies form the WSRRI Steering Committee, which convenes regularly to provide direction, make decisions, and prioritize funding within WSRRI. The collaboration among these agencies brings together diverse and complementary perspectives, expertise, and resources, strengthening the overall quality and impact of WSRRI's efforts. Operating under a consensus-based decision-making model, the Steering Committee works effectively to ensure that all decisions guiding WSRRI are reached collectively. In instances where consensus is challenging to achieve, the ultimate decision-making authority for WSRRI rests with the WDFW Director, safeguarding progress and forward momentum in a spirit of cooperation and shared goals. This leadership group plays a pivotal role in shaping the strategic direction, implementation, and impact of WSRRI's efforts, ensuring that they align with the overarching goals and values.

Long-term Strategy Advisory Group (LTSAG)

The LTSAG, consisting of agencies, organizations, and individuals deeply invested in the shrubsteppe landscape, includes shrubsteppe landowners, land managers, and organizations that operate within the shrubsteppe ecosystem. Their active involvement in WSRRI is a testament to their dedication and their substantial capacity to contribute to the cause. Meeting from January 2022 to March 2024, LTSAG members played a pivotal role in offering insights into the proposed goals, objectives, actions, spatial priorities, and the governance and planning approaches. Their commitment and contributions have significantly shaped the strategic direction of this effort.

Tribal Engagement

The development of the Strategy placed a strong emphasis on actively involving Tribes in Eastern Washington, recognizing their pivotal role in shaping WSRRI. Eastern Washington Tribes were invited to participate in the Long-term Strategy Advisory Group and additional effort was placed on specific Tribal engagement. In the spring of 2023, the Steering Committee initiated a dialogue with the Confederated Tribes of the Colville Reservation, Yakama Nation, and Spokane Tribe, meeting with each Tribe in person individually to foster a deeper understanding. These one-on-one meetings were arranged to discuss the Strategy and identify alignment with Tribal priorities, needs, and capacity. This engagement served as a conduit for the committee to gain invaluable insights into the Tribes' interests, priorities, and unique perspectives on WSRRI's efforts. Furthermore, it laid the foundation for building a cooperative and mutually beneficial relationship, ensuring that the Strategy would be fundamentally shaped by the valuable input and knowledge of the Tribes as it progressed.

Wildlife and Wildland Fire Workgroups

The Wildlife Habitat Workgroup and Wildland Fire Workgroup initiated biweekly meetings in July 2022 to formulate Objectives and Actions for the Long-Term Strategy. In October of the same year, a workshop convened in Wenatchee, Washington, bringing together the workgroups and Steering Committee to assess initial objectives, explore necessary cross-resource connections requiring further development, and collaboratively generate potential actions to accomplish the established objectives. This workshop led to the development of WSRRI Key Strategies.

Spatial Priorities Workgroup

Additional funding from the Bipartisan Infrastructure Law funding focused on Sagebrush-steppe was secured through U.S. Fish and Wildlife Service to supplement work for defining spatial priorities. WSRRI partnered with TerrAdapt, a non-profit organization with expertise in co-development of dynamic mapping tools to monitor habitat, project future conditions, and prioritize areas for conservation. This workgroup focused on identifying the important places within this landscape to guide the prioritization of conservation actions described in the plan. Spatial priorities were developed for three habitat targets - 1) xeric - dry; 2) mesic – wet; and 3) Greater Sage-grouse. Targets were selected with input from the Wildlife Habitat Workgroup, and their definition and focus were refined with the help of target-specific experts who worked with TerrAdapt to develop methods to map and monitor the spatial priorities. Xeric and mesic habitat experts and Greater Sage-grouse experts met for target-specific monthly meetings between January and December 2023, informing decisions on datasets to use, their interpretation and use, key methodological and modeling decisions, and how the resulting datasets and models informed where different actions should be taken.

Products from the Spatial Priorities Workgroup include spatially and temporally explicit maps of Core Areas, Growth Opportunity Areas, Corridors, and Other Habitat Areas for each of the three targets. Along with these categorized maps there are numerous data layers that were developed as inputs to these maps, including landcover, fractional rangeland vegetation cover, habitat quality, habitat connectivity, and ecological integrity. These datasets can be used to help monitor the landscape over time and inform spatial prioritization of actions and adaptive management.

Focus Tables

In the spring and summer of 2023, a series of topic-specific Focus Table meetings were organized to gather input from subject matter experts regarding the formulation of Actions for the Long-Term Strategy. Details on these Focus Table meetings, including topics, can be found in Table B3.

Table B3. Focus Table Topics, Dates, and Participants

WF	Meeting Dates	Participants
Grazing	2/3/23 2/22/23 3/10/23	Shana Joy (Steering Committee), WSCC Allisa Carlson (Steering Committee), WSCC Janet Gorrell (Steering Committee), WDFW Richard Fleenor, NRCS Scott Scroggie, NRCS Jeff Burnham, WDFW Wade Troutman, FCCD and Douglas County Producer Tip Hudson, WSU Extension Elayne Hovde-Knudson, Lincoln Co. CD Kari Fagerness, WDNR
Habitat Restoration	2/14/23 2/23/23 3/7/23 3/23/23 3/30/23 4/14/23	Keyna Bugner, DNR Jason Lowe, BLM Ryan Lefler, FCCD Kim Veverka, USFWS Nick George, USFWS Michael Brown, Pheasants Forever Kurt Merg, WDFW Hannah Anderson, WDFW Kat Kelly, WDFW Elizabeth Torrey, WDFW David Wilderman, DNR Colin Leingang, YTC Jay Kehne, CNW Jesse Ingels, Washington Cattlemen's Association
Habitat Protection – Incentives	5/31/23 7/25/23	Allisa Carlson (Steering Committee), WSCC Janet Gorrell (Steering Committee), WDFW Angie Reseland, WDFW Tom O'Brien, WDFW Sean Williams, WDFW Austin Shero, NRCS Kara Whittaker, WDFW Dani Madrone, American Farmland Trust Paul D'Agnolo, WSCC Braeden Van Deynze, WDFW Mark Teske, WDFW Kim Sellers, WA RCO Carlee Elliot, NRCS Kate Delavan, WSCC Vanessa Kritzer, WA Association of Land Trusts Shana Joy (Steering Committee), WSCC Sarah Brooks, Methow Conservancy Mickey Fleming, Chelan-Douglas Land Trust Megan Whiteside, Cowiche Canyon Conservancy

WF	Meeting Dates	Participants
Habitat Protection – Land Use Policy	7/10/23 9/21/23	Hannah Anderson (Steering Committee), WDFW Thomas O'Brien, WDFW Kara Whittaker, WDFW Margen Carlson, WDFW Chuck Stambaugh-Bowey, WDFW Sean Williams, WDFW Misty Blair, ECY Dave Andersen, COM Trina Bayard, Audubon of Washington Braeden Van Deynze, WDFW Sharica Jenkins-Hill, WDFW Carmen Andonaegui, WDFW Steve Davenport, COM Janet Gorrell (Steering Committee), WDFW Keith Folkerts, WDFW Julia Michalak, WDFW
Community Fire Protection	7/11/23 8/9/23	Allen Lebovitz (Steering Committee), WDNR David Way, WDNR Hilary Lundgren, WAFAC Shana Joy (Steering Committee), WSCC Guy Gifford, WDNR Laura Rivera, CAFÉ Wenatchee Rose Beaton, WDNR Hannah Anderson (Steering Committee), WDFW Janet Gorrell (Steering Committee), WDFW Reese Lolley, WARCD Alex Smith, CAFÉ Wenatchee
Fire Planning and Response #1	7/12/23 8/8/23	Allen Lebovitz (Steering Committee), WDNR Shana Joy (Steering Committee), WSCC Bob Gear Steven Harris, WDNR Vincent Jansen, WDFW Collin Haffey, WDNR Angie Lane, WDNR Janet Gorrell (Steering Committee), WDFW Curtis Bryan, BLM Danny Stone, Grant County Commissioner
Community Engagement	8/10/23 9/26/23	Allisa Carlson (Steering Committee), WSCC Shana Joy (Steering Committee), WSCC Allen Lebovitz (Steering Committee), WDNR Rachel Blomker, WDFW Eryn Couch, WDFW David Trimbach, WDFW Elayne Hovde-Knudson, Lincoln Co. CD Sarah Wilcox, WSCC Elsa Bown, Lincoln Co. CD Lilliane Ballesteros, Latino Community Fund Hilary Lundgren, WA RCD Kari Fagerness, WDNR Benjamin Anderson, WDFW

WF	Meeting Dates	Participants
Invasive Plants	8/15/23	Janet Gorrell (Steering Committee), WDFW Shana Joy (Steering Committee), WSCC David Heimer, WDFW Joe Smith, University of Montana Maria Marlin, WA RCO Keyna Bugner, WDNR Tim Walls, WDFW Mary Fee, WA State Dept. of Agriculture Vincent Jansen, WDFW
SM	8/29/23 9/14/23	Hannah Anderson (Steering Committee), WDFW Jason Fidorra, WDFW Michael Atamian, WDFW Carrie Lowe, WDFW Mike Schroeder, WDFW Gerald Hayes, WDFW Kyrsten Wolterstorff, Yakama Nation of Indians Stefanie Bergh, WDFW Sam Rushing, Confederated Tribes of the Colville Reservation Trina Bayard, Audubon of Washington Kimberly Veverka, USFWS Kyle Garrison, WDFW Jon Gallie, WDFW Emily Jeffreys, WDFW Scott Fitkin, WDFW Lisa Hallock, WDFW Kurt Merg, WDFW

Focus Table Questions

Information & Planning

- *"What information is needed to implement this action/measures successfully?*
- *"Is there planning needed to support implementation? What planning?"*

Organization & Governance

- *"Is there currently an organization structure and governance in place to implement these action/measures successfully?"*
- *If Yes - "Is, it working? If not working what improvements are needed?"*
- *If No- "Do you need to establish and organization structure and governance to implement?"*

Policy

- *"What new policies are needed to support implementation? What existing policies need to be changed"*

Resources, Capacity & Funding

1. *"Are current resources and funding adequate to support implementation?"*
2. *"If not what additional resources are needed?" "What additional funding and where might that come from?"*
3. *"Is there current capacity to support full implementation of this action?" "If not, what capacity is needed?"*

Community Support and Engagement- Education, Outreach & Landowner Incentives

- *"What community engagement and education is needed to implement this action?" "Are there existing programs to achieve this and do they need to be expanded or supported in some way?"*

Appendix C. Supplemental Information on WSRRI's Spatial Priorities

Spatial Datasets Guiding Wildlife Habitat Conservation and Protection across the Columbia Plateau

In the last few decades, several projects have mapped habitat and places of value across the Columbia Plateau (Table C1). Each project and associated datasets have provided valuable information for specific end user's needs. Many of these efforts created ideas, methods and information that TerrAdapt and WSRRI partners used to co-develop the spatial priorities.

One source of inspiration was the 2022 the Western Association of Fish and Wildlife Agencies (WAFWA) western USA sagebrush conservation design (https://www.sciencebase.gov/catalog/item/62d57e89d34e87fffb2dda62). In development of this long-term strategy, WSRRI explored WAFWA's sagebrush conservation design (SCD) spatial products with local experts on the ground as well as the WSRRI's advisory committee, to determine if and how it could inform where actions were needed across the Columbia Plateau. The group concluded that while the general approach was good, the SCD product did not fully meet WSRRI's needs. The SCD lacked information on connectivity between quality habitat in Washington due to the shrubsteppe's fragmented condition (see above sections for more context). Also, the SCD did not include lands enrolled in the Conservation Reserve Program (CRP), though the importance of CRP and previously tilled locations for Greater Sage-grouse conservation in Washington has been well-documented. Further, the SCD lacked information on wetter or mesic areas within Shrubsteppe landscapes, which are critical to inform other aspects of SGCN species conservation and fire planning. These factors resulted in the SCD maps identifying no core currently in Washington, thereby providing very little guidance on what places on the ground to implement WSRRI's strategies and actions.

The other major projects that have guided conservation planning in the Columbia Plateau have come from the Washington Connected Landscapes Project and the Arid Lands Initiative. Both of these projects identified mapping products, created collaborative user groups as well as developed and tested methods that the WSSRI spatial mapping team used in product creation. But like all landscapes, this region is dynamic and changes over time due to a variety of drivers such as human development, annual grass invasion, wildfire, altered growing conditions and restoration actions. Therefore, our desire was a tool and data to match the dynamic nature of the world we live in. The work WSRRI has done with TerrAdapt aims to provide tools that are dynamic and add to the available datasets in our toolbox that can be used for decision making, and conservation at landscape scales.

Table C1. Projects guiding conservation and protection of habitat of multiple species across the Columbia Plateau.

Project name (year created)	Project Lead	Project Focus	Spatial Data Layers Produce	Major Use Case for Spatial Data	Automatic Updates	Vegetation Condition Included in Models	WA State Centric	Source Info
Washington Connected Landscapes Project - Columbia Plateau (2012)	WASDOT, WDFW (Many collaborator)	Find areas to maintain and enhance wildlife habitat connectivity .	Connectivity maps for 11 focal species / Landscape integrity	Mapping connectivity, habitat concentration areas for focal species or core areas for landscape integrity	No	No	Yes	https://waconnected.org/cp_focalspecies_landscapeintegrity/
Arid Lands Initiative (2014)	USFWS, WDFW, Audubon, NRCS, TNC, BLM, WA State Parks, and more!	Find common set of priority lands to guide conservation action	Via a spatial prioritization model (Marxan) Spatial Prioritization of Ecological systems and Species	Prioritization and ranks of core areas important for landscape for conservation, restoration and connectivity.	No	No	Yes	https://aridlandsinitiative.org/our-projects/the-science/; https://www.sciencebase.gov/catalog/
Sagebrush Conservation Design (SCD) (2023)	WAFWA, USFWS, USGS	Explicit spatial prioritization and conservation strategy for the Sagebrush biome	SEI	Prioritization of the shrubsteppe biome based on the ecological integrity of the landscape. This effort is based on a threats-based conservation approach.	Yes	Yes	No	https://www.usgs.gov/publications/a-sagebrush-conservation-design-proactively-restore-americas-sagebrush-biome
Least Conflict Solar Siting (2023)	WSU	Collaborative, non-regulatory project to minimize conflict and negative impacts to the Columbia Plateau while increasing solar energy production	Solar Development Suitability map, Farm Land Value map, Ranchland Value Map, Environmental Conservation Map	Use of various maps to understand where solar citing conflict might occur. Understand how collaborative group of people map places of high value across the Columbia Plateau	No	Yes for the Ranchland Value map	Yes	https://www.energy.wsu.edu/documents/Least-Conflict_Solar_Siting_Report-WSUEP23-04--6-29.pdf
PHS Shrubsteppe Eastside Steppe (2021)	WDFW	Mapping priority habitat and species for WDFW	Landcover/ habitat	A flagging tool to identify areas where site-scale information should be gathered on shrubsteppe or eastside steppe habitat in order to inform land use decisions and or changes in land use	Not currently	No	Yes	https://wdfw.wa.gov/sites/default/files/2021-10/shrubsteppe_eastside_steppe_info.pdf
WSRRI (2024)	WDFW, WDNR WSCC	Prioritize areas across the Columbia Plateau for habitat conservation, restoration and fire management	Both	Prioritizing the landscape based on relative values of ecological integrity or high habitat suitability (Core, Growth Opportunity Areas, and Other habitat) as well as important areas for connectivity.	Yes	Yes	Yes	https://terradapt.org/

Defining WSRRI's Spatial Priorities - Advancing Landscape Scale Mapping and Monitoring across the Columbia Plateau

Recently there has been a big advance in our ability to analyze and produce remotely sensed data products and maps that update over time. This is critical to provide an up-to-date picture of the challenges we currently face and more timely data to map and monitor dryland habitats at landscape scales (e.g., Jones et al., 2021, Jansen et al., 2018, Allred et al., 2020). Also, in recent years advances have been made in our ability to estimate the fractional amount of dominant plant functional groups annually across the landscape (e.g., Allred et al., 2021, Riggie et al., 2020). These data allow for improved ability to differentiate areas of higher quality habitat compared to areas that are degraded by invasive annual grasses, human development or recent fire or conversely improving with restoration action or land use change such as lands enrolled in CRP. The datasets co-developed with TerrAdapt for WSRRI products rely on such dynamic data inputs which help to fill gaps in existing datasets or datasets that are becoming outdated. Important aspects of the WSSRI spatial priority mapping include -

- 2 of the 3 spatial priorities (wet-mesic and dry-xeric) are focused on ecosystems rather than any one or a group of specific animals.
- The mapping of spatial priorities of our ecosystems is based largely on the estimated ecological quality (i.e., Ecological Integrity Score) using data on vegetation condition (i.e., the fractional cover products) and a human footprint model.
- The input datasets, models and collaborators are all specific to the Columbia Plateau, as compared to the west-wide Sagebrush Conservation Design. Our local models and stakeholder groups improved our ability to model important features of this landscape.
- Provides current connectivity data on the three targets.
- The tools and datasets are dynamic allowing for us to monitor the landscape over time and make changes to priorities if on the ground conditions change (See the Adaptive Management Section and Metrics table).

DATA INPUTS

The WSRRI spatial priorities were produced using several data inputs developed by TerrAdapt and described below.

- **Landcover**

  TerrAdapt's dynamic 30m resolution landcover model classifies our region into 19 landcover types representing a variety of native vegetation communities and human land uses. The model is trained on landcover observations gathered from across Washington for each landcover class. It uses a random forest machine learning algorithm to predict the class based on a suite of environmental variables, including Landsat multispectral imagery, indices derived from Landsat imagery that reflect the seasonality of vegetation conditions, and other ancillary data related to topography, climate, hydrology, and soils. The model was projected for all years from 1984 to 2022 at the time of this study.

Fractional Rangeland Vegetation Cover

TerrAdapt's 30m resolution fractional rangeland vegetation cover model predicts the percent cover of different vegetation types (perennial grasses, invasive annual grasses, sagebrush, and shrubs). The model is trained using the US Bureau of Land Management's Assessment, Inventory, and Monitoring (AIM) field data. The AIM program quantifies the fractional cover of various vegetation types in locations across the western US, including Washington. The model uses a random forest machine learning algorithm to predict the fractional cover of each vegetation type based on a suite of environmental variables, including Landsat multispectral imagery, indices derived from Landsat imagery that reflect the seasonality of vegetation conditions, and other ancillary data related to topography, climate, hydrology, and soils. The fractional rangeland cover models were projected for all years from 1984 to 2022 at the time of this study.

Human Footprint

TerrAdapt's 30m resolution human footprint model quantifies the degree to which anthropogenic impacts to native environments diminish or degrade habitat suitability. Areas of high human footprint (e.g., dense urban areas, intensive agricultural areas, or surface mines) are assumed to provide poor habitat for native species. This model follows methods similar to Theobald et al. (2020), which quantifies the magnitude of several anthropogenic impacts such as various classes of roads (interstate highways, primary roads, secondary roads, local roads), various classes of agriculture (irrigated row crops, dryland row crops, fallow, orchard, and pasture), population density, energy transmission lines, solar installations, wind turbines, canals, dams, quarries, and electrical power stations. Each impact also has a distance over which the impacts extend from their source, reflecting processes such as the spread of noise, light, invasive species, domestic animals, pollution, and other impacts that radiate outward from impacted areas. A fuzzy sum is used to combine impacts into a single human footprint model scaled from 0 to 1 (higher values indicate greater magnitude of human impacts). The locations of these impacts are derived from several sources, including OpenStreetMap, BC Integrated Roads data, the TerrAdapt landcover model (described above), and the US Homeland Infrastructure Foundation-Level Data catalog. The human footprint model was projected for all years from 1984 to 2022 at the time of this study.

Height Above Nearest Drainage

TerrAdapt's 30m height above nearest drainage (HAND) model normalizes topography (based on a 30m digital elevation model) according to the local relative heights found along the drainage network, revealing the local draining potentials (Nobre et al. 2011). The HAND model has been shown to be highly correlated with the depth of the water table, providing an accurate spatial representation of soil water environments.

Workflow Overview

The figure below illustrates the general modeling workflow we used to map spatial priorities for each conservation target. The workflow began by linking to the input datasets stored in TerrAdapt's cloud data repository and updated dynamically each year; key input datasets for this project were described in the Data Inputs section above. We then developed models of habitat suitability (the degree to which a pixel can provide a suitable environment for the conservation target) and resistance (the degree to which a pixel resists movement during dispersal). Next, we mapped Core Areas (local concentrations of high-quality habitat) and Growth Opportunity Areas (local concentrations of present but somewhat degraded or sparse habitat). Then we modeled Corridors linking all adjacent Core Areas together if within dispersal limits. Finally, we mapped the full suite of spatial priorities as Core Areas (Core), Growth Opportunity Areas (GOAs), Corridors, and Other Habitat.

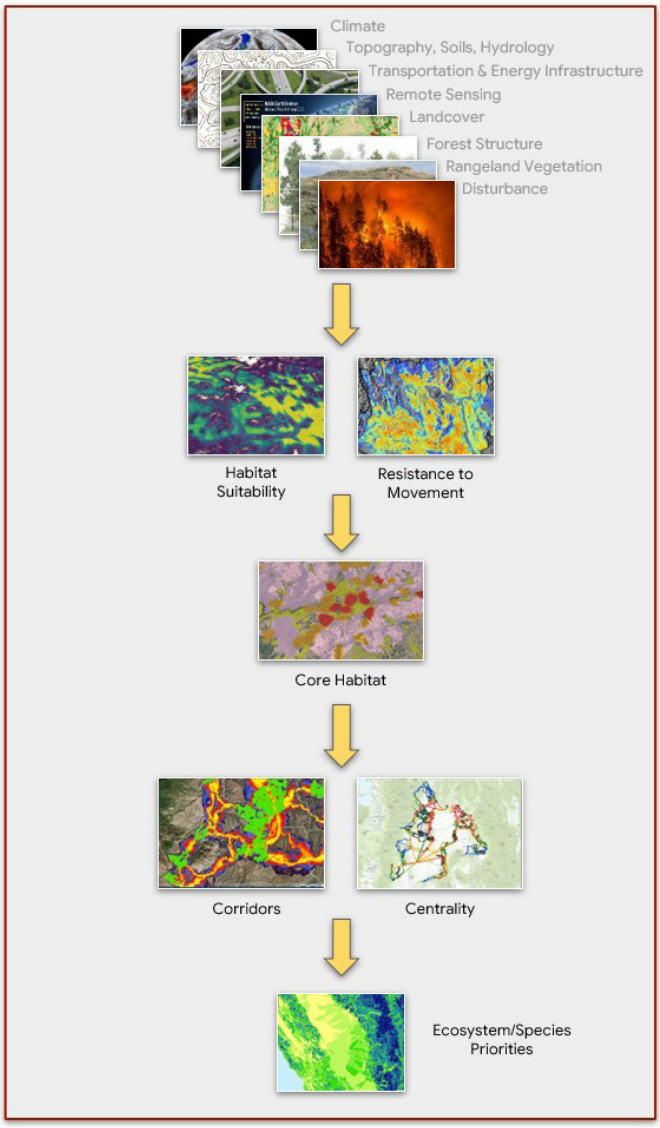


Figure C2. Modeling workflow used to map spatial priorities.

HABITAT

We modeled habitat for each of the three targets in different ways, based on expert input from each target co-production team.

Dry-Xeric Ecosystem

To map habitat for the Xeric Ecosystem, we first computed an ecological integrity score largely following the sagebrush conservation design (Doherty et al, 2022). Specifically, we fit curves to fractional cover datasets produced by Terradapt on invasive annual grass cover, perennial grass cover as well as the human footprint to calculate q score which is a measure of habitat quality (Figure C3). All data was computed on an annual basis for each 100m grid cell across the study area that were classified as either shrubland or grassland by TerrAdapt's Landcover model.

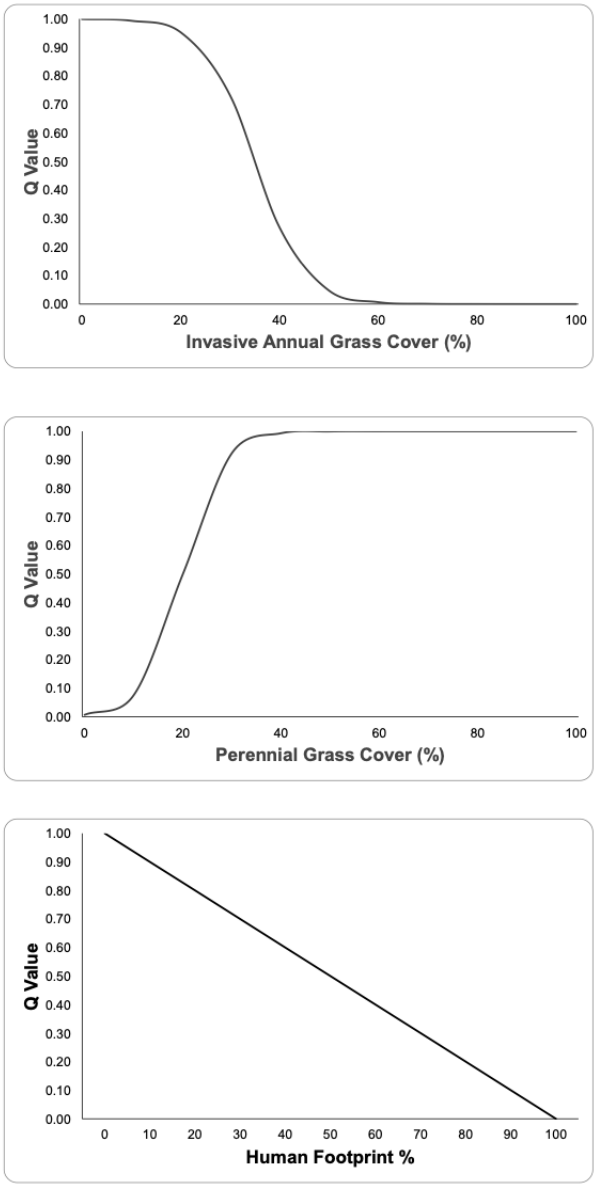


Figure C3. Q curves for invasive annual grass cover, perennial grass cover and human footprint

Wet-Mesic Ecosystem

To map Wet-Mesic habitat, we first created a layer of habitat quality and a layer of 'wetland potential'. Habitat quality was driven by the human footprint and constrained to an area defined by either 1) the wetlands landcover (emergent or woody wetland) defined by TerrAdapt's landcover model OR 2) low lying areas (defined by a height above nearest drainage less than 15m) that also were classified as mesic vegetation (mesic grass/shrub or forest). Wetland potential was defined as a linear function of the normalized difference wetness index (NDWI) calculated from Landsat imagery. NDWI is a measure of vegetation moisture, with values ranging from –1 to 1. Values above 0 are extremely moist environments likely to be inundated by water. Values in the range of –0.3 to 0 represent vegetation with ample moisture, indicating high water availability at or near the surface. We created a wetland potential index ranging linearly from 0 for NDWI values < -0.3 to 1 for NDWI values >= 0. Only pixels with a landcover class that could become a wetland if restored (irrigated or non-irrigated row crops, pasture, fallow, forest, or mesic grass/shrub) that were also in low-lying places (HAND < 15m) were allowed to have wetland potential > 0. In this way, the wetland potential index reflects low lying areas of potentially restorable landcover that has access to surface moisture.

Greater Sage-grouse

To map the spatial priorities of the Greater Sage-grouse, we trained a habitat suitability using the MAXENT algorithm (Phillips et al. 2010) empirically in a use-availability study design using habitat predictors and 93474 observations of grouse in this landscape going back to the 1980s. The habitat predictors included climate variables (mean annual temperature, mean annual precipitation, climatic moisture deficit, growing degree days, etc.), fractional vegetation cover data (perennial grass, sagebrush cover, annual grass cover), landcover data (xeric/mesic grass/shrub, developed, agricultural classes, etc.), topography data (slope, topographic wetness index, heat load index, etc.) and the human footprint (powerlines, roads, railroads, wind turbines, urbanization, etc.). The model exhibited a strong relationship to sage grouse occurrence (area under the receiver-operator curve = 0.90), with high accuracy (0.83), sensitivity (0.83), and specificity (0.82).

RESISTANCE

Xeric and mesic ecosystem

We modeled resistance for both ecosystems using an expert-based approach. In both cases, the human footprint data layer was the primary driver of resistance, with higher costs to movement a linear increasing function of the human footprint. For the xeric ecosystem, additional resistance was added for movement over water, forested areas, and cliffs (but these areas were not considered total barriers). So, areas with low human footprint in a natural vegetation type (except forest, and not water or cliff) were considered optimal for movement.

Mesic ecosystem

Resistance for the mesic ecosystem was also driven largely by the human footprint, but additional resistance was also added as 1) an increasing function of the height above nearest drainage, 2) a decreasing function of the normalized difference wetness index (NDWI), and cliffs. So areas with low human footprint in low-lying areas with moist vegetation and no cliffs were considered optimal for movement.

Greater Sage-grouse

We modeled sage grouse resistance following the methods described in an empirical model that used landscape genetics approaches to determine resistance weights (Shirk et al. 2015). This model predicts high resistance to movement arising from barriers like interstate highways, cities, and large transmission lines, and forests, with more moderate resistance coming from primary and secondary roads, agricultural lands, and areas of warmer or cooler climate relative to the mid to higher elevations of the Columbia Basin.

CORE AREAS

We modeled Core Areas for each target the same way, using an approach developed for the Washington Connected Landscapes project and implemented in the Gnarly Landscape Utilities ArcGIS toolbox (Shirk et al. 2010). First, a moving window average was applied to the habitat model and thresholded to identify local areas that have high average local habitat quality. The radius of the moving window and the thresholds varied by target and are listed in the table below. For each target, two different moving window thresholds were used to create a set of higher quality areas (the Core class in our spatial priorities hierarchy) and lower quality areas (Growth Opportunity Areas). In this way, Core Areas are nested within GOAs. Within each Core Area or GOA, all pixels with a resistance greater than 5 and all pixels with a habitat quality less than the threshold were removed.

Next, we used the target's resistance model to calculate the cost-weighted distance to the nearest valid pixel in the Core Areas and GOAs, and then applied a threshold to that cost-distance at a distance approximating a home-range type movement (see table below for the distance threshold, which varied by target). This links nearby patches together unless they're sufficiently far apart in cost-distance that it gets into the realm of dispersal (that's where we map corridors). Finally, all Cores and GOAs that were below the minimum size threshold (see table below) were removed.

Because we used moving windows and local movement neighborhoods to define Cores and GOAs, it is possible they contain pixels that are not currently classified as habitat for the target. This is intentional, as animals within Cores and GOAs are likely to move through these areas within their home ranges. These non-native habitats within Cores and GOAS are critical locations to restore or manage in a way that promotes or increases habitat quality within that area. The parameters used to map Cores and GOAs for each target are shown in the table below.

Table C4. Core and GOA Parameters.

Parameter	Dry (Xeric) Ecosystem	Wet (Mesic) Ecosystem	Greater Sage-grouse
Core habitat threshold	0.5	0.15	0.8
GOA habitat threshold	0.33	0.15	0.33
Moving window radius (km)	1	1	0.5
Home range movement distance (km)	2.5	1	2.5
Minimum size requirement (km^2)	10	1	10

CORRIDORS

To map corridors for each target, we followed methods developed by the Washington Connected Landscapes project and implemented in the Linkage Mapper ArcGIS toolbox. We first calculated the adjacency of all pairs of Core/GOA patches within the network. Patches were not considered adjacent if they were beyond the maximum dispersal distance (see table below) or if another patch was closer in cost-distance relative to the other patch in the pair. For all adjacent patches, we calculated the least-cost corridor, thresholded at a maximum corridor width. The parameters used to map corridors for each target are shown in the table below.

Table C5. Corridor Parameters.

Parameter	Dry (Xeric) Ecosystem	Wet (Mesic) Ecosystem	Greater Sage-grouse
Maximum dispersal distance (km)	100	100	100
Corridor width (km)	10	10	10

SPATIAL PRIORITIES

The above processes to map habitat, resistance, Cores, GOAs, and corridors was conducted for each year from 2018-2022 (5 years) for the xeric ecosystem and sage grouse, and from 2013-2022 (10 years) for the mesic ecosystem, using input data matched to the year of mapping. For each year and for each target, these maps with potentially overlapping classes of Core, GOA, and CORRIDOR were combined into a single prioritization, using a hierarchy where pixels labeled as Core were included first, then GOA, then corridor, and finally 'other habitat'. A final spatial priorities map was then calculated per target as the most common class (Core, GOA, corridor, or 'other habitat' across the range of years. This was done to reduce year-to-year variability in spatial priorities due to data inaccuracies and other sources of variation.

APPENDIX C REFERENCES

- Jansen V, Kolden C, Schmalz H: The development of near realtime biomass and cover estimates for adaptive rangeland management using Landsat 7 and Landsat 8 surface reflectance products. Remote Sens 2018, 10:1057.
- Allred BW, Bestelmeyer BT, Boyd CS, Brown C, Davies KW, Duniway MC, Ellsworth LM, Erickson TA, Fuhlendorf SD, Griffiths TV: Improving Landsat predictions of rangeland fractional cover with multitask learning and uncertainty. Methods Ecol Evol 2020, 12:841-849
- Jones MO, Robinson NP, Naugle DE, Maestas JD, Reeves MC, Lankston RW, Allred BW: Annual and 16-day rangeland production estimates for the Western United States. Rangel Ecol Manag 2021, 77:112-117.
- Rigge, Matthew, et al. "Quantifying western US rangelands as fractional components with multi-resolution remote sensing and in situ data." Remote Sensing 12.3 (2020): 412

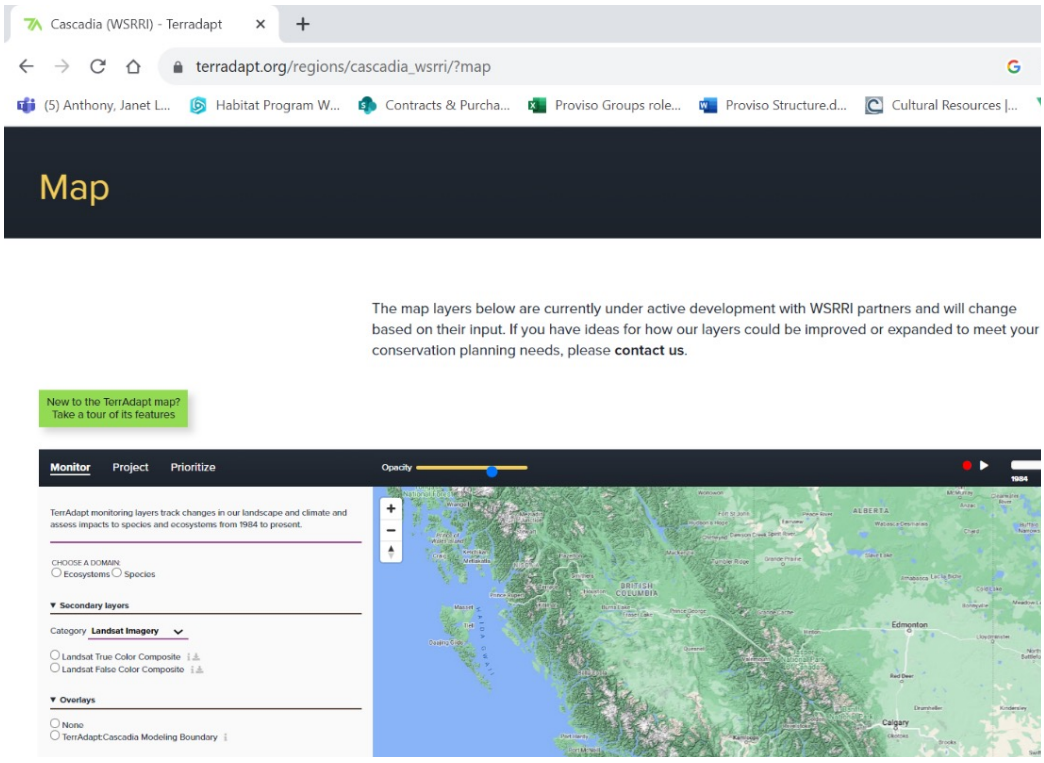
Appendix D. WSRRI Spatial Priorities User Guide

This is a simple user guide developed to facilitate navigation of the TerrAdapt tool to review the WSRRI spatial priorities. In this guide, you'll learn about the various types of WSRRI spatial priorities and how to visualize them in a web portal as well as access them in ArcGIS Online. This guide includes several screen shots below to help orient you and get you familiar with moving through the web portal. As you review the spatial priorities, please be aware of the following considerations -

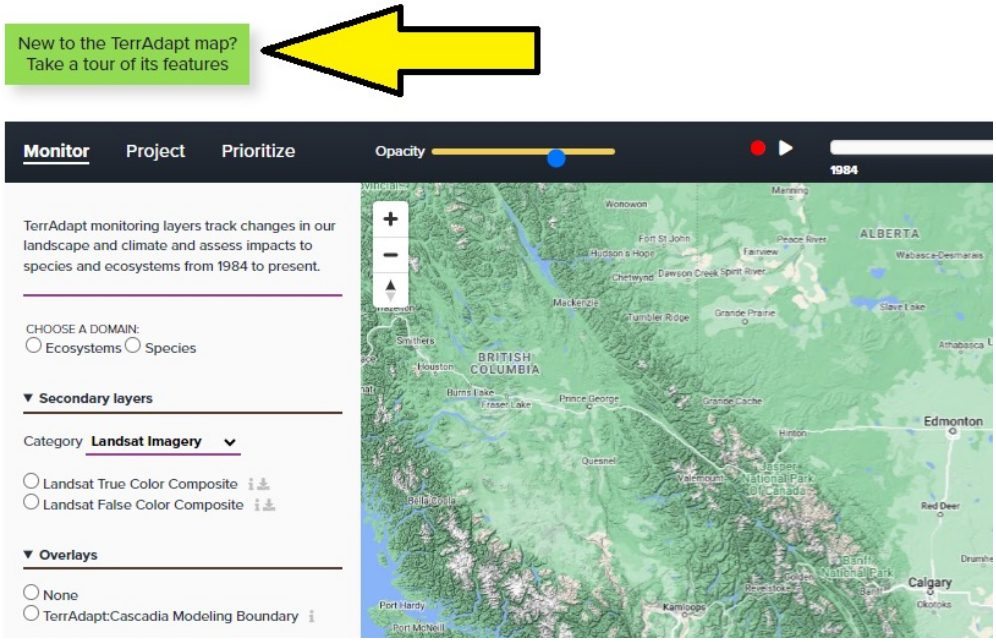
- WSRRI spatial priorities are intended to focus implementation of conservation actions locally in key areas that are projected to have the greatest benefit to regional-scale resilience. They are not intended to replace or take precedence over other existing regional-scale datasets (e.g., Arid Lands Initiative priorities) or local planning processes; by providing a measure of ecological integrity at a regional scale, WSRRI offers additional information by which partners can priorities actions.
- WSRRI spatial priorities are based primarily on remote sensing data from earth-observing satellites. The remote-sensing input datasets are designed to represent the broad regional-scale patterns of habitat and connectivity. There are inaccuracies inherent in all models, particularly at local scales (e.g., individual parcels). The WSRRI spatial priorities based on these data have not been evaluated in the field. Therefore, it is critical that the implementers do extensive site-level ground-truthing and evaluation, including bringing in local knowledge, site-level data, and other local information. The WSRRI spatial priorities are intended to draw attention to key areas in the landscape, but then it is up to the local partners to assess what, if any, actions are appropriate in those places based on local-scale information.
- Tribal lands are masked in the draft spatial priority maps in deference to Tribal preference. During Tribal review of the WSRRI Long-term Strategy, each Tribe will be asked about their preference for displaying spatial priorities on Tribal lands in a publicly accessible web portal
- Several environmental datasets were produced in this effort to inform the location of the spatial priorities, including data on landcover, fractional rangeland cover, and indices based on Landsat imagery (e.g., Normalized Difference Vegetation Index). These datasets are available for the historical period 1984-present and are updated annually each December for the past year. Each annual image represents the state of the landscape on July 1st.
- Spatial priorities represent a synthesis of the past 5-10 years of environmental data. Just because an area is mapped as a high priority does not mean it is currently in good condition. When the dashboard is launched, users will be able to calculate monitoring metrics to help understand current conditions and recent trends within priority areas, allowing for further prioritization among them.
- The spatial priorities are a summation of a vast amount of environmental data. Underlying the WSRRI spatial priority maps is a vast amount of information about the quality of habitat and the potential for connectivity among priority areas. This information can be used to understand finer-scale dynamics within and among priority areas and will be fully available in the full public release (during the review period it is partially available on the web portal described below).

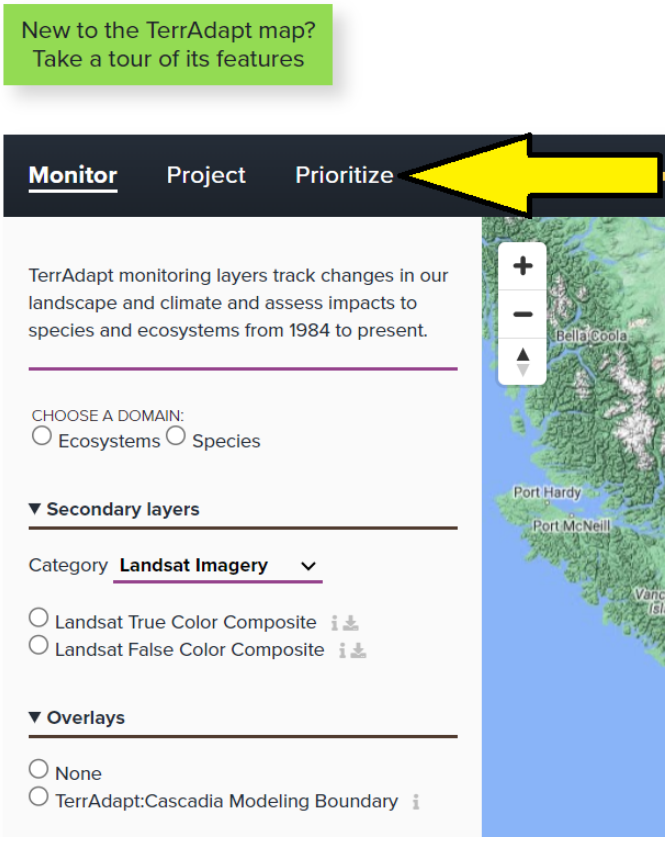
ACCESSING THE WSRRI SPATIAL PRIORITY MAPS AT TERRADAPT.ORG

To access the WSRRI spatial priority maps, go to https://terradapt.org/regions/cascadia_wsrri/?map. When you are in the web portal, your screen should look like this -



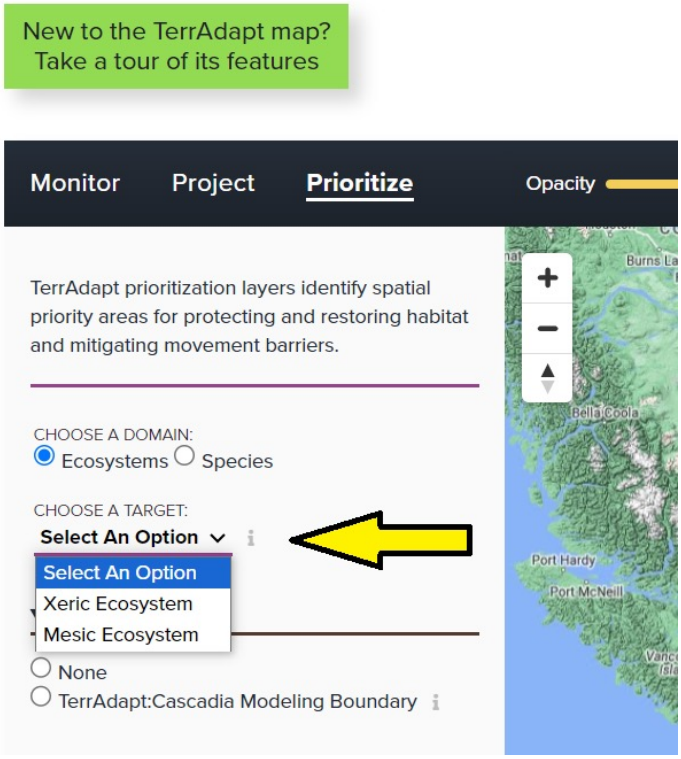
If you are new to the TerrAdapt map portal, please take a few moments to tour its features by clicking the green box to the top left of the map window.

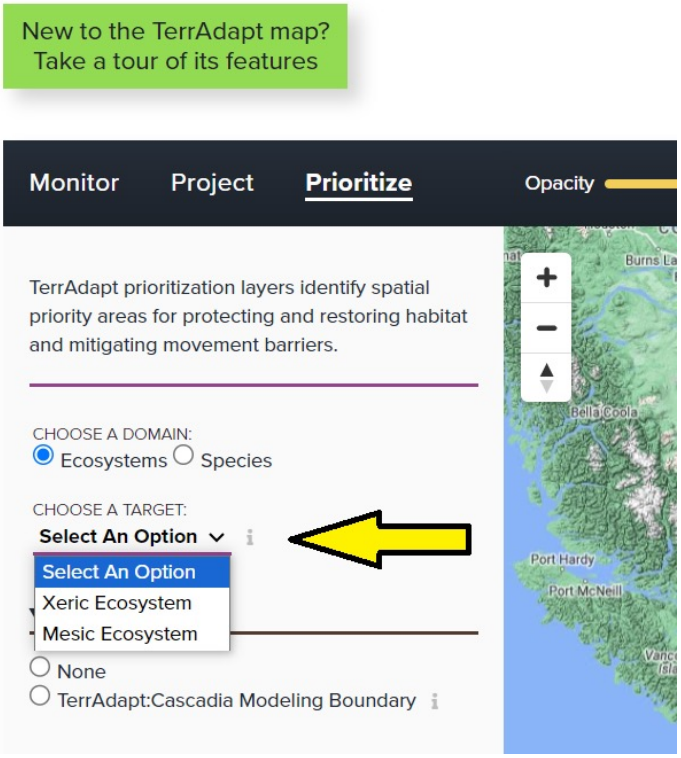




1. To view the spatial priorities for the WSRRI conservation targets, click 'Prioritize' on the black bar in the top left of the map window.

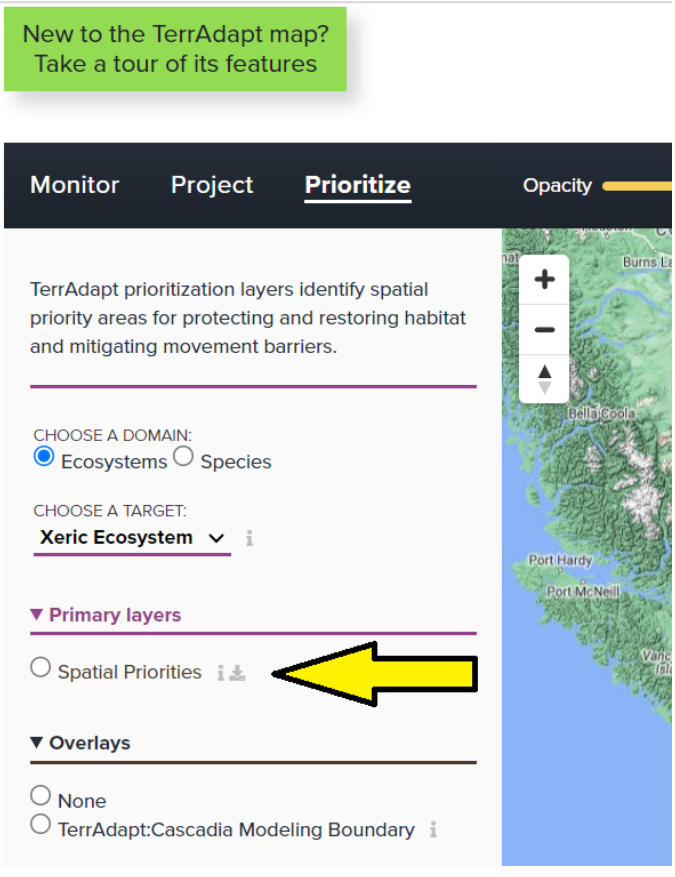
2. Then, depending on your interest, select either ecosystems or species under "Choose a domain".

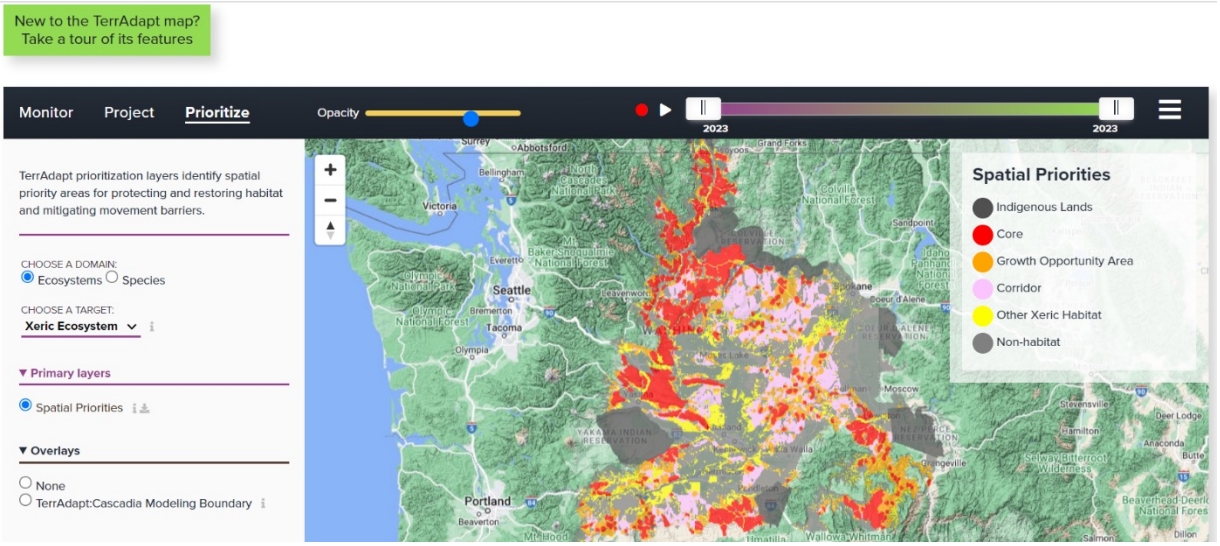




3. Choose a target.

4. Finally, under primary layers, click ‘Spatial Priorities’.

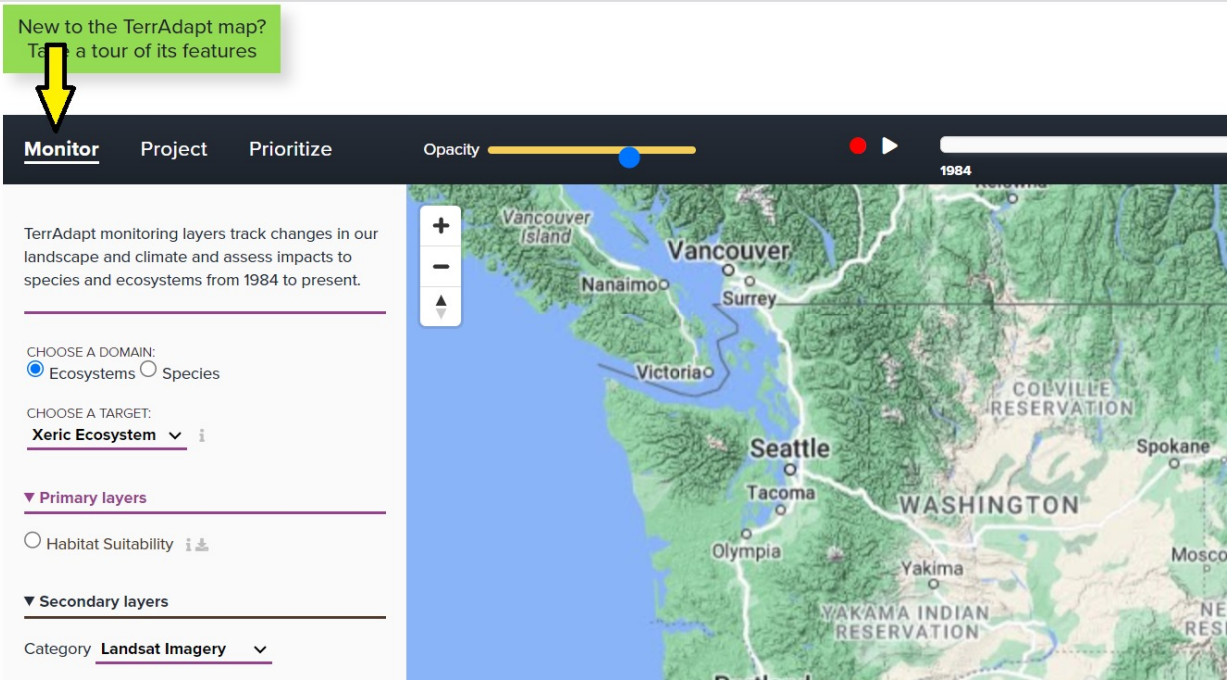




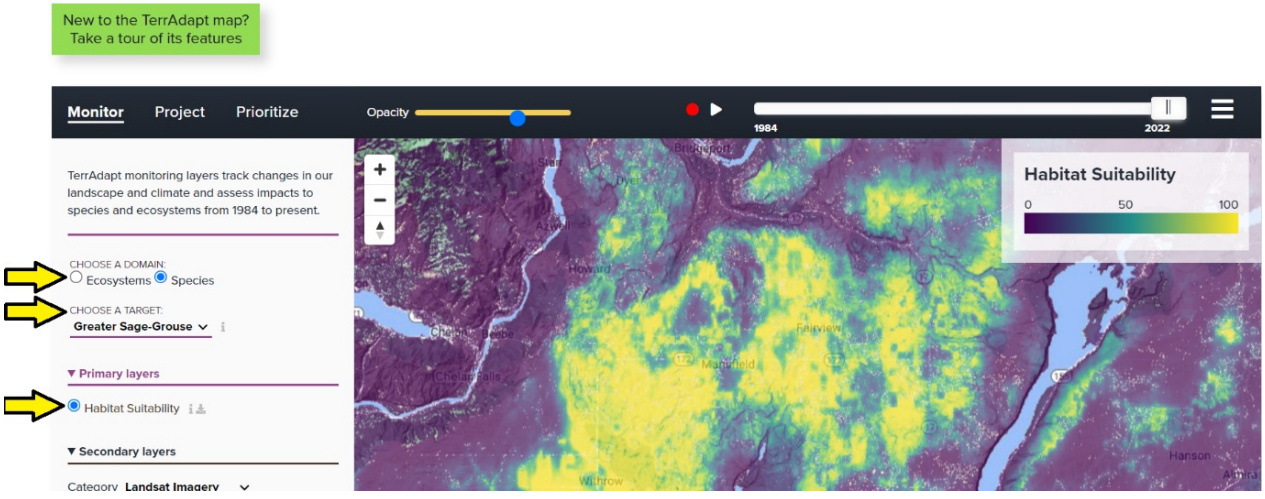
Selection of Spatial Priorities will turn on a map of the Core, Growth Opportunity Areas, Corridor and Other Habitat for your selected target (example below). You can zoom in and out by scrolling with your mouse wheel, and you can move the map with your 'hand' tool (right clicking the mouse when it's hovered over the map and holding down while dragging). The underlying reference dataset will adjust as you zoom in/out and move the map.

ACCESSING OTHER RELEVANT SHRUBSTEPPE DATASETS

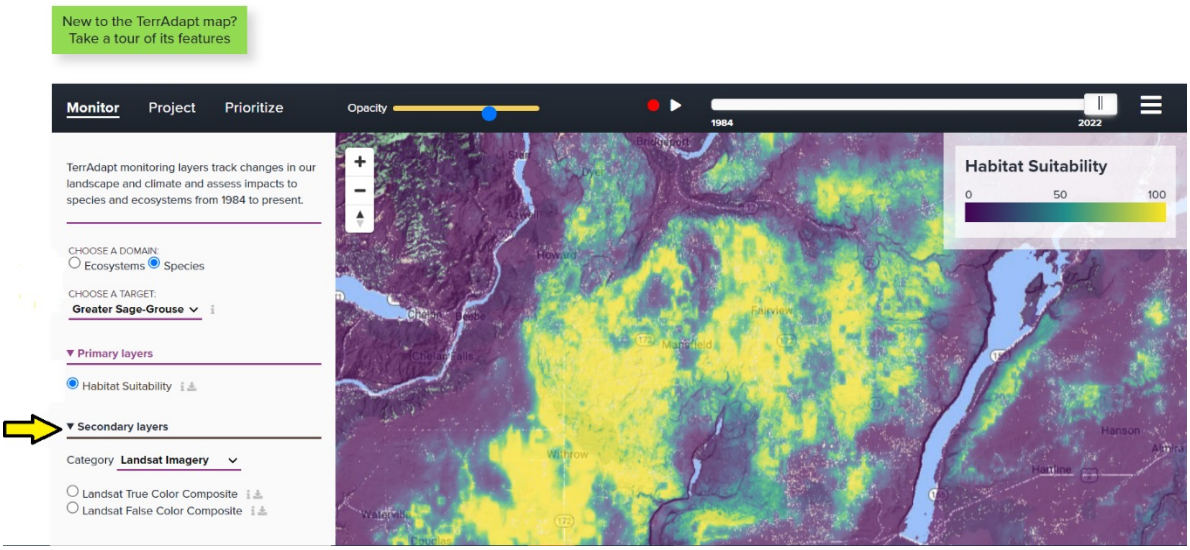
To view data on the shrubsteppe landscape from 1984 to present, click 'Monitor' on the black bar in the top left of the map window.



If you're interested in visualizing habitat suitability (i.e., the relative value of a pixel as habitat on a range of 0 to 100) for one of the three targets, first choose 'Species' or 'Ecosystems' in Choose a Domain, then choose a target. Under primary layers, select "habitat suitability."



If you're interested in viewing landsat imagery, landcover, or shrubsteppe cover (which includes fractional vegetation cover) for the region, under 'Secondary layers', select the category of interest. Each category has multiple layers that you can turn on and off. These layers are independent of any selection of target in the primary layer. Only one layer (primary or secondary) may be shown at a time.



Finally, each of these layers, as well as others throughout the tool, have icons for information and data downloading. Click on these icons to see definitions or to access the data.

Appendix E. Collaborative Conservation in Washington's Shrubsteppe Landscape

Shrubsteppe conservation and wildfire preparedness and response across Washington's Columbia Plateau have been of great interest to federal and state agencies, Tribes, nonprofit partners, and communities for years, given the region's ecological, cultural and economic values.

Indigenous Peoples have inhabited the shrubsteppe since time immemorial and have maintained connection to culturally and spiritually significant sites, as well as cultural and subsistence practices that honor ancestral traditions. Across the West, land managers are increasingly recognizing the importance of incorporating Traditional Ecological Knowledge, sometimes referred to as Indigenous Knowledge, into land management and natural resource decisions, from wildlife population monitoring to fighting climate change (U.S. Fish and Wildlife Service, 2011). In Washington, Tribes are leading independent efforts to conserve and restore native ecosystems through initiatives such as long-term water quality monitoring programs (Colville Tribe, 2023), eradication of invasive plant species (Spokane Tribe, 2023), partnerships with ranchers to implement sustainable grazing practices (Spokane Tribe, 2023), and many more. Each Tribe in the region maintains distinct lifeways and unique cultural practices rooted in relationship to the land, and all are vital to the effort to conserve and restore native ecosystems.

Ranchers, farmers, and residents are deeply connected to the land, drawing upon the landscape's natural resources for livelihoods and the preservation of cultural legacies. Agricultural producers and communities play an important role in the socioeconomic stability of rural Washington, highlighting the connection between shrubsteppe health and the enduring success of these practices. Ranchers play a vital role in maintaining habitat connectivity for wildlife, oftentimes safeguarding the lands they manage from development that would further threaten already diminished connectivity. Farmers and ranchers also often serve as early notifiers of wildland fire due to their remote locations and presence in the landscapes on which they live and work. In these ways and many more, private landowners, often in collaboration with others, implement conservation strategies and strengthen long-term ecosystem health.

Scientific researchers, environmental education, hunters, anglers, and outdoor enthusiasts all have both individual and shared interests in the shrubsteppe. The landscape serves as a hub for scientific research and environmental education, which furthers our shared understanding of shrubsteppe ecology and cultural significance. Outdoorsmen and women value the shrubsteppe for its cultural significance, natural beauty and recreational opportunities, and through their activities, contribute to local economies and conservation efforts.

Agencies, NGOs, and Land Trusts

A comprehensive network of local, state, and federal agencies along with non-governmental organizations, underpins the shrubsteppe ecosystem's conservation. State and federal agencies with both land management, natural resource management, and regulatory roles are complemented by Conservation Districts, local jurisdictions, and others in achieving conservation. Non-governmental organizations, such as land trusts, Audubon Washington, The Nature Conservancy, Conservation Northwest, and others further reinforce these efforts, focusing on wildlife protection, habitat restoration, and wildfire prevention to maintain the shrubsteppe's rich biological diversity and ecological function.

Collaborative efforts around shared interests of those described above have resulted in many regional (specific to the Columbia Plateau) planning efforts and products, several described below, that were considered foundational to the context and development of WSRRI's Long-term Strategy. Further, we describe several statewide and rangewide plans that were highly informative to our work. Finally Though not included below, WSRRI's efforts have been and will continue to be further informed by current and future strategic plans developed by agencies and organizations working around the nexus of wildlife and wildland fire.

COLUMBIA PLATEAU PLANS AND EFFORTS

Arid Lands Initiative (2009-present)

To address the challenges posed by landscape conservation in eastern Washington, a group of interested entities came together to form the Arid Lands Initiative in 2009. The team identified key biological, strategic, and spatial priorities for a strategic plan that works towards the conservation & restoration of Arid Lands in Eastern Washington. The Arid Lands Initiative has worked with experts and stakeholders to develop key science products to assess the health of systems and species in the arid landscape and to serve as a tool for collaborative conservation work, including Shared Priorities for Conservation at a Landscape Scale, and Spatial Conservation Priorities in the Columbia Plateau Ecoregion. https://aridlandsinitiative.org/

Washington Wildlife Habitat Connectivity Working Group (2007-present)

The Washington Wildlife Habitat Connectivity Working Group was formed in 2007 under the co-leadership of WDFW and the Washington Department of Transportation. The Working Group is a science-based partnership composed of participants representing land and natural resource management agencies, organizations, Tribes, and universities. Statewide connectivity analyses conducted by the group highlighted the Columbia Plateau as an ecoregion where native vegetation communities are severely fragmented, limiting movement potential for wildlife. In response, the team developed a series of more detailed connectivity analyses within the Columbia Plateau; the products allow partners and stakeholders to visualize connectivity patterns at regional and local scales to inform conservation efforts intent on allowing for continued and future wildlife movement. https://waconnected.org/columbia-plateau-ecoregion/

Multiple Species General Conservation Plan for Douglas County (2015-present)

The Multiple Species General Conservation Plan was created by the Foster Creek Conservation District in cooperation with the USFWS to protect habitat in Douglas County, while also protecting the agricultural producers who own land in these areas. The plan focuses on four endangered species found throughout the county (Columbia Basin Pygmy Rabbit, Greater Sage-grouse, Columbian Sharp-tailed Grouse, and Washington Ground Squirrel). It describes a process for private agriculture landowners or lessees to voluntarily develop site-specific Farm Plans/Site Plans with Best Management Practices that will result in improved habitat for one or more of the covered species. https://www.fostercreekcd.org/copy-of-vsp

Okanogan Working for Wildlife Initiative (2013-present)

Coordinated by Conservation Northwest and funded by the National Fish and Wildlife Foundation, the Working for Wildlife Initiative began in 2013 and is a coalition of federal, state, Tribal and nongovernmental interests working together to protect wildlife habitat, working lands and natural heritage in the Okanogan Valley and Kettle River Mountain Range. Sharp-tailed grouse and Mule deer are two priority species for the Working for Wildlife Initiative that depend upon a healthy shrubsteppe ecosystem. https://conservationnw.org/our-work/habitat/okanogan-working-for-wildlife/#:~:text=Funded%20by%20the%20National%20Fish,in%20the%20diverse%20landscape%20of

STATEWIDE PLANS AND EFFORTS

Washington's State Wildlife Action Plan (2015)

Washington's State Wildlife Action Plan is a comprehensive plan for conserving the state's fish and wildlife and the natural habitats on which they depend. It objectively assesses the status wildlife and habitats, identifies key problems they face, and outlines the actions needed to conserve them over time; a guiding principle of the SWAP is to identify actions needed to conserve wildlife and their habitats before they become too rare and restoration efforts too costly. The SWAP is structured to allow any partner that has an interest in wildlife and habitat conservation to identify and implement important conservation actions that align with their own conservation mission and goals. To that end, it provides tools and informational resources to support collaborative conservation initiatives across a range of organizations and entities.
https://wdfw.wa.gov/species-habitats/at-risk/swap

State of Washington Natural Heritage Plan (2022)

The State of Washington Natural Heritage Plan establishes a list of priority species and ecosystems and describes the criteria and process by which sites are selected for addition to the statewide system of natural areas. The statewide system includes various natural area designations employed by state and federal agencies and private, non-profit organizations. Priorities assigned to species and ecosystems are used by numerous local, state, and federal agencies to guide conservation actions and land-use decision-making.
https://www.dnr.wa.gov/NHPconservation

Washington State Wildland Fire Protection 10-year Strategic Plan (2019)

Developed in response to the 2014 and 2015 fire seasons, the Wildland Fire Protection Strategic Plan provides a blueprint for effective wildland fire protection in Washington and informs associated policy and resource decisions. The plan is one part of a larger comprehensive approach to fundamentally change the future trajectory of wildland fire in Washington; it focuses on resilient landscapes, fire-adapted communities, and safe, effective wildfire response. Additionally, the plan addresses wildfire prevention, reducing human-caused ignitions, and post-fire recovery. https://www.dnr.wa.gov/publications/rp_wildfire_strategic_plan.pdf

SHRUBSTEPPE RANGEWIDE PLANS AND EFFORTS

Western Association of Fish and Wildlife Agencies Sagebrush Conservation Strategy (2021-present)

The Sagebrush Conservation Strategy is intended to provide guidance so that the unparalleled collaborative efforts to conserve the iconic Greater Sage-grouse *(Centrocercus urophasianus)* by State and Federal agencies, academia, Tribes, nongovernmental organizations, and stakeholders can be expanded to the entire sagebrush biome to benefit the people and wildlife that depend on this ecosystem. This Strategy provides the latest science pertaining to the myriad challenges confronting managers of the sagebrush ecosystem that covers portions of 14 Western states and two Canadian provinces. It was produced by a team of 94 scientists and specialists from 34 federal and state agencies, universities, and non-governmental organizations.
https://wafwa.org/sagebrush-conservation-strategy/

Invasive Plant Management and Greater Sage-Grouse Conservation - A Review and Status Report with Strategic Recommendation for Improvement (2015)

In 2013, the U.S. Fish and Wildlife Service's Conservation Objectives Team identified wildfire and the associated conversion of low- to mid-elevation sagebrush habitats to invasive annual grass-dominated vegetation communities as the two primary threats to the sustainability of Greater Sage-grouse in the western portion of the species range. This finding led to development of a collaborative assessment of the Sage-grouse conservation challenges associated with fire and invasives across the species' geographic range, including parts of 11 states and two Canadian provinces. https://wafwa.org/wpdm-package/invasive-plant-management-and-greater-sage-grouse-conservation/

An Assessment of Native Seed Needs and the Capacity for Their Supply (2023)

This report examines the needs for native plant restoration and other activities, provides recommendations for improving the reliability, predictability, and performance of the native seed supply, and presents an ambitious agenda for action. This document addresses the various challenges facing our natural landscapes and calls for a coordinated public-private effort to scale-up and secure a cost-effective national native seed supply. https://nap.nationalacademies.org/catalog/26618/an-assessment-of-native-seed-needs-and-the-capacity-for-their-supply

Appendix F. Implementation Workplan (March 2024 – June 2027)

#	Action	Year	Lead agencies/ partners	Priority	Deliverable
Organization and Governance					
OG1	Develop a tri-agency agreement including roles, responsibilities, and a commitment to shared work.	Year 1	WDFW, WDNR, WSCC	1	Fully Executed Agreement
OG2	Develop a master Interagency Agreement between WSCC and WDFW for WSRRI work to easily move money between agencies. *Note: this already exists for WDNR and WSCC.*	Year 1	WDFW, WDNR, WSCC	1	Fully Executed Interagency Agreement
OG3	Develop and implement plan for tribal engagement and coordination with all interested tribal nations. Establish process for regular information sharing on updates, successes, and challenges with all interested tribal nations.	Year 1	WDFW, WDNR, WSCC, all interested tribal nations	1	Tribal Engagement Plan, ongoing communication and coordination with all interested tribal nations.
OG4	Develop a funding strategy that includes sources, allocations, and management structure.	Year 1	WDFW, WDNR, WSCC	1	
OG5	Develop expectations for effective collaboration between the Steering Committee, Advisory Group, Regional Teams, and other staff members.	Year 1	WDFW, WDNR, WSCC, and all partners	1	Collaboration Protocols
OG6	Identify and stand-up Advisory Group – develop charter	Year 1	WDFW, WDNR, WSCC	1	Advisory Group and Charter
OG7	Determine the process and criteria for identifying Regional Implementation Team Leads.	Year 1	WDFW, WDNR, WSCC, Program Manager	2	Guidelines for selecting Regional Implementation Team Leads
OG8	Operationalize the WSRRI Program Manager Role, including liaison roles, programmatic oversight, and communication management.	Year 1	WDFW, WDNR, WSCC	1	WSRRI Program Manager Role Operationalization and Responsibilities Description

#	Action	Year	Lead agencies/ partners	Priority	Deliverable
OG9	Summarize WSRRI capacity needs – prioritize how to fill.	Year 1	Program Manager	1	WSRRI Capacity Summary
OG10	Develop a workplan process incorporating thorough discussions of value and viability.	Year 1	WDFW, WDNR, WSCC, Program Manager	2	Value and Viability-Focused Workplan Process Framework
OG11	Prioritize actions in the LTS and identify initial tasks to achieve highest priority actions	Year 1	WDFW, WDNR, WSCC, Program Manager	1	LTS Action Prioritization and Initial Task Identification approach
OG12	Develop a tracking system for project reporting and strategy implementation.	Year 1	Program Manager	2	Project Reporting and Strategy Implementation Tracking System
OG13	Create an efficient mechanism for regular reporting and feedback to the Program Manager from Regional Implementation Team Lead Representatives.	Year 1	Program Manager	2	Regular Reporting and Feedback
OG14	Initiate a pilot Regional Implementation Team by identifying and establishing one	Year 1	Program Manager	1	Regional Implementation Team
OG15	Pinpoint topics that necessitate specialized focus and organize Topical Forums as needed.	Year 2	Program Manager	2	Topical Forums Agenda and Focus Topics Spreadsheet
OG16	Refine the project/needs solicitation, generation, and selection process for soliciting, generating, reviewing, and allocating funds and resources	Year 1	Program Manager	1	Project Generation and Selection Process Manual
OG17	Develop procedures for developing work plans at the regional implementation team level and their workflow integration	Year 1	Program Manager	2	Regional Implementation Team Workplan Development and Integration Guide
OG18	Conduct a thorough evaluation to pinpoint regions with critical conservation needs and preparedness for action. Prioritize these areas considering ecological importance, stakeholder and Tribal engagement, and the likelihood of achieving significant outcomes	Year 1	Program Manager	1	Urgent Conservation Needs Assessment and Regional Prioritization Report
OG19	Refine monitoring and adaptive management plan	Year 1	Program Manager	2	Adaptive Management Plan

#	Action	Year	Lead agencies/ partners	Priority	Deliverable
OG20	Clearly articulate application of spatial priorities	Year 1	Program Manager	1	Spatial Priorities Application Report
OG21	Establish a multi-agency communications plan for WSRRI implementation. Create platforms for sharing information, updates, and successes of WSRRI.	Year 1	WDFW, WDNR, WSCC	2	Communications Plan and Schedule
OG22	Create and execute a phased deployment plan for Regional Implementation Teams that is adaptable, accommodating changes in response to shifting environmental conditions, feedback from stakeholders and Tribes, and the effectiveness of initial implementations	Year 1	tbd	1	Adaptive Phased Rollout Strategy with Feedback Integration
OG23	Implement a system for monitoring and reporting progress towards goals and objectives	Year 1	Program Manager	2	Reporting System Implementation Plan
OG24	Identify existing efforts that align with actions identified in the Strategy and coordinate implementation.	Year 1	Program Manager	1	Alignment Assessment Coordination
OG25	Consistently evaluate and refine strategies, aiming for continual advancement in Environmental Justice by emphasizing inclusivity, and equity.	Year 1	WDFW, WDNR, WSCC, Program Manager	1	Environmental justice continuous improvement is incorporated into communications plan and other plans

#	Action	Strategy	Year	Lead agencies/ partners	Priority	Deliverable
Implementation						
I1	Analyze DNR's role in safeguarding unprotected lands: Identifying critical paths, pinpointing key activities, and recognizing straightforward opportunities. Establish strategies for securing unprotected lands in core areas.		Year 1	WDNR	1	WDNR Unprotected Lands Protection Strategy and Critical Path Analysis Report
I2	Tailor criteria for projects supported by WSRRI, including practice standards for fuel breaks, planning documents, and fence specifications; enhance these by building upon existing standards such as NRCS BMPs and conservation plans.		Year 1	Program Manager	2	WSRRI Project Support Criteria Customization
	Incorporate wildlife benefits and rangeland management specialty into the WSCC Center for Technical Development.					
I3	Seek further federal funding for WSRRI initiatives, such as through Regional Conservation Partnership Program, Community Wildfire Defense Grants, and Hazard Mitigation programs.		Year 1	WDFW, WDNR, WSCC, Program Manager	1	Federal Funding Acquisition Strategy for WSSRI Projects
I4	Seek additional funding for Wildlife Friendly Fence initiatives	Habitat Protection	Year 1	WSCC	1	Wildlife Friendly Fence Funding
I5	Pursue options for state supported virtual fence infrastructure. – on public lands and supporting private landowners that have towers to leverage benefit to multiple landowners	Habitat Protection	Year 2	WDFW, WDNR, WSCC, Program Manager	2	Virtual Fence Station Implementation Strategy and Landscape Tower Placement Analysis
	Identify efficient opportunities for where on the landscape towers could go					

#	Action	Strategy	Year	Lead agencies/ partners	Priority	Deliverable
I6	Develop a targeted shrubsteppe conservation easement program, focusing on initiatives such as carbon storage in shrubsteppe habitats and projects to prevent habitat conversion.	Habitat Protection	Year 1	WDFW, WDNR, WSCC, Program Manager, Partners	2	Shrubsteppe Conservation Easement Program Development Plan
I7	Maintain active participation in the federal Farm Bill formulation processes	Habitat Protection	Year 1	WDFW, WDNR, WSCC, Program Manager	2	Federal Farm Bill Engagement Strategy