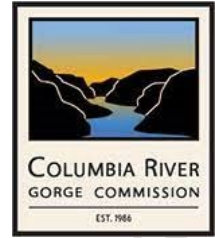


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COLUMBIA RIVER GORGE NATIONAL SCENIC AREA

CLIMATE CHANGE ACTION PLAN

2022-2025

March 8, 2022 version

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[Format with a large photo – would appreciate a photo suggestion from tribal Commissioners or partners.]

Land Acknowledgement and Support of Tribal Treaty Rights

The Gorge Commission acknowledges and honors that the Columbia River Gorge National Scenic Area is located within the ancestral territories of Indigenous peoples who have protected these lands and waters since time immemorial. We also honor the sovereignty and role of the four Columbia River Treaty Tribes in taking care of these lands and waters today—the Confederated Tribes of Warm Springs, the Confederated Bands and Tribes of the Yakama Nation, the Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe.

We thank members and staff from each of the Treaty Tribes who have offered insights and ideas from **holistic approaches** to climate change and tribal sovereignty. Water, wildlife, plants, and natural systems have been resilient for millennia, in part through intentional stewardship by Indigenous people. Colonization and western development have created current conditions. The continued systemic suppression of Indigenous land practices exacerbates climate change impacts on the land and water.

The Gorge Commission is committed to **implementing and supporting the priorities and initiatives Treaty Tribes** are taking on reservation lands, on ceded lands, and beyond. A few of the strategies we seek to support through work with Treaty Tribes include provisioning access to lands and resources, managing water and floods with natural and created wetlands, and managing fuels, plants, and wildlife with fire.

Letter from the Columbia River Gorge Commission

Climate change is one of the defining challenges of this decade for society, as it will affect every sector of the economy, every corner of society, and every public policy to varying degrees.

Therefore, it came as no surprise that when updating the National Scenic Area Management Plan, climate change was identified as the most significant threat to the future health of the National Scenic Area (NSA) and that to varying degrees climate change was already impacting parts of the NSA as evidenced by:

- Increased severity and frequency of wildfires,
- Increased vulnerability of culturally important resources, and
- Changes in water flow and temperature.

The development of this climate change action plan provides both a framework and guide for the Commission's journey, with appropriate government and community support, to build resilience within the NSA and region.

Recognized for its scenic, cultural, natural, and recreational values locally, regionally, nationally, and internationally, we need to protect the area not just for future generations, but also for the health of local economies, ecosystems, and cultural connections that are dependent upon the NSA.

This will involve making changes in how the NSA is managed so the area is more resilient to the threat of increased temperatures, changing rainfall patterns, and greater climate variability.

Addressing the multitude of physical impacts and transitional risks of climate change is not something the Commission can do alone: it requires a sustained effort from all of us. To be successful, all individuals, Treaty Tribes, organizations, and governments that have an interest in the NSA must act strategically and together and to immediately take steps that will help the NSA natural systems, communities, and economies to adapt.

This is of critical significance as research has already indicated that apart from physical impacts to natural resources, those who rely upon our natural resources for economic and traditional activities, such as tourism, fishing, and agriculture, as well as communities of color and low to moderate income individuals, are likely to be adversely impacted as society transitions to a net zero emissions environment.

More importantly, as society moves along its pathway to net zero emissions, such actions need to be institutionalized into the daily way in which we all go about our lives as the effects of climate change are likely to be experienced for decades.

As new science and learnings from our actions become available, it will be necessary to periodically review and update the Climate Change Action Plan. Our Vital Sign Indicators program will play a key role in this by alerting us to how successful our actions are in building resiliency or whether there is need to chart a different course of action to maintain the universal values of the NSA for everyone.

Sincerely,

Robin Grimwade, Commission Chair

Pah-tu Pitt, Commission Vice Chair

Acknowledgements

Commissioners [insert photo to right]

Robin Grimwade, Chair, Clark County Appointee
Pah-tu Pitt, Vice Chair, WA Governor Appointee
Sondra Clark, Klickitat County Appointee
Tamara Kaufman, Skamania County Appointee
Robert Liberty, Multnomah County Appointee
Jerry Meninick, WA Governor Appointee
Donna Mickley, USDA Forest Service Area Manager
Carina Miller, OR Governor Appointee
Michael Mills, Hood River County Appointee
Jim Morgan, OR Governor Appointee
Rodger Nichols, Wasco County Appointee
Ashley Thompson, OR Governor Appointee
Amy Weissfeld, WA Governor Appointee
Lorrie DeKay (term ended December 2021)
Bowen Blair (term ended April 2021)
Janet Wainwright (term ended March 2021)
Dan Ericksen (term ended February 2021)
Lynn Burditt (term ended December 2020)

Columbia River Gorge Commission Staff

Krystyna U. Wolniakowski, Executive Director
Jeff Litwak, Legal Counsel
Connie Acker, Administrative Analyst
Jessica Olson, Sr. Natural Resources Planner, CCAP lead author
Lisa Naas Cook, Vital Sign Indicators Planner, CCAP supporting author
Joanna Kaiserman, Sr. Land Use Planner
Aiden Forsi, Land Use Planner
Bryce Guske, Land Use Planner
Mike Schrankel, GIS Manager

Columbia River Gorge National Scenic Area Forest Service Staff

Casey Gatz, Resources and Planning Staff Officer
Morai Helfen, Landscape Architect
Brett Carre, Wildlife and Fisheries Biologist
Sarah Callaghan, Botanist/Invasive Plant Coordinator
Diane Hopster, Hydrologist
Katie Santini, Biological Science Technician
Chris Donnermeyer, Heritage Program Manager
Roland Rose, Fire and Fuels Planner

We are grateful to each member of the Review Committee who offered time, expertise, and energy to this effort. We look forward to working with you to implement the Climate Change Action Plan.

Review Committee and Technical Advisors

Dan Bell, Friends of the Gorge Land Trust

Catherine Corbett, Lower Columbia Estuary Partnership

Lindsay Cornelius, Columbia Land Trust and East Cascades Oak Partnership

Tim Counihan, US Geological Survey

Teara Farrow Ferman, Confederated Tribes of the Umatilla Indian Reservation

Laura Gephart, Columbia River Intertribal Fish Commission

Doug Glavich, USDA Forest Service Pacific Northwest Ecology Group

Elaine Harvey, Yakama Nation Fisheries

Stefanie Kranz, Nez Perce Tribe

David Peterson, University of Washington

Wenix Red Elk, Confederated Tribes of the Umatilla Indian Reservation

Colleen Sanders, Confederated Tribes of the Umatilla Indian Reservation

Jonalee Squeochs, Yakama Nation Fisheries

Steve Waste, US Geological Survey

Seth White, Columbia River Intertribal Fish Commission

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Additional Review and Support

Jennifer Bayer, Pacific Northwest Aquatic Monitoring Partnership

McKenzie Jones, City of Sedona

Jennifer Niemann, City of Flagstaff

Rachel Gregg, EcoADAPT

Amber Johnson, Washington Department of Fish and Wildlife

Mary Brazell, Oregon Department of Transportation

Terra Lingley, Oregon Department of Transportation

Cindy Thieman, Hood River Watershed Group

Sue Van Leuven, Washington Department of Fish and Wildlife

Jeanette Burkhart, Yakama Nation Fisheries

A.J. Zelada, League of American Bicyclists, Friends of the Historic Columbia River Highway, Multnomah County Bicycle & Pedestrian Advisory Committee

Erik Beever, US Geological Survey

Kathy Fitzgerald, Mid-Columbia Economic Development District

Dr. Kelsey Galimba, Oregon State University Extension

Kate Drennan, Mid-Columbia Economic Development District

Dr. Andony Melathopoulos, Oregon State University Extension

John Palmer, Environmental Protection Agency

Esther Pullido, Pacific Power

Patty Fink, Columbia Area Transit

Greg Houle, Washington Department of Natural Resources

Jonathan Tallman, Yakama Nation Forestry

Owen Wozniak, Land Trust Alliance

Kristen Sheeran, Oregon Governor's Office (formerly)

Mary Bushman, East Cascades Oak Partnership

Shannon Walker, Rivian

Thomas Tall Bull, Nez Perce Tribe

Glenn Ahrens, Oregon State University Extension

Hilary Lundgren, WA Fire Adapted Communities Network

Tova Tillinghast, Underwood Conservation District

[There will be more added to this list]

Key Abbreviations and Definitions

Key Abbreviations

EPA: Environmental Protection Agency

EVs: Electric vehicles are vehicles that derive all or part of their power from electricity.

GHG: Greenhouse gases are heat-trapping gases that warm the atmosphere, such as carbon dioxide, methane, and nitrous oxide.

IPCC: Intergovernmental Panel on Climate Change

MTCO₂e: Metric tons of carbon dioxide equivalent is a common unit of measurement for greenhouse gases that includes consideration of major greenhouse gases, including carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O).

NSA: Columbia River Gorge National Scenic Area

VMT: Vehicle miles traveled is a metric used in transportation planning to measure the cumulative miles traveled by all vehicles in a geographic region over a given time period.

Key Definitions

Adaptation: In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate (IPCC).

Adaptive Capacity: The ability of a system, population, or resource to adjust to, or moderate, potential damages caused by climate-related hazards to preserve or enhance functionality.

Agritourism: Visiting a working farm or any agricultural, horticultural, or agribusiness operation for enjoyment, education, or active involvement in the activities of the farm or operation (e.g. u-pick, farm tours, wine tasting, etc.).

Equity: Acknowledges that not all people, or all communities, are starting from the same place due to historic and current systems of oppression. Equity is the effort to provide different levels of support based on an individual's or group's needs in order to achieve fairness in outcomes. Equity actionably empowers communities most affected by systemic oppression and requires the redistribution of resources, power, and opportunity to those communities (State of Oregon, Office of the Governor).

Climate Equity: Ensuring that the people and communities who are least culpable in the warming of the planet, and most vulnerable to the impacts of climate change, do not suffer disproportionately as a result of historical injustice and disinvestment (Resources Legacy Fund, Climate Justice Working Group).

Green infrastructure: An approach to water management that emphasizes conservation and protects local watersheds by filtering runoff.

Hazards: Events or occurrences that have the potential to cause harm to people, assets, services, or ecosystems.

Integrated Pest Management (IPM): The careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage pest populations. IPM keeps pesticides and other interventions to levels that are economically justified and minimizes risks to human health and the environment. IPM can also be used to manage invasive species.

Invasive species: Non-native plant or animal species that out-compete or displace native species, causing economic, environmental, or human harm.

Low Impact development: Systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration, or use of stormwater in order to protect water quality and associated aquatic habitat (EPA).

Mitigation: A human intervention to reduce the sources or enhance the sinks of greenhouse gases (IPCC).

Natural Climate Solutions: Conservation, restoration, and improved land management actions that increase carbon storage and/or avoid greenhouse gas emissions in forests, wetlands, grasslands, and agricultural lands.

Regenerative agriculture: Farming and grazing practices that, among other benefits, mitigate climate change by rebuilding soil organic matter and restoring degraded soil biodiversity, reducing atmospheric carbon, and improving the water cycle.

Resilience: The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organization, and the capacity to adapt to stress and change (IPCC).

Risk: The potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change (IPCC).

Sensitivity: The degree to which a system, population, or resource is affected by climate impacts or changing climate conditions.

Vulnerability: The predisposition or tendency of an asset to be adversely affected by hazards.

Executive Summary

[Note: This is a simple outline of an Executive Summary. We will complete when the CCAP is finalized, to be a stand-alone, compact version of the CCAP.]

Climate change is the most sweeping and urgent threat facing land and resource managers today. In the Columbia River Gorge National Scenic Area—an incredibly dynamic and biodiverse landscape—tribes, agencies, local governments, and communities recognize the need to act quickly and boldly to build resilience in our natural and built systems to cope with climate change (adaptation) and to reduce greenhouse gas emissions (mitigation). The Gorge Commission’s Climate Change Action Plan (CCAP) sets forth immediate and long-term actions the Commission will take to sustain a thriving, resilient National Scenic Area for future generations.

[Insert abbreviated info from the introduction – why are we doing this now and what’s at stake?]

The CCAP establishes priority climate change actions to achieve two goals:

CCAP GOAL 1: Build resilience and adapt to climate change by addressing the most pressing impacts on natural, scenic, cultural, and recreation resources and to the economic vitality of NSA communities.

Climate Change Adaptation Strategies and Priority Actions for 2022-2025



Cold water habitats



Wetlands



Culturally important plants



Oak and winter range

[The following summaries for each priority topic are in-progress. They explain how we are addressing them through strategies and actions and the impact/benefit of focusing on these priorities.]



Cold water refuge streams and riparian habitats

Rising stream temperatures threaten native aquatic species, including salmon and steelhead. Cold water refuge (CWR) habitats are limited on the Lower Columbia with 98% of total CWR volume located in 12 primary tributaries. Ten of these 12 cold water refuge streams are in the NSA.

Desired outcome of CCAP strategies for action: Streams and riparian areas, especially CWR, support native aquatic species.

Streams Strategy 1: Improve stream temperatures for fish.

Streams Strategy 2: Improve riparian vegetation cover in NSA streams.

Streams Strategy 3: Monitor streams and implement the EPA Cold Water Refuges Plan.



Wetlands

Drying conditions threaten and add stress to wetland habitats and associated species. Rare and culturally important plants that are most affected by climate change in the NSA are those associated with wetlands and waterfall spray areas. **Desired outcome of CCAP strategies for action:** Wetland quality, extent, and function improve over time.

Wetlands Strategy 1: Fill information gaps about wetlands in the NSA.

Wetlands Strategy 2: Incentivize and reduce barriers to wetland enhancement and restoration.

Wetlands Strategy 3: Develop guidance or proposed plan updates to protect wetlands and wetland species, in cooperation with gorge counties.



Tribal Treaty Rights and culturally important plants

Tribes in this region are leading numerous climate change initiatives on reservation lands and across the landscape. Through the CCAP process and into the future, the Commission is learning about Tribal priorities for climate change action and how our efforts can contribute to treaty-reserved rights. CCAP actions help to protect and enhance culturally important plants and tribal access to plant populations, while working directly with Treaty Tribes to identify additional shared climate objectives. **Desired outcome of CCAP strategies for action:** Species that have cultural significance to Treaty Tribes thrive across the landscape.

Tribal Treaty Rights Strategy 1: Coordinate with Treaty Tribes to build knowledge of culturally important plants and options for protection and enhancement.

Tribal Treaty Rights Strategy 2: Consult with Treaty Tribes to identify Management Plan policy changes or guidance to protect culturally important plants and First Foods.

Tribal Treaty Rights Strategy 3: Support Treaty Tribes in their work to restore access for traditional gathering and managing of First Foods on public and private lands in the NSA.



Oregon white oak woodlands & winter range for deer and elk

Oregon white oak woodlands are one of the most biodiverse and climate-resilient ecosystems in the NSA. Oaks are drought-hardy and fire-adapted; they are expected to expand in range under future conditions. At the same time, oak woodlands are one of the fastest changing systems due to development and fragmentation, historical fire suppression leading to conifer encroachment, and other land uses. The Management Plan recognizes oaks as highly vulnerable to land use change; it envisioned sparse rural development in oak woodlands that would support biodiversity, deer and elk winter habitat, and compatible working lands. **Desired outcome of CCAP strategies for action:** Intact and connected Oregon white oak woodlands support wildlife and biodiversity.

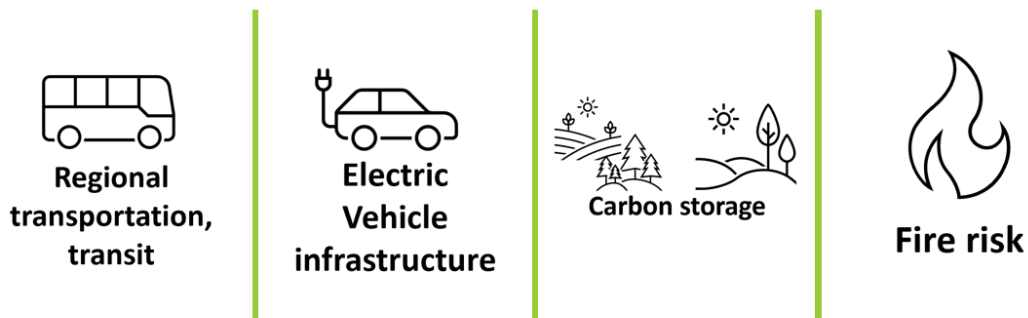
Oregon White Oak Strategy 1: Improve understanding of Oregon white oak condition and connectivity to inform policy development.

Oregon White Oak Strategy 2: Develop policy and mitigation tools to protect Oregon white oak habitat and maintain or restore connectivity.

Oregon White Oak Strategy 3: Develop policies and mitigation tools to protect winter range habitat and maintain or restore connectivity.

CCAP GOAL 2: Mitigate climate change by reducing greenhouse gas emissions and by protecting and enhancing carbon storage in the NSA.

Climate Change Mitigation Strategies and Priority Actions for 2022-2025



Regional transportation, including transit

Transportation is the greatest source of GHG emissions in both Oregon and Washington. The Commission has long understood its unique role and leadership as a regional planning body in a complex, multi-jurisdictional area with high visitation. Addressing transportation emissions through transit and planning has multiple co-benefits for equity and resource protection. **Desired outcome of CCAP strategies for action:** Transportation related emissions in the NSA are reduced.

Transportation Strategy 1: Consider options to establish specific transportation-related GHG emission goals.

Transportation Strategy 2: Leverage and build regional partnerships to reduce transportation-related emissions.

Transportation Strategy 3: Improve congestion and traffic efficiency.

Transportation Strategy 4: Help to bring transportation funding to the region.

 **Electric vehicle infrastructure**

Desired outcome of CCAP strategies for action: E-V infrastructure in the NSA reduces transportation-related emissions.

E-V Strategy 1: Participate in inclusive and proactive regional planning efforts to advance E-V infrastructure opportunities in the NSA.

E-V Strategy 2: Incentivize and reduce barriers to EV charging station development.

 **Carbon storage in habitats and working lands**

Desired outcome of CCAP strategies for action: Habitats and working lands store carbon, consistent with the NSA Act.

Carbon Storage Strategy 1: Learn more about the carbon storage contributions of different land cover types and land management practices.

Carbon Storage Strategy 2: Develop policy and mitigation tools to retain and enhance carbon storage in forests.

Carbon Storage Strategy 3: Work with partners to promote practices on all lands that build healthy soils, restore or enhance vegetative cover, and improve water quality.

 **Fire risk**

Desired outcome of CCAP strategies for action: Forest management and community actions reduce the risks of fire across the landscape.

Fire Risk Strategy 1: Build knowledge of fire risk and different strategies to inform policy development.

Fire Risk Strategy 2: Reduce fire risk on private lands.

Fire Risk Strategy 3: Coordinate with partners to advance work that improves forest health and reduces fire risk across all lands.

Sections of the Climate Change Action Plan

Introduction - Provides the context and scope of climate change action planning for the Commission.

Part I: Climate Change Adaptation in the NSA - Describes resources and values that are impacted by climate change, vulnerabilities, risks, and opportunities for the Commission to improve resilience.

Part II: Climate Change Mitigation in the NSA - Describes opportunities for the Commission to influence GHG emissions and sinks.

Part III: Commission Priority Strategies and Actions - Identifies near-term priority actions for 2022-2025 and longer-term actions for Commission consideration as capacity allows or new information emerges.

Part IV: Tracking Progress and Measuring Success - Describes a framework for tracking progress toward CCAP goals and priority actions, integrating with the Vital Sign Indicators (VSI) program.

Part V: CCAP Implementation Guide - This tool provides a quick reference table of priority actions with supporting details including timeframe, cost, and anticipated impact of each action.

The Commission is already implementing priority actions described in the CCAP. In 2023, staff will report on the status of accomplishments and outcomes, according to the Measures of Success chapter, and determine any updates needed to the CCAP or the detailed **Implementation Guide Part III** of the CCAP is intended to be revisited often, updated as needed, and maintained as a “living document” and management tool.

Introduction

Urgency and Importance

Climate change poses wide-reaching, rapidly progressing impacts on the people, land, water, and resources of the Columbia River Gorge. The latest Intergovernmental Panel on Climate Change (IPCC) report released in 2020 emphasizes the role of land and land use in climate change, noting the obvious, yet fundamental truth: “Land provides the principal basis for human livelihoods and well-being, including the supply of food, freshwater and multiple other ecosystem services, as well as biodiversity.”

The Columbia River Gorge Commission (Commission) has the authority and imperative to manage land and land uses in the National Scenic Area (NSA) for the protection of scenic, natural, cultural, and recreation resources, and gorge economies, in the face of accelerating climate change. The Commission is addressing climate change because we have an important regional role to play in a unique and treasured place, where coordinated actions across jurisdiction are necessary.

The National Scenic Area Act identifies two purposes:

To establish a national scenic area to protect and provide for the enhancement of the scenic, cultural, recreational, and natural resources of the Columbia River Gorge; and

To protect and support the economy of the Columbia River Gorge area by encouraging growth to occur in existing urban areas and by allowing future economic development in a manner that is consistent with the first purpose.

Columbia River Gorge National Scenic Area Landscape Context

The NSA spans 252,000 acres along 80 miles of the Columbia River in north-central Oregon and south-central Washington. Although a compact geographic area, the NSA contains both vertical and east-west gradients that support a diversity of flora, fauna, and human cultures. Stewards of the gorge include the Tribes who have lived in this area for millennia, government entities that manage lands and resources, families and individuals who work the land to produce forest and agricultural products, and dozens of organizations and agencies inside and around the NSA with diverse interests and responsibilities. Resources, people, and economies flow across boundaries in this unique landscape.

The National Scenic Area Act formed the Columbia River Gorge Commission as an interstate compact with Oregon and Washington to co-manage the NSA with the USDA Forest Service. This governance structure provides the Commission with unique land use authorities to protect and enhance scenic, cultural, natural, and recreation resources. In the face of a changing climate, the Commission must address climate change impacts to the resources it is charged with protecting in order to achieve its mandate.

The Management Plan for the Columbia River Gorge National Scenic Area

The Management Plan for the Columbia River Gorge National Scenic Area establishes goals and policies for resource protection in the NSA. Provisions in the Plan provide strong protections for ecosystems and biodiversity, acknowledging threats from land uses and development. However, the original Plan did not acknowledge climate change or the magnitude and speed of climate change impacts to NSA resources and communities.

In 2020, the Commission and USDA Forest Service completed its decennial review and revision of the Management Plan. Throughout the process, members of the public of all ages from across the gorge and various organizations urged the Commission to develop climate change policies. Recognizing the need to explicitly address climate change in the revised Management Plan, the Commission added a new climate change chapter that prioritizes building climate change resiliency in the NSA and reducing greenhouse gas emissions in the region.

The CCAP generates actions that result in Management Plan policy changes; implementation guidance and best management practices; partnerships and support for other efforts; and long-term monitoring and information sharing at a regional level.

In addition to the Management Plan, this CCAP supplements other federal, state, local, and tribal plans and incorporates emerging information from new plans to the greatest extent possible. A list of related plans is included in [Part IV](#).

We heard from you

These public comments on Gorge 2020 shape the CCAP:

Ecosystems: Protect and enhance wetlands, ponds, lakes, water quality and quantity, riparian vegetation, cold water habitat, upland vegetation, and open space.

Fish and wildlife: Protect climate sensitive salmon, lamprey, western pond turtles, and pika.

Transportation: Establish a common regional vision for integrated transportation throughout the gorge. Focus on equitable transit and relieving congestion; integrate climate goals with regional safety, connectivity, livability/workability, and pollution reduction goals.

Agriculture: Share knowledge and encourage farm practices that reduce synthetic chemicals, store carbon, and manage for soils, grasses and riparian plants, not weeds.

Record-breaking conditions are becoming the norm

The Fourth National Climate Assessment reported that conditions in the Pacific Northwest during 2015 were likely to become a “new normal” for the region. Extremes that summer included average temperatures 3.4 degrees above normal, drought declarations in 24 counties, and a record-breaking fire season with 1.6 million acres burned. Winter temperatures were 6.2 degrees above normal, with snowpack at the lowest recorded levels for the region. These factors affected tribal fishing and salmon populations, farmers and irrigation, recreation opportunities, and much more (Wozniak 2018).

Ice storms and landslides in Skamania County during February 2017, along with several other extreme weather events that month, prompted Washington Governor Jay Inslee to request federal emergency funds from then President Trump (Inslee 2017).

In late summer 2017, the Eagle Creek Fire burned 50,000 acres in Oregon and windborne embers ignited across the river in Washington. Due to weather conditions and rugged terrain, the fire burned for 3 months before firefighters achieved containment (Travel Oregon 2018).

During the summer of 2021, the Pacific Northwest experienced unprecedented heat waves. Health authorities in Oregon and Washington estimated a death toll of at least 200 people by mid-July from heat effects. Those most affected include farm workers and other laborers, the elderly, and those with underlying health conditions.

These extremes help to focus our attention on the urgency and dangers of climate changes. Equally important are gradual and not-so-gradual **climate-related trends**. Here are just a few:

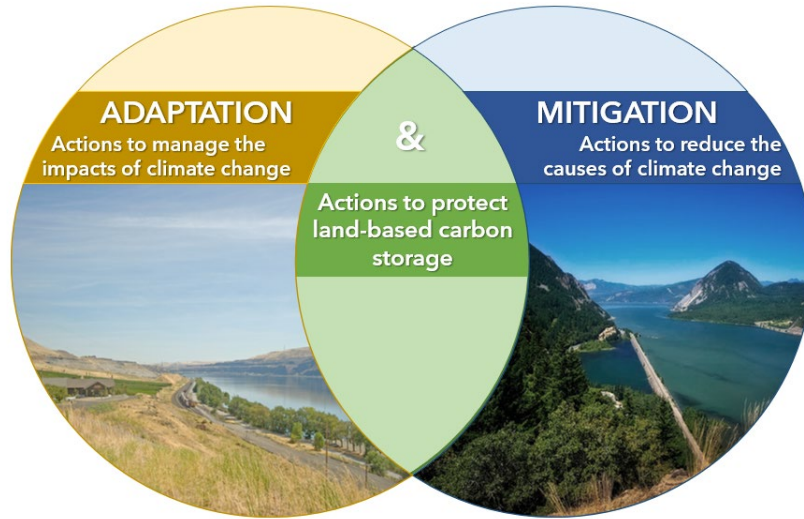
- Water temperatures are rising in the Columbia River, and Chinook and sockeye salmon runs are trending earlier year after year.
- Changing and narrowing plant bloom times and earlier spring green-up are affecting rare and culturally important plants, agricultural crops, and wildlife.
- Conditions increasingly favor non-native, invasive species, especially grassland plants and aquatic species.
- Drying conditions along with development in the wildland-urban interface mean that much of the gorge is at high fire risk.
- Gradual shifts in vegetation and water features affect scenic resources, as described by Landscape Setting descriptions in the Management Plan.
- Increasing visitation and local recreation use, along with longer shoulder seasons, raise the potential for disturbance and degradation of climate sensitive habitats and species.
- Continuing fragmentation of intact natural landscapes from human development and activity add stress to climate sensitive species.

CCAP objectives and scope

This CCAP gives direction to staff and Commissioners to implement immediate priority actions through 2025 that build climate resilience and mitigate greenhouse gas emissions. The CCAP also provides foundational information about the impacts that climate change has on the scenic, natural, cultural, and recreation resources and values in the National Scenic Area and reflects our best understanding of the wide array of adaptation and mitigation activities we can work toward in the future. The CCAP is intended to be revisited often, updated as needed, and maintained as a “living document” and management tool.

Adaptation and Mitigation to Build Resilience

The CCAP takes an integrated approach to building **resilience** in the face of climate change. Both adaptation and mitigation actions are needed.



Adaptation and mitigation are important components of the CCAP

Resilience is “the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organization, and the capacity to adapt to stress and change.” The Commission and Forest Service share a commitment to building climate resilience for the scenic, natural, cultural, and recreation resources we protect and enhance. As a regional entity, the Commission can also support local communities and the larger area in building resilience to the impacts of climate change while addressing the drivers of climate change.

Equity in Climate Adaptation and Mitigation

The worst effects of climate change are disproportionately experienced by communities of color, tribal communities, and rural communities (State of Oregon Climate Equity Blueprint 2021), and those who rely upon natural-resource economies. These individuals or groups have been historically excluded from discussions and efforts to find solutions to climate impacts. We begin to address these historical and on-going inequities by exploring actions that would proactively engage voices we do not hear often in our agency, including BIPOC residents, workers, and visitors.

Staff has focused this first phase of developing a CCAP on learning and listening to understand ways we can intentionally address the impacts our actions have on all people who value the NSA or are affected by the Commission’s decisions. Through our agency-wide diversity, equity, and inclusion (DEI) initiative, we are actively seeking to educate ourselves, build relationships and foster communication with community members, and expand our perspectives about the work that we do and how we can better serve the people who live in and visit the NSA. Social and economic resilience are important outcomes we hope to achieve through climate change action planning, informed by our DEI efforts.

Throughout the CCAP, you will see this icon to indicate an **opportunity to promote equity**. Equity is an important consideration for all areas of climate change efforts. This icon simply helps to highlight a few of the clearest connections between the Commission’s work or influence and equity outcomes. Among the topics with the greatest potential for improving equity outcomes are: Tribal Treaty Rights and culturally important plants, nature-based tourism, agricultural uses and products, and regional transportation, including transit.



Tribal Sovereignty and Leadership in Climate Adaptation

Recognizing the sovereignty of tribal nations and the reserved Treaty Rights of the four Columbia River Treaty Tribes includes working toward the climate change priorities of those who have lived sustainably with the land for thousands of years, guided by deep commitment to steward the water, land, plants, and animals that sustain human life. Indigenous people are often deeply experiencing the impacts of climate change and have important knowledge about ecological and community resilience. We look to their knowledge and adaptation strategies to inform our actions and are pursuing government-to-government opportunities to work with Treaty Tribes on climate change action. Throughout the action plan, we identify opportunities to uphold Tribal Treaty rights as a key priority and emphasis for climate change action.

Integrating New Information and Adjusting Priorities: Vital Sign Indicators Program

Primarily through the Vital Sign Indicators (VSI) program, and by partnering with others to integrate science and monitoring into our decision making, the Commission will continue learning, implementing climate actions, and evaluating our impact. In partnership with the USDA Forest Service, the Commission employs the VSI program to evaluate the long-term health of scenic, natural, cultural, and recreation resources, and local economies, of the National Scenic Area. Vital Sign Indicators are high-level measures that guide assessment of progress toward Management Plan goals. Building on the original 2009 VSI effort, the Commission and Forest Service are currently working with partners on a comprehensive VSI update. VSI supports CCAP actions in these ways:

- Filling key information gaps about water resources, rare species, and priority habitats.
- Tracking changes so that we know when we are moving toward or away from desired conditions and establishing thresholds for a change in action.
- Learning about the impacts of climate change on resources and communities.
- Assessing the effectiveness of our climate change actions.

Examples of climate-focused Vital Sign Indicators include temperature and flow in streams providing cold water refuge habitat for migrating salmon and steelhead and distribution of wildfire and fuels reduction treatments on National Forest System lands in the NSA. The CCAP is designed to be regularly updated to incorporate new information and to reassess priorities to address emerging concerns. The Commission intends to re-set priority actions for staff and Commissioners every 2-5 years, as we check in on our progress and evaluate outcomes.

Part IV of this action plan describes how we will track progress and adapt the action plan as we achieve actions and align our priorities to address urgent needs and opportunities. More details on how Vital Sign Indicators connect with CCAP actions are included here.

Monitoring Partnerships

Work is underway with the EPA, WA Department of Ecology, OR Department of Environmental Quality, USDA Forest Service, Columbia River Inter-Tribal Fish Commission, and other partners to create a CWR monitoring network across the National Scenic Area. Together, the Gorge Commission and partners can use stream temperature and flow data to inform a variety of habitat protection strategies including stream restoration, land use policy, and voluntary landowner stream enhancement projects.



Photo credit: critfc.org

Structure of the CCAP and How to Use the Action Plan

The CCAP is organized in four sections. **Part I** synthesizes information from several sources to describe how vulnerable and adaptive key resources in the NSA are to climate change. **Part II** explores opportunities and options for mitigating climate change by reducing greenhouse gas emissions and storing carbon. **Part III** identifies specific priority actions that staff and Commissioners intend to pursue from 2022-2025, based on established criteria. It also includes potential future actions that can be pursued as capacity and funding allow, or as priorities shift in the future. **Part IV** provides a framework for tracking progress and ensuring that new information is regularly incorporated into the CCAP to inform future priorities.

The **Implementation Guide** serves as a checklist and a staff work plan, describing in more detail each priority action, who is responsible, what resources are required, and estimated timelines.

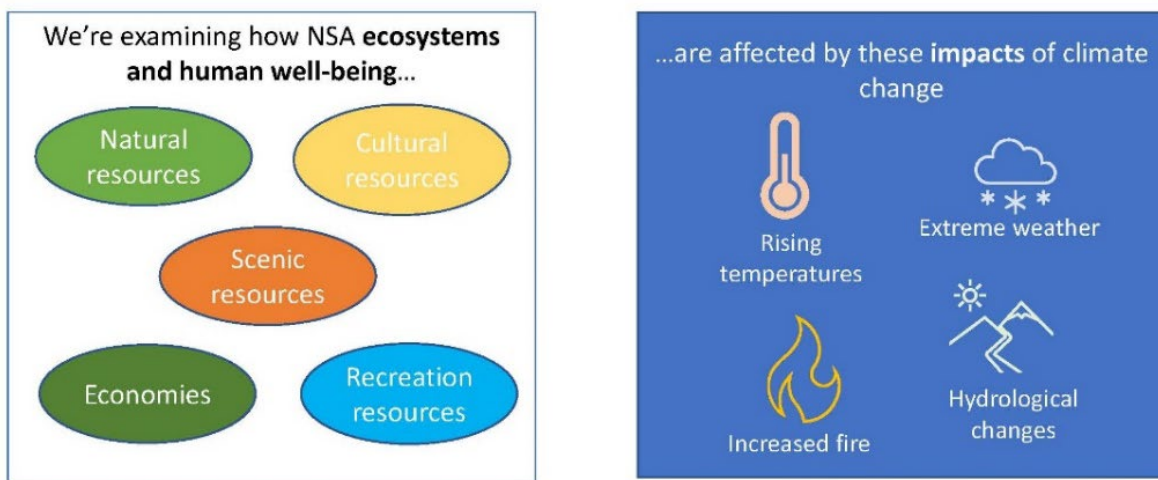
PART I: Climate Change Adaptation in the National Scenic Area

DRAFT FOR MARCH 8, 2022 COMMISSION MEETING

A. Climate Change Adaptation in the National Scenic Area

The National Scenic Area is home to incredible biodiversity, cultural diversity, and diversity in land uses and activities. Goal 1 of the CCAP is to address the most pressing impacts of climate change on natural, scenic, cultural, and recreation resources and on the economic vitality of NSA communities. To achieve this goal, we began by assessing climate change vulnerabilities for resources and values protected in the National Scenic Area. These values, described on the next page, include **ecosystems and natural resources** and aspects of **human well-being** that rely upon natural resources (cultures, natural resource economies, and health and safety). Resources and values in the CCAP reflect the Commission’s responsibilities and the Management Plan’s goals.

Economic impacts from climate change are far reaching and interconnected with many protected resources and land uses in the NSA. In this section, these impacts are addressed within the context of specific topics below including Tribal Treaty Rights and culturally important plants; nature-based tourism, agricultural uses and products; and forestry and forest products.



Approach to assessing climate change adaptation needs and opportunities in the NSA.

Resources and Values Reviewed for Climate Change Adaptation

We considered each of these resources and values in our assessment of climate change vulnerabilities, reflecting the two purposes of the NSA Act and the Management Plan. The snapshots that follow describe only those resources with medium, high, or very high rankings. Snapshots one of the key criteria we used to select climate change adaptation priority topics and actions with greatest potential impact, in [Part III](#) of the CCAP.

Ecosystems and Natural Resources

Priority Habitats protected by the Management Plan

- Water-related habitats: Riparian/streams, wetlands
- Forests: Aspen, old-growth, Oregon white oak woodlands, coniferous forests
- Other terrestrial habitats: Grasslands, shrub-steppe, dunes, winter range for deer and elk
- Habitat sites and features: Caves, snags and logs, talus, cliffs

Other natural resources protected in the Management Plan

- Rare and endemic plants
- Fish species requiring cold water refuge habitat
- Sensitive wildlife species: Western pond turtle, pika

Human Well-Being

Cultural Resources (see also natural resources)

- Tribal Treaty Rights including culturally important plants
- Cultural sites: Historic and archaeological sites
- Cultural traditions and ways of life

Scenic Resources

- Air quality
- Scenic views from Key Viewing Areas

Recreation Resources

- Recreation opportunities, access, experience: warm-weather activities, snow-based activities, wildlife-based activities, water activities, forest products and traditional gathering
- Recreation infrastructure

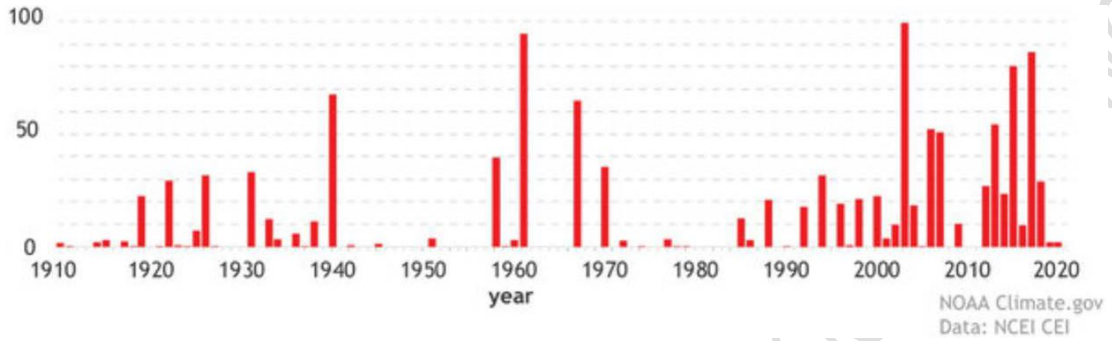
Other key assets and values affected by climate change

- Nature-based tourism
- Public and private infrastructure
- Agricultural uses and products
- Forest uses and forest products
- Livability and workability (particularly related to heat)

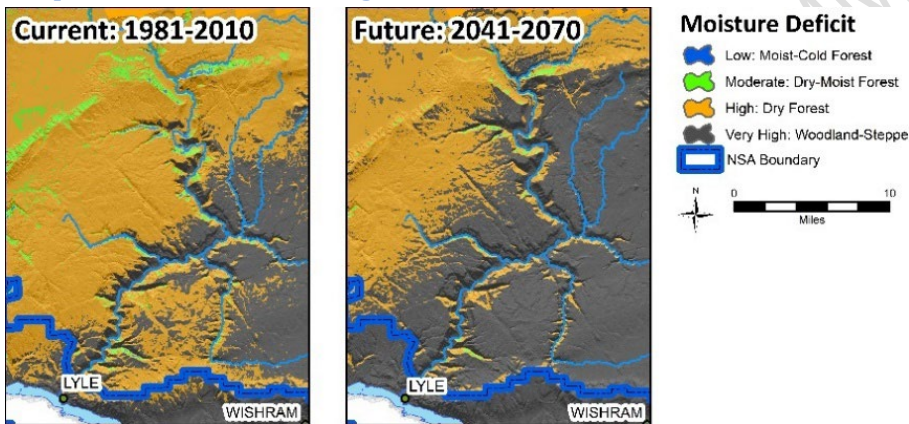
Major climate stressors in the region requiring adaptation

Rising air and water temperatures

Percent area of Oregon, Washington, and Idaho having extremely hot daytime high temperatures

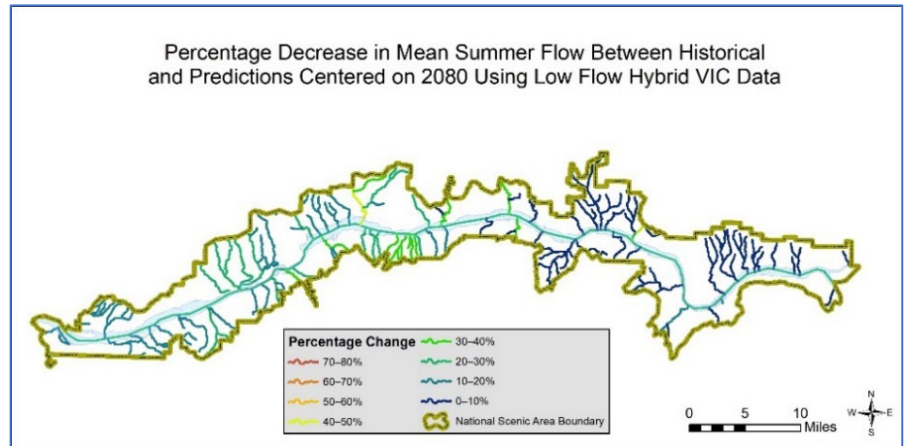


Frequent and sustained drought



Current (left) and future (right) moisture stress levels based on water balance deficit.
Adapted from WA Dept of Natural Resources 2020 Klickitat Landscape Evaluation Summary.

Reduced and flashier stream flows



Vulnerability assessment methods

For each resource or value, we describe sensitivity to climate changes, and the adaptive capacity, or ability to handle climate changes.

Step 1: Assign a qualitative sensitivity score

Sensitivity is the degree to which a system, population, or resource is affected by climate impacts or changing climate conditions. Examples:

High: Complete failure of resource or habitat function

Medium: Diminished health or function of resource

Low: Little to no impact

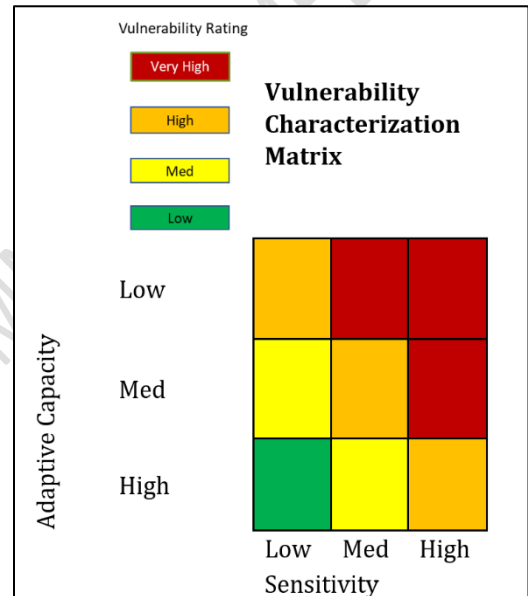
Step 2: Assign a qualitative adaptive capacity score

Adaptive Capacity is the ability of a system, population, or resource to adjust to, or moderate, potential damages caused by climate-related impacts to preserve or enhance functionality.

Low: Are there barriers that prohibit adaptation? Is the rate of climate change expected to be greater than the pace of adaptation?

Medium: Are there sufficient efforts underway to address climate impacts on this resource?

High: Can the resource accommodate changes naturally?



Step 3: Determine the vulnerability using the matrix

Vulnerability is the predisposition or tendency of an asset to be adversely affected by impacts. To assess vulnerability to climate change, we ranked sensitivity and adaptive capacity of protected resources and values in the NSA. Vulnerability is the combination of sensitivity and adaptive capacity from **Very High** to **Low**.

B. Climate Change Vulnerability Snapshots

The rankings and narratives below are “snapshots” of resource vulnerabilities, based on sensitivity and adaptive capacity. This section focuses on resources and values with high climate change vulnerability rankings; it does not describe all resources we reviewed. Some of the descriptions include non-climate stressors that exacerbate sensitivity to climate change impacts or hinder natural adaptation to those impacts. Economic impacts are considered throughout, and specifically addressed for Tribal Treaty Rights and culturally important plants, nature-based tourism, agricultural uses and products, and forestry and forest products.

Vulnerability Data

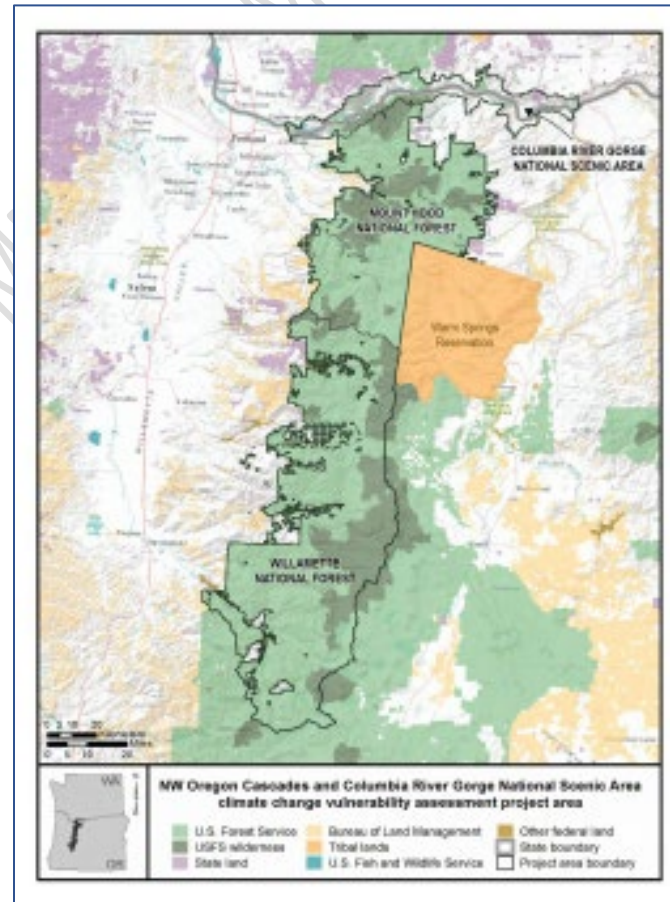
Snapshots incorporate findings of the **Forest Service climate change vulnerability assessment for the Columbia River Gorge National Scenic Area, Mt. Hood National Forest, and Willamette National Forest** (Halofsky et al. *in press*).

This assessment uses the RCP 8.5 emission scenario (high emissions; “business as usual”) to model climate change effects on vegetation, water resources, recreation, fish and wildlife, infrastructure, and ecosystem services.

Additional data and information sources are cited in the snapshots.

Climate Adaptation Emphasis Areas

Each snapshot includes a “Climate Adaptation Emphasis” section, summarizing the approaches the Commission will take to protect and enhance climate sensitive resources. These are the basis for more detailed strategies and actions described in Part III.



1. Ecosystems and Natural Resources



Cold water refuge streams and riparian habitats

Sensitivity: High | Adaptive Capacity: Low | Vulnerability: Very High

Stream and riparian function is affected by reduced snowpack, warming air temperatures, drought, and flooding. Climate change will result in warmer water temperatures, altered hydrology, higher evapotranspiration, and drier soils. Drought tolerant conifers may replace riparian hardwoods that provide unique habitat for insects, migratory birds, and other species.

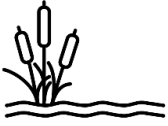
Several native fish species are highly sensitive during mid-July through mid-September when Lower Columbia River temperatures often exceed 20°C (68°F). Disease, stress, and decreased spawning success are more prevalent at warmer temperatures and fish survival requires a certain temperature range (e.g., steelhead begin to use cold water refuge at 19°C (66°F) or higher; Chinook at 20-21°C (68-70°F)). The pace of temperature change is likely faster than species' abilities to adapt. There are extensive salmon recovery efforts and an increasing focus on cold water refuge habitat work in this stretch of the Columbia River. Cold water refuge habitats are limited and many of the most critical for the mainstem are located in the NSA.

Climate change will result in altered timing and magnitude of streamflow, including reduced summer baseflows and increased frequency and magnitude of winter flooding. These changes impact aquatic life in several ways including reduced habitat quality and quantity in summer, and increased scouring of salmon redds with more severe floods in winter. Detrimental effects of winter flooding will be exacerbated by increased frequency and magnitude of wildfires, also expected with climate change. Soil erosion from burned areas will affect water quality.

Algal blooms are increasing as temperatures rise, endangering fish, wildlife, pets, and people.

Non-climate stressors that contribute to a Very High vulnerability ranking include dams and water diversions, as well as water quality changes from pollutants and sedimentation. Columbia River tributaries in the eastern gorge are located in agricultural and residential area and, according to EPA, are most at risk to becoming too warm for native fish.

Climate adaptation emphasis: Build resilience by protecting and enhancing streams, water quantity and quality, and riparian vegetation, particularly along tributaries providing fish habitat and cold water refuge along the Columbia. Build partnerships with the state and federal agencies responsible for monitoring and meeting new Total Maximum Daily Load (TMDL) standards for temperature on cold water refuge primary tributaries. Support implementation of [EPA Columbia River Cold Water Refuges Plan](#).



Wetlands and wetland species

Sensitivity: High | Adaptive Capacity: Low | Vulnerability: Very High

Wetlands and wetland-associated species are sensitive to hydrological changes, including reduced precipitation and increased drought. Adaptation is limited, particularly for isolated surface water wetlands that are dependent on overland flows. Groundwater and surface water wetlands are affected by water diversions and withdrawal, as well as reductions to overland flows.

Invasive terrestrial and aquatic species affect wetland function and native biodiversity. Wetland-associated rare plants and culturally important plants are among the most vulnerable plants to climate change impacts (Fertig 2021; Review Committee input). More information is needed on wetland condition and wetland change in the National Scenic Area.

Climate adaptation emphasis: Fill information gaps about wetlands in the NSA. Work with the Forest Service and other land managers to promote wetland enhancement and restoration, including overland flow. Develop guidance or proposed Management Plan updates to achieve the goal of no wetland loss, in cooperation with gorge counties. Help educate gorge planners about wetland species and best practices.



Grasslands/prairies

Sensitivity: Med-High | Adaptive Capacity: Medium | Vulnerability: High

Grasslands in Oregon and Washington are sensitive to drought and warming air temperatures, hydrologic shifts, and changing fire dynamics. The consequences of these changes include conversion to invasive grasses like *Ventenata dubia* (wiregrass), with shallow roots that contribute to soil erosion. Studies show that wiregrass is likely to outcompete cheatgrass, a problematic invasive in other areas, under climate change conditions (Harvey et al. 2020).

Many invasive species are more competitive in warming environments or under more frequent fire regimes and can be considered climate-related stressors. Invasive species can also be non-climate stressors in cases where human caused disturbances promote the spread or proliferation of weeds (grading, new roads, some grazing practices, etc.).

Grassland bird populations are in decline and grassland habitats are among the most threatened nationwide from non-climate stressors including wind, solar, and other development, and habitat fragmentation. In the NSA, the greatest potential for new development and new land divisions occurs in the eastern gorge in grasslands and scablands.

Grasslands store significant carbon in soils and vegetation and may be more reliable for long-term carbon storage than forests under climate change conditions (Dass 2018).

Climate adaptation emphasis: Learn more about soil condition, carbon storage capacity, and invasive grasses in the gorge. Evaluate Management Plan policies to require or support natural climate solutions in the eastern gorge. Promote or encourage restoration of native plant communities.



Oregon white oak woodlands

Sensitivity: Medium | Adaptive Capacity: Medium | Vulnerability: Med-High

Oregon white oak habitats provide for high biodiversity (ECOP). Some of the areas predicted to be most resilient in the face of climate change, due to their biophysical diversity and intactness, are located in the central and eastern gorge oak systems (The Nature Conservancy). This makes them important areas to protect into the future.

Oak systems are drought-tolerant and may benefit from increased fire frequency if other non-climate stressors are reduced and active management and restoration is increased.

However, Oregon white oak habitat and oak-dependent wildlife are **not secure** in the face of climate change impacts, given their reduced extent and fragmentation driven by non-climate stressors (land development, conifer encroachment, invasive species, and recreation). Dispersal will become more difficult for oak-associated species. Additionally, species such as Western gray squirrel, woodpeckers, and rare butterfly species may be especially sensitive to habitat changes.

Climate adaptation emphasis: Coordinate with East Cascades Oak Partnership to advance work on best management practices, oak condition monitoring, restoration, permanent conservation, policy tools, etc. Maintain connectivity and look to tighten policies to prevent fragmentation. Investigate and promote incentives for agricultural practices that protect and enhance Oregon white oak. Promote restoration and forest health enhancement of native oak communities.



Winter range for deer and elk

Sensitivity: Med-High | Adaptive Capacity: Medium | Vulnerability: High

Climate stress from drought and extreme winters will affect deer and elk during the taxing winter months, when they are feeding primarily on woody shrubs. Herds follow the green-up to access forage in springtime; in many cases the longer growing season will increase the availability of green plants.

Compounded with habitat loss and fragmentation, disease, and invasive species (see grasslands and Oregon white oak above), big game populations are likely to shift their ranges and be reduced in number. These shifts will have socioeconomic effects on First Foods and tribal culture, wildlife management, hunting opportunities, wildlife viewing, and sense of place.

Climate adaptation emphasis: Evaluate the effectiveness of current Management Plan protections for winter range. In concert with work on oak woodlands habitats, engage state wildlife agencies and East Cascades Oak Partnership to prioritize winter range habitat areas for protection. Draft Management Plan policies, such as limiting new cultivation, to maintain key winter range areas.



Coniferous forests

Sensitivity: Medium | Adaptive Capacity: Medium | Vulnerability: Med-High

Forests in the gorge include moist westside forests dominated by Douglas fir and western hemlock; dry fir-dominated forests; dry pine; and Oregon white oak woodlands. A limited amount of cold subalpine forests is found at higher elevations. Forests in the gorge provide biodiversity and many First Foods. More information is needed to predict and adapt to changes in the ranges and persistence of forest First Foods. Maintaining and increasing tribal access to these forest resources aligns with Traditional Uses, described above, and indigenous land management practices enhance forest First Foods.

Increased air temperatures, drought, and reduced snowpack will impact coniferous forests in the National Scenic Area. Douglas fir will continue to dominate western forests, with drought-intolerant species, like western hemlock, declining. In drier forest types, ponderosa pine is likely to do well. Drought-related tree mortality may shift forests to woodlands or shrublands on dry sites, and invasive grasses are likely to increase in the understory. Drought periods have been longer and more frequent in recent years throughout the West. Forests under drought stress are experiencing more frequent and severe infestations of native and nonnative insects and diseases.

Abrupt shifts from forest to non-forest types are predicted for many western forests, following severe fire (Serra-Diaz et al. 2018). The NSA, considered entirely a wildland-urban interface area (WUI), is managed by multiple fire response agencies for complete fire suppression to protect people and property. Nonetheless, conditions in the steep and windy gorge can lead fires to spread rapidly, as seen in the 2017 Eagle Creek Fire. Native understory vegetation and soils are vulnerable to high-intensity fire and post-fire flooding, and invasive grasses are increasing in western forests under climate change conditions. Soil loss and sedimentation in streams is a concern for forest streams.

Overall, coniferous forests are predicted to persist, with changes in species composition and structure described above. However, when we consider increasing fire activity as a climate change hazard, coniferous forests are at **high risk** for conversion to non-forest and invasive species. See the discussion **beginning on page X** of climate change risk rankings.

Climate adaptation emphasis: Engage and encourage state agencies to incorporate climate change strategies into forest practices, forestry programs, and funding. Consider creating forest practices policy recommendations. Focus on reducing wildfire risk by limiting new development in forests and by providing guidelines and reducing permitting barriers for forest resilience treatments (thinning, burning, etc.). Pursue gorge wide Fire Adapted Communities initiatives.



Talus

Sensitivity: High | Adaptive Capacity: Low | Vulnerability: Very High

Talus slopes are limited and fairly isolated from one another in the NSA. Climate change impacts include thermal and moisture stress from rising air temperatures. Talus-dwelling species with specialized temperature and habitat needs, like the Larch Mountain salamander and American pika, are particularly sensitive to these changes. The moss layer covering talus slopes and multi-story forest canopy cover help to maintain microclimates. Talus slopes often occur in or near recreation hot spots, where they can be subject to trampling or disturbance. Other non-climate stressors include timber harvest, mining, and development.

The vast majority of recent pika observations occur on USFS or other public lands, primarily in Open Space or SMA Forest designations. There are discrete areas of pika habitat that are in mixed public and private ownership and GMA Forest Land Use Designations where rock quarries, utilities, and timber lands dominate current development.

Climate adaptation emphasis: Work with researchers and agencies to identify opportunities to regulate or manage recreation and new mining activity in talus. Learn from studies underway about effective management interventions to offset climate impacts to wildlife, including retaining canopy cover over talus patch edges. Consider policy changes to limit mining in talus.

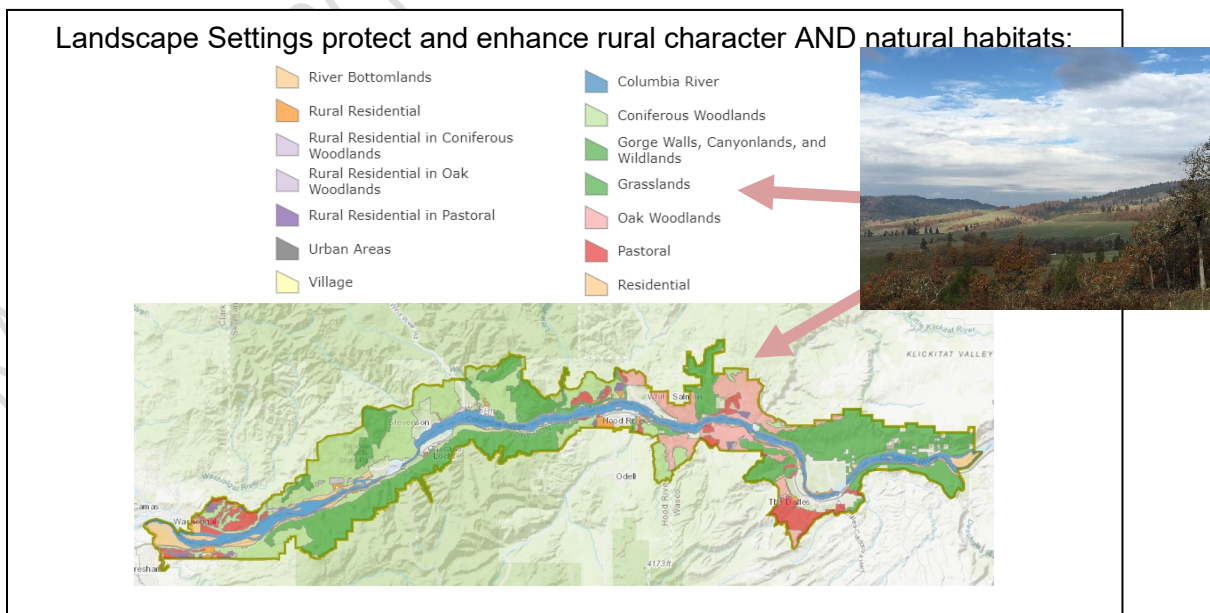
2. Human Well-Being



Scenic resources

There are two primary ways the Commission and U.S. Forest Service protect scenic resources in the NSA. The first is by maintaining views from **Key Viewing Areas (KVAs)**, ensuring that human development is either not easily seen or does not distract from the natural landscape. We protect scenic views by minimizing the amount of human development (buildings, roads, mines, etc.) that is visible from KVAs and by requiring design standards for building colors, materials, and dimensions. Development must be screened topographically or with drought-tolerant trees and shrubs. With these safeguards in place, climate change is not likely to influence the way that *new development* affects scenic resources.

The second approach to scenic resources protection considers the physical, biological, and human elements of scenery. **Landscape Settings** are used to describe the entire NSA – each setting has unique visual, ecological, and cultural characteristics. For example, the oak-pine woodland Landscape Setting is defined by dominant tree species (Oregon white oak or mixed oak-pine or oak-fir) punctuated with open grassy meadows, agricultural uses and rural developments. Landscape Settings describe how fire shapes each area, the wildlife species that inhabit each area, and the types of water bodies one might see. The ecosystem vulnerabilities in the first part of this chapter, all contribute to scenic changes, as do the human elements described in this second half. By protecting and enhancing cultural, natural, and recreation resources, Landscape Settings are also maintained.



To measure scenic integrity, the USDA Forest Service is modeling intactness of Landscape Settings as part of VSI. With this tool, we can track whether areas are moving toward or away from the desired conditions described in Landscape Settings. What will policy makers do with this integrity information? We can identify areas of concern, where conditions are moving away from Landscape Settings in terms of vegetation and habitats, ecological processes, development, and land uses. We can also identify areas of opportunity to enhance scenery toward desired Landscape Settings. These areas may require updated land use policies to protect scenic resources in a changing climate. The Management Plan specifies a policy for reevaluating landscape settings during Plan Review, so there is a process in place to address updated information.

Climate Adaptation Emphasis: Upon completion of the Scenic Integrity model, evaluate how Landscape Settings can be used to evaluate and protect scenic resources, and whether other methods of climate change adaptation to protect scenery could be useful.



Tribal Treaty Rights and culturally important plants

Sensitivity: High | Adaptive Capacity: Low | Vulnerability: Very High

Climate change affects the availability (timing and locations) of culturally important foods, medicines, and practices. Resource availability affects traditional practices of fishing, hunting, gathering, trading, and ceremonies at the individual and community level. The Oregon Climate Assessment (2021) describes “connections with traditional familial sites, homelands, and spaces, including burial grounds and sacred sites that generally are not disclosed outside the tribes, remain vital and sacred aspects of tribal identities. These connections and, often Tribe- and location-specific hunting, gathering, and cultural practices, are essential to each Tribe’s well-being and to Tribal members’ senses of place and self.” Reduced access and land development exacerbate climate change impacts on these traditions and on cultural, spiritual, and economic well-being.



opportunity to
promote equity

Traditional foods provide "physical health and well-being; sustenance; medicines for physical, spiritual, and mental health; ceremonies; community; and economic prosperity" (Dalton and Fleishman 2021). Many First Food plants are associated with wetlands, wet meadows, seeps, and riparian areas. Some members of the Review Committee suggest considering these water features to be on-the-ground indicators that First Foods might be present. Studies show that the most climate vulnerable rare and endemic plants in the gorge are those associated with wetlands and waterfall spray zones (DNR). Cliff plants also have limited opportunity to shift their ranges as conditions change.

Plants in the NSA are sensitive to hydrologic changes (earlier runoff and drought), warming temperatures, frost events, and sun scorch. These impacts are expected to result in range shifts, reduced populations and increased invasive species, and changes in the timing of green-up and flowering. These changes affect how tribal members use and steward plants and traditional gathering sites.

Tribal members and agency staff we have spoken with emphasize the importance of access to land for gathering traditional foods, particularly those not found on reservation lands.



Recreation Resources

Recreation is an important value in the NSA, protected by the National Scenic Area Act and allowed by the Management Plan in most land use designations. While the Plan guides the development of new recreation sites, amenities, and uses, the on-going administration and visitor management of recreation sites is largely up to recreation managers.

An emphasis for the Commission's CCAP is to ensure that recreation sites and recreation developments contribute to a resilient Gorge, and to emissions reduction and carbon storage, where appropriate. The U.S. Forest Service, Oregon State Parks, Washington State Parks, Army Corps of Engineers, U.S. Fish & Wildlife Service, land trusts, and various other private and public entities are key partners in providing sustainable recreation opportunities for the public. The Commission is dedicated to supporting these entities in their climate change resilience endeavors, and to engaging transportation agencies and municipalities in resolving traffic and safety concerns related to recreation.

Recreation opportunities and their vulnerabilities to climate impacts vary throughout the Gorge and throughout the year:

Snow-based Recreation

Sensitivity: High | Adaptive Capacity: Medium | Vulnerability: Very High

Snow sports in the NSA (e.g., cross-country skiing and snowshoeing) are highly sensitive to warmer air temperatures and a shift from snow to rain during the winter months. Reduced snow-based recreation opportunities are expected, with developed sites potentially able to create snow. Outside the NSA, nearby ski resorts will decline or be forced to diversify, impacting Gorge businesses dependent on winter recreation tourism. Recreationists will need to choose different locations where snow-based recreation is possible or choose alternative activities. While recreationists and managers are capable of shifting their activities in response to impacts, there will be costs associated with these shifts and snow-based recreation opportunities will be diminished.

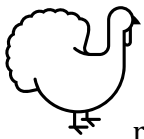
Warm-weather Recreation

Sensitivity: Low | Adaptive Capacity: Medium-High | Vulnerability: Low-Medium

Of greater concern to the Commission and land managers is the increase in warm weather recreation (hiking, biking, nature-viewing, etc), and extended "shoulder season" visitation. Increased recreation and tourism in the region is a growing concern for many reasons, including site capacity, traffic and parking, safety and emergency response demands, impacts to tribal fishing sites, and impacts to sensitive natural areas. Closely related is the growing population,

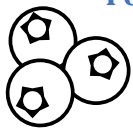
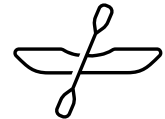
particularly in urban centers near the Gorge. Climate impacts will increase the costs of maintenance for recreation infrastructure due to increased flooding, landslides, fires, invasive species, and resource sensitivity. Wildfire can degrade scenery, reduce access, and affect how visitors are distributed. Post-fire recovery efforts require a huge investment of funds and capacity of land management agencies. Managers will face new challenges when closures increase visitation pressure in surrounding areas, and in making decisions about sustainable trail design and maintenance.

Other recreation and parks activities, many of which contribute to local heritage values:



Wildlife based activities – Hunting, fishing, viewing, photography, etc. depends on the distribution, abundance, and population health of various species. Effects will vary by location and by species. The Commission’s work to protect and enhance natural resources will in part support wildlife-based recreation.

Water based activities – Rafting, kayaking, wind sports, floating, swimming, etc. will likely see similar challenges as warm-weather activities described above. Recreation sites with water features, such as waterfalls and rivers, already tend to see heavy, concentrated use. Lower streamflow and reservoir levels can decrease demand, and interact with temperature and land use to cause algal blooms.



Forest product gathering or traditional gathering based activities will also experience many of the effects described for warm-weather recreation above. Plants will be affected by increased degree days, increased drought stress, longer growing season, and invasive species competition. Vulnerability snapshots for forests, woodlands, grasslands, wetlands, and culturally important plants provide more detailed information about plant vulnerabilities.

Climate adaptation emphasis: Consider policies and programs to increase low impact development/green infrastructure solutions to manage storm water and flooding, improve water infiltration and filtering, and promote native and drought-tolerant vegetation. Maintain and strengthen working relationships with recreation providers to build climate adaptation capacity across the Gorge. Encourage the U.S. Forest Service to proactively coordinate to facilitate public lands closures in times of high fire danger.

Mitigation emphasis: Continue improving transportation solutions at recreation sites to relieve congestion; promote transit and reduce overall passenger vehicle trips; increase bike/pedestrian options and connectivity; support future EV opportunities; and encourage city-recreation partnerships that benefit local communities and economies. See Part II of the CCAP.



Nature based tourism

Sensitivity: Med-High | Adaptive Capacity: Med-High | Vulnerability: Med-High

Tourism is closely tied to recreation (above) and the condition of scenic, cultural, and natural resources and landscapes that draw people to the gorge. Climate impacts to tourism will include all of those visitation factors described for recreation (temperatures, air quality, highway closures, public lands access, and snowfall). Climate affects to water bodies and wildlife abundance may also affect the amount of visitation in some areas.

Further, the immediate and long-term effects of wildfire have demonstrated devastating effects on small businesses that must close during emergencies and that rely on visitation business. Travel Oregon evaluated tourism impacts from the 2017 fire season, when the Eagle Creek fire burned nearly 47,000 acres in the gorge. They wrote, “businesses reported that smoke was the most prominent problem, followed by customer perceptions regarding fire-related discomfort; road closures and evacuations were also notable concerns. Lodging, food and beverage were most affected, then retail, according to business survey respondents” (Travel Oregon 2018).

Agricultural tourism is growing in the gorge and is an important strategy options for farmers to diversify and adapt their businesses to a changing climate. The effects described above apply to farms and farm businesses as well.



**opportunity to
promote equity**

Climate adaptation emphasis: Remain engaged with the Columbia Gorge Tourism Alliance and the Interagency Recreation Team. Continue working with gorge counties on ag-related tourism policies. Support local agencies in emergency response and recovery, as appropriate (as an example, the Gorge Commission and Forest Service worked with the National Forest Foundation to establish a restoration fund for the Eagle Creek Fire area).



Agricultural uses and products

Sensitivity: Medium | Adaptive Capacity: Medium | Vulnerability: Med-High

Agricultural uses and products are sensitive to gradual and extreme weather changes including higher temperatures, shifting hydrology, freeze and heat stress events, and fires. The average growing season for some crops will be extended, although crop damage from temperature extremes will be less predictable and more costly to crop yields. Under warming conditions, insect pest activity and reproduction increase. Pollinator abundance and overall biodiversity will affect productivity. These aspects of ecosystem health can influence the agritourism “draw” to farms.

Workable hours are decreasing, as heat creates unsafe conditions for outdoor physical labor. Many producers are adapting schedules and upgrading worker buildings to deal with hotter conditions. Federal and state safety policies protect farm workers from heat related illness or death.

In the NSA, pear, apple, and cherry orchards make up the largest acreage of agricultural lands. Vineyards are the fastest growing new agricultural use, steadily increasing each year in the past decade in Klickitat County. Wine grapes offer high potential for crop diversification (Wolkovich et al. 2017), however they are sensitive to new and increasing pests.

Livestock grazing occurs on some private and public lands in the NSA. Opportunities for the Commission to influence grazing practices are limited, though partnerships with local Conservation Districts and collaboratives like the East Cascades Oak Partnership can help connect producers to technical and financial resources. Rangelands and pasture lands will experience the stressors described above for grasslands and understories of forests and oak woodlands. Ranchers may consider placing artificial water sources, supplemental feeding, and moving livestock throughout the year to locations with mild weather and good forage.

Water conservation strategies, frost mitigations, and shifting to hardier crop or livestock varieties are some adaptation strategies producers can use. Incentives and technical assistance programs may offer support to offset landowner operational costs and sustainable practices may be more cost-effective in the long term. Non-climate impacts that contribute to the vulnerability ranking include a growing demand for wine, cider, and farm-related tourism, and regional and global economic pressures.

Climate adaptation emphasis: Encourage and reduce regulatory barriers to water conservation, regenerative agriculture practices, integrated pest management, and other strategies that build soil health and biodiversity. Consider best management practices or requirements for new agricultural uses. Address impacts from agriculture to protected resources described in this snapshot, particularly water resources and Oregon white oak. Build opportunities for agriculture to provide carbon storage.



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Forestry and forest products

Sensitivity: Medium | Adaptive Capacity: Medium | Vulnerability: High

Drought may lead to reduced timber yield. While timber production is not a dominant use in NSA, there are significant commercial and private timber lands in the western and central gorge. Industries reliant on timber from outside the NSA may experience the economic impact of increased supply costs.

Fuels reduction and forest health projects could increase resilience in forests, while providing timber harvest or biomass and biochar products in some places. Trees have some adaptive capacity to shift in elevation or in species composition over time, with more drought tolerant species increasing as others decrease. Improvements to forestry techniques and technologies may support adaptation. Hotter, drier conditions could result in some reductions in overall forested land cover. As described above for coniferous forests, increased fire risk and severity could reduce timber lands. Global changes in supply and demand for timber influence local and regional prices and the viability of restoration and biomass efforts.

Climate adaptation emphasis: Through Management Plan policies and implementation, ensure forested lands remain in forest cover. Promote community wildfire risk reduction, learning more about stewardship actions that the Management Plan and non-regulatory programs can support. Work with Forest Service, state agencies, and others to implement shared goals for forest health and restoration in the NSA.



Public Roads

Sensitivity: Med-High | Adaptive Capacity: Med-High | Vulnerability: Med-High

The transportation network in the NSA is a critical local and regional asset. The freeways and bridges enable commuting traffic for the many residents who live in one county or state and work in another. They provide recreation access from across Oregon, Washington, and beyond, and provide for commerce from across the country. Multimodal transportation opportunities are growing. The Columbia River itself is a critical regional transportation and trade connection, and the road network provides access to the river for fishing, boating, and other uses.

Roads and other public infrastructure in the NSA are sensitive to the effects of extreme weather events such as flooding and landslides from rain-on-snow events or post-fire rains; freeze events; and high winds. Maintenance and emergency repair needs will increase for roadways, particularly the main ingress and egress arteries of I-84, SR-14, and the Historic Columbia River Highway. Oregon was declared a national disaster area for damage by extreme storms, floods, landslides in four of the five last years (OHA 2020). While adaptive capacity is considered high, adaptation will be limited by capacity and funds.

Climate adaptation emphasis: Consider programmatic or coordinated permits for anticipated road clearing and repair across multiple counties. Support USFS, transportation partners, and fish and wildlife managers in efforts to identify and prioritize road and culvert upgrades.



Cultural sites

Sensitivity: Medium | Adaptive Capacity: Med-High | Vulnerability: Medium-High

Both archaeological and historic sites are sensitive to damage from floods, wildfires, and extreme weather. Built structures and rock art are among the features most sensitive to damage and loss from these events (UCS 2014). Landowners and land managers can document and strive to protect cultural sites from damage with flood control methods and fuels reduction. There are social and cultural losses associated with damage to sites, as well as impacts to local economies from reduced visitation when sites are damaged or closed to the public. Multnomah Falls Lodge is an example of local impact and costs of repair following the Eagle Creek Fire.

As compared to other places in the United States, the NSA has strong provisions to protect cultural sites during climate-related emergencies including fires and landslides.

Climate adaptation emphasis: Encourage proactive protections for archaeological and historic sites, including fire risk reduction. Encourage inventory efforts for cultural sites, similar to the 2005 roadside survey of properties with buildings potentially eligible for historic designations.

C. Climate Change Hazards and Risks

Vulnerability snapshots describe the stressors that influence key resources and how well they can adapt on their own. Risk assessment focuses on the potential for losses to occur as a result of prolonged or acute stress from climate change hazards.

Summary of risk rankings

In the National Scenic Area, our “assets” are the resources and values that we protect, enhance, and support. Climate change “hazards” are events or occurrences that have the potential to cause harm to people, assets, services, or ecosystems.

How we rank relative risks

The **Probability of Loss** is the likelihood that a system, population, or resource will not persist given climate impacts or changing climate conditions. For this assessment, probability is simply ranked on a scale from **Low** to **High**.

Low: *The hazards are unlikely to affect the asset.*

Medium: *The hazards may or may not affect the asset.*

High: *The hazards are likely to affect the asset.*

The **Magnitude of Loss** is the extent of the disruption to a system, population, or resource if it occurs, or the costs (financial or otherwise) of consequences from the event or impact. Magnitude is ranked on a scale from **Low** to **High**.

Low: *The hazards would cause minimal disruption to the services or function of the asset or would require minimal cost to restore services or function of the asset.*

Medium: *The hazards would cause moderate disruption to the services or function of the asset or would require some costs to restore the services or function of the asset.*

High: *The hazards would cause substantial disruption to the services or function of the asset, or would require large amounts of money, time, or other resources to restore the services or function of the asset.*

Hazard spotlight: Regional Transportation Network

Transportation is addressed at length in **Part III** - mitigation opportunities, and it is also a critical asset that is impacted by climate change and climate hazards.

Sensitivity: **Med-High**

Adaptive Capacity: **Med-High**

Vulnerability Ranking: Med-High






Probability of Loss: **High**

Magnitude of Loss: **Medium**

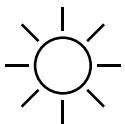
Risk Ranking: High

Rationale: Gorge roads are seeing more frequent and severe damage, roadblocks, closures, and public safety concerns due to climate change.

Table 1. Asset-hazard pairs ranking high in risk, described by probability and magnitude.

Summary of Risks		
Asset (resource or value)	Climate hazards potentially resulting in loss	
	Cold water refuge streams	High water temperatures
	Native fish species	High water temperatures Invasive aquatic species
	Aquatic habitat	Water quantity and quality change
	Wetlands and obligate species	Dry periods (reduced runoff and flow) Drought and warming
	Native upland grasses and rare plants	Uncharacteristic fire Conversion to invasive plant species Drought
	Coniferous forests	Fire Invasive species
	Cliff plants	Heat and drought
	Talus habitats	Drying out and warming air temperatures
	Archaeological and historic sites	Fire, flooding and inundation
	Roads, access and road safety	Flooding, landslides, freezing and winds
	Nature-based tourism	Fire and related closures Poor air quality days

The risk assessment framing highlights critical climate change hazards in the NSA – drought and extreme heat, wildfire, invasive species (often expanding post-fire), and flooding – posing the greatest potential losses to climate vulnerable resources if we do nothing. Examining risk brings out the most immediate needs for action, as well as greatest opportunities to influence resilience to hazards.



Drought is affecting over 90% of the Pacific Northwest, and 2001 is the warmest June-August recorded in Oregon (NIDIS – drought.gov). Addressing heat-related hazards is an important component of a resilience focus on water and stream temperatures and agriculture.



Fire seasons in the Pacific Northwest have been increasingly damaging and challenging to manage. According to the Northwest Interagency Coordination Center, by July 31, 2020, 23 large fires had burned about 40,000 acres in the region. As of July 31, 2021, 50 large fires burned more than 800,000 acres. Adaptation actions support ecological and community resilience to fire and post-fire erosion. Fire also shapes mitigation actions because it threatens the carbon storage benefits of forests, agricultural lands, grasslands, and wetlands.



Invasive plant and wildlife species affect both land and water resources in the Gorge. Important examples: *nonnative aquatic plants and animals, nonnative wiregrass*. **Native pests** are also becoming more ubiquitous under favorable conditions. Important examples: *native deer ticks, native bark beetles*.

PART II: Climate Change Mitigation in the National Scenic Area

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A. Need for Mitigation and the Commission's Role

Now that we've examined the impacts of climate change and the ways in which the Commission can address climate change vulnerabilities, **Part II** describes opportunities to mitigate greenhouse gas emissions in the region.

Mitigation includes actions that reduce the sources or enhance the sinks of greenhouse gases (GHGs)

According to the IPCC's sixth climate change assessment, unless there are immediate, rapid and large-scale reductions in greenhouse gas emissions, limiting warming to close to 1.5°C or even 2°C will be beyond reach.

Under all emissions scenarios the IPCC assessment considered, global surface temperature will continue to increase until at least the mid-century. Achieving net zero GHG emissions by 2050 is the only scenario that could limit the average increase in temperature to 1.5°C or 2°C projected out to 2100.

As a regional land use planning agency, the Commission has influence over land use and development surrounding urban centers, as well as land and resource protections that includes natural areas and working lands.

State and local leaders in the Pacific Northwest are setting targets for emissions reduction.

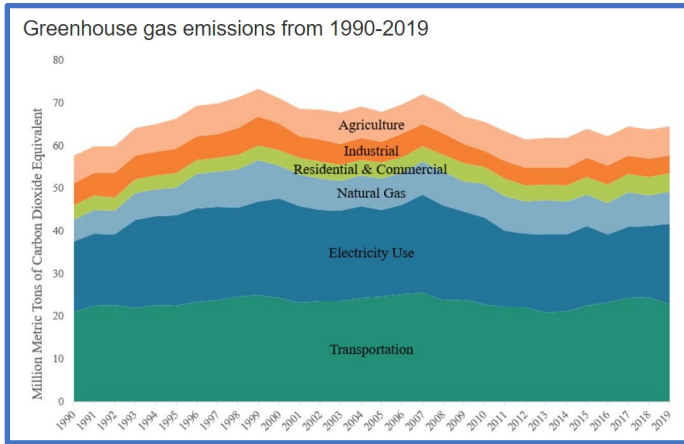
- Governor Brown's Executive Order 20-04 directs Oregon to reach at least 45% below 1990 emissions levels by 2035 and at least 80% below 1990 levels by 2050;
- Washington's legislature aims to reduce emissions at least 25% below 1990 levels by 2035, and the Department of Ecology recommends 40% below 1990 levels by 2035. The Climate Commitment Act, signed May 2021, requires a "cap and invest" carbon trading program by 2023;
- Hood River County plans to replace 30%, 50%, and 80% of power generated from fossil fuels with clean, renewable energy in buildings, water systems, and transportation by 2030, 2040, and 2050 respectively as compared with 2016 levels.
- Mosier, Oregon and White Salmon, Washington passed resolutions in 2021 to reduce municipal emissions by at least 45% by 2030 and to net zero by 2050.

While no comprehensive inventory of emissions for the gorge currently exists, one could be produced to inform the Commission in setting targets for GHG emissions and land-based carbon storage in the NSA.

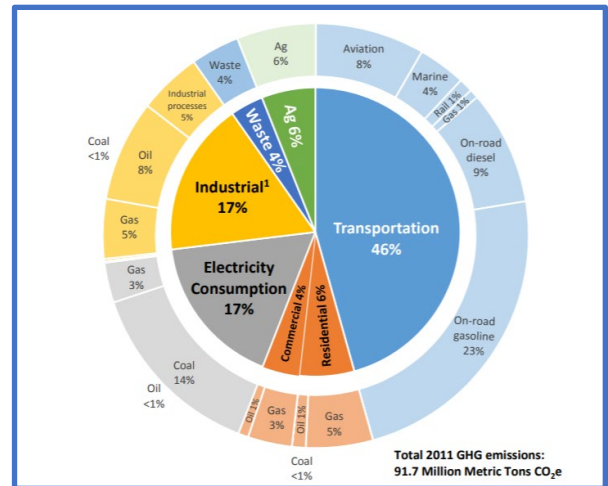
Sources of GHG emissions

For the National Scenic Area, we can draw conclusions from Oregon and Washington data about the relative sources of GHGs. Figures below illustrate emissions inventories for Washington

(2014) and Oregon (2020). Each state concludes the greatest contributions come from transportation and electricity.



Oregon sector-based greenhouse gas emissions inventory (2020)
<https://www.oregon.gov/deq/aa/programs/Pages/GHG-Inventory.aspx>



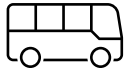
Washington greenhouse gas emissions inventory
 establishing Carbon Emissions Reduction Task Force (2014)

B. Climate Change Mitigation Opportunity Areas

1. Mitigation Opportunity: Reducing Transportation-related Emissions

The Commission recognizes the importance of regional transportation to our mission to protect and enhance gorge resources while supporting economic development in Urban Areas. Coordinated transportation planning benefits scenic character, recreation and multi-modal travel, natural and cultural resource protection, and economies at various scales. Transportation also affects air quality, health, equity, and access to services.

What does it mean to support the reduction of transportation-related emissions? Key elements are to reduce vehicle miles traveled (VMT), the number of trips, and the number of single-passenger gas-powered vehicles on roads.



Regional transportation, including transit

Land use planning and vehicle miles traveled

Managing growth and development at least conceptually prevents additional emissions from vehicle accessing new developed destinations. The Management Plan's limitations on land conversion in the NSA mean that increased traffic to new development will be very small relative to the projected increases in populations located in NSA Urban Areas and outside the NSA. The Management Plan also guides Columbia River Bridge replacements and modifications, calling for bicycle and pedestrian lanes on the future Hood River Bridge and Bridge of the Gods. In these ways, the Management Plan helps limit new emissions and provide alternative transportation.

VMTs and trips are affected by a number of economic factors including job opportunities and housing prices. According to U.S. Census Bureau information for 2018, 30% of NSA residents have a primary job located 50 or more miles from their homes. The number of people who both live and work in the NSA (10,366) is about the same as those who commute from inside to outside the boundary (10,400), and to the number who commute from outside to their primary job inside the NSA (10,700) ([OnTheMap](#) 2018 data). Cost of living and affordable housing have far-reaching implications for equity and economic vitality, as well as for transportation-related emissions. The Management Plan contains policies that require consideration of equity impacts and greenhouse gas emissions when evaluating applications to revise urban area boundaries. The Management Plan also includes policies relating to accessory dwelling units for short- or long-term occupancy, and Land Use Designations that could influence housing equity and affordability. The magnitude of potential influence on housing production and VMTs from land use changes outside of Urban Areas is uncertain.

Recreation and congestion

Tourism and local recreation in the NSA are important opportunities to reduce trips and congestion, as the vast majority of tourists access the gorge by driving. The Management Plan places limits on parking, precluding recreation sites from "building their way out" of crowding issues.

Permit systems, like those at Multnomah Falls and Dog Mountain trailhead, incentivize transit use by capping the number of single passenger vehicles and providing shuttle options. Collaborative efforts to reduce congestion along the Historic Columbia Highway include placing flaggers at busy parking areas to help with traffic flow. These solutions have been created and managed by partners, outside the Management Plan and consistent with its policies.

Transit hubs can also have an economic benefit by bringing visitors or locals to parking areas where they may also spend time and money at local businesses. Connecting these transit hubs with bicycle and pedestrian paths further reduces the need to drive for short trips or recreation.

The revised Management Plan requires and encourages transit accommodations at recreation sites, based on their level of use.

The Mid-Columbia Economic Development District (MCEDD) partners to improve transit in five counties, four of which are in the NSA. Transit **co-benefits** include equity, access to services, affordable commute options, mobility, etc.

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Electric vehicle infrastructure

Fewer vehicles and cleaner vehicles

To reach state energy goals, both Oregon and Washington are transitioning to electric vehicles (E-Vs). Washington is adopting building codes for E-V infrastructure at new residential buildings and providing tax incentives for E-V purchases. Oregon completed a transportation electrification infrastructure needs analysis to describe necessary infrastructure statewide. Recreation providers and cities we have spoken with voiced interest in a regional conversation and mapping effort to discuss desired future E-V infrastructure. Just as transit hubs can provide economic benefits, electric charging stations can be thoughtfully placed to encourage visitation to businesses and services.

It is important to consider that electric vehicles do not reduce commutes, traffic, or congestion unless paired with transit, bike and pedestrian paths for local trips, and other strategies. This is particularly important in the NSA where traffic congestion at recreation sites is a major concern and where visitation pressure rises year after year. Electric buses and e-bikes are opportunities many partners are exploring.



Implications of Electric-Powered Transportation

By some estimates, a transition to 80% electric vehicles will result in a 10-15% increase in electricity use, with new peak demand challenges. While the Pacific Northwest offers abundant renewable energy, much of the existing power grid relies on hydroelectric dams. Members of Tribal Nations from the Klamath River in California to Chile are advocating to the United Nations against reliance on hydroelectric dams to reach energy goals, citing myriad environmental and cultural consequences of dams and the significant emissions created by methane degassing in reservoirs (Harrison et al. 2021). Hydroelectric power is often characterized as “cheap and renewable”, while Indigenous people bear profound and ongoing costs as a result of hydropower’s impacts to rivers, fish, and wildlife.

Renewable energy innovation holds promise. For example, Hillsboro, Oregon is employing a new retrofit technology to harness heat energy from existing underground water delivery systems, offsetting the increased energy demand from E-V. Coupling E-V stations with solar power arrays could also help to offset the use of hydropower.

Some of the local efforts to increase transit and electric vehicles include

- Gorge Translink Alliance provides collaboration on both sides of the Columbia River to improve transit services to local rural communities
- Mid-Columbia Economic Development District convenes regional transportation stakeholders, including the Commission, to develop regional priorities and strategies
- Columbia Area Transit provides for locals and visitors
- Congestion studies in Oregon (I-84) and Washington (SR-14) are resulting in recommendations and pilot projects to improve safety and traffic flows
- Forth, Sustainable Northwest, Bonneville Environmental Foundation, and Wy'East Resource Conservation and Development Area Council, Inc. are piloting electric tractors in the Dufur area
- The Clean Rural Shared Electric Mobility (CRuSE) Project is a three-year program funded by the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy's Vehicle Technologies Office to demonstrate a financially sustainable model for plug-in electric vehicle carsharing in rural communities
- The Dalles is one of 10 communities participating in an Oregon pilot for E-V car-shares co-located with affordable housing
- Several state, federal, and private funding sources are becoming available to support many more projects and programs



opportunity to
promote equity

CCAP mitigation emphasis – Leverage and generate regional partnerships to reduce transportation-related emissions. Utilize policies and implementation measures to promote regional transportation/transit projects that reduce GHG, VMT, and promote equity. Participate in regional transportation planning efforts addressing topics including but not limited to:

- Transit to reduce the overall number of vehicles on the road,
- Congestion relief and traffic efficiency,
- Inclusive, proactive planning for E-V infrastructure and opportunities,
- Connected bike/ped/other multi-modal and alternative transportation,
- Connections between recreation opportunities and Urban Areas/cities,
- Drawing attention to the gorge as a region of opportunity for concerted transportation planning; preparing and helping partners prepare to bring transportation funding to the region.

2. Mitigation Opportunity: Reducing Agency Emissions

While the Commission’s direct carbon footprint is small in comparison to these other opportunity areas, we have a chance to walk the talk of climate change mitigation and show our earnest commitment. Simple tools exist to calculate, report, and reduce our footprint. The State of Washington has reporting tools to support biennial agency accounts that might be the best option. The Commission reported its emissions to Washington prior to 2016. Now, only larger state agencies are required to report every two years on their progress toward a goal to reduce overall emissions to 521,000 metric tons, or 15% below 2005 levels, by 2030. Department of Ecology in their [2021 Department of Ecology report](#) estimate that greenhouse gas emissions from state agencies account for about 1% of Washington’s emissions.

CCAP mitigation emphasis – Track and reduce the Gorge Commission’s agency carbon emissions.

3. Mitigation Opportunity: Protecting and Enhancing Carbon Storage in Forests, Grasslands, Agricultural Lands, and Wetlands

The NSA is rich in natural and working lands that provide opportunities for carbon storage, improved practices to reduce emissions, and avoided emissions that would occur if those lands were converted to other uses. In the U.S., forests are a net carbon sink, storing 14% of total annual carbon emissions (or 11.5% of total GHG emissions), according to the Forest Service (Domke et al. 2021). Climate change affects the amount of carbon stored below and above ground in NSA forests in two ways: through ecosystem function changes such as growth rates and changes in species composition and from large wildfire events like the 2017 Eagle Creek Fire.

Non-climate factors affecting carbon storage include land use change, timber harvest and forest management, and agricultural practices. These represent opportunity areas for potential Management Plan policies and voluntary, incentive-based approaches.



Carbon storage in habitats and working lands

Studies and reports produced for Oregon and Washington explore a whole suite of opportunities to store carbon in natural systems and working lands in the Pacific Northwest. Two assessments indicate the greatest opportunity to gain carbon storage is through forest management (Graves et al. 2020; Robertson et al. 2021). Cropland improvements offered important carbon storage gains by reducing nitrogen fertilizer use, cover cropping, mulching, and other practices. Grasslands and rangelands are also a sustainable carbon store in a drying future that can be managed for carbon enhancement (Dass et al. 2018).

Some of the local efforts to increase carbon storage

- Agricultural producers are building soils and soil health using cover cropping, compost and mulch, biochar (burning plant material to create carbon rich soil amendments that also store water), and other techniques
- Natural Resources Conservation Service offers annual funding for different conservation actions, including soil health and biodiversity (BMPs for bees)
- Local conservation districts and Oregon and Washington university extension offices connect farmers to funding and technical assistance
- Columbia Gorge Community College is developing the Ag Tech Education Alliance to strengthen sustainable farming in the gorge

Researchers from The Nature Conservancy and the University of Washington calculated the potential for a suite of Natural Climate Solution (NCS) pathways to reduce Washington's net emissions under three implementation scenarios. The study found that NCS could reduce annual emissions accounting for 4% to 9% of the state's net zero goal by 2050. Oregon Governor Kate Brown set research-based targets for Oregon to sequester an additional 9.5 MMTCO_{2e} by 2050.

There are a few applicable models for estimating and tracking carbon. Regional and local estimates are largely based upon Forest Inventory and Analysis plot data collected across all National Forest System lands. The state of Oregon is supplementing these locations with identical plots on state-owned forests.

Through the VSI initiative, we're building a data foundation for setting goals or targets and tracking progress toward meeting these carbon-focused goals, should the Commission decide to create them. Proposed actions for mitigation describe creating a detailed land cover dataset for the NSA and options to build on that data to model carbon contributions and changes in carbon storage over time. [TerraCount](#) is one scenario planning tool used in Merced County, CA that could provide a template for the gorge.



Fire risk

While wildfire is an important ecological function in gorge ecosystems, we have seen an increase in the number and severity of fires in recent years. Increasing fire risk threatens human health and safety, property and security, as well as scenic, cultural, natural, and recreation resources protected in the NSA. For these reasons, managing forests and other landscapes for reduced fire risk is a common priority in the region and a shared priority for reaching the Commission's adaptation and mitigation goals.

The Forest Service estimates that above-ground carbon loss from forest restoration/fuels reduction efforts (thinning and prescribed burning) is short-term and promotes long-term tree growth while protecting lands from severe wildfires. Reduced tree cover under warmer, drier conditions results in vegetation types that store less carbon. In grasslands, where the majority of carbon storage is retained in deep soils and plant roots, conversion to invasive grasses and soil erosion post-fire can also reduce carbon below and above ground.

The NSA is an ideal place to foster **Fire Adapted Communities**. The Commission is building relationships with local fire and fuels interests, as well as regional, state, and nationwide networks to help address the many facets of fire adaptation for forests and communities.



CCAP mitigation emphasis - Retain and enhance carbon stores in forests, grasslands, agricultural lands, and wetlands in part by

- Protecting natural and working lands that store carbon
- Reducing the risk of large or severe wildfire
- Promoting practices on all lands that build healthy soils, restore or enhance vegetative cover, and improve water quality (a co-benefit)
- Learning more about the carbon storage contributions of different lands and land management practices

Additional resources:

[Natural and Working Lands Proposal](#) developed by Oregon's Global Warming Commission 2021.

Community wildfire risk, including demographic information on vulnerable populations by county: <https://wildfirerisk.org/explore/>.

Online portal estimating potential for reforestation to increase carbon storage and sequestration: <https://www.reforestationhub.org/>

Baseline Assessment of Forest Carbon Storage in the Pacific Northwest (2015): <https://www.fs.fed.us/climatechange/documents/PacificNorthwestRegionCarbonAssessment.pdf>

EV readiness resources for the Peninsula region (WA-centric): <https://www.prtpo.org/ev-resources>

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PART III: Commission Priority Strategies and Actions

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This section builds on the vulnerability snapshots and mitigation opportunities described in **Parts I and II**, highlighting recommended priorities for Commission climate action.

Priority actions are guided by the Commission's two overarching CCAP goals:

CCAP Goal 1: Build resilience and adapt to climate change by addressing the most pressing impacts on natural, scenic, cultural, and recreation resources and to the economic vitality of NSA communities. These actions protect and enhance ecosystems as well as human well-being.

CCAP Goal 2: Mitigate climate change by reducing greenhouse gas emissions and by protecting and enhancing carbon storage in the NSA.

Together with the USDA Forest Service National Scenic Area Office, the Commission uses regulation (the Management Plan and approved county ordinances), education and landowner outreach, and strategic partnerships to protect and enhance scenic, natural, cultural, and recreation resources, and support economic vitality, within the NSA. The CCAP is written in close coordination with the USDA Forest Service, and some actions will support or elevate work they are leading. In this way, the CCAP reflects the shared responsibilities of these two agencies, while focusing on the Commission's distinct management responsibilities.

A. Criteria for Prioritizing Climate Change Actions

The list of potential actions to adapt to and mitigate the causes of climate change is extensive. Together, the priority actions described in this section, along with future potential actions in **Section X**, represent a comprehensive list of actions that contribute to the two CCAP goals. The purpose for including both priority and future potential actions is multi-faceted: document the full range of potential actions identified through the CCAP process to date, provide a suite of management options to inform future CCAP updates, and share ideas for action with our partners that we could accomplish together with additional funding and resources.

Commission criteria for **adaptation priorities**

- Climate change vulnerability and risk rankings
- Commission's ability to influence resilience, informed by resilience mapping
- Existing partnership opportunities
- Impacts on historically excluded groups and communities
- VSI program priorities
- Rareness - endemic species or resources that exist only in the gorge

Commission criteria for **mitigation priorities**

- High GHG emissions or storage
- Commission's ability to affect GHG emissions and carbon storage
- Existing partnership opportunities
- Impacts on historically excluded groups and communities

- VSI program priorities

B. Prioritization Results: Adaptation and Mitigation Priority Topics

This table highlights how topics met Commission criteria for adaptation and mitigation priorities.

CCAP Adaptation and Mitigation Priorities							
Climate Change Topic green - adaptation orange - mitigation	Criteria for Climate Change Action Priority Topics						
	High Vulnerability and Risk (adaptation only)	High Relative GHG Contribution (mitigation only)	Commission Potential Impact	VSI Priority (as of 2021)	Existing Opportunity	Impacts Historically Excluded or Vulnerable Individuals	Rare or Unique to Gorge
Cold water refuge streams and riparian habitat	●	n/a	●	●	●	●	●
Wetlands	●	n/a	●	●	●	●	
Tribal Treaty Right, including culturally important plants	●	n/a	●	●	●	●	●
Oregon white oak and winter range	●	n/a	●	●	●	●	
Regional transportation, including transit	n/a	●	●		●	●	●
Electric vehicle infrastructure	n/a	●			●		
Carbon storage in habitats and working lands	n/a	●	●		●		
Fire risk	n/a	●	●	●	●	●	

Two additional topics, **Coniferous forests** and **prairies/grasslands**, also met most of the criteria. These habitats are addressed in three places in the Commission Priority Strategies and Actions that follow: Overall adaptation priorities, fire risk, and carbon storage. **Healthy soils** and **water quality** are addressed throughout different topics, and specifically highlighted in the carbon storage section. Additional specific actions benefitting coniferous forests, grasslands, soils, and water quality are described in Potential Future Actions beginning on page 74.

To achieve our climate change goals for these priority topics, there are near- and long-term actions, as well as low- and high-investment actions. The Commission established additional criteria, below, to help determine **immediate** priorities for action.

Additional criteria for prioritizing immediate actions for 2022-2025:

- Potential to inform Management Plan improvements
- Feasibility of achieving the action, given current resources

- Serves historically excluded groups or communities

The Implementation Guide (page X) describes actions meeting these additional criteria, serving as a workplan for near-term priority actions.

C. Priority Actions for 2022-2025

The following section describes strategies and actions to advance work on the Commission’s climate change priority topics.

Strategies in the CCAP tend to be longer-term and higher level in nature than the actions that follow. These strategies are intended to guide the Commission’s climate work for years to come.

Actions are generally short-term (to be completed by 2025), though some require significant resources or on-going programs to accomplish.

First, three overall climate change strategies are described, followed by eight priority topics (four adaptation areas and four mitigation areas) with corresponding strategies and actions. Appendix X includes additional actions for several of these priority topics, in addition to extensive potential actions for lower priority topics.

Priority actions generally fall within these four categories:



Management Plan Policy Updates



Implementation Improvements or Guidance



Analysis, Research, and Monitoring



Partnerships, Shaping Ongoing Efforts, Convening New Efforts

The Implementation Guide (page X) offers more detail on how each recommended priority action aligns with these categories of actions.

1. Overall Climate Change Priority Actions

Resilient lands and waters

Through VSI, we are building a complete land cover dataset to fill information gaps about priority habitats. We have mapped climate resilient areas (using The Nature Conservancy data and discussions with local land trusts) and their overlap with open space designations and protected

lands. Staff also compiled spatial data as part of Gorge2020 to describe land cover change in Oregon white oak and winter range for deer and elk.

Strategy: Complete mapping and assessment of priority habitats, including coniferous forests, grasslands, oaks, and wetlands.

Priority Action

- **VSI data and monitoring:** Assess extent, condition, and connectivity for priority habitats.

The NSA and Management Plan are set up to protect natural and working lands, sensitive species and habitats, water resources, cultural sites and Tribal Treaty rights, scenic views, and nature-based recreation. There are several tools in the plan, including open space designations, large minimum parcel sizes, low-density development, and prohibitions on industrial development, that protect habitats and species. The plan also provides a framework for coordination with state and federal agencies that the Commission has strengthened in recent years, aligning efforts, leveraging resources, and building a regional resource monitoring framework through VSI.

Strategy: Protect natural landscapes, connectivity, and ecosystem functions.

Priority Actions

- **Climate resilient lands:** Complete staff evaluation of resilience maps. Select 1-3 specific locations for developing land use policy options to protect resilient areas. Consider **scenic values** as well as **ecological integrity** in setting priorities.
- **USFS Scenic Integrity Analysis:** Coordinate with USDA Forest Service, who are producing a scenic integrity map that will be used for VSI, to evaluate the data with climate change priorities in mind. This initial action could inform future scenic resources climate change actions.
- **Enhancement:** Update Management Plan to create options for permit-exempt or streamlined resource enhancement projects (streams, wetlands, soils, forests, etc.). Evaluate feasibility of awarding small grants, through the Gorge Commission's designated fund, to entities taking proactive restoration efforts on CRGC climate priorities.

Inclusive climate change work

Climate change affects all communities, and we are eager to listen to and learn from diverse voices in our work on climate change. The Commission is currently developing a Diversity, Equity, and Inclusion framework that will guide future action planning. Additional resources will be needed to facilitate and enhance engagement with diverse individuals and partners.

Strategy: Engage diverse communities and partners to plan for climate change and implement adaptation and mitigation actions.

Priority Actions

- **Diverse CCAP involvement:**

- Maintain a community of practice and establish a forum for regular input to the Commission’s climate work. Include youth participants.
- Present CCAP to Tribal Councils and invite continued coordination so that the plan, our actions, and future versions of the plan serve Tribal priorities for climate change adaptation and mitigation.
- Continue working with The Next Door to understand and be responsive to the interests and needs of Latino/Hispanic and Spanish-speaking communities in the Gorge.
- **Local knowledge:** Through DEI and VSI efforts, listen to others and learn about climate change effects on gorge resources and communities. Explore opportunities to share stories, oral histories, and qualitative information in ways that respect confidentiality and tribal data sovereignty. Develop interactive web-based tools, such as story maps and indicator dashboards, to share information about climate change work in the NSA.
- **Equity:** Incorporate recommendations from the Oregon [Climate Equity Blueprint](#). Through DEI work, better define who is most “climate vulnerable” in the Gorge and in what ways, to inform future actions.

Integrating climate into CRGC operations and budget planning

The Gorge Commission has 8.5 staff to carry out its full workload and multiple initiatives. A half-time Climate Change Planner will continue to work on implementing the CCAP, in close coordination with a full-time VSI Planner. No additional funds are available to support CCAP implementation, as of early 2022. Recognizing these limitations, many of our short-term priority actions are those most feasible to accomplish with current resources and staff. Additional resources will be required to meet our adaptation and mitigation goals.

Strategy: Integrate climate change with agency operations and work planning, especially where the CCAP advances the Commission’s other strategic priorities.

Priority Action

- **Legislative priorities:** Track and regularly share legislative news and funding at state and federal levels connecting to Commission climate change priorities. Encourage Commission discussions of legislative priorities for climate change work.
- **Risk Register:** Continue to address climate change with the agency Risk Register, a tool that evaluates various risks to our mission and day-to-day operations. Where the CCAP identifies how resources are threatened by climate change, the Risk Register identifies how climate change threatens the Commission’s ability to meet the two purposes of the National Scenic Area Act.

2. Adaptation Priority Actions



Cold water refuge streams and riparian habitats

Overview: Building upon Gorge 2020 policy analyses, Management Plan updates can further protect and support enhancement of streams and riparian habitats. The Commission recently approved stream temperature and flow indicators for cold water refuge (CWR) salmon and steelhead habitat as part of the VSI program. Staff are working with EPA, Oregon Department of Environmental Quality, WA Department of Ecology, USGS, and others to monitor temperature and flow on ten CWR tributaries in the CRGNSA.

Desired outcome of CCAP strategies for action – Streams and riparian areas, especially cold water refuge habitats, support native aquatic species.

Strategy: Improve stream temperatures for fish.

Priority Actions

- **Stream enhancement permitting:** Update Management Plan policies to reduce permitting barriers for stream enhancement projects.
- **WA salmon priorities:** Identify opportunities for the Commission to advance the WA salmon strategy through focused meetings with Governor Inslee's staff.
- **Sedimentation removal:** Gather information about CRITFC's and Tribes' projects to remove sediment at tributary mouths to improve confluences (improves fishing and creates CWR), including opportunities for Commission to support. Provide letters or other support, based on project needs.

Strategy: Improve riparian vegetation cover in NSA streams.

Priority Action

- **Riparian vegetation enhancement:** Update Management Plan to incentivize or require for riparian vegetation enhancement when development is proposed near streams.

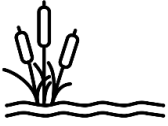
Strategy: Monitor streams and implement the EPA Cold Water Refuges Plan.

Priority Actions

- **Stream temperature and flow:** Coordinate with EPA, DEQ, Ecology, USGS, and others to monitor stream temperature and flow on ten CWR tributaries in the CRGNSA through the VSI program.
- **Salmonid food abundance and quality:** Support aquatic ecosystem health monitoring and research efforts, such as benthic macroinvertebrate sampling, to inform policy updates and best management practices for CWR habitat.
- **CWR habitat creation:** Learn from USDA Forest Service project at Horsetail Creek about design applicability for other streams in the CRGNSA. Project incorporates Lower Columbia

Estuary Partnership's log structure design to increase cold water pool volume at stream confluence with Columbia.

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Wetlands and wetland species

Overview: The Commission approved wetlands indicators for the VSI program. Staff are developing a wetland land cover spatial data layer that will be used to track change over time.

Desired outcome of CCAP strategies for action – Wetland quality, extent, and function improve over time.

Strategy: Fill information gaps about wetlands in the NSA.

Priority Actions:

- **Wetland monitoring:** Coordinate with USFS and other partners to map and track wetlands extent and land cover change through VSI.

Strategy: Incentivize and reduce barriers to wetland enhancement and restoration.

Priority Actions:

- **Enhancement and restoration permitting:** Update Management Plan to create options for permit-exempt or streamlined enhancement.
- **Wetlands priorities for enhancement:** Work with USFS and appropriate agencies to identify priority areas for wetland improvements. These projects could be implemented by partners and/or as required mitigation for infrastructure projects that disturb wetlands.
- **Floodplain restoration:** Emphasize/support restored connections between surface and groundwater, such as Stage 0 floodplain restoration.

Strategy: Develop guidance or proposed plan updates to protect wetlands and wetland species, in cooperation with gorge counties.

Priority Actions:

- **Buffer guidelines:** Revise GMA wetlands portion of Management Plan to achieve the goal of no wetland loss. Consider establishing a wider buffer for certain types of review uses that could lead to sedimentation.
- **Best management practices:** Create best management practices implementation guidelines for Western pond turtle (completed in 2021), blackberry/other invasive plants, etc. These should be used by landowners to design projects and by counties determining conditions of approval.
- **Agricultural conservation practices:** Compile local and regional resources to help agricultural producers implement conservation practices. Consider incorporating best practices in the plan, recognizing rights of farmers protected in the Act and the need for flexibility of operations.
- **Educational field tours:** Make field visits to wetlands in the gorge to learn about best practices, landowners' permitting experiences, etc.



Tribal Treaty Rights and culturally important plants

Overview: Through our work on CCAP and VSI, we've begun learning from each of the four Columbia River Treaty Tribes about their immediate priorities for Treaty Rights and climate change resilience. Staff are currently working with the USFS CRGNSA Heritage Program Manager on letters of invitation to the Treaty Tribes to learn more about how we can support their climate change priorities, including culturally important plants, cold water refuge streams, and First Foods.

Desired outcome of CCAP strategies for action – Species that have cultural significance to Treaty Tribes thrive across the landscape.

Strategy: Coordinate with Treaty Tribes to build knowledge of culturally important plants and options for protection and enhancement.

Priority Actions:

- **Habitat mapping:** Improve habitat map data through VSI. Build knowledge of areas likely to have culturally important plants (e.g., wetlands and native grasslands), while respecting confidential site- and species-specific information.
- **Plant surveys and local knowledge:**
 - Partner with USFS colleagues and others to encourage plant surveys on public lands, private lands adjacent to public lands, and large private parcels that could accommodate tribal access in the future (with willing landowners).
 - Learn about First Foods survey work at the Sandy River Delta and applicability for other NSA sites. In the summer of 2021, Greg Archuleta, with the Grand Ronde Cultural Resources Department, conducted the survey as an independent project and prepared a report for the Sandy River Watershed Council.
- **Predictive models:** If Tribes are supportive, consider developing predictive models to prioritize survey locations and landowner outreach efforts. Washington DNR may have capacity and has expressed interest, particularly for plants that are also tracked by the Heritage program.
- **Staff educational opportunities:** Seek staff trainings and educational opportunities to empower staff to work on behalf of Treaty Tribe interests on high-profile planning projects such as the Hood River Bridge replacement. Share resources with the Gorge Planners network.

Strategy: Consult with Treaty Tribes to identify Management Plan policy changes or guidance to protect culturally important plants and First Foods.

Priority Actions:

- **Plant survey guidelines:** Consider Management Plan requirement to allow or provide plant surveys near wetlands or other areas likely to support culturally important plants.

Focus on options that leverage volunteers, citizen science, or agency capacity to minimize costs to landowners.

- **Plant enhancement on private lands:** Work with tribal botanists to compile lists of plants that can be planted/seeded on private lands and provide information on where to find plant material. Add this to the Building in the Scenic Area Handbook.
- **Development review process:** Continue to improve effectiveness of notice and comment procedures. This may include adding key contacts to notice lists, requiring follow up on any comments made by Tribes, etc.

Strategy: Support Treaty Tribes in their work to restore access for traditional gathering and managing of First Foods on public and private lands in the NSA.

Priority Actions:

- **Tribal access agreement policies:** Consider Management Plan language or policies to promote tribal access agreements.
- **Voluntary access programs:** Promote incentive programs and voluntary efforts to increase access to private lands for gathering traditional plants, hunting, etc. Explore models such as the Farm Bill Voluntary Public Access and Habitat Incentive and access agreements for state-owned lands. Raise awareness and help build relationships with land trusts and other partners.



Oregon white oak woodlands and winter range for deer and elk

Overview: The Commission approved Oregon white oak indicators for the VSI program. Using a modeled oak distribution map developed by East Cascades Oak Partnership, staff are continuing to work on a comprehensive oak land cover spatial data layer that will be used to track change over time. As part of Gorge2020, staff also compiled spatial data to describe land cover change in winter range for deer and elk. We've completed initial evaluations to determine how these two priority habitats overlap with areas of high climate resilience and NSA open space designations.

Desired outcome of CCAP strategies for action: – Intact and connected Oregon white oak woodlands support wildlife and biodiversity.

Strategy: Improve understanding of Oregon white oak condition and connectivity to inform policy development.

Priority Actions:

- **Oak monitoring and assessment:** Map and track oak habitat extent and land cover change through VSI.
 - Work with East Cascades Oak Partnership to develop tools to assess current condition in various oak system types (e.g., savannah and woodland) and learn more about potential future structure and function of these habitats.
 - Identify existing oak wildlife habitat corridors that are important to maintain.
 - Continue exploring measures of oak connectivity and intactness through VSI.

Strategy: Develop policy and mitigation tools to protect Oregon white oak habitat and maintain or restore connectivity.

Priority Actions:

- **Policies limiting conversion and fragmentation:** Coordinate with East Cascades Partnership and others to advance work on policies and best management practices that maintain oak connectivity and prevent fragmentation.
- **Agricultural incentives:** Investigate and promote incentives for agricultural practices that protect and enhance Oregon white oak.
- **Restoration guidelines:** Develop guidelines for restoration or resilience treatments. One specific example: large diameter trees should generally be retained and protected from fire to provide large cavity trees and snags that are likely to be more limited in the future. Also promote restoration and forest health enhancement of native oak communities.

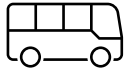
Strategy: Develop policies and mitigation tools to protect winter range habitat and maintain or restore connectivity.

Priority Actions:

- **Policies limiting conversion and fragmentation:** Consider Management Plan policies, such as limiting new cultivation, to maintain key winter range areas.
- **Priority areas for protection:** In concert with work on oak woodland habitat, prioritize winter range habitat areas for protection. Engage state wildlife agencies and East Cascades Oak Partnership in this effort.

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3. Mitigation Priority Actions



Regional transportation, including transit

Overview: The Commission is actively participating in Mid-Columbia Economic Development District’s collaborative regional transportation planning for its economic development strategy. We are also building relationships with partners to help us convene regional transportation interests and prepare to secure newly available funds.

Desired outcome of CCAP strategies for action – Transportation-related emissions in the NSA are reduced.

Strategy: Consider options to complete an emissions inventory and establish specific transportation-related GHG emission goals.

Priority Actions:

- **Commission learning session:** Provide a work session for the Commission, sharing available data to inform discussion.

Strategy: Leverage and build regional partnerships to reduce transportation-related emissions.

Priority Actions:

- **Transportation Summit:** Encourage a director level summit on transportation to convene decisionmakers across the gorge.
- **Land Use Policies:** Work with economic development interests and others to examine regional transportation goals and challenges alongside housing goals and land use policies. Review the Management Plan Land Use Designations and resources such as Bronin et al. (2021) to uncover opportunities for land use policies to create multiple benefits. Example: Review Village and Rural Residential LUD policies to ensure the Management Plan is supporting walkable neighborhoods.
- **Commute Distances:** Continue accessory dwelling units (ADUs) policy work that began during Gorge 2020, considering ways to support affordable housing and reduce commutes.
- **Economic Benefits:**
 - Reference DLCD’s GHG emission reduction toolkit to encourage or require complete streets and strategies to drive local economic benefits.
<https://www.oregon.gov/odot/Planning/Pages/GHG-Toolkit.aspx>
 - Explore options for the USFS and interagency recreation partners to address emissions. Showcase pilot projects with communities where transit or electric vehicle infrastructure benefits recreation and economic development.

Strategy: Improve congestion and traffic efficiency.

Priority Action:

- **Historic Columbia Highway:** Support Historic Columbia River Highway congestion mitigation study recommendations that are appropriate for the Commission. Examples: Support shared messaging to the public through Columbia Gorge Tourism Alliance and Interagency Recreation Team participation. Engage in short-term strategy 13 to develop long-term Columbia Gorge Express (CGE) transit funding and governance strategy.

Strategy: Help to bring transportation funding to the region.

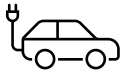
Priority Actions:

- **State transportation grants:** Recommend states make transportation grants available in the Gorge. For example, Oregon DEQ and DOT are grantmaking to reduce in emissions in 2021. Support local partners in preparing to secure state and federal funds.
- **Regional funding:** Elevate the gorge as a region in need of concerted transit and transportation planning and funding at state and federal levels.
- **Regional Transportation Authority:** If new legislation and funding support a regional transportation authority, request a seat for the Commission.

Strategy: Support regional connected bike/pedestrian/other multi-modal and alternative transportation.

Priority Actions:

- **Multimodal Transport Guidelines:** Consider plan policies for recreation development or upgrades that promote continuity of multimodal transport. (Objective 3 in the revised Management Plan: *Improve linkages between different modes of transportation* at major recreation sites in the National Scenic Area.)
- **Recreation Intensity Class (RIC) Standards:** Review RIC language and consider changes. Items to consider: requiring parking management along major travel corridors; changing standard from an allowed number of spaces to an allowed square footage of improved surface for transportation infrastructure (pavement, permeable, gravel, etc.); and accommodating transit and E-V access and charging at RIC 3 and 4 parking areas.



Electric vehicle infrastructure

Overview: We are building relationships with government and private sector partners to help us bring innovative pilot projects to the gorge and prepare to secure newly available funds.

Desired outcome of CCAP strategies for action: – EV infrastructure in the NSA reduces transportation-related emissions.

Strategy: Participate in inclusive and proactive regional planning efforts to advance E-V infrastructure opportunities in the NSA.

Priority Actions:

- **Urban Areas:** Encourage Urban Areas to develop electric vehicle infrastructure to provide connectivity across the gorge. Support multiple benefits for economic vitality, recreation, and equity.
- **Recreation Sites:** Create opportunities for recreation sites to provide electric charging infrastructure.
- **Transportation Electrification Infrastructure Needs Analysis (TEINA):** Invite TEINA team to share results of the needs assessment and facilitate regional conversation about desired future.
- **Alternatives to Hydro Power:** Encourage or require solar or other energy sources to alleviate reliance on hydropower, working with private and public partnerships.

Strategy: Incentivize and reduce barriers to EV charging station development.

Priority Actions:

- **Expedited Review:** Consider an expedited review use for EV charging stations at recreation sites



Carbon storage in habitats and working lands

Overview: Work is underway to develop a detailed land cover data layer for VSI which also serves as a first step in exploring options to measure carbon storage across priority habitats and working lands in the NSA. The Commission is also currently working within our formal partnership agreement with Underwood Conservation District to enhance carbon storage on working lands, while also encouraging counties to inform residents about their local soil and water conservation districts, who provide technical and financial assistance.

Desired outcome of CCAP strategies for action: – Habitats and working lands contribute to overall emissions reduction by storing carbon, while meeting purposes of the NSA Act.

Strategy: Learn more about the carbon storage contributions of different land cover types and land management practices.

Priority Actions:

- **Carbon inventory:** Map and assess relative carbon storage contributions of different habitats considering changes in land use, wildfire, conversion, and invasive species.

Strategy: Develop policy and mitigation tools to retain and enhance carbon storage in forests.

Priority Actions:

- **Mitigation:** Review and provide policy guidance to interpret the revised Management Plan climate change chapter policy that states: “For conversion [of forest lands] to agriculture or recreation, the Management Plan should require full mitigation.”
- **Enhancement:** Review and revise as needed Management Plan policies to allow forest enhancement projects that are consistent with the NSA Act and resource protection policies in the plan. (See also Fire Risk below.)
- **New dwellings:** Evaluate the impacts of the recent Management Plan change to prohibit new dwellings on Commercial Forest and Large Woodland properties. Consider additional plan changes to maintain forested lands.

Strategy: Work with partners to promote practices on all lands that build healthy soils, restore or enhance vegetative cover, and improve water quality.

Actions:

- **Wetlands:** Leverage CCAP actions to support wetlands and riparian areas (connecting floodplains, restoring hydrology of wet meadows) to improve carbon storage throughout the year.
- **State carbon goals:** Contribute to the actions described in the [Natural and Working Lands Proposal](#) developed by Oregon Global Warming Commission.
- **Agriculture:**

- Encourage conservation practices on agricultural lands including cover cropping, mulching, and no-till practices.
- Connect landowners, especially ag producers, to conservation districts and other organizations providing financial and technical assistance for enhancing soil carbon and reforestation efforts.
- **Recreation:** Support partners in reducing unauthorized trails and soil disturbances that cause soil erosion.

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Fire risk

Overview: During Gorge2020, the Commission improved policies to reduce the risk of fire in forested systems. New residential development is no longer allowed in Commercial Forest or Large Woodland properties in the GMA. In and near forests, new development must meet fire protection measures that were updated through Gorge2020. We are now updating, with the USDA Forest Service, the Building in the Scenic Area Handbook to help landowners achieve scenic standards while also improving fire safety. The Commission also approved wildfire indicators for the VSI program to track where fire is occurring and where fuels reduction work is implemented across the landscape.

Desired outcome of CCAP strategies for action: – Forest management and community actions reduce the risks of fire across the landscape.

Strategy: Build knowledge of fire risk and different strategies to inform policy development.

Priority Actions:

- **Monitoring and assessment:** Track wildfire occurrence and fuels reduction treatments through VSI.
- **WA Fire Adapted Communities Learning Network:** Join this learning network of diverse agencies, organizations, and communities across WA and report key learnings on relevant policies, best management practices, and community outreach strategies periodically to the Commission.

Strategy: Reduce fire risk on private lands.

Priority Actions:

- **Landowner resources:** Share resources and encourage landowners to access grant funds for small forest projects and Firewise activities (currently underway).
- **Permitting guidelines:** Update Management Plan to reduce permitting barriers to forest resilience treatments that reduce fire risk (e.g., thinning, burning, defensible space, etc.).
- **New development:** Review future development potential under Management Plan policies in areas at high fire risk (based on existing information from DNR, ODF, and USFS).

Strategy: Coordinate with partners to advance work that improves forest health and reduces fire risk across all lands.

Priority Actions:

- **Fire Adapted Communities (FAC):** Engage urban areas, landowners, and resource managers to identify regional needs and opportunities to build resilience, including conducting a Fire Adapted Communities regional self-assessment and exploring interest in establishing more Fire Adapted Communities in the NSA.

- **Forest practices:** Coordinate with ODF and DNR on climate change efforts that we can mutually support through annual agency coordination meetings (began in 2021). Provide letters to ODF and DNR (possibly also to Oregon and Washington) detailing Commission and USDA Forest Service priorities for forested lands in the NSA, including scenic and cultural resources; natural resources (e.g., shade cover for streams and talus); and recreation resources.
- **Forest closures:** Encourage USFS to proactively engage counties and other partners to create decision tools and plans for future forest closures under agreed upon circumstances, including coordinating capacity to enforce closures.

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D. Potential Future Actions

This section includes additional actions that staff recommends the Commission consider in future CCAP work. This list serves multiple purposes:

- Documents a wider range of potential actions identified through the CCAP process to date,
- Provides additional areas of focus and management options to inform future CCAP updates,
- Identifies regional priorities that can help bring funding to the NSA, and
- Offers ideas for our partners may choose to support Commission CCAP actions with additional funding and resources.

1. Potential Overall Climate Change Actions

Inclusive climate change work

Strategy: Engage diverse communities and partners to plan for climate change and implement adaptation and mitigation actions.

Potential Actions:

- **Community Leadership:**
 - Identify opportunities to work with Justice Outside, Corazon Latino, other organizations supporting engagement with Latinx or other underrepresented communities.
 - Consider inviting community climate advisors or convening a citizens' committee.
- **Urban Areas:** Support the cities and counties in their efforts. Explore coordinated resiliency planning with cities and counties in the Gorge to improve equity and resilience.
 - **Natural Hazards Planning:** Coordinate with DLCDC to bring hazard planning resources to cities and counties.
 - **Livability:** Leverage climate change focus to continue and expand engagement in regional work on affordable housing.

Staff capacity and budget

Strategy: Build agency capacity and funding for CCAP work, especially where it advances the Commission's other strategic priorities.

Potential Actions:

- **Facilitated CCAP work:** Consider hiring a facilitation team to engage the broader public in setting and achieving goals for a climate resilient future.

2. Potential Adaptation Actions

CCAP Goal 1: Build resilience and adapt to climate change by addressing the most pressing impacts on natural, scenic, cultural, and recreation resources and to the economic vitality of NSA communities. These actions protect and enhance ecosystems as well as human well-being.

Overall Adaptation Actions

Strategy: Support **invasive species** management and monitoring.

Potential Actions:

- Provide information to landowners and planners about invasive species. Support citizen science and funding for invasive species management and monitoring (through VSI). Potential partners include Columbia Weed Management Area, Columbia Land Trust, and Confederated Tribes of the Umatilla Indian Reservation.

Strategy: Identify locations of **water quality** concerns and develop policies and practices to limit water pollution, warming, and sedimentation.

Potential Actions:

- **Green infrastructure/low impact development:** Review stormwater and drainage code, green infrastructure standards that could apply to projects with grading component, or large scale, or public, projects. This could lead to BMPs and/or Management Plan updates. Examples:
 - Minimize impervious surface; break up pavement or use permeable paving options.
 - Enhance native plants, including pollinators.
 - Increase shade trees in the eastern Gorge with spacing between canopies to minimize fire risk.
 - Consider more specific requirements for road projects to improve water quality.
- **Agricultural practices:** Promote incentive programs (e.g., NRCS and Conservation Districts) to improve agricultural practices affecting water quality. Promote biochar as a way to reduce runoff and filter contaminants. Work with ECOP, conservation districts, and county planners to extend reach to producers.
- **Certifications:** Explore opportunities to leverage certifications, like Salmon Safe, to improve conditions in the gorge.
- **Monitoring:**
 - Support development of recreation indicators that track water quality impacts, if compatible with overall VSI priorities.
 - Continue work with Columbia River Toxics Monitoring effort through VSI.
 - Encourage continued and expanded efforts to monitor insecticides and other pollutants in waterways through the Pesticide Stewardship Partnership and other programs.

Cold Water Refuge Streams and Riparian Habitats

Strategy: Support voluntary or proactive conservation actions.

Potential Actions:

- **Peer learning:** Assist the USDA Forest Service in sharing lessons learned from climate-focused restoration work with partners and landowners.
- **Grants:** Support OWEB's new efforts to fund projects that improve climate resilience; promote OWEBB grants to local partners.

Wetlands

Strategy: Support voluntary or proactive conservation actions.

Potential Actions:

- **Water storage:** Learn more about options to encourage created wetlands for water storage and infiltration. Consult the Confederated Tribes of the Umatilla Indian Reservation and Yakama Nation who have expressed experience and interest.

Priority Habitats and Sensitive Species

The Management Plan lists several Priority Habitats that we evaluated as part of vulnerabilities and risks described in Part I of this action plan. The CCAP does not include specific actions for some of these with very limited extent (e.g. aspen and dunes) or fine spatial distribution (e.g. logs and snags).

- | | |
|------------------------------|------------------|
| • Riparian areas | • Dunes |
| • Talus | • Logs and Snags |
| • Grasslands/prairies | • Aspen |
| • Old-growth forests | • Caves |
| • Oregon white oak woodlands | • Cliffs |
| • Shrub-steppe | |

Strategy: Protect resilient habitats and provide opportunities for climate sensitive species to adapt.

Potential actions for all priority habitats:

- Identify descriptive priorities (short-term) and spatially explicit priorities (long-term) for preservation/conservation, alongside USDA Forest Service. Support local conservation efforts to protect priority lands and waters.
- Leverage VSI findings to partner on restoration priority planning and evaluating the impacts of restoration work.

- Host periodic coordination meetings with ODFW and WDFW to discuss Management Plan options for recommended buffers, timing restrictions, and other measures that can become conditions of approval.
- Work with USDA Forest Service and others to create lists, sources, and recommendations for native plant materials for enhancement and restoration in the NSA that includes culturally important plants.
- Create prescriptive habitat mitigation requirements for priority habitats
 - Establish a mitigation banking option for certain types of projects or types of impacts that require an applicant to fund off-site mitigation to improve priority resources on protected lands (long-term, resources needed).

Additional Potential actions for talus:

- **Monitoring:** Through VSI and with the USDA Forest Service as lead, pilot a simple monitoring effort to track temperature and moss cover.
- **Management Plan revisions:**
 - Determine if buffers are appropriate for talus, to maintain shading tree canopy cover.
 - Consider revisions to Management Plan to prevent mining in talus habitat.
- **Priorities for habitat enhancement and climate adaptation:**
 - Coordinate with USGS on research to evaluate management actions to build adaptive capacity for talus-dependent species.
 - Analyze pika locations and underlying land uses to determine needs for action. Coordinate with appropriate state and federal agencies. Help USDA Forest Service identify locations and methods for pika habitat enhancement and climate adaptation.

Additional Potential actions for rare plants

- Work with the USDA Forest Service and state natural heritage programs to update species lists and understanding of sensitive plants and wildlife in the NSA.
- See also actions for wetlands and streams, as the rare plants with highest climate vulnerability in the NSA are those associated with wet and riparian habitats.

Scenic Resources

Potential Actions:

- **Landscape Settings and Land Use Designations:**
 - Review the Landscape Settings alongside resilience maps, wildfire data, and land cover datasets (when completed through VSI). Consider whether Landscape Settings and Land Use Designations are going to persist in their current locations in the future. For example: Are today's ag lands going to be ag lands in the future? Coniferous forests? Etc.

- More explicitly state that LUDs for farm and forest might need to be revisited as a result of scenic and natural resources analyses.
- Consider a review of climate change and development impacts to reassess Landscape Settings.

Tribal Treaty Rights, Including Culturally Important Plants

Potential Actions:

- **Huckleberry restoration:** Learn more about huckleberry population status (very limited in the NSA) and opportunity for facilitated range shift/expansion. USFS ecologists are working with tribal members on the Gifford Pinchot and Mt. Hood National Forests.

Recreation Resources

Strategy: Ensure climate change informs recreation resource management.

Potential Actions:

- **Collaborative planning and management:** Recognize compounding effects of climate change and increasing demand. Encourage cross-jurisdictional collaboration to manage people more adaptively. Continue active participation in Columbia Gorge Tourism Alliance and the Interagency Recreation Team.
- **Monitoring:** Through VSI, learn about and evaluate climate change impacts to recreation.
- **Transportation-related emissions reduction:** Pursue transportation-related mitigation actions, many of which apply to recreation sites.

Nature-Based Tourism

Potential Actions:

- **Climate-related disasters:** Remain engaged with Columbia Gorge Tourism Alliance and Interagency Recreation Team to support small businesses and recreation managers in preparing and responding to climate-related disasters.
- **Agricultural tourism:** Continue work with counties to develop ag-tourism policies.

Agricultural Uses and Products

Potential Actions

- **Resources for Producers:** Add resources and improve ease of using Gorge Commission website for technical and financial resources. As capacity allows, host listening sessions, workshops, and other activities to engage local producers in advancing conservation actions to address climate change impacts.

Forestry and Forest Products

Potential Actions:

- As scenic and natural resources analyses are completed, consider implications for forest Land Use Designations.
- Actively engage with state Forestry agencies to update policies and plans.
- See also “Carbon Storage on Habitats and Working Lands” and “Fire Risk” priority actions.

Public Roads

Potential Actions:

- **Road and culvert improvement:** Coordinate with USDA Forest Service, who has been inventorying roads needing upgrades, and use available online data to identify roads and culverts for improvement to address future flooding and impacts to fish habitat.
- **Spoils disposal sites:** Work with USDA Forest Service, WSDOT, and ODOT to identify preferred locations for spoils disposal sites throughout the gorge.

Cultural Sites

Potential Actions:

- **Needs analysis:** Support the USDA Forest Service to inventory and evaluate cultural sites for needs and potential to protect with defensible space or other protections against fire, flood, landslide, and other damage. This would require funding.
- **Funding:** More broadly, seek sustainable funding for heritage work in the NSA. See discussion of incentives for resource enhancements **on page X**.

3. Potential Mitigation Actions

CCAP Goal 2: Mitigate climate change by reducing greenhouse gas emissions and by protecting and enhancing carbon storage in the NSA.

Regional Transportation, Including Transit

Potential Actions:

- **Gorge Transportation Strategy:** Consider sponsoring a study or convene a high level leadership group to create a Gorge transportation strategy, incorporating elements of existing efforts, and exploring novel funding methods for parking management, transit, and other solutions.
- [Any to add here that are not in priority actions? Seeking Commissioner suggestions.]

Electric Vehicle Infrastructure

[Any to add here that are not in priority actions? Seeking Commissioner suggestions.]

Agency GHG Emissions

Strategy: Reduce emissions from Gorge Commission agency operations.

Potential Actions:

- Review prior agency emissions reports to state of WA. Resume tracking and report internally. Establish goals to reduce agency emissions.
- Request an exemption from current state rule that requires minimum annual mileage in order to justify the Commission’s single agency vehicle.

Development and Building Standards to Limit New Emissions

Strategy: Reduce energy emissions associated with Management Plan development policies.

Potential Actions:

- Review model ordinances and consider building efficiency standards. These could include size limits to reduce heating and cooling and promote efficient design in new public buildings.
- Update the Building in the Scenic Area Handbook to help landowners design for energy efficiency.
- Promote “climate-friendly” construction and design.
 - Attract and promote green infrastructure designers and builders.

- Host a green infrastructure design competition for students or businesses.

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PART IV: Tracking Progress and Measures of Success

DRAFT FOR MARCH 8, 2022 COMMISSION MEETING

A. Framework for Evaluating and Updating the CCAP

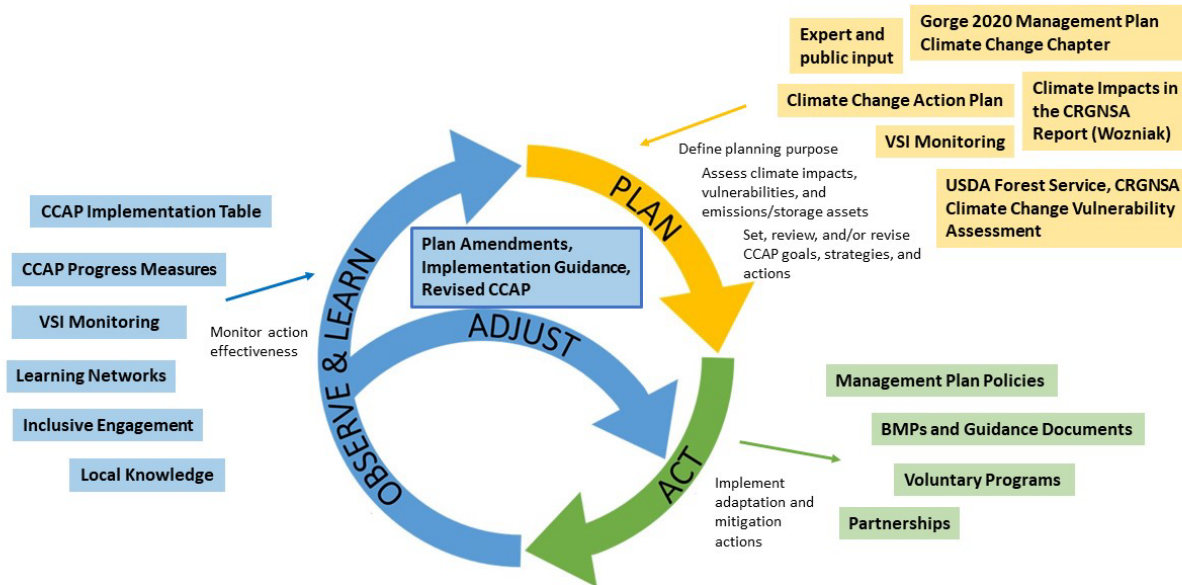
The CCAP framework is designed to be adaptive. In developing the CCAP document, we have incorporated prior Commission work, recent publications, expert and partner input, and initial learning from the Vital Sign Indicators (VSI) program. As we begin implementing the actions identified in the CCAP, we will be producing recommended Management Plan revisions, implementation guidelines, best management practices, and new or strengthened partnerships. As VSI findings are reported and public engagement proceeds, the Commission will revisit the CCAP and determine what is needed to adapt to new information.

Updating the Action Plan

Options to update and adapt the CCAP include:

- Updating the Implementation Guide to reflect accomplished actions and new priority actions;
- Updating other sections of the plan and revising priority areas for future action; and
- Completing companion assessments or plans to supplement the CCAP (examples could include a GHG inventory report or a strategy for carbon storage).

Climate Change Action Planning Cycle



Tracking CCAP Progress

The Commission will track and evaluate the CCAP at multiple levels and in close coordination with the VSI program. First, we will use the **Implementation Guide** on **Page X** as a check list to track the Commission’s priority actions, as they are implemented. **CCAP Progress Measures**, described in the table below, summarize progress on CCAP strategies.

B. Measuring Success with Vital Sign Indicators

Vital Sign Indicators are high-level measures that help us understand the status and trends of protected resources affected by CCAP actions (e.g., priority habitats, recreation experiences, and scenic views).

These Vital Sign Indicators support evaluation of CCAP priority adaptation and mitigation strategies and actions:

- **Cold water refuge streams:** Stream temperature and flow
- **Wetlands:** Extent and distribution; Land cover change
- **Oregon white oak woodlands:** Extent and distribution; Land cover change
- **Fire risk:** Wildfire extent and distribution; Fuels reduction on National Forest System lands
- Other Vital Sign Indicators, such as air quality, help inform management of resources affected by climate change including recreation, scenic views, and economic vitality of local communities.

Type of Actions	Priority Area in CCAP	CCAP Goals	Vital Sign Indicators	CCAP Progress Measures
Adaptation	Cold water refuge streams and riparian	Improve temps and stream function	CWR Stream temperature, flow, etc.	Number of enhancement projects supported
	Wetlands	Protect wetlands. Incentivize or reduce barriers to enhancement.	Wetland extent	Number/acres of wetland enhancement or restoration projects
	Culturally important plants	Protect culturally important plants and enhance opportunities for Tribes to steward plant populations.	TBD with Treaty Tribes	
Adaptation and Mitigation	OR white oak and winter range	Protect and enhance habitats and corridors.	Oak extent, distribution; Land cover change (TBD)	Number of development reviews/landowners including restoration or mitigation actions. Number of Plan improvements for LUDs or mitigation
	Protecting carbon stores from fire and conversion	Reduce fire risk across all lands. Encourage Fire Adapted Communities in the gorge.	Wildfire extent, distribution; Fuels reduction on NFS lands	Number of fire adapted communities in the Gorge?; Acres of fuels reduction on NFS lands
Mitigation	Reducing transportation emissions	Reduce transportation emissions.	To be determined	Commute data from OnTheMap EV charging stations from PlugShare.com Number of recreation sites with transit or congestion strategies in place
	Enhancing carbon storage	Enhance carbon storage in forests, ag lands, grasslands, and wetlands.	To be determined	

[PLACEHOLDER FOR CONCLUSIONS – THIS IS IN PROGRESS]

Points to consider incorporating, based on Commissioner comments:

- The CRGC has been working on behalf of a sustainable gorge since its inception. The original Management Plan had many climate change resilience measures already in place, before it was even a common term.
- This Action Plan creates a deeper, more intentional process for addressing climate change than we have ever had before. Formalizing the CCAP helps us to focus and get more specific with impactful activities within our authority.
- Clarify the relationship between the CCAP and Management Plan revision processes in the future.

[**SEE IMPLEMENTATION TABLE – SEPARATE EXCEL SPREADSHEET TEMPLATE – FOR DETAILED LIST OF PRIORITY ACTIONS****]**

DRAFT FOR MARCH 8, 2022 COMMISSION MEETING

References

- Bossio, D.A., Cook-Patton, S.C., Ellis, P.W. *et al.* The role of soil carbon in natural climate solutions. *Nat Sustain* 3, 391–398 (2020). <https://doi.org/10.1038/s41893-020-0491-z>
- Bronin, Sara C., Land Use and Transportation Policies Addressing Climate Change (October 11, 2021). Sara C. Bronin, Land Use and Transportation Policies Addressing Climate Change, in *Global Climate Change and U.S. Law* (American Bar Association Press; Michael B. Gerrard, Jody Freeman, and Michael Burger, eds.) 3d ed. 2022 Forthcoming, Available at SSRN: <https://ssrn.com/abstract=3940681> or <http://dx.doi.org/10.2139/ssrn.3940681>
- City of Flagstaff. 2018. Climate Action and Adaptation Plan. [Online] <https://www.flagstaff.az.gov/DocumentCenter/View/59411/Flagstaff-Climate-Action-and-Adaptation-Plan-Nov-2018> [note: Commission staff has reviewed dozens of similar plans as part of our effort. This citation is included because we adapted their graphic in our work]
- Columbia River Gorge Commission. 2020. Draft Strategies and Actions Report. Originally presented Feb, 2020: <http://www.gorgecommission.org/meeting/february-2020-monthly-crgc-meeting> and revised and shared in summary form Dec, 2020 <http://www.gorgecommission.org/meeting/archived/monthly-meetings-2020>.
- Columbia River Gorge Commission and U.S. Forest Service. 2020. Management Plan for the Columbia River Gorge National Scenic Area. Climate Change Chapter pp 387-389.
- Columbia River Intertribal Fish Commission. 2017. Climate Change Needs Assessment Survey. [Online] <https://www.critfc.org/wp-content/uploads/2019/01/CRITFC-CC-Survey.pdf>
- Dalton, M.M., and E. Fleishman, editors. 2021. Fifth Oregon Climate Assessment. Oregon Climate Change Research Institute, Oregon State University, Corvallis, Oregon.
- Dass, P., B.Z. Houlton, Y. Wang, and D. Warlind. 2018. Grasslands may be more reliable carbon sinks than forests in California. *Environmental Research Letters*. 13.
- Domke, G.M., B.F. Walters, D.J. Nowak, J. Smith, M.C. Nichols, S.M. Ogle, J.W. Coulston, and T.C. Wirth. 2021. Greenhouse Gas Emissions and Removals from Forest, Land, Woodlands, and Urban Trees in the United States, 1990-2019. Resource Update FS-307. Madison, WI: U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Dye, A.W., J.B. Kim, A. McEvoy, F. Fang, and K.L. Riley. 2021. Evaluating rural Pacific Northwest towns for wildfire evacuation vulnerability. *Natural Hazards* 107: 911-935.
- Fertig, W. 2020. Climate change vulnerability index reports for selected Washington State rare plant species. Report to U.S. Forest Service Region 6. Department of Natural Resources, Natural Heritage Report 2020-04. https://www.dnr.wa.gov/publications/amp_nh_ccvi_wa_rare.pdf

Gilbertson-Day, J.W., R.D. Stratton, J.H. Scott, K.C. Vogler, A. Brough. 2018. Pacific Northwest Quantitative Wildfire Risk Assessment: Methods and Results. Prepared for the Bureau of Land Management and US Forest Service Pacific Northwest Region by PyroLogix.
https://oe.oregonexplorer.info/externalcontent/wildfire/reports/20170428_PNW_Quantitative_Wildfire_Risk_Assessment_Report.pdf

Halofsky, J.E.; Peterson, D.L.; Gravenmier, R.A., eds. 202X. Climate change vulnerability and adaptation in the Columbia River Gorge, Mount Hood National Forest, and Willamette National Forest. Gen. Tech. Rep. PNW-GTR-xxx. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. In Press.

Halofsky, Jessica E.; Peterson, David L.; Ho, Joanne J.; Little, Natalie, J.; Joyce, Linda A., eds. 2018. Climate change vulnerability and adaptation in the Intermountain Region. Gen. Tech. Rep. RMRS-GTR-375. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Part 2. pp. 199–513.

Harrison, J.A., Y.T. Prairie, S. Mercier-Blais, and C. Stoued. 2021. "Year-2020 Global Distribution and Pathways of Reservoir Methane and Carbon Dioxide Emissions According to the Greenhouse Gas from Reservoirs (G-res) Model."

Harvey, Audrey J.; Rew, Lisa J.; Prather, Tim S.; Mangold, Jane M. 2020. "Effects of Elevated Temperature and CO₂ Concentration on Seedling Growth of *Ventenata dubia* (Leers) Coss. and *Bromus tectorum* L." *Agronomy* 10, no. 11: 1718.
<https://doi.org/10.3390/agronomy10111718>

Howe, P., Mildenerger, M., Marlon, J.R., and Leiserowitz, A., "Geographic variation in opinions on climate change at state and local scales in the USA," Nature Climate Change. DOI: 10.1038/nclimate2583. Yale Program on Climate Change Communication Data Visualization Tool, 2020 data.

Inslee, Governor Jay. 2017. Letter to President Donald Trump.
https://www.governor.wa.gov/sites/default/files/images/2017-04-07_Disaster_Request_Letter.pdf

ITEP STACC Report. 2020
<https://drive.google.com/file/d/11uwJpvcUkJNdaCGZAPdguYe35R4KXm1d/view>

Monz, C.A., K.J. Gutzwiller, V.H. Hausner, M.W. Brunson, R. Buckley, C.M. Pickering. 2020. Understanding and managing the interactions of impacts from nature-based recreation and climate change. Royal Swedish Academy of Sciences.

NorWEST temperature data portal: Isaak, D.J.; Wenger, S.J.; Peterson, E.E.; Ver Hoef, J.M.; Hostetler, S.W.; Luce, C.H.; Dunham, J.B.; Kershner, J.L.; Roper, B.B.; Nagel, D.E.; Chandler, G.L.; Wollrab, S.P.; Parkes, S.L.; Horan, D.L. 2016. NorWeST modeled summer stream temperature scenarios for the western U.S. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2016-0033>.

Oregon Climate and Health Report. 2020. Oregon Health Authority. [Online] <https://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/CLIMATECHANGE/Pages/Publications-Training.aspx>

Oregon Conservation Strategy. 2016. Oregon Department of Fish and Wildlife, Salem, Oregon.

Oregon Tourism Commission (Travel Oregon). 2018. The Impacts of the 2017 Wildfires on Oregon's Travel and Tourism Industry. <https://industry.traveloregon.com/wp-content/uploads/2018/07/TO-2017-Wildfires-Impact-Report-Final.pdf>

Rice, Janine; Bardsley, Tim; Gomben, Pete; Bambrough, Dustin; Weems, Stacey; Huber, Allen; Joyce, Linda A. 2017. Assessment of aspen ecosystem vulnerability to climate change for the Uinta-Wasatch-Cache and Ashley National Forests, Utah. Gen. Tech. Rep. RMRS-GTR-366. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 67 p.

Serra-Diaz, J.M., Maxwell, C., Lucash, M.S. *et al.* Disequilibrium of fire-prone forests sets the stage for a rapid decline in conifer dominance during the 21st century. *Sci Rep* **8**, 6749 (2018). <https://doi.org/10.1038/s41598-018-24642-2>

U.S. Environmental Protection Agency. Climate Change Indicators website. <https://www.epa.gov/climate-indicators>. Accessed 2021.

U.S. Environmental Protection Agency. 2021. Columbia River Cold Water Refuge Plan. <https://www.epa.gov/sites/default/files/2021-01/documents/columbia-river-cwr-plan-final-2021.pdf>

USGCRP. 2018. *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018.

U.S. Federal Government. 2014. U.S. Climate Resilience Toolkit. [Online] <http://toolkit.climate.gov>. Accessed 2020-2021.

Washington Department of Fish and Wildlife. 2015. Washington's State Wildlife Action Plan: 2015 Update. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Wozniak, O. 2019. Summary of Climate Change Effects in the Columbia River Gorge National Scenic Area. Presented to the Commission October 8, 2019.

Other Climate Change Plans for the Gorge Region

[This list is not yet complete]

This Action Plan supplements and incorporates information from federal, state, local, tribal, and other plans for the Columbia River Gorge region, including:

Confederated Tribes of the Umatilla Indian Reservation Climate Change Vulnerability Assessment (2017) and Adaptation Plan (2021) <https://ctuir.org/departments/natural-resources/climate-adaptation/ctuir-climate-adaptation-plan-revised-final-drafts/>

Hood River County Energy Plan (2018) https://www.mcedd.org/wp-content/uploads/2019/04/Hood-River-Energy-Plan_6-18-18.pdf

MCEDD Draft Columbia Gorge Economic Development Strategy (2022) https://www.mcedd.org/wp-content/uploads/2021/12/2022-2027-Columbia-Gorge-CEDS_draft.pdf

Oregon Department of Forestry Climate Change and Carbon Plan (2021) <https://www.oregon.gov/odf/forestbenefits/Documents/odf-climate-change-and-carbon-plan-draft.pdf>

Oregon Global Warming Commission Biennial Report to the Legislature (2020) <https://static1.squarespace.com/static/59c554e0f09ca40655ea6eb0/t/5fe137fac70e3835b6e8f58e/1608595458463/2020-OGWC-Biennial-Report-Legislature.pdf>

Oregon Climate Change Adaptation Framework (2021) https://www.oregon.gov/lcd/CL/Documents/2021_CLIMATE_CHANGE_ADAPTATION_FRAMEWORKandBlueprint.pdf

Oregon Department of Transportation Electric Infrastructure Needs Assessment (2021) https://www.oregon.gov/odot/Programs/Documents/Climate%20Office/TEINA_Final_Report_June282021.pdf

Oregon Department of Transportation Highway Congestion Strategy [\(see folder\)](#)

State of Oregon Climate Equity Blueprint (2021) https://www.oregon.gov/lcd/CL/Documents/2021_Jan_Climate-Equity-Blueprint.pdf

USDA Action Plan For Climate Adaptation and Resilience (Oct 2021) <https://www.sustainability.gov/pdfs/usda-2021-cap.pdf>

Washington State Inventory of Emissions and on-going reporting <https://ecology.wa.gov/Air-Climate/Climate-change/Tracking-greenhouse-gases/GHG-inventories>

Yakama Nation Climate Change Action Plan (2021) https://yakamafish-nsn.gov/sites/default/files/YakamaNationCAP_Approved_Final_3_2021.pdf