



## Funding Opportunity

### Northwest Climate Adaptation Science Center Research Fellowship Program

The Northwest Climate Adaptation Science Center (NW CASC) invites proposals for its 2026-2027 Research Fellowship Program from *graduate students* at University of Washington (UW), Boise State University (BSU), Oregon State University (OSU), Portland State University (PSU), University of Montana (UM), Washington State University (WSU) and Western Washington University (WWU) and *postdoctoral scientists* at BSU, OSU, PSU, UM, WSU and WWU (this Fellowship cannot fund postdocs at UW, though UW postdocs may apply to participate in fellowship activities without funding).

The NW CASC Fellowship supports research related to climate adaptation in Northwest natural and cultural resource management and training in the principles and practices of co-producing decision-relevant (i.e., “actionable”) science during the 2026-2027 academic year (see below for information about specific funding period). **Proposals are due March 9, 2026.**

#### Program Overview

The NW CASC was established to help safeguard the natural and cultural resources of Idaho, Oregon, Washington and surrounding river basins (e.g., western Montana, northern California) by providing managers and policymakers with actionable science on climate change impacts and adaptation actions. The NW CASC is hosted by the UW in partnership with the Affiliated Tribes of Northwest Indians (ATNI), Northwest Indian College (NWIC), BSU, OSU, PSU, UM, WSU and WWU.

The NW CASC Research Fellowship Program<sup>1</sup> aims to support the development of science relevant to natural and cultural resource managers facing climate-related risks and challenges. To achieve this aim, the program supports research conducted by graduate students and postdoctoral scientists *and* provides training in the principles and practices of co-production of decision-relevant (i.e., “actionable”) science.

**Research Support.** The NW CASC Fellowship will support research relevant to identifying and addressing climate impacts in Northwest natural and cultural resource management. The program supports both research that generates new knowledge and that which synthesizes, assesses or interprets existing knowledge for application in specific management contexts. Proposed research must (1) align with the NW CASC Science Agenda, (2) demonstrably benefit NW CASC interest holder(s) and (3) result in actionable-science deliverables within the Fellowship year.

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<sup>1</sup> <https://nwcasc.uw.edu/programs/research-fellowship-program/>

*Science priorities.* NW CASC science priorities are closely tied to the needs of regional natural and cultural resource managers and are detailed in the portions of the NW CASC Science Agenda priorities for 2025-2030 available in Appendix B and in the *NW CASC Deep Dive Actionable Science Agendas*<sup>2,3,4,5</sup> and *Research Needs and Capacity Needs*<sup>6</sup> developed during NW CASC Deep Dives. Applications must have a clear link to climate impacts and/or adaptation (not climate mitigation).

Applications addressing the NW CASC Science Agenda for 2025-2030 must address at least one priority ecosystem (as listed in Figure 4) or at least one species of greatest conservation need in Idaho, Oregon or Washington (see “Priority Species” on pg. 9) and at least one climate-linked driver of change (as listed in Figure 5). Applications addressing the *NW CASC Deep Dive Actionable Science Agendas* may address science priorities detailed in the following documents:

- Managing Western Washington Wildfire Risk in a Changing Climate (*Actionable Science Agenda on Westside Fire*<sup>2</sup>)
- Managing Post-Fire Vegetation Change in a Warming Climate (*Actionable Science Agenda on Post-Fire Vegetation Transformation*<sup>3</sup>)
- Managing Inland Migration of Coastal Habitats in Response to Sea Level Rise (*Actionable Science Agenda on Coastal Squeeze*<sup>4</sup>)
- Managing the Ecological Impacts of Extreme Heat in the Northwest (*Actionable Science Agenda*<sup>5</sup>)
- Understanding and Responding to Climate-Induced Impacts on Stream Permanence in the Northwestern U.S. (*Research Needs and Capacity Needs related to Stream Permanence*<sup>6</sup>)

*NW CASC interest-holders.* Primary NW CASC interest-holders are fish, wildlife and ecosystem managers within the US Department of the Interior bureaus (National Park Service, US Fish and Wildlife Service, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation; note: the US Forest Service is not a DOI bureau), Northwest Tribes or Tribal entities and state fish and wildlife and natural resource management agencies. Prospective fellows must detail how their proposed research would benefit one of these NW CASC interest-holders and provide an interest-holder letter of support. Proposals that demonstrate working partnerships or other deep interest-holder engagement will be evaluated more favorably.

*Fellowship Funding Period and Deliverables.* The funding period for the NW CASC 2026-2027 Fellowship cohort is from the beginning of fall term, 2026 through 31 July 2027, with the potential for funding to begin as early as the beginning of the Fellow’s summer term 2026 and for extension to the end of summer term, 2027. Extensions are contingent on continued DOI funding of the NW CASC itself and satisfactory progress by the Fellow. Research proposals must define substantive results and deliverables that will be produced during the Fellowship period. Progress on the funded research is required to be documented with (1) an interim project report, due May 1, 2027 and (2) a final report due within one month after Fellowship funding ends.

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<sup>2</sup><https://nwcasc.uw.edu/wp-content/uploads/sites/23/2026/01/Managing-Western-Washington-Wildfire-Risk-in-a-Changing-Climate.pdf> (see pages 9-10)

<sup>3</sup><https://nwcasc.uw.edu/wp-content/uploads/sites/23/2026/01/Managing-Post-Fire-Vegetation-Change-in-a-Warming-Climate.pdf> (see pages 10-11)

<sup>4</sup><https://nwcasc.uw.edu/wp-content/uploads/sites/23/2026/01/Managing-Inland-Migration-of-Coastal-Habitats-in-Response-to-Sea-Level-Rise.pdf> (see pages 12-13)

<sup>5</sup><https://nwcasc.uw.edu/wp-content/uploads/sites/23/2026/01/Managing-the-Ecological-Impacts-of-Extreme-Heat-in-the-Northwest.pdf> (see pages 14-15)

<sup>6</sup><https://nwcasc.uw.edu/wp-content/uploads/sites/23/2026/01/Understanding-and-Responding-to-Climate-Induced-Impacts-on-Stream-Permanence-in-the-Northwestern-U.S.pdf> (summary on page 2, more information in Tables 1-3 & 6-8)

**Actionable Science Support.** NW CASC Research Fellows learn and practice actionable science principles and practices through a variety of activities, including skills development and network enhancement activities:

- *Cohort Meetings.* Fellows will participate in monthly meetings using video conferencing services to facilitate group learning and cohort building. Cohort meetings will provide an opportunity for Fellows to discuss challenges/opportunities encountered in their research projects, particularly related to their co-production and actionable science efforts.
- *Skills-Building Webinars.* Fellows will attend NW CASC's periodic Actionable Science Skills-building Webinars, which are designed to help those engaged in climate impacts and adaptation research better understand the range of approaches for developing actionable science.<sup>7</sup>
- *Actionable Science Graduate Seminar.* Fellows will participate (in-person and remotely via Zoom) in a 2-credit winter-quarter UW seminar: *The Theory and Practice of Linking Knowledge with Action to Address Modern Environmental Challenges*. This reading and discussion-based seminar reviews foundational and emerging literature that explores the science and practice of linking of knowledge and action (e.g., co-production, knowledge brokering, transdisciplinarity) in the context of climate change adaptation. The seminar will meet weekly during the UW winter quarter (January-March 2027). Fellows at institutions other than UW can receive independent study credit for the seminar.
- *NW Climate Conference.* If a NW Climate Conference is held during the Fellowship year, Fellows will be expected to attend and will be provided travel support from the NW CASC.

### **Criteria for Funding of NW CASC Research Fellowships**

*Proposed research projects must:*

- Involve graduate students (at UW, OSU, PSU, BSU, UM, WSU and WWU) or postdoctoral scientists (at BSU, OSU, PSU, UM, WSU and WWU) who are committed to participating in the Fellowship training activities described above (this Fellowship cannot fund postdocs at UW, though UW postdocs may apply to participate in fellowship activities without funding). To be eligible, the graduate student or postdoctoral scholar must be currently enrolled (and in good standing), employed or accepted to begin enrollment or employment by Fall Term 2026. *Please note that students who have previously received funding through the NW CASC Fellowship Program are not eligible to apply for additional funding.*
- Be focused within the NW CASC geographic domain, i.e., Idaho, Oregon, Washington and surrounding river basins (e.g., western Montana, northern California),
- Be relevant to management decisions related to identifying and addressing climate impacts on Northwest natural and cultural resource management, as identified in the *NW CASC Science Agenda for 2025-2030* and the *Actionable Science Agendas* developed during NW CASC Deep Dives,
- Be relevant to primary NW CASC interest holders, i.e., fish, wildlife and ecosystem managers within the US Department of the Interior bureaus (National Park Service, US Fish and Wildlife Service, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation; note: the US Forest Service is not a DOI bureau), Northwest Tribes or Tribal entities and state fish and wildlife and natural resource management agencies,
- Be designed to produce substantive results and deliverables during the Fellowship year.

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<sup>7</sup> <https://nwcasc.uw.edu/resources/actionable-science-webinars/>

The NW CASC Research Fellowship funding can be used to initiate a new research project; to support, extend or complete an ongoing research project; or to extend ongoing research to support management decisions. It can be used to support research to generate new knowledge or efforts focused on synthesizing, assessing and interpreting existing knowledge for application in specific management contexts.

Priority will be given to projects that demonstrably leverage other efforts and resources (e.g., tuition cost-share; funding from other governmental and private organizations; or use of laboratory space, equipment, field station or site) and for which NW CASC funding will make a demonstrable difference.

Previous awards have averaged around \$30,000, with a range of \$8,000 to \$65,000 (with larger amounts typically reserved for postdoctoral Fellows). Because of UW matching funds, total allowed award costs from UW Fellows are calculated *excluding* tuition and indirect costs.

### **Application and Selection Process**

Applications are due by **11:59 pm PDT on March 9, 2026**. Please complete **two** steps:

1. *Complete online application form.* Please use [this online form](#) to submit the following information:
  - a. Name and contact information (email, phone) of prospective Fellow
  - b. University
  - c. Graduate degree being pursued during the Fellowship and year started (e.g., pursuing MS in Conservation Biology, started in 2025; PhD in Aquatic and Fishery Sciences, started in 2023)
  - d. Academic department
  - e. Name and contact information (email, phone) of faculty advisor(s)
  - f. Project title
  - g. Geographic location (if relevant)
  - h. Brief (2 sentence) project description
  - i. Specific component(s) of the NW CASC Science Agenda for 2025-2030, the Actionable Science Agenda on Westside Fire, the Actionable Science Agenda on Post-Fire Vegetation Transformation, the Research Needs and Capacity Needs on Stream Permanence, Actionable Science Agenda on Coastal Squeeze or the Actionable Science Agenda on Ecological Impacts of Extreme Heat that your project addresses (e.g. 1.1.1. "Identify drought impacts on groundwater recharge, discharge, and storage," Aquatic Resources Goal 1).
  - j. Specific outputs/outcomes anticipated during period of funding
  - k. List of external partners
  - l. Total requested funding
  - m. Leveraged support
2. *Email proposal.* Please email your proposal (as a single pdf) and budget (both within your PDF and as a separate Excel file) directly to [nwcasc@uw.edu](mailto:nwcasc@uw.edu). **Email must be received by 11:59 pm PDT on March 9, 2026.** Proposals are to be primarily the work of the student applying to the Fellowship. Advising faculty are encouraged to review and provide feedback to the applicants, but should not be the primary author of the application materials. Proposals should be formatted with 1-inch margins and 12 point font. Include the following documents in the pdf:
  - a. *Cover page* listing the name of prospective Fellow and project title.
  - b. *Letter of support from the faculty advisor* (1 page). The faculty member's letter must indicate a justification for the research, endorsement of the student's/postdoc's proposed research and support for the student's/postdoc's participation in the NW

CASC Fellowship Program activities. Please indicate at what percentage time and for how many and which months Fellowship support is desired. The faculty letter is not simply a letter of recommendation.

- c. *Letter of application from the prospective Fellow* (1-2 pages maximum). The application letter should include the applicant's reason for seeking a NW CASC Fellowship and relevance of the Fellowship training to their career objectives and previous experience.
- d. *Concise summary of the proposed research* (3-page limit; references can be included on additional pages) including the following as appropriate to the project:
  - i. Background, justification (including relevance of the proposed project to NW CASC science priorities and primary interest-holders), goals and objectives.
  - ii. Research design, including methods and plans for analysis.
  - iii. Timeline with tasks to be completed.
  - iv. Intended deliverables and products.
  - v. Plan for interaction with NW CASC primary interest-holders, expected use of products in natural resource decision making, any additional project outcomes.
- e. *Budget details* including, as appropriate, salaries, benefits rates, tuition, supplies, travel, and indirect (F&A) rates for specific terms, including summer if applicable. Please use and submit the sample budget Excel spreadsheet available here: <https://nwcasc.uw.edu/programs/research-fellowship-program/applying-for-the...llowship-program/>. (The budget should be included both in the complete pdf application file *and* submitted as a separate Excel spreadsheet.)
- f. *A brief statement of support from an external partner or interest-holder* (e.g., in a governmental agency, Tribe, NGO, or similar organization) describing their involvement in the project and the expected impact of the data, analyses, or other knowledge or resources produced in supporting their decisions regarding management of climate risks. Letters should be from someone who works in resource management for these organizations, not someone who primarily works as a scientist.
- g. *CV of the prospective Fellow.*

After screening for the minimum requirements listed above, applications will be reviewed based on the promise shown by the prospective Fellows, the salience of their work to NW CASC priorities and to the criteria noted above, and the degree to which their work effectively leverages other efforts and sources of funding. Final decisions also consider representation of Consortium institutions and projects that reflect the breadth of NW CASC Science Agenda priorities. The criteria that reviewers will use to appraise applications is provided in Appendix A of this document.

*Note:* NW CASC USGS staff (see below) are available to consult with prospective Fellows on the salience of their potential research to NW CASC science priorities and primary interest-holders and may be able to assist in identifying additional NW CASC interest-holders for some proposed projects.

## For More Information

### *University of Washington:*

- Dr. Meade Krosby – NW CASC University Director, UW Climate Impacts Group  
[mkrosby@uw.edu](mailto:mkrosby@uw.edu), 206-579-8023
- Dr. Anima Kalafatis – NW CASC Deputy University Director, UW Climate Impacts Group  
[scottkal@uw.edu](mailto:scottkal@uw.edu), 206-543-6720

### *Boise State University:*

- Dr. Kelly Hopping – NW CASC Co-Lead for BSU  
[kellyhopping@boisestate.edu](mailto:kellyhopping@boisestate.edu), 208-426-4152

### *Oregon State University:*

- Dr. Selina Heppell – NW CASC Lead for OSU  
[selina.heppell@oregonstate.edu](mailto:selina.heppell@oregonstate.edu), 541-737-9039

### *Portland State University:*

- Dr. Paul Loikith – NW CASC Lead for PSU  
[ploikith@pdx.edu](mailto:ploikith@pdx.edu), 503-725-3078

### *University of Montana:*

- Dr. Solomon Dobrowski – NW CASC Lead for UM  
[solomon.dobrowski@umontana.edu](mailto:solomon.dobrowski@umontana.edu), 406-243-5521

### *Washington State University:*

- Dr. Jan Boll – NW CASC Co-Lead for WSU  
[j.boll@wsu.edu](mailto:j.boll@wsu.edu), 509-335-4767
- Dr. Julie Padowski – NW CASC Co-Lead for WSU  
[julie.padowski@wsu.edu](mailto:julie.padowski@wsu.edu), 509-335-8539

### *Western Washington University:*

- Dr. John Rybczyk – NW CASC Lead for WWU  
[John.Rybczyk@wwu.edu](mailto:John.Rybczyk@wwu.edu), 360-223-5806

### *USGS:*

- Dr. Leona Svancara – NW CASC Acting Regional Administrator  
[lsvancara@usgs.gov](mailto:lsvancara@usgs.gov)

## Appendix A: NW CASC Fellowship Proposal Review Criteria

*Proposed research projects must:*

1. Involve **graduate students** (at UW, BSU, OSU, PSU, UM, WSU and WWU) or **postdoctoral scientists** (at BSU, OSU, PSU, UM, WSU and WWU) who:
  - Are currently enrolled (and in good standing), employed or accepted to begin enrollment or employment by Fall Term 2026. Note that this Fellowship cannot fund postdocs at UW, though UW postdocs may apply to participate in fellowship activities without funding.
  - Have not previously received funding through the NW CASC Fellowship Program.
2. Be focused within the **NW CASC geographic domain**, i.e., Idaho, Oregon, Washington and surrounding river basins (e.g., western Montana, northern California).
3. Be **relevant to management decisions** related to identifying and addressing climate impacts on Northwest natural and cultural resource management, as **identified in the NW CASC Science Agenda for 2025-2030 and the Actionable Science Agendas developed during NW CASC Deep Dives**. Please note that the portions of the NW CASC Science Agenda for 2025-2030 available in Appendix B includes a list of Topics Outside the Scope of the NW CASC at the end. If this list does not clarify questions about the relevance of the proposed research for NW CASC, applicants should contact NW CASC Deputy University Director Dr. Anima Kalafatis ([scottkal@uw.edu](mailto:scottkal@uw.edu)).
4. Be **relevant to primary NW CASC interest-holders**. Prospective Fellows must detail how their proposed research would benefit one of these NW CASC interest-holders, and provide an interest holder letter of support. Support from other interest holders is welcome, but would need to be *in addition* to support from interest holders listed here. Proposals that demonstrate working partnerships or other deep interest holder engagement will be evaluated more favorably. NW CASC interest holders include:
  - US Department of the Interior bureaus (National Park Service, US Fish and Wildlife Service, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation; note: the US Forest Service and NOAA are not DOI bureaus),
  - Northwest Tribes or Tribal entities
  - State fish and wildlife and natural resource management agencies
5. Be **designed to produce substantive results and deliverables during the 2025-2026 Fellowship year**. Deliverables should include products likely to be readily applied by decision-makers (e.g., tools, datasets, workshops), rather than a peer-reviewed paper alone.
6. Priority will be given to projects that **demonstrably leverage other efforts and resources** (e.g., tuition cost-share; funding from other governmental and private organizations; or use of laboratory space, equipment, field station or site) and **for which NW CASC funding will make a demonstrable difference**.

*After screening for the minimum requirements listed above, applications will be reviewed based on:*

- The promise shown by the prospective Fellow
- The rigor of the proposed work and its salience to NW CASC priorities
- Evidence of the prospective Fellow's commitment to participating in Fellowship training activities
- Final decisions also consider representation of Consortium institutions and projects that reflect the breadth of NW CASC Science Agenda priorities

#### **Appendix B: NW CASC Science Agenda**

This appendix contains portions of the NW CASC's Science Agenda for 2025-2030 relevant for applicants to the 2026-2027 NW CASC Research Fellowship Program. These include a list of Northwest Priority Ecosystems (Figure 4), information about identifying priority species by state, climate-linked drivers of ecological change for Northwest natural and cultural resource management (Figure 5) and a list of topics outside the scope of the NW CASC.

## Northwest Priority Ecosystems & Species

The NW CASC's mission is to help species, ecosystems, lands, waters, and people adapt to a changing climate. State, Tribal, and federal natural resource management agencies are all stewards of these resources across the Northwest, and each plays a different but complementary role in resource management. Unless preempted by federal authority (e.g., Endangered Species Act [ESA], Marine Mammal Protection Act, Migratory Bird Treaty Act), states possess primary authority and responsibility for protection and management of fish and wildlife. However, species occurring in some areas, such as National Parks or National Wildlife Refuges, are typically managed by the relevant federal land management agency. Further, many Tribes also retain the right to manage species within their reservation boundaries and retain rights to hunt, fish, and harvest in off-reservation areas. Ultimately, coordination and cooperation among federal, state, and Tribal agencies is necessary for successful conservation and management of fish, wildlife, plants, and their habitats.

### **Priority Ecosystems**

The ecosystems of the Northwest range from moist maritime forest to arid shrub-steppe and from high elevation talus slopes to hardwood riparian forest. Climate change impacts ([Appendix C](#)) vary across these systems and are presenting new challenges for resource managers. NW CASC Advisory Committee members identified six major ecosystem classes and specific habitats or subclasses considered to be current management priorities for their respective agencies and Tribes, including:

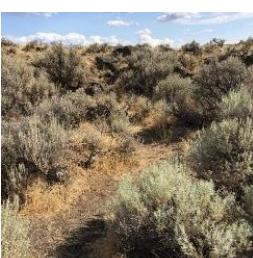
	<b>Aquatic</b> <ul style="list-style-type: none"><li>Streams and rivers</li><li>Lakes and ponds</li><li>Riparian areas</li><li>Forested wetlands</li><li>Vernal pools</li><li>Cold water refugia</li></ul>		<b>Coastal</b> <ul style="list-style-type: none"><li>Marine coastlines and nearshore habitats</li><li>Rocky intertidal zones</li><li>Estuaries</li><li>Sandy coastlines</li></ul>
	<b>Alpine &amp; Sub-Alpine</b> <ul style="list-style-type: none"><li>High montane forests</li><li>High montane mesic meadows</li><li>Lower montane forests</li></ul>		<b>Grasslands</b> <ul style="list-style-type: none"><li>Willamette Valley prairies</li><li>Western Washington prairies</li><li>Palouse Prairie</li></ul>
	<b>Forests &amp; Woodlands</b> <ul style="list-style-type: none"><li>Temperate rain forests dominated by Douglas fir &amp; Western hemlock</li><li>Mixed conifer forests</li><li>Drier ponderosa and lodgepole pine</li><li>Aspen</li><li>Oak woodlands</li><li>Juniper woodlands</li><li>Whitebark pine</li></ul>		<b>Sagebrush Steppe</b> <ul style="list-style-type: none"><li>Perennial bunchgrasses</li><li>Large, intact areas of dry shrubland</li><li>Mesic areas in shrublands (e.g., vernal pools, playas, saline lakes)</li><li>Sand dunes</li><li>Greasewood flats</li><li>Salt desert scrub</li></ul>

Figure 4. Northwest priority ecosystems identified by the NW CASC Advisory Committee.

While urban areas are not a primary focus of the NW CASC, green infrastructure and green spaces provide benefits to some Northwest priority species (e.g., monarch butterfly, other pollinators), and maintaining and improving these benefits in a changing climate is also a priority.

### ***Priority Species***

As noted above, responsibility for managing fish and wildlife in the United States is divided between the federal government, states, and Tribal partners. Resource managers participating on the NW CASC Advisory Committee identified some of their agency's priority management species. We also look to documents published by our partners identifying declining species, species of conservation concern, and federal and state listed species. The ESA provides federal guidelines for the protection of endangered and threatened species. However, state agencies are chief stewards for the wildlife within their borders and often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants.

State fish and wildlife agencies in the NW CASC region have developed State Wildlife Action Plans (SWAPs) to strategically conserve and manage the individual states' most at-risk fish, wildlife, and plants (identified as Species of Greatest Conservation Need) and the habitats on which they depend. Guidance on voluntary conservation actions needed for these species and habitats emphasizes prevention of future listings of these species under the ESA. For more information on species and habitats of conservation concern in the NW CASC region, see the [Idaho SWAP](#), [Oregon SWAP](#), [Washington SWAP](#), state lists of threatened and endangered species in [Oregon](#) or [Washington](#), and the [federally listed species by state](#).

### ***Climate-Linked Drivers of Ecological Change***

Natural and cultural resources in our region are often impacted by multiple interacting stressors and drivers of ecological change. NW CASC partners and advisors indicated that understanding and addressing the following climate-linked drivers of change, as well as interactions among those drivers and compounding threats, are high priorities for implementing effective climate adaptation actions. For a more extensive review of climate change effects and trends in the Northwest see [Appendix C](#). Resource managers participating on the NW CASC Advisory Committee identified five key drivers of change and additional stressors that they considered to be of paramount concern to their respective agencies (Figure 5).

## Northwest Priority Ecosystems & Species

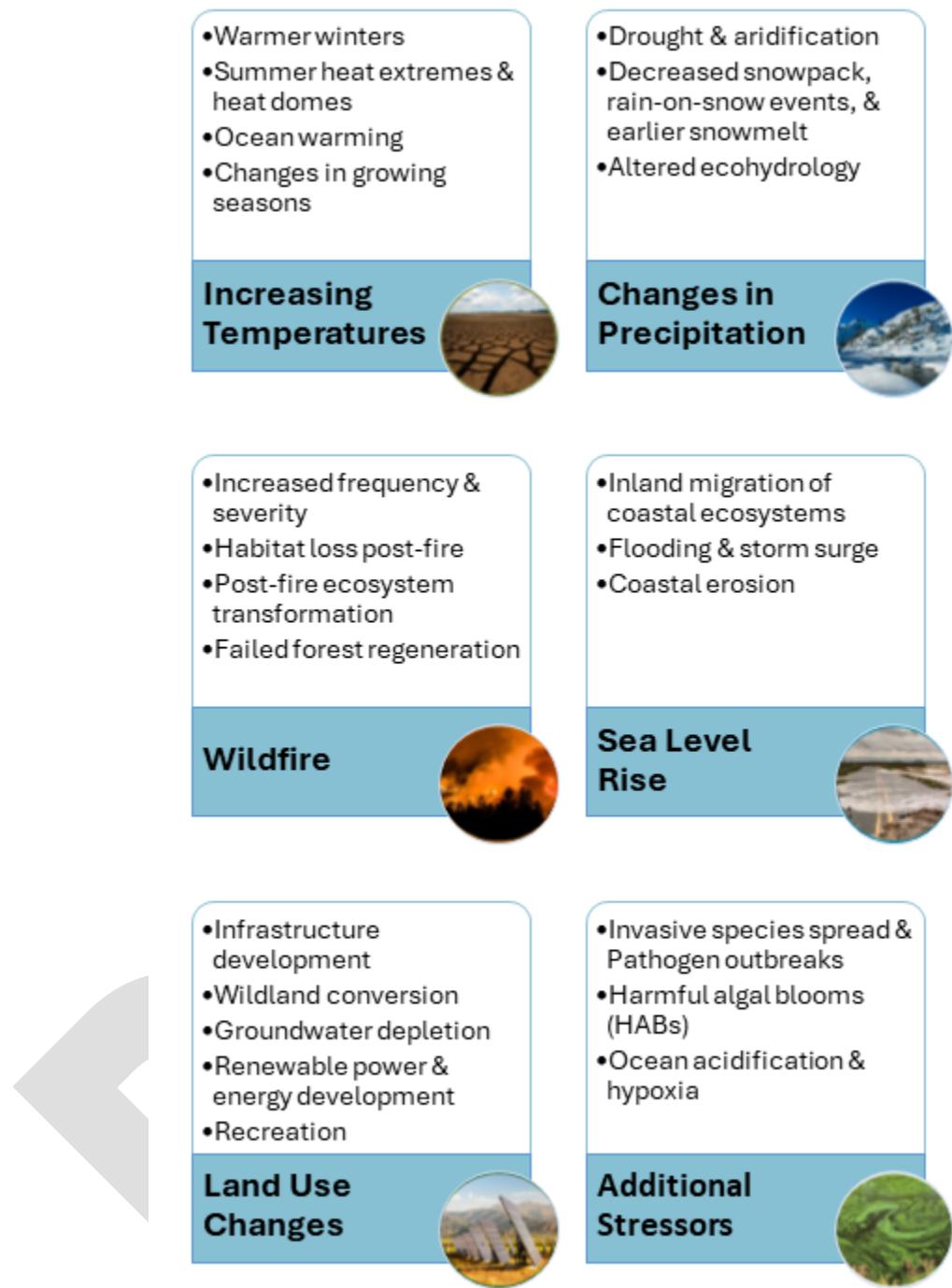


Figure 5. Examples of high priority, climate-linked drivers of change identified by resource managers in the Northwest.

## Northwest Priority Ecosystems & Species

### Increasing temperatures

As temperatures in the Northwest increase, managers are facing challenges ranging from loss of glaciers and earlier snowmelt to increased summer heat waves and warming ocean temperatures. Increasing temperatures are affecting water availability, stream permanence, loss of habitat for snow-dependent species, and changes in growing seasons that can lead to mismatches in phenology (e.g., flowers and pollinators) resulting in negative impacts to species in the Northwest.

### Changes in precipitation

Precipitation under future climate scenarios is expected to continue to have large interannual variability. Timing and amounts of precipitation are also projected to change, with more extreme storms and longer dry spells. Reduced winter snowpack, reduced summer stream flows, and increased evapotranspiration (USGCRP 2023) will compound the effects of increasing temperatures on water availability. Loss of water resources and changes in water availability affect fisheries, forestry, agriculture, and recreation across the region. Frequency of extreme precipitation events is projected to increase, with increased flooding risks in fall and winter.

### Wildfire

In the western United States, climate conditions have grown hotter and drier during the last several decades. Larger, more frequent and severe wildfires and longer fire seasons are impacting forests, grasslands, and sagebrush-steppe, resulting in forest regeneration failures and post-fire ecosystem transformations. Secondary climate-related factors, such as invasive bark beetles, have made many forests more susceptible to high severity fire.

### Sea level rise

Under all future climate scenarios, sea level is projected to increase across the Northwest, although net sea level changes will vary by location. Wave height and tidal surge are also projected to increase. Relative to the 1991–2009 average, sea levels in the Northwest are projected to rise 0.6 to 1.0 feet by 2050 for the Intermediate and High emissions scenarios, respectively placing physical structures and communities at risk. Inland migration of coastal species and habitats is anticipated with rising sea levels (USGCRP 2023).

### Land use changes

Land use change, particularly transformations from natural systems to human-dominated systems, are stressors that can interact with and compound the effects of climate change. Infrastructure development, wildland conversion, renewable energy/power development and operations, and mineral development are all activities that resource managers need to address to restore and maintain healthy ecosystems in the face of climate change.

### Additional stressors

Environmental stressors are processes or activities that impair the ability of species to meet their life history needs or affect the ability of ecosystems and communities to function. Species or individuals may become more susceptible to disease while ecosystems can become more vulnerable to invasive species and wide-ranging pathogens. Northwest managers have identified tree diseases, bark beetles, and harmful algal blooms as pathogens of concern. Invasive species, including both nonnative (introduced) and range-expanding native species, are a concern in aquatic and terrestrial systems.

## Northwest Priority Ecosystems & Species

Ecosystem transformation, altered phenology, emerging infectious diseases, range shifts, declining forage for ungulates, ocean acidification, hypoxia (aquatic systems), and unintended consequences of management are additional environmental stressors of concern in these systems. Human activities including recreation, overgrazing, and water removal for agriculture can also be compounding stressors in the Northwest. The NW CASC recognizes that new stressors may emerge over the lifetime of this Science Agenda, and we encourage partners to share [Emerging Priorities](#) with the NW CASC.

### **Topics Outside the Scope of the NW CASC**

NW CASC science seeks to develop knowledge that helps fish, wildlife, water, land, and people adapt to a changing climate. However, our work focuses primarily on climate adaptation approaches for managing natural resources and the services these resources provide to human communities. The following topics are currently not areas of focus for the NW CASC:

- Off-shore marine systems (e.g., deep-water oceanic species and habitats). *Example: Impacts of climate change on marine species distribution.*
- Infrastructure and green building (without an ecosystem or species focus). *Example: Development and evaluation of climate resilient roads, bridges, water supply systems.*
- Agriculture without a priority ecosystem or species focus. *Example: Evaluating crop production in a changing climate.*
- Domesticated animal husbandry and other agricultural practices related to breeding and raising livestock. *Example: Development of grazing strategies to minimize impacts of reduced water availability on beef production.*
- Aquacultural or maricultural practices unrelated to improving climate resiliency of native Northwest species or species considered to be First Foods of Northwest Tribes and Tribal Nations. *Example: Development of practices to reduce heat stress impacts on commercially farmed oysters.*
- Impacts of climate change on outdoor recreation industries (e.g., fishing, skiing, snowmobiling). *Example: Assessing impacts of reduced winter snow on ski resort viability in the Cascades mountains.*