# Pacific Northwest Region
# Ecology Program 2021 Annual Report

**Applying Science to Serve the National Forests**

**Acknowledgements**

We thank all of our partners, both within and outside the Forest Service, for your cooperation and collaboration. Our success has always, and will always, depend on you.

We acknowledge our recently retired ecologists: Jane Kertis, Steve Acker, and Mike Simpson, who were all pillars of the program. They will be sorely missed and difficult to replace. We offer our deepest gratitude and best wishes.

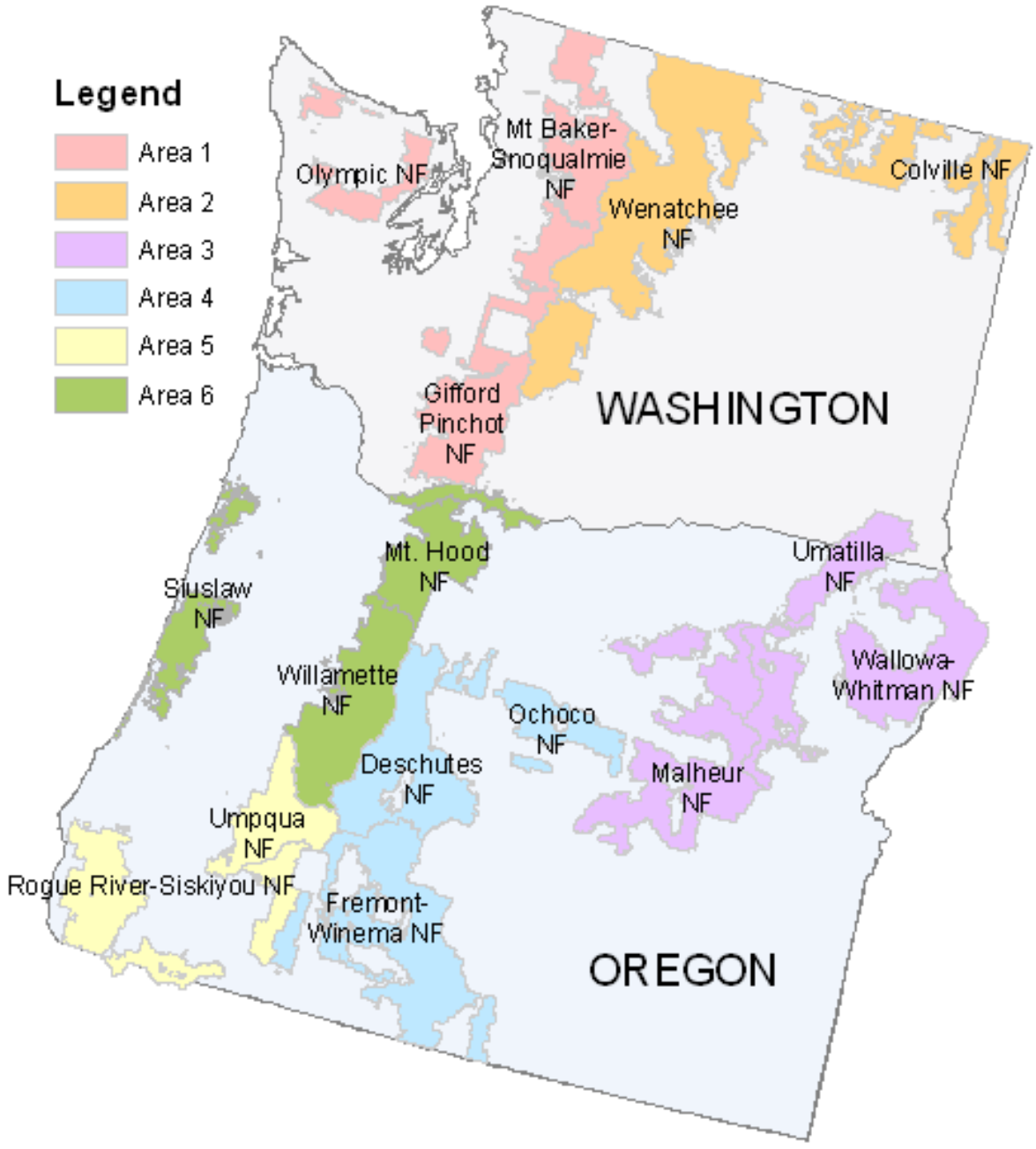
Thanks also to the ecologists in the program, for all you do.

Tom DeMeo, Regional ecologist
Portland, February 2022

*Cover photo: Field site in the Big Sheep-Grossman project area, part of the Morgan-Nesbit Project on the south-southeast side of the Wallowa Mountains. Ecologists are responding to a request from members of the ID Team. Photo: Nathan Poage*

# Contents

# Region 6 Ecology Areas




*The Ecology Program in the Pacific Northwest Region is organized into six areas comprised of two to three National Forests each. Ecologists' annual program of work is drawn up jointly with the Forest natural resource staff officers in that area, with input from the Regional Office and partners as well.*

# Ecology Program Mission Statement

The Ecology Program is a network of ecologists applying science to serve the National Forests in the Region through core services of landscape assessment, technology transfer, monitoring, climate change adaptation, support to planning (including postfire restoration), products (maps, publications, and databases), and partnerships. The ecologists work as equal partners with other disciplines on an area basis to serve multi-Forest needs and provide a landscape perspective. Ecologists are based on National Forests and are hence accountable to Forest leadership.

# Ecology Program in the Pacific Northwest Region

The Regional Ecology Program today has a terrestrial emphasis and is organized by areas. Six areas cover the Region, as shown on page 4. Ecologists in these areas carry out a program of work crafted according to the National Forests' needs. Tom DeMeo serves as the Regional Ecologist, based at the Regional Office in Portland.

**Ecologists serving the six areas:**

| Area | Area Name | Ecologists |
|---|---|---|
| **1** | **Western Washington** | Kevin James (with Botany), Jessica Hudec, Kim Crider (with Planning) |
| **2** | **Eastern Washington** | Kerry Kemp, Monique Wynecoop |
| **3** | **Blue Mountains** | Amarina Wuenschel, Nathan Poage, Christal Johnson, Cameron Naficy (starting 2022, with FHP) |
| **4** | **Central Oregon** | Gregg Riegel, Cristina McKernan, Max Wahlberg (with FHP), Monitoring ecologist (Vacant) |
| **5** | **Southwest Oregon** | Bill Kuhn, Pat Hochhalter, Devin McMahon |
| **6** | **Northwest Oregon** | Upekala Wijayratne, Doug Glavich, Bobette Jones, Cheryl Friesen |

The program is built on a social contract between National Forest leadership, ecologists on the ground, and the Regional Office. The program of work is crafted annually with Forest Leadership Team and Staff Officer guidance. A high degree of accountability of performance is characteristic of the program.

Beginning in FY20, ecologists are now fully funded at the Regional level, with funding held in a central Regional Office account and drawn on by the Area programs. Ecologists do not count toward Forest-level head count caps. **The Regional commitment has been a decision of Forest Supervisors collectively as an investment in the multi-Forest landscape perspective, continuity, and the many other services the ecologists provide.**

# Core Services

## Climate Change Adaptation

The Regional Ecology Program helps Forests adapt to the climate changes we are already experiencing and to prepare for the decades to come. Much of our work centers on using the best available science and local knowledge to map out possible patterns of vegetation on the landscape—past, present, and future—including in the context of climate change. Ecologists serve as climate change points of contact for individual Forests, collecting and sharing recent findings and regional and national guidance on climate adaptation. Ecologists were instrumental in completing Climate Change Vulnerability Assessments for each area, and are now working with planners and specialists to distill these comprehensive documents into action on the ground. Examples include:

- Analysis of climate change impacts on infrastructure for Travel Management planning
- Mapping and developing strategies to conserve potential refugia from the effects of climate change and fire
- Contributions to climate change vulnerability assessments for each area, and frameworks for applying them in project planning
- Collaboration with silviculturists and geneticists on reforestation strategies for drought, fire, and insect resilience
- Working with the University of Washington to incorporate projected climate change effects into landscape assessment of ecological departure

## Support to Planning (including Postfire Restoration)

In addition to its longstanding work on Forest-wide and project-level planning, the ecology program now plays a critical supporting role in postfire restoration efforts across the region. At the request of Forest staff and leadership, ecologists are helping develop a strategy for restoration in the massive footprint of the 2021 Bootleg Fire on the Fremont-Winema National Forest, and preparing to launch similar efforts for the 2020-21 fires in Northwest and Southwest Oregon. Other examples of project-level planning include:

- Preparing a decision support tool to inform the Snowy Butte project on the Rogue River-Siskiyou NF
- Ongoing support to interdisciplinary teams on the Malheur and Wallowa-Whitman NFs on the Upper Bear and Morgan-Nesbit projects
- Broad-scale restoration analysis for North Fork Stillaguamish project on the Mount Baker-Snoqualmie NF
- Assessing landscape patterns and function for three-District planning on the Willamette NF

## Landscape Assessment

Ecologists bring together tools and data sources to set the context for land management and identify locations where action could move the ecosystem toward possible desired conditions. At the request of Forest staff and leadership, ecologists have analyzed current and potential conditions on and across watersheds, helping site new projects and develop alternatives within projects. Region 6 Ecologists' landscape assessments are also critical to Forest Plan revision in both Regions 5 (California) and 6, and to long-term, big-picture planning for Collaborative Forest Landscape Restoration Projects (CFLRPs) in the Blue Mountains, Northeast Washington, and the Deschutes and Fremont-Winema National Forests. New CFLRP projects are anticipated soon for Central Washington and Southwest Oregon.

Ecologists are on the frontier of developing an understanding of the natural range of variation (NRV) in riparian zones. Steve Acker has a paper to be published soon for NRV in riparian zones of Northwest Oregon. Nathan Poage in Northeast Oregon is working on meeting a similar need in Northeast Oregon. Riparian zones and their management are receiving increasing focus on our landscapes.

The Regional ecology group and partners also maintain regionwide tools for landscape assessment. **Potential Natural Vegetation** (PNV) products map major vegetation types, each indicating environmental conditions and possible succession pathways and disturbance regimes, across Washington, Oregon, and California. **Departure maps** build on PNV maps to identify departure from reference conditions at watershed scales and the resulting need for disturbance or succession to restore ecosystem structure. Maps of restoration needs were published by Haugo et al. 2015 and DeMeo et al. 2018. The Ecology Program and university and NGO partners maintain scripts to update the maps as conditions change. In 2021, these products formed the basis for identifying and assessing the health of major ecosystems in preparation for Forest Plan Revision across Rogue River-Siskiyou, Klamath, Six Rivers, Shasta-Trinity, and Mendocino National Forests. Departure maps were also used for the 2019 BioRegional Assessment, by Washington DNR in developing their Forest Health Strategy, and as context for the recent revision of the Eastside Screens. We now have the capability to produce annual updates of the Regional departure map, including northern California.

## Technology Transfer

A plant identification session at the Spokane Tribal Network Food Sovereignty Garden, with ecologist Monique Wynecoop.

In 2021, ecologists adapted their popular plant association trainings for a hybrid virtual/field environment, enabling new silviculturists and other specialists to use current plant communities to identify site conditions. Trainings were held in several Northwest Oregon locations, as well as for staff of the Umpqua National Forest, the Malheur National Forest, and the Confederated Tribes of the Colville Reservation.

Eastern Washington ecologist Monique Wynecoop is leading the program's efforts to incorporate traditional knowledge into planning, adding a crucial source of Best Available Scientific Information and increasing opportunities for Indigenous land management. Readership has boomed for the Traditional Knowledge and Fire newsletter Monique launched in 2020, as awareness of the importance of Traditional Knowledge increases within the Forest Service. Other ecology areas are also building relationships through which tribes can share and enact their knowledge, including with the Confederated Tribes of the Umatilla Indian Reservation.

The ecology program continues to refine and document its State-and-Transition models to play out scenarios in support of project planning and Forest Plan Revision. The models are correlated with Potential Natural Vegetation subzones and represent detailed changes in stand structure and composition in response to disturbances and management. In 2021, ecologists attended trainings and formed a working group with analysts across the country to share best practices for applying these models, aided by the expertise of ecologist and longtime ecology partner and modeler Max Wahlberg. (We were delighted this year when Max joined the Ecology Program in a position we share with the Forest Health Program in Central Oregon.)

Northwest Oregon ecologist Doug Glavich developed predictive spatial models for identifying meadows and other non-forest unique habitats, and refined them with field analysis and verification in summer 2021. These models will be very helpful not only in project-level planning, but in developing regionwide programmatic special habitat restoration analyses.

Ecologists also honed their virtual presentation dialogue skills for multiple groups, including the National Advanced Silviculture Program, collaborative groups, and university speaker series.

## Monitoring

Ecologists apply their expertise to develop and carry out practical and meaningful monitoring to understand the outcomes of management actions. Monitoring enables adaptive management and builds engagement and trust with stakeholders. Monitoring projects in 2021 included:

- Developing and applying new methods to better identify understand fen ecosystems and the impacts of grazing practices on the Fremont-Winema National Forest
- Sampling design and initial data collection for sugar pine treatment effectiveness monitoring on the Umpqua National Forest's novel Calf Copeland Restoration Project, in partnership with state foresters, federal researchers, and local Youth Corps
- Set up a monitoring strategy with the Willamette NF to evaluate danger tree selection criteria and future fuel and forest recovery dynamics
- Developed protocols for monitoring effectiveness of early seral habitat creation in Western Washington
- Maintaining long-term GLORIA high-elevation ecological change monitoring in the Wallowa Mountains
- Completed and presented first post-restoration riparian analysis on Big Creek, Southern Blues CFLRP
- Led the effort for a new Common Monitoring Strategy for collaborative projects (CFLRPs) based on lessons learned from 10 prior years of CFLRP experience. The new Strategy is designed to improve efficiency, reporting, and maintaining data and capacity over time. The Strategy is being implemented and refined on the Northern Blues CFLRP in Northeast Oregon.

## Products (Maps, Presentations, Publications, Databases)

In addition to the Potential Natural Vegetation, Restoration Needs/departure maps, and State and Transition models, ecologists shared information in multiple formats in 2021. See area reports for details of these products.

See the area-specific reports that follow for details on their specific publications and presentations.

# Western Washington

- Dickinson, M.B.; Thompson, K.; Dailey, S.; Barba, C.; Heckel, M.; Key, H.; Ruswick, S.; Hudec, J.; Butz, R.J.; Ewell, C. 2021. Fuels, Vegetation, Fire Behavior, and Fire Effects on the 2021 River Complex, Klamath and Shasta-Trinity National Forests. U.S. Forest Service Fire Behavior Assessment Team Report.
- James, K.M.; Thibeault, S; Plumage, J. 2021. Consistency Request Review for North Fork Nooksack Vegetation Management Project – Proposed Actions for Late Successional Reserve 111. REO approved in April 2021.
- James, K.M. 2021. Restoration Opportunities in the North Fork Stillaguamish Project Area: a first look. Presentation to the Darrington Collaborative.
- James, K.M. 2021. A Collaborative Approach to Using the ICO method on the Mt. Baker-Snoqualmie National Forest. Presentation to the National Advanced Silviculture Program.
- James, K.M. 2021. Climate Change Analysis in Support of Travel Management. R6 Climate Change Coordinator Presentation.
- James, K.M.; Slaney, D. 2021. Virtual Volunteer Session: Climate Change Presentation.
- Maclennan, A. 2021. Mapping Climate Vegetation Refugia in Oregon, Washington, and California. R6 Climate Change Coordinator Presentation.

# Eastern Washington

Presentations

- February 2021. Wynecoop. University of WA Invited Speaker, "The theory and practice of linking knowledge to address modern environmental challenges".
- March 2021. Wynecoop. Methow Nature Conservancy Invited Speaker for course: "Overlooked- How underrepresented peoples and communities shape the past, present, and future of the Methow Valley".

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- May 2021. Wynecoop. NW Climate Adaptation Climate Science Center (CASC) Spring Webinar Series, "Collaborative Fire Management Case Studies from the Colville National Forest".
- May 2021. Wynecoop. Invited Guest Speaker at Santa Clara University, "Incorporating Tribal Community Feedback into Resource Management Practices"
- May 2021. Wynecoop. 44th Annual Intertribal Timber Council Conference. Invited to present and sit on panel of managers. Cancelled due to Pandemic Travel Restrictions.

Publications/Products

- 2021. Wynecoop et al. CFLRP Monitoring Report
- 2021. Wynecoop. Update CNF Fire & Fuels Monitoring Plan
- 2021. Wynecoop et al. CNF Fire & Fuels Monitoring Report
- 2021. Wynecoop et al. NRFSN Annual Report Impact Statement
- 2021. Wynecoop et al. Land Acknowledgement for the NRFSN webpage.
- 2021. Wynecoop et al. Write Burn Plan and Cultural Burn Film Storyline. Film interviews.
- 2020. Wynecoop. White bark Pine Ecosystem Foundation Nutcracker Notes Article, "Making Science Delivery Socially and Culturally Relevant".
- 2020. Wynecoop. IFTDSS Case Study for the Colville National Forest Selkirk, Sullivan, Slate, and Salmo Watersheds.

# Blue Mountains

Publications

- Torgersen, C.E., Fuller, M.R., Faux, R.N., Poage, N.J., and Mejia, F.H., 2021, Airborne thermal infrared remote sensing of summer water temperature in the Middle Fork John Day River (Oregon) in 1994-2003: U.S. Geological Survey data release, https://doi.org/10.5066/P9UQBZ2X.
- Johnson, C. 2021. Research brief: Changing successional trajectories following a reburn in the Klamath Mountains
- Johnson, C. 2021. Understanding Early Successional Forest Ecosystems. Unpublished report

# Central Oregon

Publications

- Oblinger, B.W., B.C. Bright; R.P. Hanavan, M. Simpson, A.T. Hudak, B.D. Cook, L.A. Corp. Identifying conifer mortality induced by Armillaria root disease using airborne lidar and orthoimagery in southcentral Oregon. submitted to Forest Ecology and Management (Sept. 2021)

Products

- Riparian Scorecard Monitoring Report and Summary. Lakeview BLM District. (McKernan, Riegel) October 2020.
- Multiple Indicator Monitoring Analysis. (Schmitz, McKernan) November 2020.

# Southwest Oregon

Products

- Metlen, K. L., T. Fairbanks, M. Bennett, J. Volpe, B. Kuhn, M.P. Thompson, J. Thrailkill, M. Schindel, D. Helmbrecht, J. Scott, and D. Borgias. (2021). "Integrating forest restoration, adaptation, and proactive fire management: Rogue River Basin case study." Canadian Journal of Forest Research **51**(9): 1292-1306.
- Ecological integrity summaries for Juniper Woodland, Knobcone Pine, Mountain Hemlock, Port-Orford Cedar, and Western Hemlock ecosystems. White papers to inform Plan Revision, March 2021.
- Draft Klamath Forest Assessment and Terrestrial Ecosystems Appendix, July 2021.

Presentations

- Jefferson Public Radio, The Jefferson Exchange radio interview and discussion of "The West is Burning" film and general thoughts on wildfire risk and mitigation in southwest Oregon. (B. Kuhn)
- "Sugar pine research and monitoring on the Umpqua NF." Presentation to the National Advanced Silviculture Program Region 6 Best Available Science Module, June 2021 (McMahon)
- Plant Association Training for Umpqua NF silviculturists, June 2021.

# Northwest Oregon

Publications

- Glavich, D. 2021. Oviposition habitat parameters for the Oregon Silverspot Butterfly (Speyeria zerene hippolyta) on the Siuslaw National Forest. Report to the Siuslaw National Forest.

Presentations

- "Marys Peak Meadow Restoration: Monitoring Vegetation Response to Stand Removal and Disturbance." Marys Peak FS partners (Marys Peak Alliance and Marys Peak Stewardship Group), February 2021 (Glavich).
- "Oregon Silverspot Butterfly – Oviposition Habitat Study." OSB Recovery Working Group (USFS, USFWS, OSU, OR State Parks, NPS, CA State Parks), May 2021 (Glavich).
- "Historic, current and future tree species distributions, forest types & forest stressors within the basin." Journey Down the Clackamas Conference, July 2021 (Acker, Kim, Kearns, Wijayratne).
- "East Fork Big Creek Riparian Monitoring." Sustainable Northwest Collaborative Workshop, September 2021 (Lindsay, Hassmiller, Wijayratne)

# Regional Office

Presentations

- "Ecology Program Overview" Presentation to Regional Leadership Team, March 2021
- "Collaborative Forest Landscape Restoration Projects, Lessons Learned". Presentation to Regional Leadership Team, June 2021 (with Lindsay Buchanan and Jessica Peterson).

Publications

- CFLRP Science-Based Approach (Monitoring). Report to Congress on the First 10 Years of CFLRP Monitoring
- CFLRP Science-Based Approach (Monitoring). Report for Practitioners on the First 10 Years of CFLRP Monitoring, 16 pp
- CFLRP Achieved Restoration of Priority Landscapes. Report to Congress on the First 10 Years of CFLRPs. (With Sarah Anderson and Lindsay Buchanan)
- CFLRP Achieved Restoration of Priority Landscapes. Report to Practitioners on the First 10 Years of CFLRPs. (With Sarah Anderson and Lindsay Buchanan)
- Five-Year Strategy for the Ecology Program to Support Restoration 2021-2026
- Olszewski, J., T. DeMeo, A.Markus, M. Laughlin, and M. Gregory. Changes in forest structural departure over tie in south central Oregon. Paper submitted to Northwest Science, 23 pp.

## Partnerships

The Ecology Program continually builds and maintains partnerships that make our planning, monitoring, products, and trainings more useful, efficient, and powerful. Partners and example projects include:

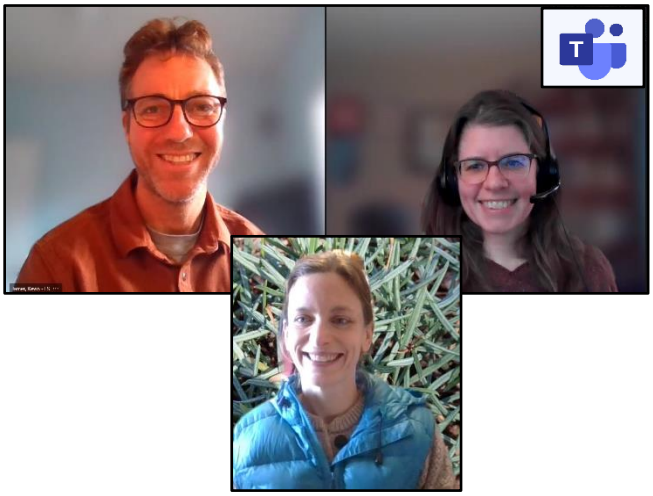
- Pacific Northwest Research Station: projects include the Westside Fire Initiative, pine health research, and application of existing vegetation maps
- Washington State Department of Natural Resources: postfire monitoring, landscape planning, project surveys
- Regional Forest Health Protection and Genetics programs: five-needle pine monitoring, assisted migration trials
- Pacific Northwest and Rocky Mountain Fire Science Consortia; Northern Rockies Fire Science Network
- The Nature Conservancy: land classification and monitoring in Southwest Oregon and other areas
- US Fish and Wildlife Service: deployment of acoustic monitors for spotted owl surveys
- Fire management: ecologists serve on fire incidents and contribute to pre-planning and prescribed burning
- American Forests consultancy on Bootleg postfire restoration planning
- University of Washington, incorporating climate change effects into assessing departure from the natural range of variation

# Western Washington Ecology Program (Area 1)

## Gifford Pinchot, Mount Baker-Snoqualmie, and Olympic National Forests

### Program Priorities

In FY2021, Western Washington Natural Resource Staff Officers, Ecologists, and the Regional Ecologist agreed the focus for Western Washington Ecology Program would be **monitoring, planning,** and **partnerships**. Ecologists' work continues to be integral to all levels of project planning and management, including the development of broad-scale landscape management strategies and mid-level resource management plans, supporting specific project implementation, and carrying out various types of monitoring.



*Western Washington Ecologists*

### Western Washington Area Ecology Program Team

Jessica Hudec
Kevin James
Kim Crider
Colin Meston (detail)
Audrey Maclennan (detail)

## Accomplishments

Western Washington Ecology Program has selected a subset of our accomplishments from 2021 to highlight.

**Monitoring**

- Postfire: partnered with University of Washington and Washington Department of Natural Resources (WA-DNR) on postfire monitoring efforts
- Treatment effectiveness: developed monitoring protocols for early seral habitat creation adaptive management
- Northern spotted owls: initiated development of an implementation plan for acoustic monitoring

**Planning**

- Landscape level
  - Applied fire refugia models to local landscapes with Oregon State University and WA-DNR
  - Worked with WA-DNR to identify westside priority watersheds for management
  - Assisted WA-DNR with eastside forest health strategy implementation
- Project level
  - Provided broad-scale restoration analysis for North Fork Stillaguamish project

*Large, fire-scarred trees in an old growth patch on Gifford Pinchot National Forest provide an appropriate backdrop for fire refugia discussions.*

*Continued from previous page*

- Contributed ecological context for purpose and need and climate change reports for Environmental Analyses (EAs) and interfaced with Late Successional Reserve (LSR) work group on North Fork Nooksack, Canyon, and Yellowjacket projects
- Presented broad-scale ecology information for pre-NEPA project proposal, liaised with WA-DNR on priority forest health issues, and explored fire and climate refugia as possible tools to guide management on Little White Salmon project

### Climate Change Coordination

- Participated in regional climate change calls, shared information on updated direction, and served as forest points of contact for climate change issues
- Incorporated climate change into landscape level planning and into project level NEPA as indicated by Regional direction
- Used information from vulnerability assessments to strengthen NEPA project proposals and analyses

### Collaboration and Partnerships

- Worked with researchers on topics including early seral habitat management, postfire monitoring, climate change and climate refugia, fire history and fire refugia, vegetation and habitat modeling, etc.
- Interfaced and collaborated with LSR work group and U.S. Fish and Wildlife Service on LSR and Critical Habitat Unit issues
- Supported Line Officers by working with local collaborative groups
- Partnered with U.S. Fish and Wildlife Service and WA-DNR on implementing project-level acoustic recording unit surveys for northern spotted owls.

*Western Washington Ecologists often co-lead collaborative group field trips.*

## Publications and Presentations


- Dickinson, M.B.; Thompson, K.; Dailey, S.; Barba, C.; Heckel, M.; Key, H.; Ruswick, S.; Hudec, J.; Butz, R.J.; Ewell, C. 2021. Fuels, Vegetation, Fire Behavior, and Fire Effects on the 2021 River Complex, Klamath and Shasta-Trinity National Forests. U.S. Forest Service Fire Behavior Assessment Team Report.
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- Maclennan, A. 2021. Mapping Climate Vegetation Refugia in Oregon, Washington, and California. R6 Climate Change Coordinator Presentation.


### Responding to Future Needs

Planning, monitoring, and partnerships will continue to be priorities for the Western Washington Ecology Program in 2022. We will focus on northern spotted owl habitat identification, fire ecology and fuels management strategies, watershed analysis, and integrating climate change adaptation into forest management. Finally, Western Washington Ecologists will continue to provide consistent representation between the Forest Service and partners that is not tied to one specific resource area. In doing so, we will foster connection among people and between people and places. In 2022, notable partnerships include work with WA-DNR in priority watersheds on both the eastside and westside of the Cascades, with Level 1 wildlife consultation teams for work regarding northern spotted owls, and with research and collaborative groups on a variety of ongoing projects across the area.

# Eastern Washington Ecology Program (Area 2)

## Okanogan-Wenatchee and Colville National Forests

### Program Priorities

The priorities for 2021:

1. Support expanded pace and scale of restoration.
2. Develop shared knowledge, tools, and processes with partner agencies.
3. Communicate current science, including traditional ecologic knowledge (TEK), to managers and partners.
4. Create research and management partnerships to address new issues.

### Area 2 Ecology Program Team

Aja Woodrow, Wildlife Biologist/Ecologist (Detail)
Monique Wynecoop, Fire Ecologist
Kerry Kemp, Area Ecologist (recently hired)

### Accomplishments

2021 was a great year for increased collaboration, communication, and knowledge sharing between the Eastern Washington Area and partner agencies.

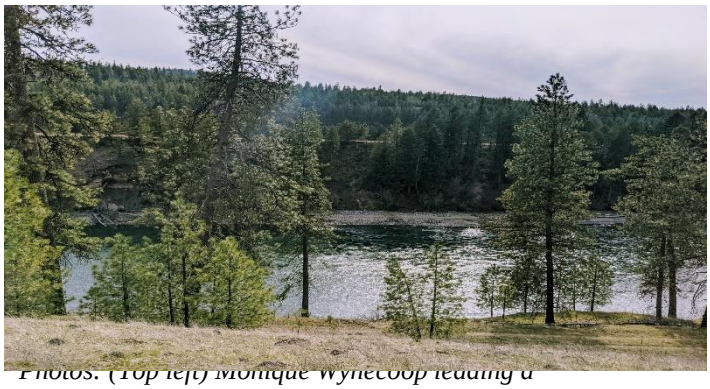
Our team continues to offer local and regional guidance and support on projects, and monitoring and field efforts that foster shared learning, communication, collaboration, and adaptive management by: setting up an agreement to incorporate the Okanogan-Wenatchee National Forest Restoration Strategy Landscape Evaluation northern spotted owl habitat output in the Upper Swauk Project; assisting Audrey Maclennan's 'Mapping Climate Vegetation Refugia' effort; updating the Forest Fire and Fuels Monitoring Plan; providing feedback to a Carbon Assessment white paper; collecting annual fire and fuels monitoring data and reports from forest districts; participating in a core team on a Oka Wen NF Restoration Strategy Review originating from a local forest collaborative; co-developing and leading forest-level and interagency monitoring training and workshop with NRFSN, WA DNR, and NW BIA; providing science delivery to fellow ecologists, forest managers, and the public through presentations, workshops, webinars, and reports; involvement in DNR 20 Year Monitoring Plan Meetings; maintaining a role in the Forest Health Advisory Committee; participating in the NW Climate Adaptation Science Center workshops, webinars, and papers.

To ensure that we are kept up to date on the most current science, collaboration opportunities, and also sharing the story of the ecology and work being accomplished in Northeastern Washington, our team continues to take the lead in coordination and participation in multiple collaboration, tech transfer, and science delivery opportunities.

Fire Ecologist, Monique Wynecoop continues to build and maintain relationships with tribal and non-tribal agencies through her roles as Fire Ecologist and Tribal liaison for the Northern Rockies Fire Science Network. There has been an overwhelming interest in Fire Ecology and Traditional Knowledge. As with 2021, Monique was invited to speak at multiple webinars, college seminars, workshops, and conferences. The semi-annual NRFSN TK and Fire in the Northern Rockies & Pacific NW Newsletter, created and edited semi-annually by Monique on behalf of the NRFSN, has now gained 295 subscribers since its first issue in June 2020.

This spring, she helped the Spokane Tribal Network and the Spokane Tribal Fire & Fuels Program develop objectives for a cultural burn plan for the Spokane Tribe Food Sovereignty Garden. This was the first time a cultural burn of this kind has been done on the Spokane Reservation in decades. The ecological

and educational opportunities of such a cultural burn led to the co-production of a collaborative monitoring and cultural burn film project with the Northern Rockies Fire Science Network (NRFSN), Spokane Tribal Network (STN), and the Salish Kootenai College. The film discusses the fire ecology of NE WA and the connection between fire, cultural burning, food sovereignty, and community wellness. The film has all indigenous interviewees and the NRFSN hired an indigenous videographer/ firefighter from Salish Kootenai College to film the video and add to his portfolio.



*Photos: (Top left) Monique Wynecoop leading a monitoring and plant ID demonstration with the Spokane Tribal Network and Tribal Community at the Spokane Tribe Food Sovereignty Garden and Cultural Burn Site. (Top right) Monique demonstrating FFI monitoring protocol prior to the cultural burn. (Bottom) Spokane River view from cultural burn site.*

## Products, Papers, Publications

Products/Papers:

- 2021. Wynecoop et al. CFLRP Monitoring Report
- 2021. Wynecoop. Update CNF Fire & Fuels Monitoring Plan
- 2021. Wynecoop et al. CNF Fire & Fuels Monitoring Report
- 2021. Wynecoop et al. NRFSN Annual Report Impact Statement
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- May 2021. Wynecoop. 44th Annual Intertribal Timber Council Conference. Invited to present on panel of managers. Cancelled due to Pandemic Travel Restrictions.

### Responding to Future Needs

The eastern Washington Area Ecology program has responsibilities across the Colville and Okanogan-Wenatchee National Forests. We collaborate with managers from these two forests in addition to the Pacific Northwest Research station, Rocky Mountain Research Station, Tribal communities within the NW & Rocky Mountain Region, Washington State Department of Natural Resources, and The Nature Conservancy. A bulk of work that we provide is science and technology information transfer to managers. In addition, we provide input to ongoing research to help that work be directly useful for managers. The work that is carried out with other federal and non-federal partners helps to facilitate the ongoing all lands restoration and monitoring work throughout the zone. Expanding collaboration, partnerships, and the application of traditional knowledge, landscape principles, science transfer, and management efficiencies will continue to be an important emphasis in the upcoming year.

# Blue Mountains Ecology Program (Area 3)

## Malheur, Umatilla, and Wallowa-Whitman National Forests

## Program Priorities

The Blue Mountains Ecology Team meets annually with all natural resource staff officers to discuss program priorities and jointly build the annual program of work. FY 2022 work will generally reflect the priorities:

**Climate Change Integration**
- Climate change implementation playbook (already doing this at the region)
- Threatened species refugia

**Landscape Scale Wildfire Resilience**
- Landscape prioritization tools
- Assistance with grants
- Monitoring to refine techniques, assess treatment efficacy, and to evaluate potential sensitivities regarding broad-scale treatment

**Postfire Restoration**
- Postfire assessment

**Collaborative Monitoring and Science**
- Northern Blues CFLRP, Southern Blues CFLRP, Blue Mountains Forest Partners, Harney County Forest Restoration Collaborative, and Northern Blues Forest Collaborative
- Area-wide ecological monitoring database

**Integrating forest health issues**
- Landscape assessment of drought/insect and disease tree mortality and stress
- Evaluation of forest treatment and tree insect and disease outcomes

**Ecological Monitoring**
- Rangeland
- Riparian (shrubland/grassland/forests)
- Whitebark Pine
- Forest treatment/disturbance

**Project Planning**
- Insert best available science into project planning
- Include climate change adaptation strategies
- Provide high-level analysis support and potential monitoring, if needed
- Plant association training
- Provide field visit support to provide treatment recommendations and forest descriptions

## Accomplishments

The Blue Mountains Ecology program accomplished a great deal despite only being staffed by two ecologists: Nathan Poage and Christal Johnson who was fulfilling commitments to Presidential Management Fellowship (PMF) rotations in Northern California for much of the year. Amarina Wuenschel started her role as Area Ecologist at the very end of fiscal year 2021. In early 2022, the area filled its FHP analyst/ecologist position, which is jointly funded with the Blue Mountains Forest Insect and Disease Service Center.

- Supported the Northern Blues CFLRP project, served on monitoring committee and sub teams in the first year as monitoring planning
- Led and co-led plant association trainings on the Confederated Tribes of the Umatilla Indian Reservation and the Malheur NF, respectively
- Whitebark pine blister rust resistance breeding program: Blues-wide climber certification, cone caging and cone collection
- Climate Change Coordinator for the Wallowa-Whitman NF
- Conducted READ work on the Green Ridge Fire

## Area 3 Ecology Program Team

| Team Members: | Collaborators: |
|---|---|
| Amarina Wuenschel | Kerry Kemp |
| Nathan Poage | Susan Geer |
| Christal “Christy” Johnson | Mike McWilliams |

Cameron Naficy (shared position with FHP), recently hired

- Collected/replaced data loggers at GLORIA high elevation monitoring sites in the Wallowa Mountains.
- Regular participation in PNW Research Station's Carbon Research Initiative's Carbon Modeling Working Group.
- Participated on WA-DNR SE Washington Landscape Evaluation
- Ongoing involvement with interdisciplinary teams on two projects: Upper Bear Lake (Creek) Project on the Malheur and Morgan-Nesbit on the Wallowa-Whitman National Forest
- Completed first post-restoration riparian analysis on Big Creek, Malheur NF to support the work being done through the Southern Blues CFLRP. Presented to Malheur.
- Continued to provide technical assistance, vegetation data, and geospatial analytical products to natural resources specialists, leadership teams, and collaborative groups on all three Area NFs.

*Fieldwork was conducted this year to help understand forest development at the Big Sheep – Grossman riparian area, which is part of the Morgan – Nesbit Project located on the south – southeast side of the Wallowa Mountains. This work is being conducted as part of request-for-assistance made from members of the ID Team to the Ecology Program.(photo by N. P.)*

*Whitebark tree climbing and pine cone collection. Both Nathan Poage and Christal Johnson assisted the Wallowa-Whitman with this in 2021 (Photos C.J.)*

## Products, Papers, and Publications

Torgersen, C.E., Fuller, M.R., Faux, R.N., Poage, N.J., and Mejia, F.H., 2021, Airborne thermal infrared remote sensing of summer water temperature in the Middle Fork John Day River (Oregon) in 1994-2003: U.S. Geological Survey data release, https://doi.org/10.5066/P9UQBZ2X.

Johnson, C. 2021. Research brief: Changing successional trajectories following a reburn in the Klamath Mountains

Johnson, C. 2021. Understanding Early Successional Forest Ecosystems. Unpublished report

*Whitebark pine (photo by C.J.)*

# Central Oregon Ecology Program (Area 4)

**Deschutes, Fremont-Winema, and Ochoco National Forests**
**Crooked River National Grassland**

## Program Priorities

The Central Oregon Area Ecology Team specializes in addressing a wide range of eastside forest, upland range, and wetland and riparian ecological management issues. We are currently focused on: 1) drought and livestock grazing interactions, 2) forest stand and landscape vegetation analyses and monitoring and, 3) upland range inventory and monitoring.

- Provide riparian, meadow, and fen ecological expertise, conduct monitoring of ecological status attributes for Rangeland Allotment Management Plan renewal NEPA process.
- Provide Landscape Assessment-Departure Analysis support for vegetation of Central OR National Forests & Grasslands.
- Implement understory and fuel profile models for Central Oregon ponderosa pine forests to assist restoration and fuel treatment planning through our Alternative Fuel Treatment and the Repeated Fire Return Interval Administrative Studies.
- Assistance with Ecological Site Descriptions for the Crooked River National Grassland.
- Provide support for invasive weed management and monitoring.
- Provide program support to Region, Forest, and Ranger Districts. Collaborators include Lakeview BLM, NRCS Klamath Falls Soil Survey Office, PNW, PSW, RMRS; and OSU.

## Area 4 Ecology Program Team

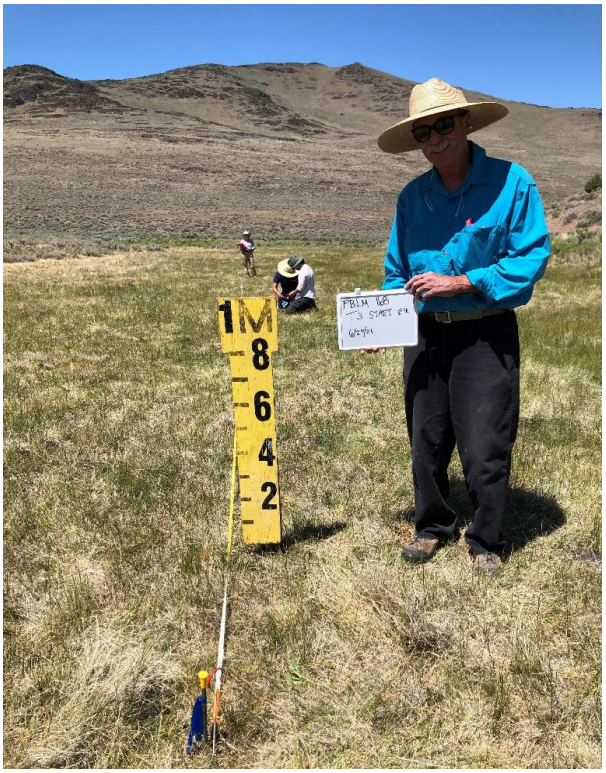
| | |
|---|---|
| Gregg Riegel | Mike Simpson |
| Cristina McKernan | Max Wahlberg |
| Molly Jones | Kelly Smith |
| Kristen McBride | Denine Schmitz (detail) |

**Cooperators**: Kevin Keown, Chuck Burley, Steve Gibson, Ben Goodin, Jim David, Jacob Young, Jennifer Ferriel, Erin Rentz, Christina Veverka, Beth Johnson, Susan Geer, Jimmy Leal (BLM), Les Boothe (BLM), and Chris Gebauer (NRCS).

## Accomplishments

### Effectiveness Monitoring

- Ecological Site Description (ESD)- Measured vegetation attributes and updated the database for the Crooked River National Grassland.
- Riparian Monitoring: 1) Measured streambank vegetation using Multiple Indicator Monitoring (MIM) protocol on Frazer Creek and North Fork Wind Creek, Ochoco NF, and 2) Completed Riparian Scorecard measurements on the Lakeview BLM district. Both projects evaluate long-term livestock grazing effects on vegetation and soils.




To assess livestock grazing effects over time, we measure plant species composition, rooting depth, and surface litter utilizing the riparian scorecards developed for a Mesic Graminoid Ecologic Type. This plot, located on the northeastern flank of the Warner Mountains, was established under contract with the Lakeview BLM. Front to rear, Gregg Riegel (Ecology Program), Kate Johnston (Bio Tech, BLM), Desi Zamudio (retired Soil Scientist, Fremont-Winema NF), and Cristina McKernan (Ecology Program). 6/24/21 Photo credit: Molly Jones.

**New Projects:**

- We developed and received approval, to begin a two-phased fen monitoring program to assess livestock impacts on the Antelope pastures, Chemult RD, Fremont-Winema NF. Phase 1, Inventory and Assessment, of fens was initiated in FY2021. Phase 2, Monitoring, will be implemented in FY2022 and FY2023 and will include ground water level monitoring to connect hydrologic conditions to plant species composition and assess impacts to fens from livestock use.

Cristina McKernan (Ecology Program) discusses peat soil characteristics with (l to r) Molly Jones (Ecology Program Bio Tech) and NRCS Soil Scientists Chris Gebauer (MLRA Survey Leader) and Brooke Hogan from the Klamath Falls Soil Survey Office. 8/24/21, Crooked Meadow, Chemult RD. Photo credit: Gregg Riegel

**Planning**

- Completed the 2021 version of the PNV Map for Oregon, Washington, and California and continued work on documentation of the methods used to produce it for a future GTR.
- Updated current conditions for Viable Ecosystem Analyses for Deschutes, Fremont-Winema, and Ochoco NF's using the 2017 FIA/GNN imputations.
- Assisted with refreshing the Wildlife Habitat analyses (WILDHAB) for the Deschutes, Fremont-Winema, and Ochoco NF's using the 2017 updated Viable Ecosystems departure assessments.
- Assisted with HRV assessments for the Klamath and South Warner ALRs, Fremont-Winema.
- Review of Forest Carbon Assessments for the Deschutes, Ochoco, and Fremont-Winema NF's.
- Watershed Condition Framework – Riparian Vegetation Assessment.

**Technology Transfer**

- Ongoing engagement with collaborative efforts Deschutes CFLRP.
- Central Oregon Shared Stewardship Alliance (Wahlberg).
- Analytical support to and ongoing coordination with the Central Oregon Forest Health and Protection Service Center (Wahlberg).
- National Cadre Instructor: Rx 310 Introduction to Fire Effects (Riegel).
- Interagency Cadre Instructor: Interpreting Indicators Rangeland Health (Riegel).
- Backup Instructor for National Wetland Plant Identification Training with National Conservation Training Center (NCTC) (McKernan).
- OSU Courtesy Faculty Graduate Committee Member: 1) Claire Tortorelli (PhD Candidate) *Ventenata dubia* Invasion and Expansion Facilitated by Fire in the Blue Mountains, 2), Kelly Smith (MS Student) Examination of Postfire Reforestation Efforts and Forest Recovery in California National Forests Concepts. (Riegel).
- Past President (Executive Officer) of the Northwest Scientific Association through March 2021 (Riegel).
- Fire and Weeds Working Group PNW, R6, OSU, Great Basin Fire Science Exchange (Riegel).
- Fen Ecological Problem Solving. October 2020, July 2021 (McKernan, Riegel).

## Products, Papers, and Publications

Oblinger, B.W., B.C. Bright; R.P. Hanavan, M. Simpson, A.T. Hudak, B.D. Cook, and L.A. Corp. Identifying conifer mortality induced by Armillaria root disease using airborne lidar and orthoimagery in southcentral Oregon. submitted to Forest Ecology and Management Sept. 2021.

Riparian Scorecard Monitoring Report and Summary. Lakeview BLM District. (McKernan, Riegel) October 2020.

Multiple Indicator Monitoring Analysis. (Schmitz, McKernan) November 2020.

# Responding to Future Needs

Black Butte Swamp lies 13 miles east of the Cascade Range crest, and south of Black Butte (upper photo). The prolonged severe drought and warming temperatures have reduced stream flows and ground water, causing unprecedented plant mortality (lower photos). Cristina McKernan examines dead beaked sedge (*Carex utricluata*) rhizomes and fully desiccated peat soil on a stream bank with Fuels Specialist Andrew Myhra (COFMS). We are in discussions with Sisters RD specialists about mapping vegetation and soil to inform Beaver Dam Analog restoration planning beginning in FY 2022. 9/30/21. Photo credit Gregg Riegel.

## Personnel Updates

Mike Simpson retired after 35 years with the Forest Service. Mike was hired as a Botanist for the Ochoco NF in 1991, and in 2003 became the first person in the Region to be hired in a shared position with the Area Ecology Program and the Central Oregon Forest Health Protection Service Center. Mike's Forested Plant Associations of the Oregon East Cascades (2007) remains a highly valued guide for managers. He also led the PNV mapping project for the Pacific Northwest and Northern California Forests and continues to assist in the final product development in his retirement.

Maximillian "Max" Wahlberg joined the Central Oregon Area Ecology program in July 2021, as an Ecologist shared with the Area Ecology and Forest Health Protection programs. Max most recently worked for the USFS Enterprise Program where he served as a Fire Ecologist on fire risk, planning, and climate change projects throughout the nation. Max's areas of expertise include large landscape disturbance ecology, climate change vulnerability and adaptation, state and transition simulation modeling, remote sensing, large landscape spatial analytics, fire and disturbance modeling, riparian area management, and both project and forest planning.

# Southwest Oregon Ecology Program (Area 5)

## Rogue River-Siskiyou and Umpqua National Forests

## Accomplishments

### Monitoring to inform management

- **Sugar pine monitoring**: Developed protocols and collected pre-treatment data to understand effects of different thinning treatments on pine health and reproduction, in a new partnership with Pacific Northwest Research Station, Forest Health Protection, Oregon Department of Forestry, and Roseburg Phoenix Youth Corps. Results will inform future pine management, scalable remote sensing research, and public interest.
- **Huckleberry assessment**: Completed baseline data collection on huckleberry presence and productivity to inform future treatments in a Special Interest Area designated for cultural and culinary resources.
- **Rogue Forest Restoration Initiative**: Continued collaboration with multiple partners on a long-term multi-party monitoring plan that includes implementation and effectiveness monitoring on the RRS, as well as BLM and private lands.
- **Forest Health monitoring**: Collaborated with specialists from the USFS, BLM, The Nature Conservancy, local collaboratives, and Oregon State University Extension to submit two proposals to use both FIA plot data and remote sensing technology to assess tree to landscape forest health and vigor.

### Support of forest priorities

- **Ecological assessments for planning areas**: Prepared a decision support tool for prioritizing treatments on Snowy Butte (RRS) and a historical vegetation analysis for Lower Jackson Creek (UMP).
- **Fire support**: Served the forests and region on a Type 2 Incident Management Team and as resource advisor, BAER team member, and GIS analyst.
- **Climate change adaptation**: Continued to serve as points of contact for integrating climate change into project design and documentation.

### Regional and multi-region priorities

- **Forest Plan Revision**: With northwest California ecologists, completed and documented assessment of the integrity of terrestrial ecosystems across RRS and four other National Forests.
- **Regional Potential Natural Vegetation map**: Finalized the latest map version and continue to work on documentation. This map informs several ongoing planning efforts.

### Area 5 Ecology Program Team

Bill Kuhn
Pat Hochhalter
Devin McMahon

### Partnerships and collaboration

- Rogue Forest Partners and the Rogue Forest Restoration Initiative $6 million Oregon Watershed Enhancement Board (OWEB) award.
- Klamath-Siskiyou Oak Network OWEB proposal
- Helped organize field trip for staff of Senator Merkley to the pending Rogue Basin CFRLP

As a new SW OR ecologist, Devin met colleagues across disciplines through fieldwork, including planting inspection (photo credit Adrienne Barcas)

## Products and Presentations

Metlen, K. L., T. Fairbanks, M. Bennett, J. Volpe, B. Kuhn, M.P. Thompson, J. Thrailkill, M. Schindel, D. Helmbrecht, J. Scott, and D. Borgias. (2021). "Integrating forest restoration, adaptation, and proactive fire management: Rogue River Basin case study." Canadian Journal of Forest Research 51(9): 1292-1306.

Ecological integrity summaries for Juniper Woodland, Knobcone Pine, Mountain Hemlock, Port-Orford Cedar, and Western Hemlock ecosystems. White papers to inform Plan Revision, March 2021.

Draft Klamath Forest Assessment and Terrestrial Ecosystems Appendix, July 2021. SW OR ecologists authored and edited large sections of these comprehensive (and now more comprehensible) documents.

Jefferson Public Radio, The Jefferson Exchange radio interview and discussion of "The West is Burning" film and general thoughts on wildfire risk and mitigation in southwest Oregon. (B. Kuhn)

"Sugar pine research and monitoring on the Umpqua NF." Presentation to the National Advanced Silviculture Program Region 6 Best Available Science Module, June 2021 (McMahon)

Plant Association training for Umpqua silviculture, June

Potential Natural Vegetation training for ecologists, May

## Preparing for the future

In 2021, we laid groundwork for 2022 priorities:

- Postfire restoration: work with a small team to map and prioritize treatment options across the fire-affected Umpqua NF, offering datasets, analysis, and examples from other areas
- South Cascades LSR Assessment Update: incorporate new science and changed conditions in owl habitat within fire-prone forests since the 1990s
- CFLRP: Regional ecologists have compiled monitoring protocols and best practices for large-scale, long-term collaborative projects, coming soon to the RRS
- Vegetation models for forest planning: updating and documenting state-and-transition models for scenario development and plan revision

Patchy mortality from the 2021 Jack Fire reintroduced some variety and topographic patterning in former plantations in the North Umpqua River corridor. Recent fires provide opportunities to help ecosystems adapt to future climate and to help fire managers support ecological and safety goals. SW OR ecologists are working with forest staff to build on these fires. Photo credit: Devin McMahon (as resource advisor)

# Northwest Oregon Ecology Program (Area 6)

**Mt. Hood, Willamette and Siuslaw National Forests**

**Columbia River Gorge National Scenic Area**

## Program Priorities

The Northwest Oregon Ecology Program meets yearly with its working group to discuss ecological issues and develop potential program of work ideas. Ideas are vetted, proposals are written, and work is prioritized with the steering committee of Forest/CRGNSA Natural Resource staff, Regional Ecologist, and BLM representatives.

Program priorities for 2021 included:

- Continuing long-term, landscape projects:
  - Special habitat mapping and classification
  - Deadwood analysis
  - Incorporating climate change and adaptation strategies into planning
  - Postfire vegetation and deadwood trajectories
  - Tools for riparian vegetation management
  - PODs for planning
- Providing technology transfer
- Assisting Forests with high priority issues:
  - Landscape analyses
  - Meadow management support
  - Meadow ESA recovery species support
  - Post fire restoration and monitoring

## Area 6 Ecology Program Team:

Doug Glavich
Bobette Jones
Pek Wijayratne
Cheryl Friesen

## Accomplishments

**Long-term projects**

- Special habitat mapping/classification: Produced test maps in Google Earth Engine - 600K acres on the west slope Cascades on the Willamette NF and 300K acres in the Coast Range on the Siuslaw NF. Field checked maps and collected field data for map corrections.
- Transitioned existing information, processes, tools, and documents used by previous ecologist to current for NRV updates, late seral summaries, DecAid, and PODs.
- Climate Change information exchange: Continued support for the Coast Range Climate Change Vulnerability Assessment – provided vegetation data for final maps.

**Technology transfer:**

- Plant Association Training– Virtual classroom developed, and trainings completed for Coast Range on Siuslaw NF, Coast Range Dry Forest on BLM, and Cascades west slope on Willamette NF.

*Field trip to Jim's Creek Study Area with study lead Bart Johnson (University of Oregon) and Willamette NF staff*

**Forest high priority issues**

- Landscape Analyses- 3D planning area Worked on final draft document that assessed landscape

drivers, historical condition, current condition in the context of patterns and function for the planning area. This was a landscape ecology learning opportunity for district staff and a mentoring opportunity for new ecologists.

- Continued support for project meadow management on Siuslaw NF.
- Continued support for Oregon Silverspot Butterfly habitat needs and participation in the interagency and multi-partner working group
- Huckleberry restoration and management: Field and data analysis support.
- Members of Vital Signs Indicators working group for the Columbia River Gorge Commission. Product will inform CRGNSA management plan.
- Collected first-year postfire data on Echo Mtn fire, Siuslaw NF. Results of monitoring will inform elk forage resources post wildfire.
- Developed a monitoring strategy with the forest to evaluate danger tree selection criteria and future fuel and forest recovery dynamics for the Willamette NF.

**Collaboration**

- Assisted with field data collection for pilot research project on riparian resiliency to wildfire following Stage 0 restoration. In collaboration with Portland State University and University of Nottingham, UK.

*Downed cottonwood on South Fork McKenzie Stage 0 restoration project.*

- Leading a PODs+ working group to collaboratively identify priority management areas and integrate a landscape fire planning framework with the Southern Willamette Forest Collaborative

## Products, Papers, and Publications

Publications:

Glavich, D. 2021. Oviposition habitat parameters for the Oregon Silverspot Butterfly (*Speyeria zerene hippolyta)* on the Siuslaw National Forest. Report to the Siuslaw National Forest.

Presentations:

"Marys Peak Meadow Restoration: Monitoring Vegetation Response to Stand Removal and Disturbance." Marys Peak FS partners (Marys Peak Alliance and Marys Peak Stewardship Group), February 2021 (Glavich).

"Oregon Silverspot Butterfly – Oviposition Habitat Study." OSB Recovery Working Group (USFS, USFWS, OSU, OR State Parks, NPS, CA State Parks), May 2021 (Glavich).

"Historic, current and future tree species distributions, forest types & forest stressors within the basin." Journey Down the Clackamas Conference, July 2021 (Acker, Kim, Kearns, Wijayratne).

"East Fork Big Creek Riparian Monitoring." Sustainable Northwest Collaborative Workshop, September 2021 (Lindsay, Hassmiller, Wijayratne)

### Responding to Future Needs

The NW Oregon Ecology group will continue to engage with our working group and steering committee to ensure we deliver timely and relevant products. We will continue to make progress on long term landscape projects. We will assist in Regional products and tools. We will promote applied ecological principles while consulting, partnering, and serving our Area and Region.

An emerging focus for our Area is addressing landscape resiliency to wildfire and climate change.