



Climate Resilience Attributes of Oregon Lands and Waters **Final Report**



OREGON
WATERSHED
ENHANCEMENT BOARD



The following report provides a recommended set of climate resilience attributes for Oregon’s lands and waters. These attributes were developed through a scan of existing attribute frameworks (Appendix A), a 3-day design workshop, and a draft report and public comment period, all of which have been incorporated into this final version.

This report was possible thanks to the innumerable contributions from many people who have helped inform our thinking, including during the design workshop, through public comment, or in other consultation meetings. OWEB, ODFW, and the Governor’s Office teams are profoundly grateful for this expertise, and this revised report incorporates that important feedback.

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(Photos in report: Linda Repplinger-OWEB, LDED-flickr, Jeff Clark-BLM, Matt Christenson-BLM, Jim Choate, Bonnie Moreland.)



SECTION I: Background

1. Context

On October 21, 2025, Oregon Governor Tina Kotek issued [Executive Order No. 25-26](#) (EO), titled *Directing State Agencies to Take Urgent Action to Promote the Resilience of our Communities and Natural and Working Lands and Waters*. Included in Section I of the EO, *Foster Resilient Lands, Waters, and Communities*, the Oregon Watershed Enhancement Board (OWEB) and Oregon Department of Fish and Wildlife (ODFW) hereafter, “lead agencies,” were directed to use existing plans and strategies and the best available science to define key resilience attributes for Oregon with the goal of defining characteristics of lands and waters that are:

- 1) Currently resilient to impacts from climate change and therefore able to deliver multiple benefits that are likely to persist under future climate conditions; or,
- 2) Capable of achieving multiple benefits of high resilience in the face of changing conditions if supported by focused actions that promote restoration, enhancement or reconnection of those lands and/or waters.

The goal of the attributes is to outline the characteristics of climate resilience for Oregon’s lands and waters, serving as the first step in a coordinated and sustained effort across state agencies and helping guide investment and action. The state agencies identified in Section II of the EO are tasked with using the resilience attributes combined with other relevant information to identify and improve programs, processes, and practices that protect and promote stewardship of working lands and waters to adapt to the impacts of a changing climate. The resilience attributes are also intended to inform the 2025 baseline, with Section III of the EO directing agencies to protect, conserve, connect, or restore ten percent of lands and waters within ten years as compared to baseline.

As directed, this process focused on defining the climate resilience attributes of Oregon’s lands and waters, emphasizing their ecological resilience and resistance. While there are many state efforts underway to strengthen community systems—such as transportation, public health, economic prosperity, and emergency preparedness—this effort centers primarily on ecosystems, bearing in mind that social, economic, and health outcomes are inseparable from resilient natural systems, as established in the statutory definition of climate resilience (ORS 468A.183).

2. Process

The lead agencies tasked with developing the resilience attributes were directed to lead a natural resource interagency team. After consultation with the Governor’s Natural Resource Office, the lead agencies expanded the attribute development process beyond an interagency team, and in January 2026, contracted with Portland State University’s Oregon Consensus program to support

with facilitation. This led to a three-day design workshop, intended to function as a sprint exercise, which would lead to a set of draft attributes for a wider audience to respond to.

There were roughly 45 participants at the design workshop, with approximately half coming from state agencies and the other half content experts experienced in similar climate resiliency planning and assessment efforts, including experts from Tribal governments, federal agencies, local governments, academic and research institutions, resource management organizations (representing private and working lands), philanthropic foundations, and conservation science organizations (See Appendix C for invitee list).

Prior to the workshop, OWEB and ODFW collaborated on a [background memo](#), pulled from the most salient findings from the literature review and preliminary conversations with invitees, and intended to set the stage for the workshop content. The memo included guidelines for the workshop, links to key Oregon plans and strategies, and eight proposed attributes as an initial draft for people to respond to, which helped tee up the conversation on the first day.

3. Workshop

The workshop was held in March 2026 in Salem. On the first day, the conversation opened with remarks from the Governor’s Natural Resource Office and from OWEB and ODFW. These remarks highlighted the intent and sideboards of the EO and the goals of the attributes process during the following three days. That afternoon, attendees broke up into small groups to discuss the eight initial attributes outlined in the background memo and began to winnow them down. On the second day, representatives from three Oregon Tribes were able to join and provide feedback on the consolidated draft list. Their feedback highlighted gaps around the reciprocal role of human stewardship in ecological processes, and the importance of taking a holistic view of ecological processes (i.e. water cycles, nutrient flows, or fire regimes) and existing state policies and regulations in discussions about climate resilience. On the third day, additional attendees from state agencies joined to discuss how the resilience attributes would inform their work and to surface cross-agency implementation needs. For a more detailed write up of the workshop, please see [these notes](#).

After the workshop ODFW and OWEB, with the help of Oregon Consensus, pulled the draft attributes and discussion notes into a draft report, published on April 8. This was shared with workshop participants, agency colleagues, and OWEB’s GovDelivery email lists for feedback. Lead agencies asked for input about whether respondents saw their work and expertise reflected in the attributes and corresponding indicators, if there was anything that should be included that wasn’t, and if the attributes and indicators were practical and actionable. ODFW and OWEB also coordinated with Oregon Department of Energy staff, who support the Oregon

Climate Action Commission, to ensure consistency between the EO attributes and the forthcoming Natural Climate Solutions metrics.

4. Feedback Process and Results

More than 40 people and organizations took the time to provide feedback, either as written comments or in response to a survey posted on OWEB's website. Lead agencies also received compiled feedback from five state agencies and held several one-on-one and group meetings with interested partners to collect feedback and input. Respondents generally felt that the draft attributes reflected their work and expertise, appreciated the attributes' focus on ecological function under changing conditions, and valued that the interconnection between people and environment in achieving resilience outcomes was acknowledged. Other key themes from the feedback are summarized below:

1. While the workshop focused on defining the attributes of resilient lands and waters, participants also brainstormed possible indicators of progress for each of the attributes. These indicators, included in the draft report only as examples, generated such significant feedback that more work, including additional partner engagement, will be needed to advance indicators in a cohesive framework. As a result, this final report incorporates the feedback received and includes revised attributes, but it does *not* update the indicators. That work will occur alongside agency workplan development for the 2027–2029 biennium. Indicators identified during the workshop will be shared with state agencies for consideration in future workplan development. Feedback provided during this round of work on potential indicators will be carried forward into that effort.
2. Several respondents recommended including more acknowledgement of working lands across the four attributes, rather than just in attribute #4, *climate resilient lands and waters support vibrant communities, lifeways, and livelihoods*. Some respondents said this framing made working lands seem incidental to climate resilience and discounted the important contributions of landowners and land managers in stewarding ecosystems. In response to this feedback, the role of working lands has been incorporated into the descriptive paragraphs for attributes #1, #2, and #3; stewardship of working lands has been included in the language around the enabling environment; and the economic resilience of working lands in the face of climate impacts is now included in #4 where the Plan for a Resilient Oregon and the Prosperity Roadmap are noted as key strategies for economic viability.

Conversely, other respondents saw the draft attributes as too focused on human-ecosystem interactions and recommended greater focus on the inherent benefits and resilience of natural systems. Respondents with multiple perspectives expressed a desire for early coordination and engagement opportunities on these types of initiatives.

3. Some respondents highlighted that it would be helpful to link applicable Oregon plans and strategies more closely with the attributes, rather than as an appendix. While many plans are crosscutting, the most topical plans and strategies are now included with each attribute.
4. In response to feedback, greater consideration of surface and groundwater has been incorporated into the attributes. As agencies develop their 2027-29 workplans, it will be imperative to incorporate the Integrated Water Resources Strategy (IWRS) and other basin-scale efforts that are already underway.
5. There was feedback about roads and culverts being framed solely as barriers to connectivity, rather than acknowledging how culvert replacements can improve hydrologic function or how roads serve an important function in emergency response, ecosystem management, and post-disturbance restoration efforts. The connectivity language has been revised to reflect that strategic infrastructure planning and management practices can both support working lands and ecological outcomes.



SECTION II: Climate Resilience Attributes

5. Framing

Prior to outlining specific attributes, it is important to articulate a shared definition of climate resilience, what it means for Oregon lands and waters, and why it matters for future ecological and human well-being.

Defining Climate Resilience

As stated in Executive Order 25-26, “The Oregon State Legislature established a definition of climate resilience in House Bill 3409 (2023) as ‘the capability to anticipate, prepare for, respond to and recover from significant climate-related threats while minimizing damage to social wellbeing, the economy and ecosystem functions.’” At the March workshop, participants recommended further expanding our use of the term to reflect that climate-related disturbances are a part of natural ecological processes and also play an important role in resilience. They also emphasized the importance of recognizing how human stewardship supports key ecosystem functions, such as carbon and water cycles.

Some Oregon ecosystems are naturally able to resist change when they experience disturbances like small, frequent fires. This ability to stay the same is called ecological resistance, and it is an aspect of climate resilience. For the purposes of the EO, ecological resilience (the ability to recover) and ecological resistance (the ability to stay the same) are treated as related and complementary ideas within the broader definition of “climate resilience.”

The EO and the attributes development process emphasized that ecosystems, communities, and economies in Oregon are at risk of disruption and loss due to a number of factors, including climate-related impacts such as long-term drought, catastrophic wildfire, sea level rise, destructive flood events, as well as other stressors like habitat loss, invasive species, and disease. The goal of resilience is not to preserve things exactly as they are at a point in time, but to protect the ability of lands and waters to cope, adapt, and/or transform in response to a changing climate and to continue to support essential functions even as conditions change.

FIGURE 1.0. Reasons for Considering Climate Resilient Land and Waters

The diagram below illustrates that climate impacts involve both short-term shock events (i.e., wildfire, heat domes, or drought) combined with long-term stressors (i.e., rising temperatures or changes in the timing or type of precipitation). These climate impacts are magnified by other pressures that may or may not be directly related to climate change (i.e., pests, habitat loss and fragmentation, etc.). In order to be climate resilient, ecosystems must be able to cope with many different impacts over time or will likely transition to an alternative state.

WHAT IS CLIMATE RESILIENCE?



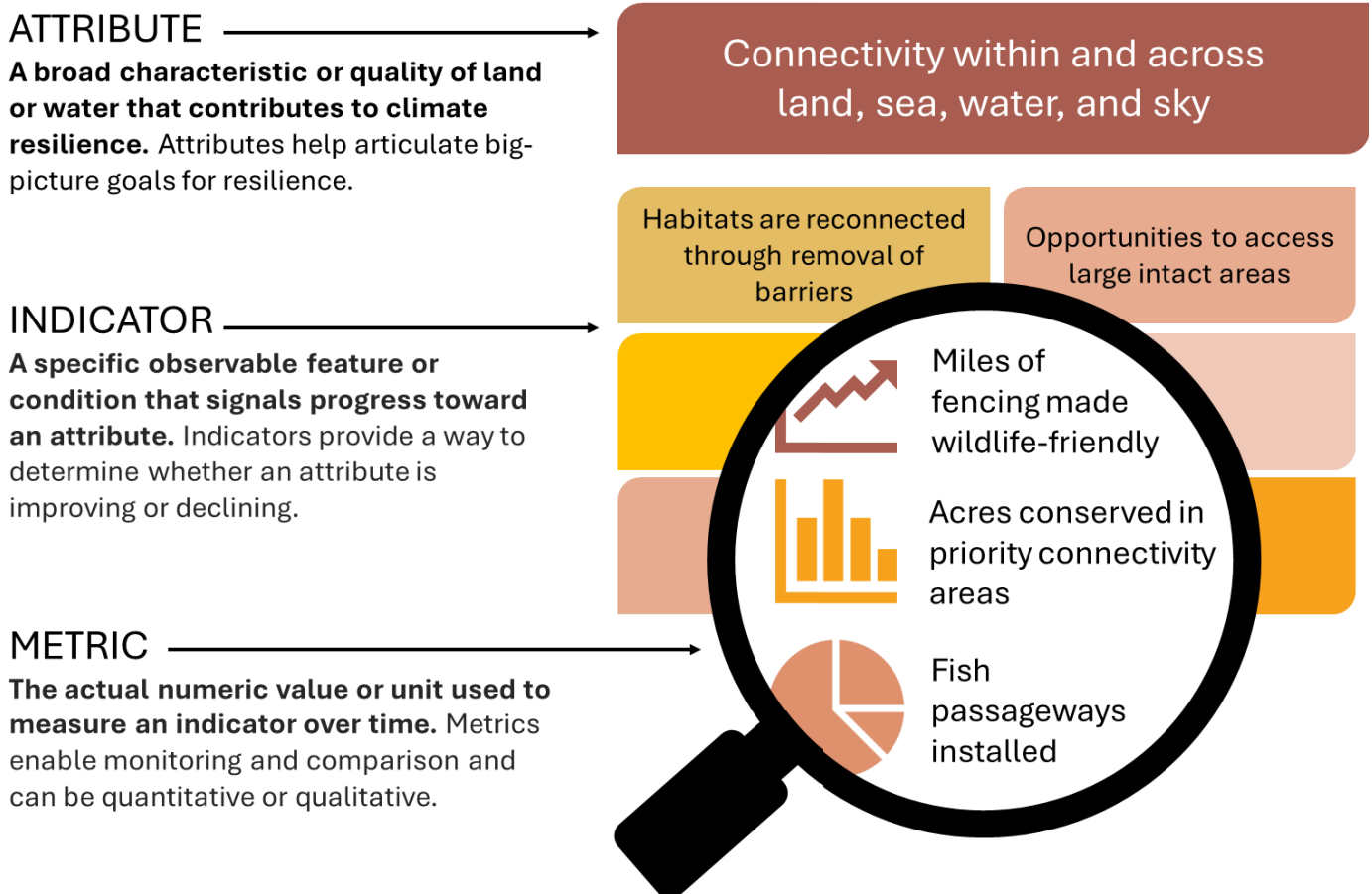
As climate change shocks and stressors accelerate, our stewardship must adapt to keep Oregon’s lands, waters, species, and communities resilient.

Definitions of Lands and Waters:

For the purposes of the EO attributes, it is important to clearly define what is meant by “lands” and “waters,” ensuring that the diversity of Oregon’s ecosystems is included. The EO outlines natural and working lands and waters as, “including forests, grasslands, rangelands, farmlands, wetlands, rivers, lakes and coastal and marine waters, and the parks and open spaces in urban environments.” As attributes are described throughout this document, the intent is to be inclusive of all types of lands and waters, and to be inclusive of terrestrial and aquatic systems, regardless of any specific examples provided.

6. Considerations for Attributes

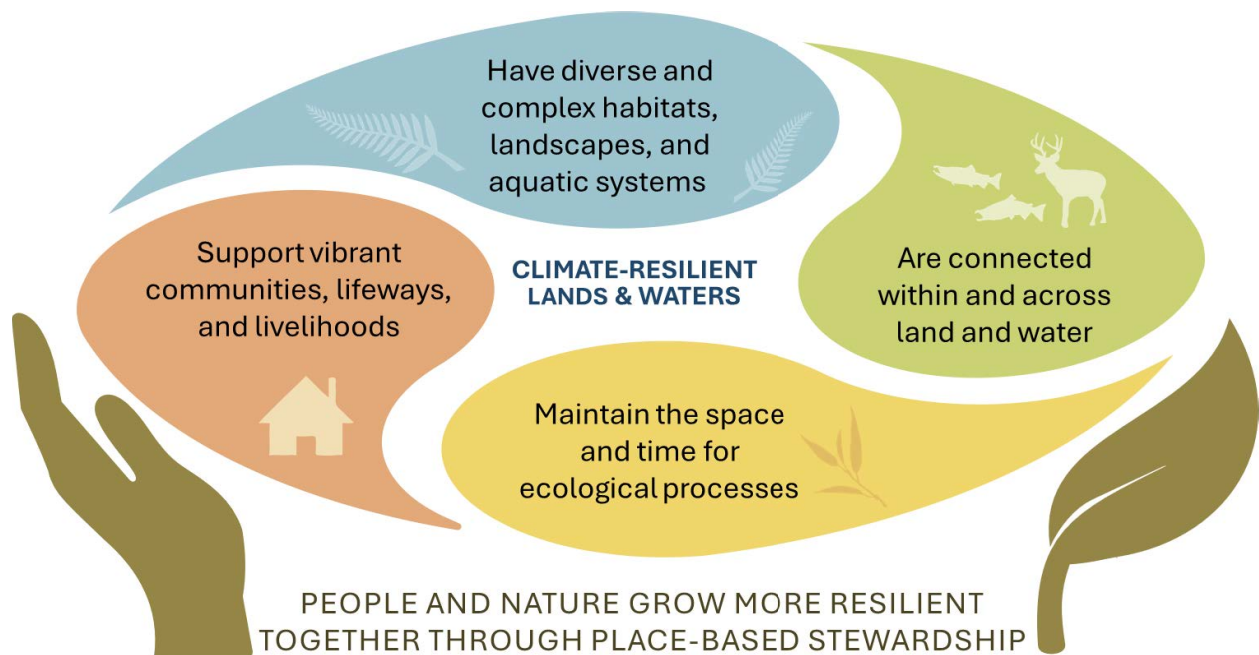
This effort was intended to define the attributes of climate-resilient lands and waters, knowing that in order to be operationalized, attributes will have to step down to indicators and metrics. This report provides the attributes, and future work will articulate the indicators and metrics required to track progress toward these attributes.



7. Climate Resilience Attributes

After reviewing the literature, the results of the three-day design workshop, and input from the public feedback process, the lead agencies have articulated four attributes of climate-resilient lands and waters, situated in the enabling environment of people working together to manage and steward for resilience outcomes.

In outlining these attributes, it is crucial to remember that everything is interconnected, and no attribute stands on its own. They must all be in place, as highly connected ecological and social processes that interact across space and time. This concept is illustrated below, showing that resilience is the summation of interconnected attributes, each one influenced by people and communities working together towards climate resilience goals, and which subsequently make human communities more resilient as well.



The Enabling Environment: People and nature grow more resilient together through place-based stewardship

Before articulating the resilience attributes, it is important to start with the role of active management and stewardship as the *enabling environment* through which climate resilience occurs and as illustrated above in the text outside the four attributes. In other words, climate resilience doesn't just happen but must be intentionally managed for.

As was discussed during the three-day workshop, the relationship between people and the environment is reciprocal and human actions shape the ecology of Oregon. Tribes, landowners, communities, businesses, and government all play essential roles in advancing climate resiliency.

In order to fill an important stewardship role, landowners and land managers need consistent financial, economic, technical, and policy supports that balance wildlife habitat, food and fiber production, clean energy infrastructure, carbon benefits, and community development in a changing climate (this is also reflected in Oregon statute: ORS 468A.185(3)(d)). Climate resilience requires ongoing planning, intention, and investment around how land and water are used, currently and into the future.

The concept of an enabling environment is different from attribute #4, *climate resilient lands and waters support vibrant communities, lifeways, and livelihoods*, in that it speaks to the *conditions* that must be in place, rather than the characteristics of climate resilient lands and waters. That is to say, the enabling environment is the prerequisite for climate resiliency efforts across all of the four attributes, including interventions that support connectivity, diversity, ecological processes, and thriving working lands.

To create this enabling environment, people and communities need:

- Structures for collaborative management across ownership boundaries;
- Systems and policies for decision-making that are data-informed and are responsive to changing ecological and social trends;
- Economic conditions and incentives that foster the capacity to implement voluntary practices;
- Access to representation and participation in planning and resource allocation processes that account for disproportionate impacts, equity, and Tribal sovereignty; and
- Innovations which help foster new ways of working and understanding impact.

1

Attribute #1: Connectivity within and across land and water to facilitate the movement of organisms and ecological processes.

Connectivity is the degree to which land and water facilitate the movement of organisms and ecological processes. Connectivity encompasses both structural and functional components. Structural connectivity is the *physical* structure of the landscape, seascape, and hydrologic systems. For example, structural connectivity might look like open sagebrush rangeland that mule deer cross in their seasonal migration, or it might look more like a ribbon of streamside riparian vegetation that migratory birds use as stopovers for rest and foraging as they move across working lands or urban areas. Managed agricultural landscapes and working forests can function as a permeable matrix habitat when operators adopt wildlife-friendly infrastructure and management practices.

Functional connectivity is the extent to which structural connectivity supports the successful movement of organisms (the deer and the birds safely reaching their destination) and ecological processes, such as water flow and nutrient cycling (seasonal flooding of wetland areas carrying leaf litter, sediment, and dissolved nutrients to different habitat zones).

Connectivity of surface and groundwater is also important. Surface water like rivers, streams, wetlands, and floodplains must be connected with aquifers and springs below ground. This hydrologic connection has a moderating effect on water quality and quantity, and supports resilience during droughts, floods, and changing climate conditions.

It is important that connectivity within and across ecosystems is consistent with the underlying biophysical environment and linked to appropriate reference conditions, such as the historic range of variability and/or future range of variability (that is to say, what conditions would normally look like—either in the past or as expected in the future).

Connectivity over space and time allows for the movement of species both over the short term, such as when fish retreat to cold water refugia during a heat event, and over the long term, such as tree species moving up in elevation in response to rising annual temperatures and long-term drought. Connected habitats also allow species to complete their full life history cycles; organisms must have access to pathways for their daily, seasonal, and once-in-a-lifetime movements in the face of climate impacts.

Key Plans and Strategies:

- [Oregon’s 20-Year Landscape Resiliency Strategy](#), 2023, ODF: Department of Forestry-led plan to coordinate federal, local, and state partners, and leverage investment opportunities within priority geographies to achieve landscape-scale resilience and wildfire risk reduction.
- [Oregon State Wildlife Action Plan](#) (formerly the Oregon Conservation Strategy), 2016 (2026 revision pending), ODFW: An overarching state strategy for conserving fish and wildlife. It provides a shared set of priorities for addressing Oregon’s conservation needs. Includes the [Oregon Wildlife Corridor Action Plan](#) (2024), which addresses wildlife and habitat connectivity.
- [Oregon Plan for Salmon and Watersheds](#): The Oregon Plan for Salmon and Watersheds was established in 1997 to restore salmon populations and improve watershed health in Oregon. The plan included specific actions to address factors affecting fish populations and watershed health, aiming for a comprehensive approach to ecosystem restoration.

2

Attribute 2: Diverse and complex habitats, landscapes, and aquatic systems that provide options for native species and human communities to respond to change and disturbance.

Diversity helps create resilience in many different ways and at many different scales. Diversity has many potential components and can refer to the variety, complexity, and redundancy in a system. Variety can apply to species, genes, landscape patches, vegetation communities, habitat types, soils, depths, seafloors, nutrient regimes, flow and temperature regimes, topography and stream channel complexity, crop types, cultural groups, management approaches, and more.

Diversity can also refer to having complexity in a system at multiple scales. For example, having multiple tree age- or size classes in a forested stand, or multi-aged forest stands in a watershed; or having a variety of substrate types, water velocities, and structures in a stream. Whereas diversity speaks to the range of species types (for example), complexity speaks to the range of structures and functions.

Equally important to complexity and diversity is redundancy; that is, the replication of particular elements of a system such that short-term losses can be absorbed. Diversity and redundancy are critical attributes of climate-resilient lands and waters because they allow the ecosystem to better handle disturbances or changing conditions and provide “insurance” in the event of uncharacteristic disturbance. Akin to connectivity, diversity and redundancy must also be defined by, and consistent with, the natural range of variability and/or future range of variability for a given area.

Key Plans and Strategies:

- [Oregon Native Seed Strategy](#), 2025, ODA: Guidance document that supports ecological restoration and conservation through the procurement, preservation, and production of native seed in Oregon.
- [Oregon State Wildlife Action Plan](#) (formerly the Oregon Conservation Strategy), 2016 (2026 revision pending), ODFW: An overarching state strategy for conserving fish and wildlife. It provides a shared set of priorities for addressing Oregon’s conservation needs and includes the [Oregon Wildlife Corridor Action Plan](#) (2024), which addresses wildlife and habitat connectivity.
- [Oregon Statewide Strategic Plan for Invasive Species](#), 2017, Oregon Invasive Species Council: Invasive species management is foundational to maintaining native species diversity and preventing the loss of landscape heterogeneity. This plan is meant to guide a comprehensive state-wide approach over the next ten years.

3

- [Integrated Water Resources Strategy](#), 2025, State of Oregon: The IWRS provides a statewide inter-agency framework for better understanding and meeting Oregon's instream and out-of-stream water needs. Oregon's Water Resources Commission adopted the first IWRS in 2012 and the second in 2017. Oregon Revised Statute (536.220) was updated in 2023 to require that the IWRS is updated every 8 years.

Attribute 3: Flood, fire, and other natural processes have the space and time to sustain key ecological functions.

Natural processes — such as fire, flooding, the carbon and nutrient cycles, sea level dynamics, and soil formation — play an important role in systems like the hydrologic cycle, air quality, and nutrient cycling. Ecological functions rely on disturbances such as fire, high flow and flood events, wind events, and landslides to create, enhance, and sustain structural and functional diversity across the landscape and to facilitate the flow of nutrients and materials through the ecosystem. When ecological processes are taking place, and when disturbance events are within the historic or desired range of variability, lands and waters can resist, adapt, recover, and sometimes even benefit from short-term shocks and long-term stressors.

Managing for ecological processes requires good monitoring and an understanding that future conditions are uncertain and variable. Successful adaptive management depends on data-informed decision-making and the capacity to translate that to on-the-ground actions. Tools like climate modelling on current trajectories and future scenarios are important for Oregon to understand changing ecological processes (i.e., precipitation, temperature, vegetation community, and species range shifts, etc.) and to manage for those changes.

Progress toward this attribute includes land use planning and restoration activities, which take into account the frequency, extent, and severity of disturbance in order to protect the ecological functions they support. For example, rivers and floodplains need room to move, store, and slow water, thereby reducing the exposure of people and assets to drought or high flow events. Fire can also act as a natural control to invasives by providing disturbance, which helps reset the understory. Additionally, some human activities can be done in a way that mimics the benefits of ecosystem processes and natural disturbance. Maintaining and enhancing the space and time for disturbance processes to occur often operates on very long timescales, and it is important to keep in mind the time horizon for returns on investment under this attribute.

Oregon's working landscapes are where ecological processes and human management intersect daily. For example, when wildfire burns rangeland or when floods destroy irrigation infrastructure, the working landscape's capacity to recover both ecological and productive function is itself an indicator of whether this attribute is being achieved. The resilience of

ecological processes on working lands depends on operators having the adaptive capacity and access to resources to restore function after disturbance events.

Key Plans and Strategies:

- [Oregon's 20-Year Landscape Resiliency Strategy](#), 2023, ODF: Department of Forestry led plan to coordinate federal, local, and state partners, and leverage investment opportunities within priority geographies to achieve landscape-scale resilience and wildfire risk reduction.
- [Oregon Plan for Salmon and Watersheds](#): The Oregon Plan for Salmon and Watersheds was established in 1997 to restore salmon populations and improve watershed health in Oregon. The plan included specific actions to address factors affecting fish populations and watershed health, aiming for a comprehensive approach to ecosystem restoration.

4 Attribute 4: Natural and working lands and waters support, and are supported by, vibrant human communities, lifeways, and livelihoods.

Lands and waters that are highly resilient to climate change support and protect human resilience as well. Healthy ecosystems provide the resources and benefits that all living things, including people, need to thrive. Sometimes referred to as ecosystem services, these resources and benefits may include everything from food and timber production to cultural resources to recreation access to flood attenuation and fire mitigation. It means that people have the ability not only to earn a living from the resources our working lands provide, but also have safe places to live, recreate, or practice ceremony.

Additionally, climate resilience is an outcome of stewardship and management. On working lands and waters, adopting climate-smart practices in forestry, farming, fishing, and ranching activities supports and reinforces the other attributes. Activities like crop rotation, cover cropping, and rotational grazing have benefits for soil health and water conservation as well as increasing the resilience of agricultural land to fire, invasive species, or drought. Foresters, restoration crews, wildfire contractors, and other working lands managers implement climate-smart practices on forestlands that enhance forest structure and species diversity and mimic natural disturbance patterns.

In urban areas, the efficient use of land already inside of Urban Growth Boundaries takes pressure off the lands outside, helping protect the natural systems that provide climate benefits. Thoughtful and deliberate land use changes, where they do occur, improve climate resilience by reducing exposure to climate-related hazards (i.e. keeping development out of floodplains, fire-prone areas, or coastal erosion areas, etc.), and encourage climate-ready development (i.e. stormwater harvesting, urban tree canopy, development that reduces heat islands and transportation emissions, etc.).

Key Plans and Strategies:

- [Climate Change and Carbon Plan](#), 2021, ODF: The plan positions Oregon forestry as a regional leader in climate-smart forestry, including both climate-change mitigation and adaptation. The goals are to reduce greenhouse gas emissions, increase carbon sequestration (i.e. storage of carbon in trees), and positively benefit climate-impacted and resource-dependent communities.
- [Integrated Water Resources Strategy](#), 2025, State of Oregon: The IWRS provides a statewide inter-agency framework for better understanding and meeting Oregon's instream and out-of-stream water needs. Oregon's Water Resources Commission adopted the first IWRS in 2012 and the second in 2017. Oregon Revised Statute (536.220) was updated in 2023 to require that the IWRS is updated every 8 years.
- [Plan for a Resilient Oregon](#): The Plan for a Resilient Oregon (PRO) is a people-centered resilience strategy to help communities around Oregon adapt and thrive in the face of increasingly severe disasters. The PRO aims to be responsive to the unique cultures, demographics, histories, and hazards of Oregon's diverse regions and will inform the work of Executive Branch agencies, the Governor's recommended budget, and the legislative work for the next biennium.
- [Prosperity Roadmap](#), 2025, State of Oregon: A statewide economic strategy built around three overarching goals (accelerate Oregon's economic growth, catalyze job growth, and retain and grow Oregon's businesses) and a set of strategic initiatives designed to achieve those goals.

8. Conclusion and Next Steps

This document reflects the significant contributions of a broad cross-section of expertise, lived experience, and institutional knowledge. The process to develop these attributes took place over six months and included a three-day design workshop, a draft report and public comment period, and several one-on-one and group meetings. The climate resilience attributes presented here reflect the participation, expertise, and enthusiasm for mitigating the impacts of climate change so that Oregon's lands and waters continue to contribute to the social, environmental, and economic well-being of all Oregonians.

In the summer and fall of 2026, Oregon natural resource agencies will submit their 2027-2029 workplans in alignment with these resilience attributes. These workplans include agency-specific actions to identify and improve programs, tools, and incentives that support stewardship and co-benefits; improve permitting processes; protect, conserve, restore or connect key lands and waters; enhance climate resilience on state-owned and managed lands; and other actions identified in the EO.



APPENDIX A: Attribute Frameworks Explored

A.1. The Nature Conservancy's Center for Resilient Conservation Science

- The framework is called “Conserving Nature’s Stage,” which looks at the “conditions that allow nature to move, adapt, and thrive in a changing world.” Available at <https://crcs.tnc.org/pages/resiliencescience>.
- This framework is useful because it represents over two decades of work and considers the unique ecoregions of the Pacific Northwest.
- The framework is based on the idea that the biota (flora and fauna) need the landscape (aka, stage) to survive and thrive. By identifying the characteristics of landscapes that support thriving plants and animals, TNC can then look for landscapes and/or parcels of landscapes to protect and conserve.
- This framework emphasizes connectivity, not only looking within regions of the United States and ecoregions, but the tools help identify connections across ecoregions and geographies.
- The Resilient Land Mapping Tool <https://www.maps.tnc.org/resilientland/#/explore> and Resilient River Mapping Tool <https://www.maps.tnc.org/resilientrivers/#/> are the results of decades of research to map lands and waters across the US.
- Attributes are:
 - Geophysical: soil order, slope, elevation

A.2. Synthesis of Pacific Northwest and West Coast Tribal Frameworks

- Tribal plans emphasize that resilience is not resistance to change, but the capacity of lands, waters, and communities to continue providing food, culture, identity, and life under changing conditions. It is also the capacity of the people to adapt to changing conditions.
- This framework is useful because it offers a non-Western perspective on resilience. The plans do not frame resiliency as a set of attributes, rather resilience is ecological processes, cultural relationships, and adaptive capacity.
- The Confederated Tribes of the Umatilla Indian Reservation have articulated an Uplands Vision and a River Vision that include “Touchstones” which might be similar to attributes:
 - [Uplands](#): Soil Stability; Hydrological Function; Landscape Pattern; Biotic Integrity
 - [Rivers](#): Water and Water Quality; Geomorphology; Connectivity among habitats and across the river network; Riverine biotic community; Riparian vegetation

- Tribal plans also emphasize connectivity, but from a systems perspective rather than an attributes perspective. Cyclical versus linear?
- Attributes (the plans do not describe them as such; ChatGPT found implicit characteristics) include
 - Intact, connected watersheds (ridge-to-reef/headwaters-to-estuary)
 - Functioning estuaries, nearshore, and tidal wetlands
 - Structurally diverse forests and culturally stewarded fire landscapes
 - Cold-water refugia and groundwater-supported system (springs, seeps, wetlands)
- A synthesis of the following Tribes and Tribal organization plans:
 - Confederated Tribes of the Umatilla Indian Reservation
 - Swinomish Indian Tribal Community
 - Tulalip Tribes
 - Jamestown S’Klallam Tribe
 - Lummi Nation
 - Quinault Indian Nation

A.3. Maine Climate Council

- 2019 legislation created the Maine Climate Council. The Council, with six working groups and a subcommittee, created a four-year action plan, [Maine Won’t Wait](#), to address climate change in Maine. The plan has four goals:
 - Reduce Maine’s Greenhouse Gas Emissions
 - Avoid the Impacts and Costs of Inaction
 - Foster Economic Opportunity and Prosperity
 - Advance Equity through Maine’s Climate Response
- In October 2024, Maine started a \$69 million climate resilience grant, funded through the National Oceanic and Atmospheric Administration’s Climate Resilience Regional Challenge.
- Created a State Resilience Office (SRO) which “works to grow the ability of communities and the state to prepare for and thrive within a changing climate.”
- Office of Policy Innovation and the Future/ Community Resilience Partnership

A.4. Local Government Plans

- King County, Washington’s [Strategic Climate Action Plan](#) defines a “Clean Air, Water, and Healthy Ecosystems” objective. The objective discusses protecting and restoring high-value forest and farmland; more robust tree canopy in heat islands; improved stormwater management and water conservation; protected floodplains to reduce flood risk; promoting habitat connectivity for salmon recovery; protecting shorelines and minimizing economic impacts of sea level rise.

- The City of Portland, Metro Regional Government, Lane County, and other local governments in Oregon have also defined local climate action plans, natural hazard mitigation plans, and other strategies that point to resilience attributes for lands and waters.

APPENDIX B: Oregon Plans and Strategies

Oregon Department of Agriculture. (2025). [Oregon Native Seed Strategy 2025](#).

Oregon Department of Emergency Management. (2025). [Comprehensive Emergency Management Plan Volume I: Natural Hazards Mitigation Plan](#).

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APPENDIX C: Workshop Invitees

Affiliation	Name	Position
Allen Family Philanthropies	Yuta Masuda	Director of Science
American Rivers	Sarah Dyrdaahl	Northwest Regional Director
Blue Mountains Forest Partners	Mark Webb	Executive Director
Burns Paiute Tribe	Trey Wall	Natural Resources Director
City of Ashland	Chris Chambers	Forestry Officer
City of Portland	Nishant Parulekar	Resilience Program Supervisor
Columbia River Gorge Commission	Lisa Naas Cook	Climate Program Manager
Confederated Tribes of Coos, Lower Umpqua and Siuslaw Indians	Ashley Russell	Director of Natural and Cultural Resources
Confederated Tribes of Siletz Indians	Angela Sondena	Director, Natural Resources
Confederated Tribes of the Grand Ronde	Brandy Bishop	Tribal Emergency Preparedness Coordinator
Confederated Tribes of the Grand Ronde	Colby Drake	Natural Resources Director
Confederated Tribes of the Grand Ronde	Lindsay McClary	Restoration Ecologist & Wildlife Policy Analyst
Confederated Tribes of the Umatilla Indian Reservation	Eric Quaempts	Natural Resource Director
Confederated Tribes of Warm Springs	Austin Smith, Jr	General Manager, Natural Resources
Conservation Science Partners	Brett Dickson	Chief Scientist
Coquille Indian Tribe	John Ogan	Executive Director of Natural Resources
Coquille Indian Tribe	Robin Harkins	Director, Natural Resource Department
Cow Creek Band of Umpqua Tribe of Indians	Kelly Coates	Natural Resources Director
ECONorthwest	Sarah Reich	Project Director
Farmers Conservation Alliance	Peter Harkema	Community Relations Manager
Foundations of Success	Marcia Brown	Senior Program Officer
Gilliam Soil and Water Conservation District	Herb Winters	District Manager
Institute for Applied Ecology	Laura Brophy	Estuary Technical Group Director
Klamath Tribes	Steve Rondeau	Natural Resources Director
Lomakatsi	Marko Bey	Executive Director
Mary's River Watershed Council	Nicole DeCrappeo	Director
Nature Record	Heather Tallis	Center for Coastal Climate Resilience
Oregon Biodiversity Information Center	Eleanor Gaines	Director
Oregon Sea Grant	Jessi Kershner	Associate Director of Extension & Engagement
Oregon State University, Geography and Environmental Sciences	Hannah Gosnell	Geography and Environmental Sciences
Oregon State University, Oregon Climate Change Research Institute	Erica Fleishman	Director
Pacific States Marine Fisheries Commission	Caren Braby	Economics Fisheries Information Network Program Manager
Research Triangle Institute International	Jeff Petrusa	Director, Energy and Environmental Economics
San Francisco Estuary Institute	Ellen Plane	Senior Scientist

Affiliation	Name	Position
Sustainable Northwest	Dallas Hall Defrees	Regenerative Ranching Program Director
The Nature Conservancy	Pete Caligiuri	Oregon Forest Strategy Director
The Nature Conservancy	Ryan Haugo	Director of Conservation & Science for Oregon
The Pew Charitable Trust	Andy Maggi	Officer, US Conservation
Trout Unlimited	Nell Scott	Director
Tualatin Soil and Water Conservation District	Dean Moberg	Director
US Department of Agriculture, Agricultural Research Service	Chad Boyd	Ecologist
US Department of Agriculture, Natural Resources Conservation Service	Cory Owens	Associate Director for Soil Services
US Fish and Wildlife Service	Mike Hudson	Regional Climate Change Coordinator
US Forest Service	Becky Flitcroft	Research Fish Biologist
US Forest Service	Meta Loftsgaarden	Forest Supervisor
US Geological Survey	Jason Dunham	Supervisory Research Ecologist
US Geological Survey, NW Climate Adaptation Science Center	Leona Svancara	Acting Regional Administrator
Wallowa Resources	Nils Christoffersen	Executive Director
Washington State Department of Ecology	Jimmy Kralj	Climate Resilience Strategy Planner
Washington State University, Center for Sustaining Agriculture and Natural Resources	Chad Krueger	Director
West Coast Seafood Processors	Susan Chambers	Deputy Director
Western Wildland Environmental Threat Assessment Center	Jessica Halfosky	Director
Weyerhaeuser	Jessica Homyack, PhD, CWB	Director of Environmental Research and Operational Support
World Wildlife Fund	Becky Chaplin-Kramer	Global Biodiversity Lead Scientist
WSP	Kelsey Harpham	Alliance for Global Water Adaptation Project Manager
Governor's Office	Chandra Ferrari	Natural Resources Policy Advisor
Governor's Office	Geoff Huntington	Senior Natural Resources Advisor
Oregon Climate Advisory Commission	Cathy Macdonald	Chair
Oregon Department of Agriculture	Jonathan Sandau	Deputy Director
Oregon Department of Agriculture	Troy Abercrombie	Program Manager
Oregon Department of Energy	Jamshed Suntoke	Climate Team Lead
Oregon Department of Energy	Jason Sauer	Natural & Working Lands Research Analyst
Oregon Department of Environmental Quality	Jennifer Wigal	Water Quality Division Administrator
Oregon Department of Environmental Quality	Joshua Seeds	Forest Water Quality Analyst
Oregon Department of Fish and Wildlife	Debbie Colbert	Director
Oregon Department of Fish and Wildlife	Rachel Wheat	Wildlife Connectivity Coordinator
Oregon Department of Fish and Wildlife	Sarah Reif	Habitat Division Administrator
Oregon Department of Fish and Wildlife	Spencer Sawaske	Water Program Manager
Oregon Department of Forestry	John Tokarczyk	Resource Planning Manager
Oregon Department of Forestry	Tim Holschbach	Deputy State Forester

Affiliation	Name	Position
Oregon Department of Geology and Mineral Industries	Christina Appleby	Legislative Coordinator and Geologist
Oregon Department of Geology and Mineral Industries	Jason McClaughry	Geological Survey and Services (GS&S) Program Manager
Oregon Department of Land Conservation and Development	Kirstin Greene	Deputy Director
Oregon Department of Land Conservation and Development	Meg Reed	Coastal Policy Specialist
Oregon Department of State Lands	Bill Ryan	Deputy Director for Aquatic Resource Management
Oregon Department of State Lands	Jane Rombouts	Mitigation Coordinator
Oregon Department of State Lands	Randy Wiest (virtual)	Lead rangeland manager
Oregon Health Authority	Beth Haley	Senior Climate and Health Equity Strategist
Oregon Health Authority	Carey Palm	Emergency Preparedness Tribal Liaison
Oregon Health Authority	Gabriela Goldfarb	Environmental Public Health Section Manager
Oregon Health Authority	Kim Tham	Operations & Policy Analyst
Oregon Parks and Recreation Department	Andrea Hanson	Central Operations Resource Manager
Oregon Parks and Recreation Department	Matt Rippee	Central Park Services Manager
Oregon Water Resources Department	Annette Liebe	Technical Services Division Administrator
Oregon Water Resources Department	Crystal Grinnell	Integrated Water Resources Strategy Specialist
Oregon Watershed Enhancement Board	Alexa Schmidt	Water and Climate Coordinator
Oregon Watershed Enhancement Board	Sara O'Brien	Executive Director
Oregon Watershed Enhancement Board	Stephanie Page	Deputy Director