

Cascade-Siskiyou Connectivity Symposium



Ashland, Oregon | May 4th, 2022



Cascade-Siskiyou Connectivity Symposium Planning Team. Many thanks to the Planning Team, which engaged in all aspects of planning and design of the symposium, as well as, providing review and input to this summary report. The Planning Team includes:

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Executive Summary

The Cascade-Siskiyou landscape straddles the Oregon-California border at the juncture of three distinct ecoregions (Klamath Mountains, Southern Cascades, and Eastern Cascades Slopes). Due to the area's strategic location, complex terrain and varied climates, Cascade-Siskiyou is widely recognized for supporting outstanding levels of biodiversity and acting as a critical ecological link between coastal and inland ecosystems. Maintaining and restoring habitat connectivity here is essential to the recovery of several imperiled species (e.g., gray wolf, Pacific fisher, marten, northern spotted owl, coho salmon), but also vital to wide-ranging wildlife like mountain lion, as well as species like elk and deer that make seasonal migrations. Habitat fragmentation caused by roads, dams, and land development are the most pressing challenges in the Cascade-Siskiyou landscape. Strategically conserving and restoring connectivity between remaining wildlands represents both an effective countermeasure to the adverse effects of habitat fragmentation, and an essential form of mitigation to address the impacts of climate change

The Cascade-Siskiyou Connectivity Partnership (hereafter Partnership) is a loosely-formed, interdisciplinary coalition and communication network created in 2018 to promote coordination across jurisdictional boundaries and diverse disciplines in southern Oregon and northern California. The primary goal of this Partnership is to protect, maintain, and restore ecological connectivity in this globally significant landscape. The Partnership works toward this goal by engaging with and promoting collaboration among wildlife, land use and transportation agencies, land managers, Tribes, professional scientists, land trusts, conservation organizations, local land owners, and others to identify and implement coordinated actions that help establish, conserve, and restore connectivity at multiple spatial scales (e.g., from local to landscape).

The Cascade-Siskiyou Connectivity Partnership hosted its second Cascade-Siskiyou connectivity symposium in Ashland, Oregon on May 4, 2022. The symposium engaged more than 55 people from over 30 different affiliations, including federal, state and local wildlife, transportation, and land management agencies in both Oregon and California; Tribes; academic institutions; land trusts; and non-profit organizations. This report summarizes the information gathered at this event, and presents a series of recommendations related to connectivity conservation organized into six distinct focus areas:

Research & Monitoring
Land Use & Policy
Transportation & Infrastructure
Restoration & Stewardship
Land Conservation Needs & Opportunities
Outreach & Education

Recommendations, Next Steps, and Action Items:

Highlighted below are 10 key recommendations, next steps and action items that were developed at the recent symposium and can be carried forward by members of the Cascade-Siskiyou Connectivity Partnership:

1. The Partnership will create a quarterly bulletin of news and activities in the Cascade-Siskiyou region that are related to connectivity and wildlife movement, including opportunities for

engagement and calls to action. This information will be distributed via a facilitated listserv to organizations, entities and individuals involved with the Partnership.

2. Given that more than 60% of the Cascade-Siskiyou landscape is public land managed by one or more federal agencies, many organizations in the Partnership will be participating in upcoming revisions to land & resource management plans on both Bureau of Land Management (BLM) and US Forest Service (USFS) lands that are located in southern Oregon and northern California.
3. A goal of select Partnership members is to identify lands most suitable for connectivity conservation and restoration under the Land and Water Conservation Fund (LWCF). Once these lands are identified, the Partnership hopes to support collaborative conservation efforts that leverage available federal LWCF funding while delivering significant conservation benefits.
4. In an effort to expand the scope and participation of this work at the local level, the Partnership will seek to recruit new partners to this network that are focused on tracking county general plans. With the recommendation to identify more land use monitors, we can begin engaging with a small handful of land use monitoring NGOs that are currently focused on wildlife and connectivity-related issues across southern Oregon's Josephine and Jackson Counties.
5. With increased funding made available to states from both the Infrastructure Investment & Jobs Act and Inflation Reduction Act, some partners may have the opportunity to advocate for larger investments in transportation projects in strategic locations that will help increase permeability for wildlife and fish passage. Partnership members can also reinforce more climate-friendly and wildlife-friendly policies for working lands at the state and federal levels.
6. A number of planned transportation projects at both the Oregon and California Departments of Transportation present opportunities for Partnership members to improve human safety and wildlife permeability in critical linkages. Agencies and organizations in the Partnership can assist with a broad range of activities, such as helping to identify and/or pursue funding for wildlife crossing infrastructure design and implementation, helping to pass local policy measures, increasing community support, conserving key private land parcels, and providing in-kind support for research and monitoring.
7. A small team of volunteers working under the auspices of the Southern Oregon Wildlife Crossings Coalition, has built momentum and developed funding channels for wildlife crossings in a relatively short amount of time. Many of the Partnership's members are affiliated with and/or a part of this coalition, which is currently focused on increasing wildlife permeability across Interstate 5 near Siskiyou Pass. As the I-5 crossings project continues to develop, the Partnership hopes to continue supporting these efforts including the research, design, and fundraising phases.
8. As wildlife and fish crossing projects advance across the Cascade-Siskiyou landscape, partners would like to build upon these efforts by conducting fine-scale, parcel-level analyses of private lands located within or in close proximity to critical connectivity areas. The results of this analysis can then be used to help prioritize strategic investments in conservation easements or land purchases that will in turn help conserve and restore connectivity at key locations.
9. The Partnership aims to support restoration and rehabilitation of lands that will be in recovery over coming decades due to removal of the four lower Klamath dams, which is now getting underway in Siskiyou County, California. Dam removal on the Klamath is the centerpiece of the largest river restoration effort in the country, and involves a diverse coalition of Klamath River Tribes, state and federal partners. The Partnership is particularly interested in monitoring the restoration process, and also has recommendations for managing Class B lands associated with dam removal.
10. The Partnership will also create a series of slideshow presentations and briefing papers related to connectivity issues in the Cascade-Siskiyou landscape. These materials are part of a larger effort

to increase outreach to elected leaders, agency personnel, and private landowners so as to build support over time for connectivity conservation.

It is the Partnership's intent to continue hosting a biennial Cascade-Siskiyou Connectivity Symposium that will share the latest connectivity science, communicate progress in the focus areas, and identify actions for future efforts. We anticipate the next Partnership symposium will take place in Spring or Fall 2024. In between scheduled symposia, we plan to host quarterly virtual and in-person "brown bag gatherings" or informal presentations that address one or more of the six primary focus areas identified above. From these shared learning opportunities, the Partnership can continue increasing the collective knowledge base related to opportunities for as well as constraints to connectivity conservation in the greater Cascade-Siskiyou landscape .

The Partnership planning team will continue meeting on a regular (quarterly) basis to identify ongoing opportunities for coordinated actions, and also to analyze connectivity-related issues using information gathered from agencies, NGOs, and scientists and researchers. The planning team will also continue to pursue funding opportunities so as to maintain capacity for the Partnership and future symposia to move forward. Quarterly timelines will allow this conversation to continue, while also recognizing our respective agencies and organizations are still adjusting respective programs and capacities after a global pandemic.

Members of the Partnership are all deeply committed to building this collective effort to enhance connectivity and improve wildlife movement across the greater Cascade-Siskiyou landscape. Working towards this ambitious goal will take time and resources, and we hope there continues to be a spirit of mutual collaboration when it comes to funding opportunities for planning and organizing efforts. The wealth of information and diverse relationships represented in this Summary Report can serve a strong foundation from which to build future joint efforts. This summary report is intended to be a living document and will continue to be refined by members of the Partnership as new data and information become available.

1. Background

The Cascade-Siskiyou Connectivity Partnership was initiated in 2018 as an ongoing interdisciplinary forum and communication network to promote coordination across jurisdictional boundaries and diverse disciplines in southern Oregon and northern California. The Partnership's primary goals are protecting, maintaining, and restoring habitat connectivity and wildlife movement in this globally significant region. The Partnership seeks to engage and promote collaboration among wildlife, land use and transportation agencies at all levels, land managers and planners, tribes, ranchers, foresters and farmers, academic and professional scientists, land trusts and conservancies, conservation organizations, and others to identify and implement coordinated actions to establish, conserve, and enhance connectivity. Improving existing communication channels and information sharing strategies can help ensure that each member's efforts are coordinated with the actions of others through a mutually reinforcing plan of action that leverages resources for connectivity conservation and stewardship.

Numerous agencies, organizations and individuals throughout the region can each play a unique role in conserving ecological connectivity while pursuing their own missions. For example, wildlife agencies, such as U.S. Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife (ODFW) and the California Department of Fish and Wildlife (CDFW), actively plan for conservation while also serving as regulators and land managers. Public land management agencies, like US Forest Service (USFS) and Bureau of Land Management (BLM), seek to maintain functional connectivity to meet their charge of managing our public lands for natural resource values, recreation and other uses. Oregon and California Departments of Transportation have stewardship goals to protect and enhance ecological resources, improve safety, and serve the transportation needs of their respective state's growing population. Local and regional planning agencies, such as county planning departments or Association of Governments, work to conserve open space and natural resources through land use policies. Hundreds of organizations throughout the region have missions connected to land conservation, habitat restoration, habitat connectivity, endangered species protection, environmental planning, and environmental advocacy that all play a role in conserving ecological connectivity. Hundreds of families steward forests and rangelands, many for generations, providing valuable habitat for wildlife and maintaining part of our cultural heritage. Thus, while each agency, organization and individual may have very different missions, they can all benefit from and contribute to connectivity conservation.

The first Cascade-Siskiyou Connectivity Symposium was held in November of 2018 and engaged 60 people from over 35 different agencies, organizations, academic institutions, and businesses, along with several private landowners from Oregon and California to discuss opportunities for maintaining and improving habitat connectivity and wildlife movement in the Cascade-Siskiyou region. Another symposium was planned for 2020 but was cancelled due to COVID. Thus, the second Cascade-Siskiyou Connectivity Symposium was held on May 4, 2022 and engaged 55 people from over 30 different affiliations. While participants in the 2018 symposium included diverse stakeholders from both Oregon and California, the California contingent wasn't as well represented at the 2022 symposium. Therefore, we have also integrated relevant data collected from a January 2020 Northeastern California Wildlife Connectivity Symposium (Penrod 2020) that overlaps the Cascade-Siskiyou Connectivity Planning Area. This report summarizes information gathered in the following focus areas: Land Use & Policy, Transportation & Infrastructure, Restoration & Stewardship, Conservation Needs & Opportunities, Research & Monitoring, and Education & Outreach.

2. Purpose and Need

Movement is essential to wildlife survival. It is vital for the day-to-day movements of individuals seeking food, shelter, or mates; dispersal of offspring to new home ranges; seasonal migration; recolonization of unoccupied habitat after a local population has been extirpated; and for species to shift their distributions in response to global climate change (Forman et al. 2003, Crooks and Sanjayan 2006). The obstruction of these natural movement patterns by roads, development, or other impediments can alter these essential ecosystem functions. Without the ability to freely move within and between natural habitats, species become more susceptible to environmental disturbances, and show higher rates of local extinction and inbreeding depression (Soulé and Terborgh 1999). When essential movement and connectivity is compromised or lost, isolated populations become more susceptible to extinction (MacArthur and Wilson 1967, Levin 1970, Shaffer 1981, Schonewald-Cox 1983, Soulé 1987, Hanski and Gilpin 1991, Mills and Smouse 1994).

Countering these threats requires conserving well-connected networks of large wildlands, where natural ecological and evolutionary processes can continue operating over a range of spatial and temporal scales. These processes include: top-down regulation by large predators, natural patterns of pollination, reproduction success, gene flow, dispersal, energy flow, and nutrient cycling. Enhancing connectivity and linking natural landscapes has been identified as the single most important adaptation strategy to conserve biodiversity during climate change (Heller and Zavaleta 2009). Natural resource managers, including the BLM and USFS, need to make short-term decisions in the face of existing land use pressures as well as long-term climate change. Habitat fragmentation by roads, dams, resource extraction, and urban and agricultural development are the most pressing challenges to biodiversity in the Cascade-Siskiyou region. Strategically conserving and restoring functional connections between natural habitats is widely recognized as an effective countermeasure to habitat loss and fragmentation, and an essential mitigation measure against the impacts of climate change.

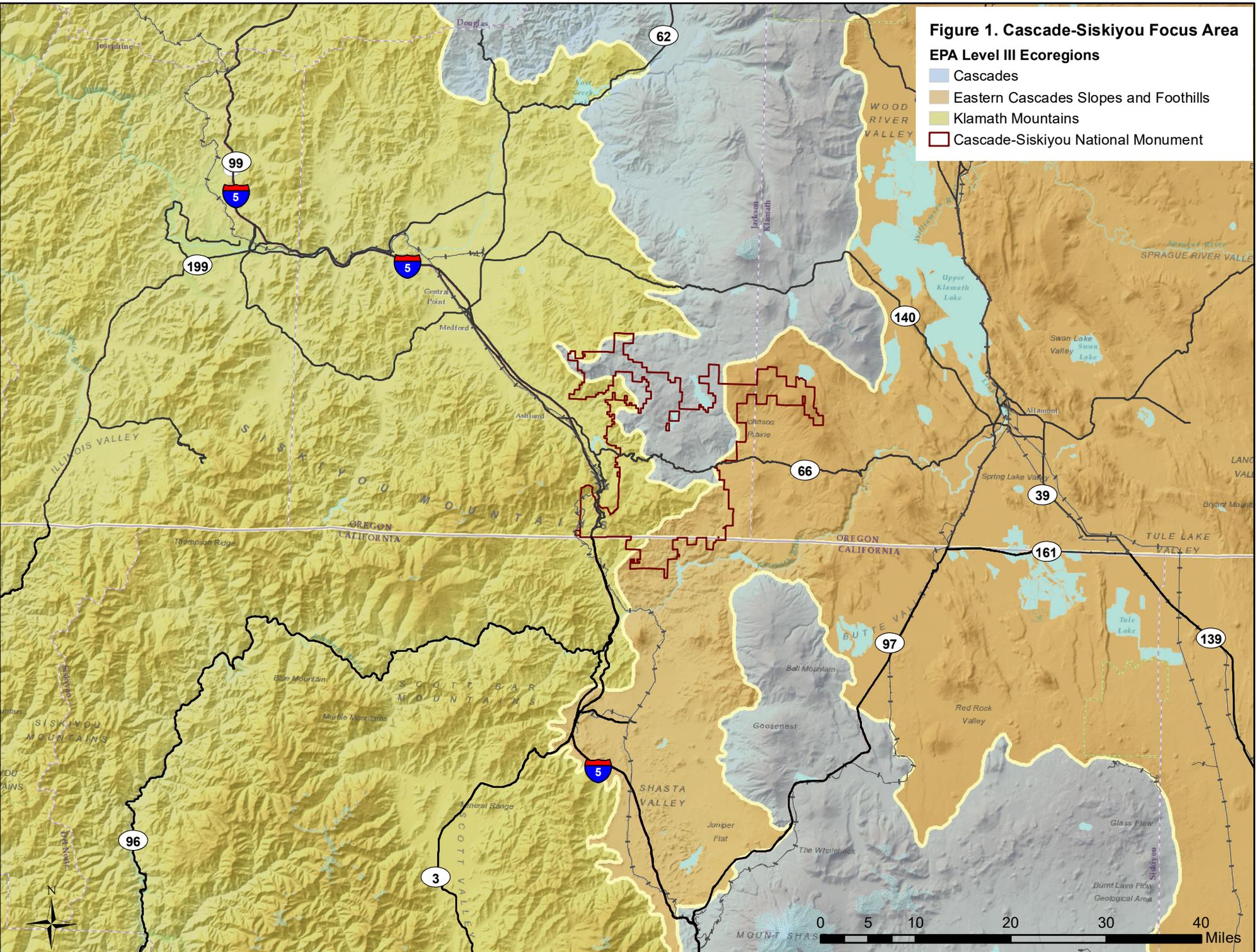
The Cascade-Siskiyou Connectivity focus area (Figure 1) includes southern Oregon and northern California at the convergence of three major ecoregions: Klamath Mountains/North Coast Range (to the west), Cascade Range (north/south), and the Eastern Cascade Slopes and Foothills (east). The focus area includes several regionally important landscape linkages, including critical wildlife movement corridors that cross the Oregon-California state line. Maintaining and restoring habitat connectivity here is not only essential to the recovery of several imperiled species in the Cascade-Siskiyou region (e.g., grey wolf, Pacific fisher, marten, northern spotted owl, coho salmon), but also vital to area-sensitive species like mountain lion and black bear, as well as species like elk and black-tailed deer that depend upon seasonal migrations. Disruption of landscape-level connections that are needed for species movements and range shifts is one of the greatest threats to the integrity of this important ecological crossroads.

Effectively conserving connectivity at a landscape scale, across multiple jurisdictions, will require agencies, organizations and individuals from diverse sectors to work together. No single entity can do it or be successful acting alone. The Cascade-Siskiyou Connectivity Partnership seeks to engage federal, state and local wildlife, transportation, land management, and land use agencies; tribes; academic institutions; land trusts; non-profit organizations; and others to promote coordination among diverse stakeholders, and build the partnerships that are needed to conserve habitat connectivity at a landscape scale. For collective impact, the Partnership emphasizes coordinated actions in land use, policy, transportation and infrastructure, habitat restoration, stewardship, land conservation, research, monitoring, and outreach.

Figure 1. Cascade-Siskiyou Focus Area

EPA Level III Ecoregions

- Cascades
- Eastern Cascades Slopes and Foothills
- Klamath Mountains
- Cascade-Siskiyou National Monument



3. Symposium Objectives

The May 4, 2022 symposium served as an opportunity to reconvene participants from the 2018 and 2020 symposiums and engage new stakeholders to share knowledge and identify opportunities to coordinate, integrate, and focus efforts that can help maintain and restore habitat connectivity and support landscape resiliency. The overall objectives of the symposium were to:

- Identify existing or past research or monitoring efforts, and research or monitoring needs related to habitat connectivity and wildlife movement in the focus area, as well as partnership opportunities for filling those needs.
- Identify land uses or policies that may support or hinder (e.g., proposed specific plans) wildlife movement in the region, and opportunities for engagement in public review processes.
- Identify existing or past efforts, specific needs, or opportunities to address existing barriers to wildlife movement related to transportation or other linear infrastructure.
- Identify partnership opportunities and funding sources to support design and implementation of wildlife crossings to remediate barriers to wildlife movement.
- Identify existing or past efforts, or specific needs or opportunities, to restore or steward land so as to improve habitat connectivity and wildlife movement (e.g., stream restoration, and dam or road removals).
- Identify specific needs or opportunities to protect and conserve habitat connectivity and wildlife movement in the region (e.g., willing property sellers, key parcels).

4. Symposium Layout

After the welcome and opening remarks, we began the symposium with brief introductions of all participants, with each stating name, position and affiliation, so that everyone could get a sense of the diverse stakeholders gathered in the room. Various skill sets are needed to maintain and restore habitat connectivity and wildlife movement (e.g., land use and transportation planning, research & monitoring, land acquisitions, restoration & stewardship), and the symposium included roundtable discussions and breakout sessions around these primary focus areas to collect information and spatial data.

The introductory session was followed by a series of presentations related to various issues that directly pertain to connectivity conservation in the Cascade-Siskiyou focus area. These presentations set the stage for the afternoon breakout sessions, which were designed to gather data and collect participant input. Large format maps and datasheets were provided to help gather data and information from participants for each facilitated breakout session, which were centered around five different focus areas:

- Research & Monitoring;
- Land Use & Policy;
- Restoration & Stewardship;
- Transportation & Infrastructure; and
- Land Conservation Needs & Opportunities.

A summary of the morning presentations is provided below, followed by sections on each breakout session. The detailed agenda of the meeting and the list of participants are available in **Appendices 1 and 2** of the report. Datasheets used in the breakout sessions are included in **Appendix 3**.

5. Summary of Presentations

How Traditional Ecological Knowledge (TEK) Helps Inform and Connect

Samantha Chisolm Hatfield (enrolled Siletz; Cherokee), Department of Fisheries, Wildlife and Conservation Sciences, Oregon State University

Dr. Chisolm Hatfield shared her journey as a scientist, educator, specialist and facilitator of Traditional Ecological Knowledge (TEK) and bridging the gap between TEK and western science. She explained that TEK evolves from lengthy generations of Indigenous Science understanding and experience, happening in many forms, such as cultural burning. She also explained there are other forms of Ecological Knowledge that are not as longstanding as TEK, such as Farmer or Fishermen Ecological Knowledge that reside within 1-3 generations. She noted that Traditional Knowledge comprise the foundational systems upon which many Indigenous populations operate. She explained that subsistence lifestyles depend on TEK; sustainable use of taking only what is needed to maintain the resource for future generations. TEK often uses environmental indicators for traditional activities, such as gathering, hunting and/or fishing. TEK sustainability practices, resource use and management rely on information databases that can extend back hundreds of years.

Dr. Chisolm Hatfield also emphasized the importance of integrating TEK into western scientific contexts. She shared how TEK scientists and Indigenous communities can contribute valuable and relevant information and data to western science. For example, her research involving tribes' TEK traditional cultural adaptation responses to climate change brought forth results that western science models and data sets have not have produced. Climate change models cannot evaluate qualitative measures of human interactions such as cultural impact adaptations. Adaptation responses included practices such as traditional food substitutions, adjusting timing sequences of hunting, gathering, fishing, or ceremonial events. Integrating TEK and western scientific methodology can provide datasets that address climate change more comprehensively and holistically.

Oregon Connectivity Assessment and Mapping Projects (OCAMP): Linking Landscapes

Rachel Wheat, Oregon Department of Fish and Wildlife

Dr. Wheat provided an overview of the Oregon Connectivity Assessment and Mapping Project [Oregon Connectivity Assessment and Mapping Project](#) (OCAMP) and project progress to date. She explained that OCAMP is a multi-year, statewide, collaborative effort led by ODFW with assistance from Portland State University and Samara Group, to analyze and map connectivity for a wide diversity of species to advance priority conservation planning aimed at understanding and mitigating barriers to wildlife movement in Oregon. She described the modeling approach and walked participants through the results of each analysis, using pronghorn as an example. She also provided a project status update – 54 surrogate species had been selected and habitat permeability modeling had been completed for each; habitat permeability validation, habitat connectivity modeling and validation were in progress at the time of the symposium; and compositing maps, prioritization and final connectivity map was expected in late 2022. She explained that the fine-scale resolution priority connectivity maps they will produce are intended to support state-wide planning for strategic conservation investments, species protection measures, siting of land use changes and development, targeted habitat restoration efforts, and transportation improvements, including reduction of wildlife-vehicle collisions. She said that final products are expected to be released to the public in

summer 2023. She closed by inviting participants to a Practitioners Group meeting May 23, 2022 to help inform the end stages of the project and provide input on end user needs, desired tools and features, and development, access and use of the final products.

Federal/State Policies Related to Connectivity and Pacific Northwest Climate Connectivity

Jessica Walz-Schafer, Wildlands Network

Ms. Walz-Schafer opened with the idea that sound science must be the cornerstone to all land use decisions and that connectivity maps are needed to develop targeted, on-the-ground campaigns to increase connectivity. She provided an overview of the 'Pacific Climate Connectivity Wildway' map (Figure 2) that Wildlands Network created in coordination with Dr. Josh Lawler at the University of Washington, which identifies areas important for landscape-level connectivity today and in the face of climate change. She zoomed into the planning area to highlight that the model captures several important linkages in the Cascade-Siskiyou focus area.

Ms. Walz-Schafer also emphasized the importance of science-supported policies at the federal, state and local level to initiate and ensure the durability of on-the-ground conservation efforts. She provided an overview of pending federal legislation, titled the [Wildlife Corridors Conservation Act of 2019](#), that would authorize funding for wildlife corridors and crossings. She also discussed recently enacted policies, including the America the Beautiful Initiative: Conserving 30 percent of US land and waters by 2030, and Secretarial Order 3362 to enhance and improve big game winter range and migration corridors/habitat in the West. She also provided an overview of recent connectivity legislation passed in Oregon (House Bill 2834 Signed by Governor Brown 2019) that requires ODFW to create a Wildlife Corridor Action Plan and ODOT to establish a program to reduce wildlife-vehicular

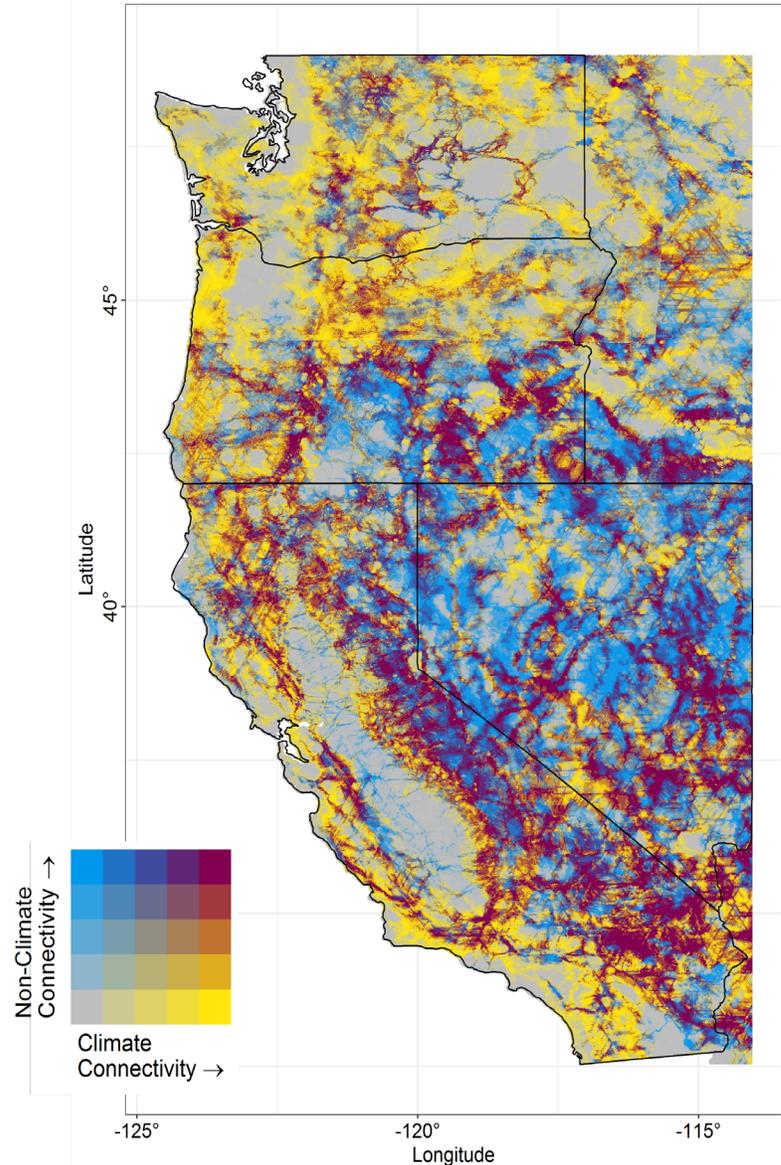


Figure 2. Pacific Wildway Climate Connectivity Map developed by a team at the University of Washington including Tristen Nunez and Dr. Josh Lawler is in review for the journal *Frontiers in Ecology and the Environment*. Areas in blue are important for connectivity wildlife habitat; yellow for allowing species migration in the face of climate change, or magenta for both.

collisions; and California's Safe Roads and Wildlife Protection Act (AB 2344), which was pending at the time of the symposium but has since been signed into law (September 2022). These recently enacted policies are further described below in Section 7, Land Use & Policy.

With all of the federal lands in the Cascade-Siskiyou focus area, she also highlighted the 2012 Forest Service Planning Rule policy that includes requirements for maintaining and restoring connectivity. She encouraged public participation in USFS and BLM processes that will update Resource Management Plans to ensure peer-reviewed connectivity and climate science is integrated into planning at the landscape scale. She emphasized the importance of collaborative partnerships with USFS Regional Foresters and BLM State Directors to working with local-level planning efforts at the county level to improve connectivity outcomes on the ground.

She closed with an overview of connectivity funding at the federal and state level, and directed participants to a webinar series [Demystifying Wildlife Crossing Infrastructure Projects](#) that was collaboratively produced by Wildlands Network, Arc Solutions, Center for Large Landscape Conservation, and the National Park Conservation Association.

Integrating Traditional Ecological Knowledge into Restoration and Stewardship Efforts

Tim Hayden, Yurok Tribe

Mr. Hayden, a fisheries biologist and Deputy Executive Director of the Yurok Tribe for Natural Resources, shared how the tribe partnered with Western Rivers Conservancy to acquire over 47,000 acres from Green Diamond Resource Company to establish the Blue Creek Salmon Sanctuary and Yurok Community Forest. He explained that the Sanctuary and Community Forest are located along the Klamath River and entirely within the Yurok Tribe's ancestral territory and the watershed of Blue Creek contains the most sacred of Yurok religious sites. The Tribe's goals are to protect and restore the area to a healthy ecosystem rich in biodiversity and resilient to resource threats (such as drought and climate change) and to re-establish the traditional Yurok role in the management and stewardship of their ancestral territory.

He said that their land stewardship role is culturally important to the tribe. He shared that the Blue Creek acquisition, with its ecologically diverse fish, wildlife and connection to the late-successional forest in designated wilderness in the upper watershed, was a huge accomplishment for the Tribe. He said that fish are a huge part of the Yurok lifestyle and cultural, way of life. The land acquisition provides federally recognized fishing rights for commercial and ceremonial needs using traditional techniques. He explained that Blue Creek provides a critical cold-water refuge for salmon migrating up the Klamath River. He said that the Tribe's Fisheries Department conducts annual monitoring of spawning and rearing salmonids and has been working with partners to accelerate fisheries restoration in the lower Klamath for decades.

He explained that the Tribe's land management strategy has a two-pronged approach. For the Blue Creek Sanctuary, the primary goal is to restore the complexity and diversity of coastal redwood forest to an old growth condition, so as to support species like Northern spotted owl, Pacific fisher, Humboldt marten, and coho salmon. Now, the area is primarily comprised of even-aged stands; the Tribe is employing restoration techniques to accelerate the recovery of old-growth and help restore connections between Wilderness in the upper watershed to Redwood National and State Parks on the coast. The Tribe works closely with many partners on habitat restoration, road decommissioning, tree planting, and fuels reduction projects through cultural burning. He described management for the Yurok Community Forest as sustainable

forestry, uneven-aged forest management to restore fish and wildlife populations and meet endangered species goals, while providing economic opportunities for the Tribe, access for cultural purposes, such as traditional gathering for basket materials and medicinal purposes, and hunting and fishing. He also described the Tribe's Forest Carbon Project (the first in the state, including parts of the Sanctuary and Community Forest) which has allowed the Tribe to fund acquisitions and support management needs, like road decommissioning and habitat restoration that put tribal members to work.

Mr. Hayden closed his presentation with a video from the day before the symposium, when the Northern California Condor Recovery Program released the first condors to fly in the skies over Yurok Ancestral Territory in more than a century. He noted that the condor is culturally significant to the Yurok Tribe and featured prominently in Yurok culture and that the Tribe is doing prairie restoration to support recovery of condor and the mardon skipper butterfly. He explained that the Yurok Condor Reintroduction Initiative began in 2003 as a priority project for the Tribe's Wildlife Program, and that US Fish and Wildlife Service proposed establishment of a non-essential experimental population of the California condor in the Pacific Northwest in 2019, in partnership with the Yurok and other agencies.

Undamming the Klamath River – Paths to Restoration

Gwen Santos and Dave Coffman, RES

Mr. Coffman, a Senior Fluvial Geomorphologist, Director of Northern California and Southern Oregon Operations, and the Klamath River Renewal Project Restoration Program Manager for RES, explained that the Klamath River Renewal Corporation hired RES to help them implement restoration for the largest dam removal and river restoration effort ever performed in the U.S. He provided history on the Klamath dam removal effort, which involved decades of collaboration amongst numerous Tribal Nations, Natural Resource Agencies, Land owners, Scientists, and countless others! He shared the importance of the restoration effort to the Yurok, Karuk, Hoopa Valley, Shasta, and Klamath tribes for cultural ceremonies, practices, and culturally-significant resources that have been impacted by the presence of the dams. He described the purpose of the project is to remove 4 dams to restore a free-flowing Klamath River with the overarching goal of volitional fish passage and reopening 400+ miles of historic salmon spawning and rearing habitat to support recovery of many threatened or endangered species. Mr. Coffman explained that the entire river watershed is fragmented due to the presence of the dams and the lower-most dam, Iron Gate, is the main barrier to anadromy because it cuts off the upper part of the watershed. He provided an overview of the process for the deconstruction and removal of the Iron Gate, Copco 1 & 2, and JC Boyle dams and RES's role as restoration designer and contractor, regulatory approval support, implementation of biological conservation measures, and long-term monitoring and maintenance.

Ms. Santos, a Senior Wetland Ecologist and Director of Ecology & Regulatory for the Western Region with RES, described the process of how restoration of currently inundated land will be accomplished. She gave an overview of the restoration goals, including a free-flowing river for fish passage, removing excess sediment and sediment stabilization through revegetation, and restoring habitat complexity (e.g., large woody debris) within the river and along tributary channels to support salmon recovery. She explained the desired/expected outcomes of the habitat restoration effort for endangered fish, native peoples and river communities. She noted that revegetation not only contributes to sediment stabilization, but native vegetation is also important for pollinator species, food sources, provides competition for invasive species, and there are many native plants that are culturally important. She highlighted that to achieve the diversity and abundance of desired native plant species that seeds are being collected directly from the watershed

for amplification with commercial nurseries for use as broadcast seed, propagation of tens of thousands of oaks and other native shrubs, and herbaceous plugs. The seed collection effort for habitat restoration is being led by the Yurok Tribe and their Senior Riparian Ecologist. She also explained the planned long-term monitoring of the habitat restoration efforts using landscape photo points to document the recovering of revegetation.

Mr. Coffman wrapped up the presentation by giving an overview of various Management Plans (MP) being developed to guide implementation of various biological conservation measures and long-term monitoring and maintenance, such as a Terrestrial and Wildlife MP, Water Quality MP, Aquatic Resource MP, Fish Presence Monitoring and Spawning Habitat Availability Plans. He closed with enthusiastic gratitude for the opportunity to work with restoration designers, engineers, fisheries biologists, ecologists, botanists, permitting specialists, and construction implementation crews on the largest dam removal and river restoration project in the world.

Northern CA regional plan to reduce wildlife-vehicle collisions and increase roadway permeability

Eric Rulison, California Department of Transportation

Mr. Rulison, a Caltrans biologist, described what the department is doing to improve wildlife permeability across transportation features in District 2 (far northern CA). He explained that connectivity is important for wildlife populations, species and natural communities, and is particularly vital for wildlife that have large home ranges (e.g., black bear, mountain lion, elk, mule deer) which are often intersected by transportation infrastructure. He also described ungulate populations in the region that seasonally migrate between summer and winter ranges. He explained that in areas without wildlife crossings, large herds of mule deer, elk, and pronghorn may have to cross highways at-grade, which creates safety hazards for both wildlife and the traveling public. Roadways fragment habitat, create barriers and increase mortality risks. To improve permeability and increase connectivity, Caltrans is studying roadways where wildlife-vehicle collisions are relatively common to identify locations where wildlife crossings are needed. He specifically highlighted segments of Interstate 5 and State Routes 97, 139, 395 and 44 that have been identified as having high wildlife-vehicle collisions. He explained that Caltrans is working with several partners within these identified roadway segments to identify locations for new wildlife crossing structures to be constructed and/or enhancements to existing structures to increase permeability and decrease wildlife-vehicle collisions.

Safe Passages, Roads & Wildlife

Meghan Fagundes, Oregon Department of Transportation

Ms. Fagundes, a biologist in ODOT's Region 3 (southwest Oregon), described recent federal and state legislation driving wildlife crossing efforts in Oregon. She explained that Oregon's HB 2834, which passed in 2019, requires ODFW to develop a wildlife corridor map and action plan and ODOT to further develop its wildlife passage program to reduce wildlife-vehicle collisions and to incorporate corridors into design options for road projects with potential to threaten connectivity. She highlighted the need for dedicated funding to actually implement wildlife crossings in priority areas. She mentioned Secretarial Order 3362 (2018) that is designed to improve big game winter range and migration corridor habitat through partnerships with fish and wildlife agencies in 11 western states. She highlighted the recently passed Infrastructure Investment and Jobs Act (2021), which includes the Wildlife Crossings Pilot Program that will provide \$350 million over 5 years and explained the project selection criteria. She also referenced several other federal transportation programs that wildlife crossing projects are eligible for, including the Surface Transportation Block Grant Program, Nationally Significant Freight and Highway Program, Bridge

Investment Program; the Collaborative based, Aquatic-focused, Landscape-scale Restoration Program; the National Culvert Removal, Replacement, and Restoration Grant Program, the Forest Service Legacy Roads and Trails Remediation Program, and the Pollinator-friendly Practices on Roadsides and Highway Rights-of-Way Program.

Ms. Fagundes provided an overview of wildlife-vehicle collision hotspots, current wildlife crossing projects, and ODOT priorities for wildlife crossing improvements. She described ODOT’s existing wildlife-vehicle collision reduction projects across that state that are completed, under construction or planned. She showed the map below of priority wildlife passage project locations (Figure 3) and highlighted projects in the Cascade-Siskiyou study area: the I-5 Ashland – California Border (i.e., Southern Oregon Wildlife Crossing described in following PPT) and the OR-140 Klamath Falls West/Dayville project which is being explored but not yet a full project.

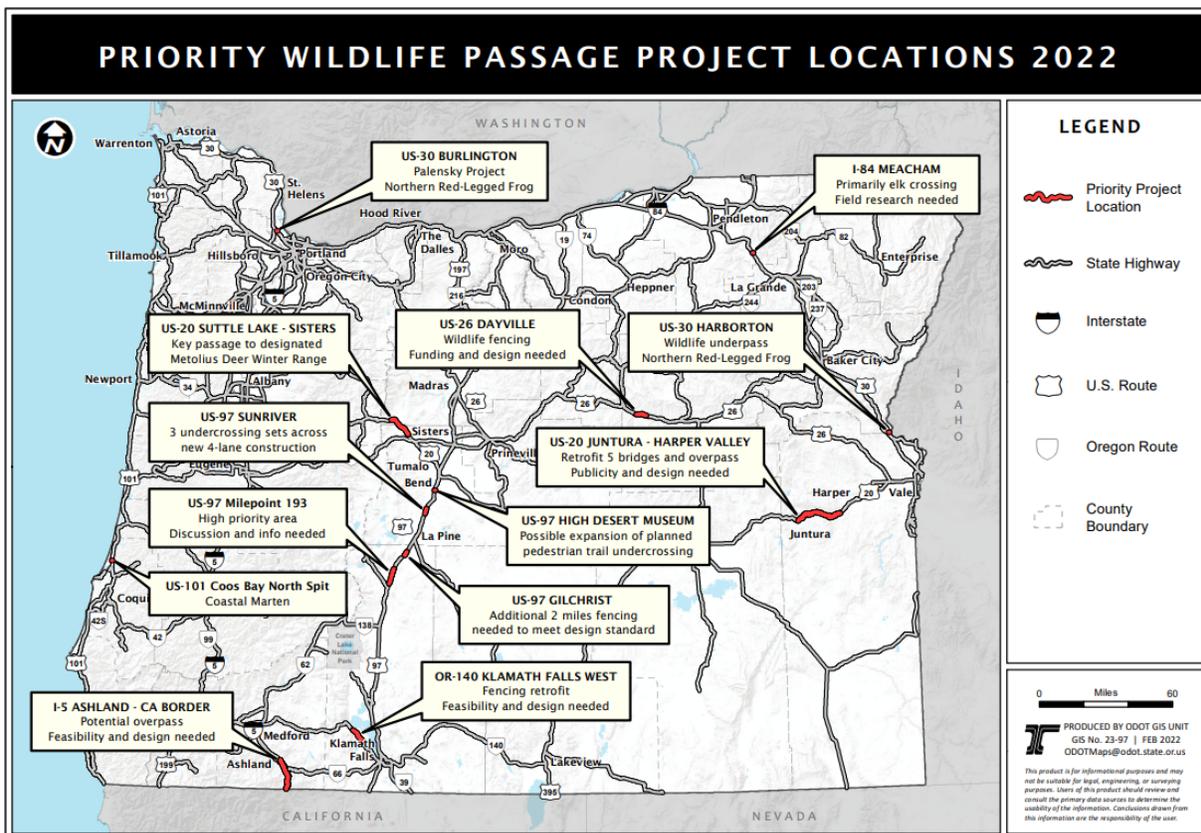


Figure 3. Priority Wildlife Passage Project Locations 2022 (Produced by ODOT GIS Unit February 2022)

Southern Oregon Wildlife Crossing Coalition & Feasibility Study

Amy Amrhein (SOWCC) and Leslie Bliss-Ketchum, Samara Group

Ms. Amrhein, the coordinator for the highly effective Southern Oregon Wildlife Crossing Coalition (SOWCC), gave an overview of how and why the coalition came together, its primary goals and provided a timeline of major milestones for achieving its goals. She described the coalition, which is fiscally sponsored by the Oregon Wildlife Foundation [SOWCC | orwildlife \(myowf.org\)](http://SOWCC | orwildlife (myowf.org)), as a broad-based

partnership advocating for improved wildlife movement and increased safety for motorists in the Siskiyou Summit region of I-5 between Ashland and the California border. She explained that the coalition was initiated in early 2021 with diverse members that include the Oregon Departments of Transportation and Fish and Wildlife, Bureau of Land Management, US Fish and Wildlife Service, Oregon Wildlife Foundation, Southern Oregon University, Oregon Hunters Association, Oregon Backcountry Hunters & Anglers, Soda Mountain Wilderness Council, Southern Oregon Land Conservancy, Pacific Forest Trust, Trout Unlimited, Rogue Valley Audubon Society, KS Wild, Selberg Institute, SC Wildlands, Wildlands Network, and the Office of Representative Pam Marsh. She described the coalition's role in ongoing coordination and fundraising to support implementation of priority wildlife crossings, from planning and design to construction. She laid out the timeline, from the Alternatives Analysis and Conceptual Design of wildlife crossing that was ongoing at the time of the symposium; to Oregon Department of Transportation's Engineering and Design projected to be completed by the end of 2024; and fundraising strategies for construction of the priority wildlife crossings, which is anticipated to begin in 2025.

Dr. Bliss-Ketchum, the Founder and Director of [Samara Group](#), provided an overview of the Alternatives Analysis and Conceptual Design process for the Southern Oregon Wildlife Crossings Project that they were working on with the [River Design Group](#). She described the range of opportunities being evaluated for increasing permeability across I-5 that considers the movement needs for the full range of taxa that occur in the area, and are feasible/reasonable from an engineering perspective, including vegetation management, habitat structure (down wood/boulder), dry bench/shelf, full culvert replacement and/or conversion to bridge and wildlife overpasses.

Dr. Bliss-Ketchum shared how the SOWCC is participating in the process at key junctures, including providing data on wildlife use of existing structures (described in the following presentation); site visits of each potential crossing location to discuss crossing design goals/objectives/concerns; interviews with members of the coalition that addressed land ownership and scale, ecological values of each crossing location, co-benefits and/or concerns, and future considerations and opportunities; and a series of meetings to share design elements and engineering considerations that could be implemented at each location and collaboratively select priority sites. She also summarized how the information gathered through the interview process was used to create a design matrix to support project prioritization, funding source opportunities, and other aspects of project selection:

Land Ownership and Scale: Importance of collaboration across political and jurisdictional boundaries. Conserved land for structure placement and surrounding land ownership considered by many partners as primary consideration in identifying crossing locations, since easements or acquisitions may be needed if crossing sites are located on private land. Identifying crossing locations with consideration of surrounding road network and infrastructure that may be barriers to movement beyond I-5. Identifying site-specific engineering and design considerations for crossings and directional fencing to guide animals to the structures. Identifying dual-use structure opportunities (such as I-5 Mt. Ashland Exit & Neil Creek residential road). Ensuring no changes in sight distance or driver safety impacts.

Ecological Values: Multi-species approach that addresses ecological connectivity for multiple taxonomic groups, including carnivores, ungulates, amphibians, reptiles, pollinators, terrestrial and/or road- sensitive birds. Crossing considerations for terrestrial and aquatic species that reduce wildlife-vehicle collisions and address non-mortality road impacts (e.g., noise and light) that may

contribute to avoidance behavior. Factoring in connectivity for plant communities that are likely to shift over time with climate change.

Co-benefits and/or Concerns: Co-benefits such as continued partnership and funding development; structures reaching end of lifespan that provide opportunities for wildlife crossing improvements with transportation improvement projects; and maintenance of existing structures (i.e., clearing debris or drainage improvements) that could result in dual benefit for wildlife. Concerns such as ensuring structures already providing safe wildlife passage are not blocked; working with Tribes to identify cultural resources; and addressing public access concerns (e.g., illegal camping) and opportunities (e.g., trails).

Future Considerations & Opportunities: Considerations include funding for construction, wildlife monitoring pre- and post-construction, and maintenance of the structures once built. Opportunities to contribute to the development of standards to wildlife-sensitive culvert replacement and design; incorporate Indigenous and place-based local art styles (overcrossing); and community outreach.

Southern Oregon University Wildlife Camera Study on the I-5 Crossing Locations

Professor Karen Mager and Students Maya Smith and Alex Zenor, Southern Oregon University

Dr. Karen Mager, a professor in the Department of Environmental Science, Policy, and Sustainability at Southern Oregon University, introduced two undergraduate students, Alex Zenor and Maya Smith. She explained that the students were recruited to monitor wildlife camera and video traps on I-5 from Neil Creek just south of Ashland to the California border, in support of the Southern Oregon Wildlife Crossing Coalition's work described in the previous presentation, as part of their senior capstone project. Dr. Mager coordinated with Charlie Schelz, an ecologist with the BLM's Cascade-Siskiyou National Monument, who together set up twenty camera traps along wildlife trails near drainage culverts, vehicle bridges, and an overpass for the railroad that pass over or under I-5 in the Siskiyou Summit region. The primary goal was to identify which wildlife species are using existing structures to safely traverse the busy highway. Zenor and Smith helped collect and analyze the data from Schelz's cameras, along with some they and Dr. Mager installed.

Ms. Smith and Mr. Zenor described where the camera and video traps were located, how often they downloaded the data at each site, characteristics at each location, and which species were observed at or in the vicinity of each trap site. Species recorded at the various sites include black bear, deer, elk, mountain lion, bobcat, coyote, Pacific fisher, gray fox, red fox, raccoon, striped skunk, ermine or short-tailed weasel, jack-rabbit, Douglas squirrel, Western gray squirrel, California ground squirrel, and woodrat. They also described how they analyzed and summarized the data collected, which included tens of thousands of videos and still images. They noted that while some sites, like Bear Gulch and Mariposa Lily Preserve, are being used by a variety of species, other sites like the bridge at the I-5 Mt. Ashland exit are used almost exclusively by deer.

A Review and Synthesis of the Scientific Literature on Ecological Connectivity in the Greater Cascade-Siskiyou Landscape.

Evan Frost, Terrestrial Ecologist, Wildwood Consulting LLC

Mr. Frost described a [review and synthesis of connectivity assessments in the Cascade Siskiyou region](#) (Frost 2018) of 22 studies published between 1999-2018 that analyzed ecological connectivity in some way across all or portions of southwest Oregon and adjacent California. This review included national assessments (Theobald et al. 2012, Belote et al. 2016 and 2017, McGuire et al. 2016), regional assessments (Western Governors' Association 2010, Theobald et al. 2011, Buttrick et al. 2015, McCrae et al. 2016, Dickson et al. 2017, Littlefield et al. 2017), statewide assessments in Oregon (Hatch et al. 2008) and California (Spencer et al. 2010, Hannah et al. 2012, Cameron et al. 2018), Klamath-Siskiyou ecoregional assessments (Noss et al. 1999, Olson et al. 2012), and species-level assessments for northern spotted owl (Carroll and Johnson 2008, Carroll 2010, USDI BLM 2015), gray wolf (Carroll et al. 2012), and Pacific fisher (USGS-GAP 2014, USDI FWS 2016a).

Mr. Frost's (2018) synthesis found a high degree of agreement regarding the locations of ecologically important connectivity zones in the Cascade-Siskiyou focus area, which were identified as six primary landscape-level linkages (Figure 4). The two areas most frequently identified for their outstanding

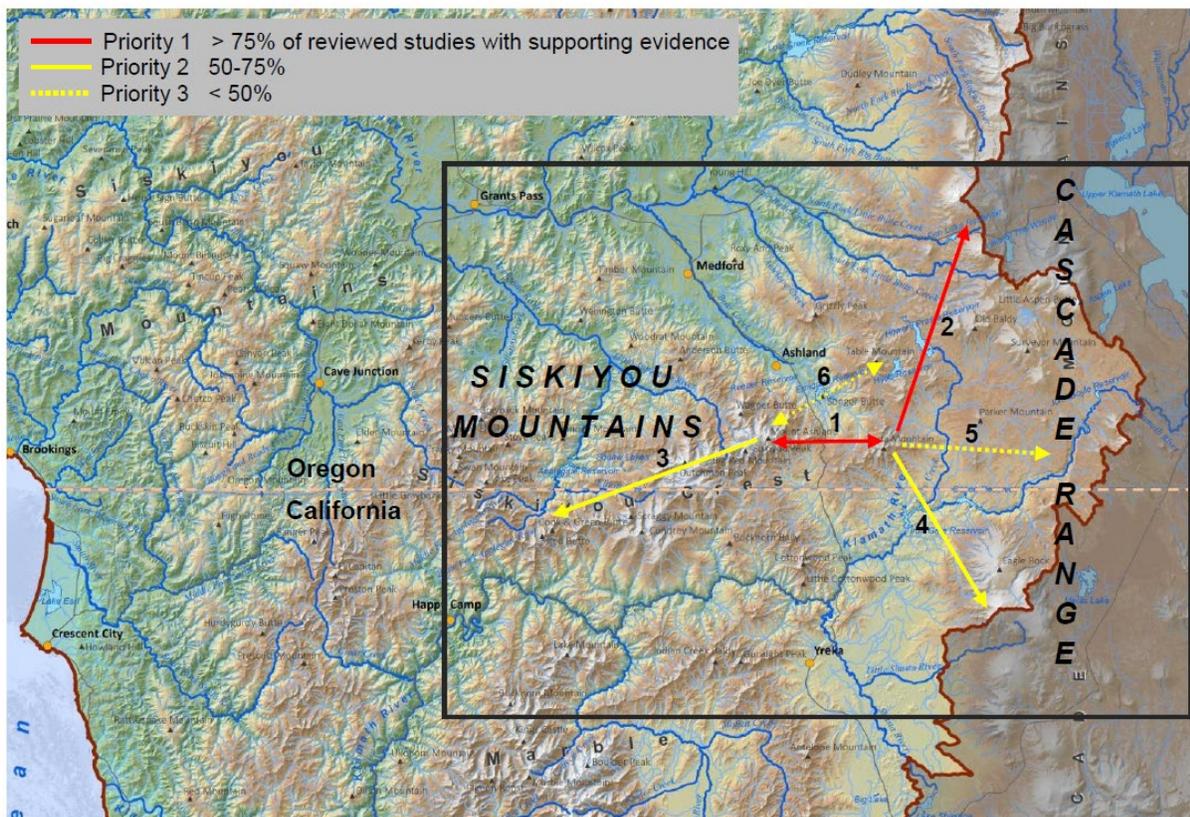


Figure 4. Generalized locations and prioritization of connectivity pathways in the Cascade-Siskiyou focus area (black rectangle) identified by studies included in Frost 2018. Linkages are classified into three priority classes based on the proportion of reviewed literature with supporting evidence for each pathway, and numbered from highest to lowest priority as follows: 1) Cascade-Siskiyou Land Bridge, 2) Southern OR Cascades; Cascade-Siskiyou NM to Rogue River-Siskiyou NF, 3) Siskiyou Crest; Mt. Ashland to western Siskiyou, 4) Southern OR Cascades; Cascade-Siskiyou NM to Klamath NF, 5) Klamath River Canyon; Cascade-Siskiyou NM to Klamath Falls BLM, and 6) Bear Creek Valley; Southern OR Cascades to Eastern Siskiyou (from Frost 2018).

connectivity values are the east-west, inter-regional linkage and junction point between the eastern Siskiyou and Cascade Ranges [referred to as the "Cascade-Siskiyou land bridge"], and a north-south trending pathway that essentially follows the orientation of the Southern Cascades in Oregon. The Siskiyou Crest (moving west from the land bridge / national monument), and from the Southern Oregon Cascades trending southeast into California -- were also frequently identified as important linkages in this landscape.

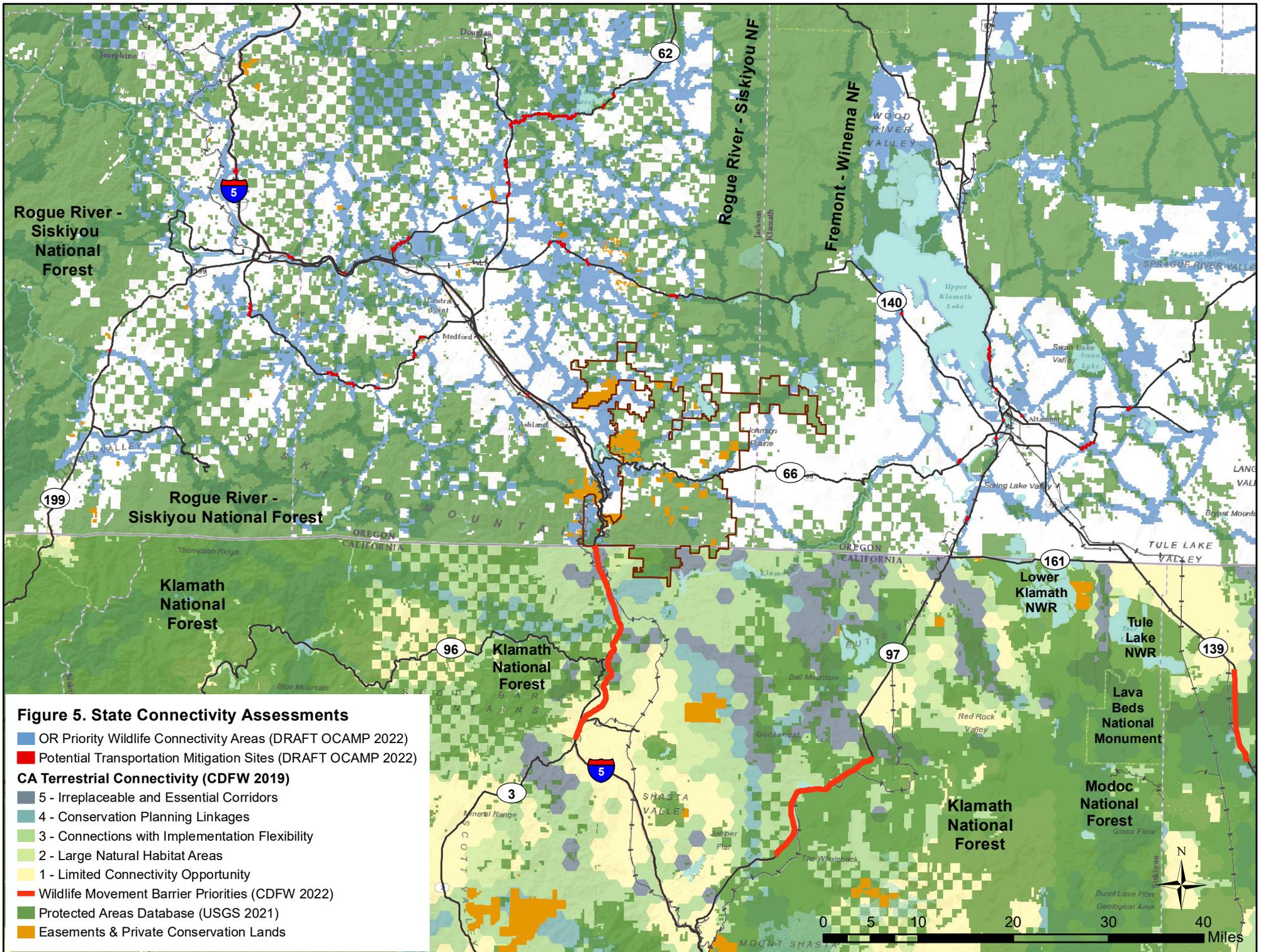
The robust nature of these findings underscores the importance of increasing conservation efforts in these high priority linkages -- particularly in critical bottlenecks (i.e., where key movement pathways are most vulnerable), and/or where large connectivity gains can be made with targeted, strategic investment (e.g., mitigating known movement barriers such as the Interstate 5 highway). In particular, the Cascade-Siskiyou land bridge stood out as unique in that the area not only represents a critical landscape-level connectivity bottleneck, but also facilitates movement between ecoregions; thereby providing critical movement pathways for special status species (e.g., northern spotted owl and Pacific fisher). Moreover, available evidence indicates these linkages are likely to remain relatively resilient to climate change impacts while also supporting high levels of both biodiversity and ecological intactness.

6. Research & Monitoring

Scientific Research & Monitoring can improve understanding of linkage function and provide essential data and information to support linkage conservation, stewardship, transportation and land use planning, policy and adaptive management. For example, focal species monitoring can provide further justification for placement of wildlife crossings to make transportation barriers more permeable to wildlife movement, or for acquisitions or easements of particular parcels. Many of the agencies, organizations, Tribes and academic institutions that participated in the symposium conduct research and monitoring that can inform and support conservation delivery. Participants can also assist public land managers (i.e., BLM, USFS, USFWS) with their research and monitoring priorities. Research and monitoring data and information should inform all other focus areas (e.g., land use, policy, stewardship, transportation, infrastructure, easements) to ensure each reflects the best science and strategies for conserving connectivity.

Since Frost's 2018 study, both California and Oregon have furthered statewide connectivity research and planning (Figure 5). ODFW's Oregon Connectivity Assessment and Mapping Project is in its final stages of identifying Priority Wildlife Connectivity Areas at the time of this summary report. CDFW has provided an update to the California Essential Habitat Connectivity Project (Spencer et al. 2010) with the development of the Terrestrial Connectivity Areas of Conservation Emphasis, which are both further described below.

ODFW is nearing completion of the [Oregon Connectivity Assessment and Mapping Project \(OCAMP\)](#) as part of the Oregon Conservation Strategy. This fine-scale assessment used circuit theory-based spatial modeling to address connectivity for 54 surrogate species, which were selected on an ecoregion-by-ecoregion basis to represent a diversity of habitat associations and structural habitat characteristics, taxa, life history strategies, and sensitivity to anthropogenic threats. Connectivity was mapped across each species' range, including a buffer into neighboring states (ODFW 2022). For the surrogate species whose distribution extend beyond Oregon, the connectivity models and individual species priorities cross state boundaries. However, for the purpose of identifying the Draft Priority Wildlife Connectivity Areas (PWCAs) depicted in Figure 5 (ODFW 2022), the network was limited to the area within state boundaries and



excluded GAP 1 lands since these areas are already under the highest possible level of protection (e.g., designated Wilderness). The draft results of the analysis have gone through a rigorous validation and prioritization process to identify areas for strategic conservation investments, restoration, barrier remediation, etc. Initial recommendations for potential Transportation Mitigation Areas (TMAs) were identified based on three criteria:

- Areas where the PWCAs intersect with the state highway system;
- At the location where the PWCA crosses the highway, there are multi-species connectivity priorities (i.e., there are multiple species that would benefit from a crossing structure at the site, rather than just one or a few); and
- Collision densities with large-bodied wildlife, identified by the ODOT carcass removal dataset, are intermediate or high at the location.

The potential transportation mitigation areas were separated into two categories, “high” and “highest”, with the locations attributed as the “highest” priorities having both the greatest number of species with connectivity priorities and the highest collision densities. The Draft PWCAs and TMAs depicted in Figure 5 are expected to undergo review by Oregon Department Fish and Wildlife district and field staff. In late spring 2023, there will be a public comment period associated with the Wildlife Corridor Action Plan.

California’s Terrestrial Connectivity Areas of Conservation Emphasis (CDFW 2019a) is a synthesis of the best available spatial information on connectivity and wildlife movement (Figure 5) and is intended to support better integration of biodiversity conservation with transportation and infrastructure planning. The Terrestrial Connectivity dataset is one of the four key components of CDFW’s Areas of Conservation Emphasis (ACE) data visualization platform, along with Terrestrial Biodiversity, Significant Habitats, and Climate Resilience (CDFW 2019a). The Terrestrial Connectivity dataset summarizes information by ACE hexagons (2.5 square miles each) including the presence of mapped corridors or linkages and the juxtaposition with large, contiguous, natural areas. CDFW’s connectivity layer displays five ranks: Irreplaceable and Essential Corridors, Conservation Planning Linkages, Connections with Implementation Flexibility, Large Natural Habitat Areas, and Limited Connectivity Opportunity Areas. Additional details on the analysis and data integrated into this synthesis, which is regularly updated as new connectivity data becomes available, see [ACE Datasheet Fact Sheet: Terrestrial Connectivity \(CDFW 2019\)](#).

CDFW released the California Wildlife Barriers reports (2020, 2022), which identified a suite of priority wildlife movement barriers across the state. Target species were identified for each of the priority barriers and include diverse species across multiple taxonomic groups. These include species, such as gray wolf, mountain lion, bobcat, badger, kit fox and other meso-carnivores; ungulates such as bighorn sheep, elk, pronghorn and mule deer; amphibians and reptiles such as California tiger salamander, arroyo toad, blunt-nosed leopard lizard, and western pond turtle; and imperiled invertebrates such as the Quino checkerspot butterfly. The 2022 report identifies 146 segments of linear infrastructure as wildlife barriers throughout California, 62 of which were identified as priority wildlife barriers and 12 which were included on the statewide top priority list. The 146 segments were evaluated based on criteria identified at the 2020 Northeastern California Connectivity Symposium (Penrod 2020). Three of the Priority Wildlife Barriers that would benefit from wildlife crossing improvements are in the Cascade-Siskiyou Planning area (Figure 5).

In addition to the recent connectivity models and priority wildlife barriers at the state-wide level in both Oregon and California (CDFW 2019a, 2022, ODFW 2022), there are recent connectivity models for specific species and a number of research and monitoring efforts that include wildlife collars on mule deer, elk, pronghorn, bear, wolves and mountain lions in the Cascade-Siskiyou focus area. Collar data can identify

important habitat use patterns, dispersal routes, daily and seasonal movements, and wildlife-vehicle collision hotspots. Documented transboundary movements emphasize the importance of partnering with sister wildlife and transportation agencies in neighboring states to maintain and restore connectivity.

USFWS is working on important landscape connectivity areas in the mid-Klamath Basin (in northern California and southern Oregon) for two species of conservation concern: Pacific marten and Pacific fisher (USFWS 2018, 2019), to identify where connectivity could be significantly improved through restoration or other actions. Both of these species are small forest-dwelling carnivores that have large home ranges and are dependent on late-successional forests. Connectivity models for Pacific fisher (Figure 6) and Pacific marten (Figure 7) developed by Conservation Biology Institute (Spencer et al. 2019) for USFWS identify connectivity conservation priority areas for these species, some of which overlap areas of interest identified at the workshop and are further described below. A participant from USFWS noted they're currently working with Caltrans and the Karuk Tribe to monitor bridges and culverts for these species. Another participant pointed to a recent model for Pacific fisher (Barry et al. 2021) in the Cascade-Siskiyou land bridge that used empirical data (1240 camera traps/74,219 trap nights and 196 detector dog surveys) that overlaps the Spencer et al. (2019) corridors and further supports recovery efforts for this at-risk species.

The Ungulate Migrations of the West effort (Kauffman et al. 2020, 2022ab), a collaboration among federal scientists, university researchers and biologists and analysts from state and tribal agencies, is mapping migrations of mule deer, elk, and pronghorn in support of Secretarial Order 3362, (described in the Land Use & Policy section). Using data from GPS collars, the team has mapped year-round movements of 152 ungulate herds to date, including seasonal migration corridors, stopovers, and winter ranges of herds across the west, in order to identify conservation opportunities and barriers to migration (Kauffman et al. 2020, 2022ab). California integrated telemetry data for several herds (CDFW 2022 in Kauffman et al. 2022ab), including two mule deer herds and two elk herds that overlap the Cascade-Siskiyou focus area, two of which have documented interstate migration corridors between California and Oregon (Figure 8). The Modoc Interstate mule deer herd migrates from a winter range near Clear Lake Reservoir in California north into Oregon for the summer, with some of the herd's winter range and migration corridors spanning Highway 139 in the focus area (CDFW 2022 in Kauffman et al. 2022a), which is a roadkill hotspot (Caltrans 2014, Huijser and Begley 2019, CDFW 2020, 2022). The East Shasta Valley sub-herd of Rocky Mountain elk's winter range occurs mostly on private rangelands in Shasta Valley, migrating to their summer range around Grass Lake, Bull Meadows, and Deer Mountain, with some animals migrating north into Oregon across Route 66 to the west of Upper Klamath Lake or moving eastward, with many documented vehicle collisions between Horsethief Creek and Grass Lake Summit on Highway 97 where a wildlife overcrossing is proposed (CDFW 2022 in Kauffman et al. 2022a, Bell et al. 2022). The Siskiyou mule deer herd migrates from winter ranges around Mount Shasta to summer ranges scattered between the Mount Shasta Wilderness and the Burnt Lava Flow Geological Area, crossing major highways (U.S. Highways 97 and 89) with numerous road mortalities recorded on Highway 97 (CDFW 2022 in Kauffman et al. 2022b). Only a small area of the Egg Lake Rocky Mountain elk sub-herd range occurs in the southeast of the Cascade-Siskiyou focus area. This herd's winter range is primarily around Big Valley Mountains near Egg Lake and extending as far east as Highway 139; they migrate west to private timberlands around the community of McCloud off of Highway 89. Another sub-herd occurs east of Highway 139 near Clear Lake which is likely a barrier between these two elk herds as some elk-vehicle collisions have been documented (CDFW 2022 in Kauffman et al. 2022a). Comparable movement data for deer, elk, and pronghorn herds in the northern and western part of the Cascade-Siskiyou focus area are not yet available or haven't been integrated into the Ungulate Migrations of the West. This report series and associated data from this extensive and ongoing research and monitoring effort is intended to be used for conservation planning across the West.

Figure 6. Pacific Fisher Connectivity Model (Spencer et al. 2019)

Connectivity Conservation Priority Areas, Pacific Fisher

Value
High : 1

Low : 2.98023e-08

Protected Areas Database (USGS 2021)

Conservation Easements & Private Conservation Lands

State Bridges

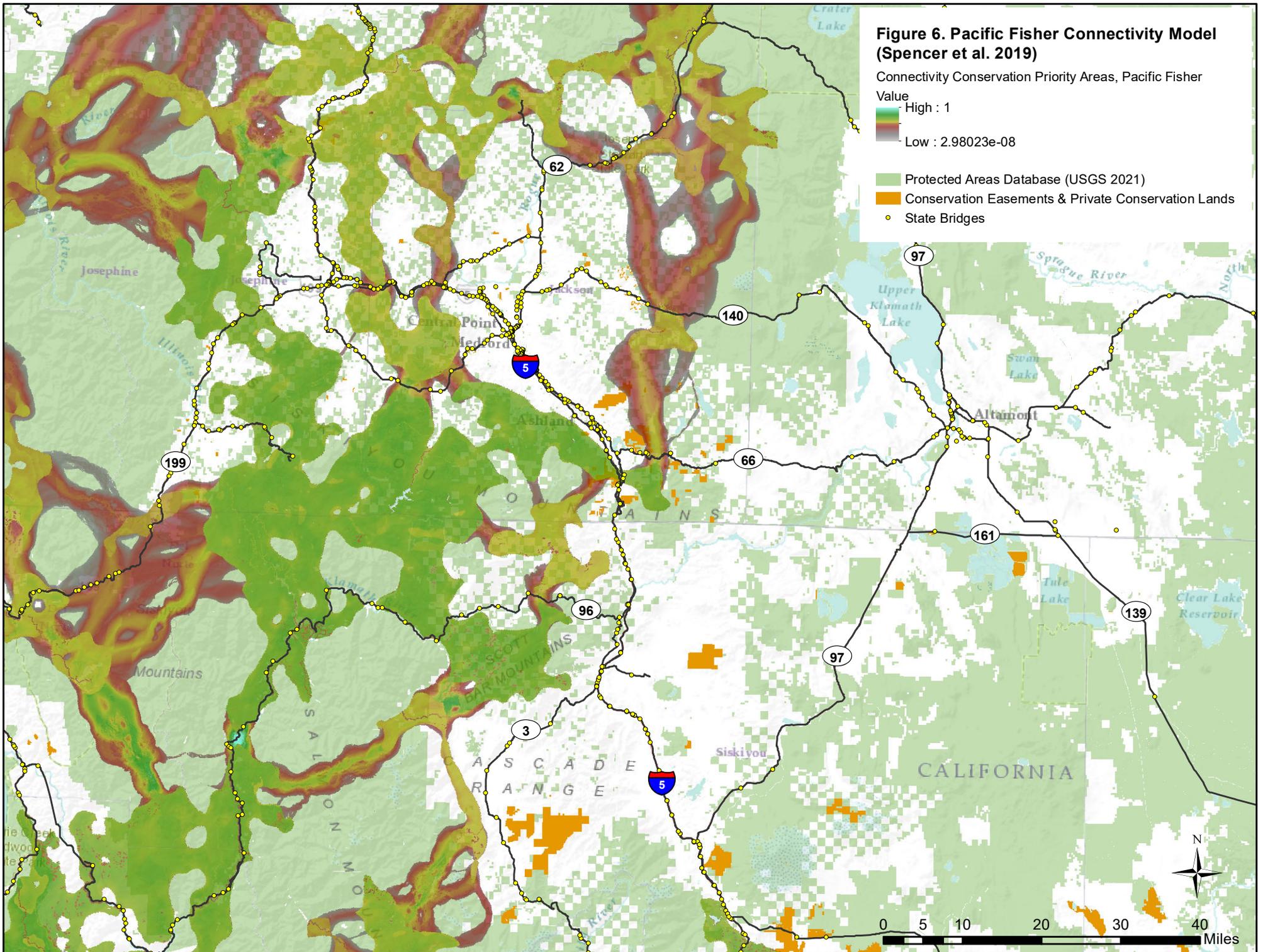
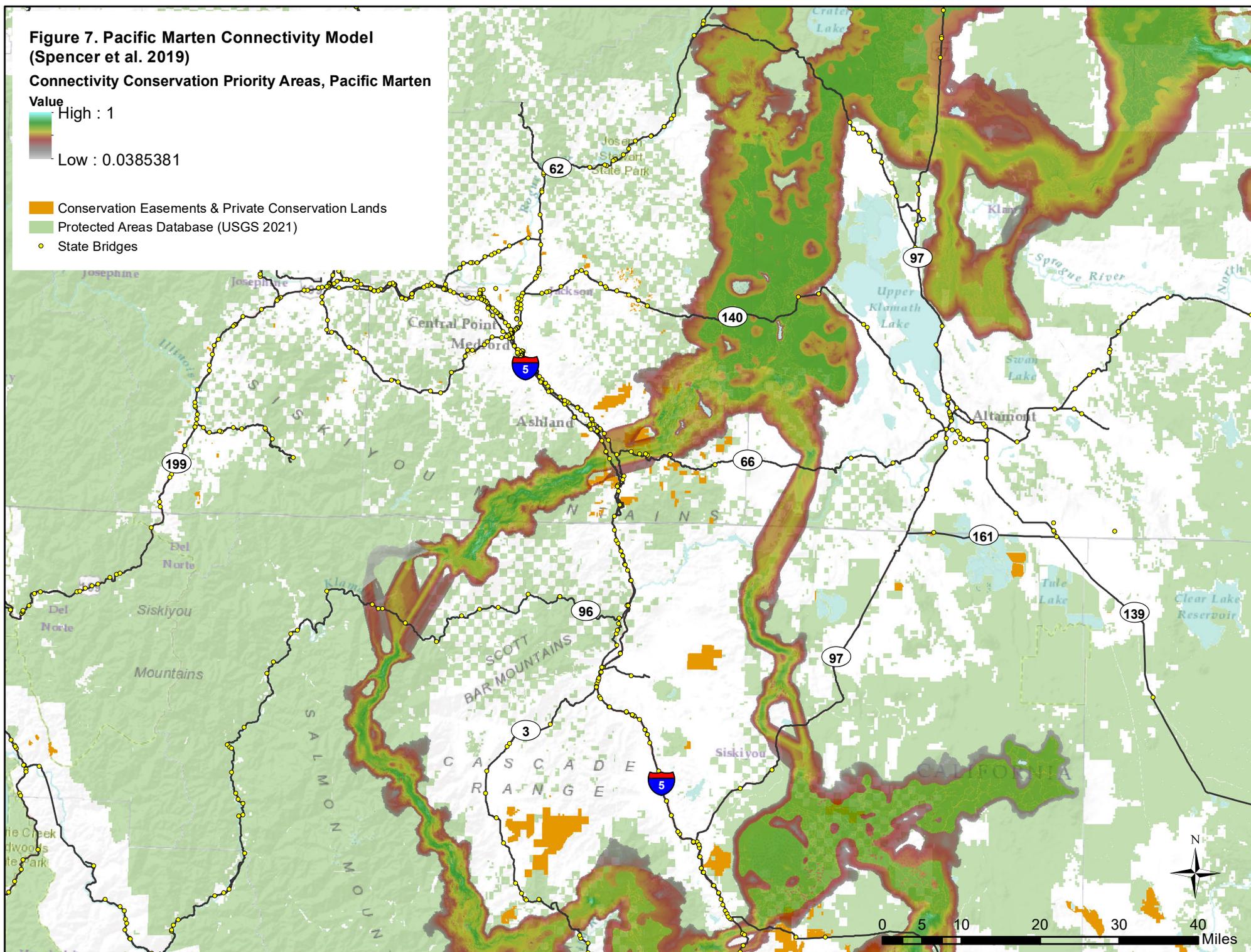


Figure 7. Pacific Marten Connectivity Model
(Spencer et al. 2019)

Connectivity Conservation Priority Areas, Pacific Marten

Value
High : 1
Low : 0.0385381

- Conservation Easements & Private Conservation Lands
- Protected Areas Database (USGS 2021)
- State Bridges



The Siskiyou deer herd was also the focus of another recent study to identify factors that may be contributing to an apparent population decline (Wittmer et al. 2021). The Siskiyou Deer-Mountain Lion Study, a collaboration between CDFW and University of California Santa Cruz, had a number of specific objectives related to the population dynamics of this herd, including investigating carnivore abundance and rates of predation. The study found coyotes and bears to be the most frequent predators of fawns, while mountain lions were the most frequent predators of adults (Wittmer et al. 2021). The study tracked 81 female adult deer with GPS collars between 2015-2020 and 14 mountain lions, including 5 females and 9 males, between 2017-2020 (Wittmer et al. 2021). The deer data was used to identify winter range, stopover sites and migration corridors for the Siskiyou herd in the Ungulate Migrations of the West study described above (CDFW 2022 in Kauffman et al. 2022b). Wittmer et al. (2021) found the mountain lion population in Siskiyou County California connected to southern Oregon, as evidenced by movements of collared individuals including the dispersal of one male (Figure 9). The GPS data from 14 collared mountain lions

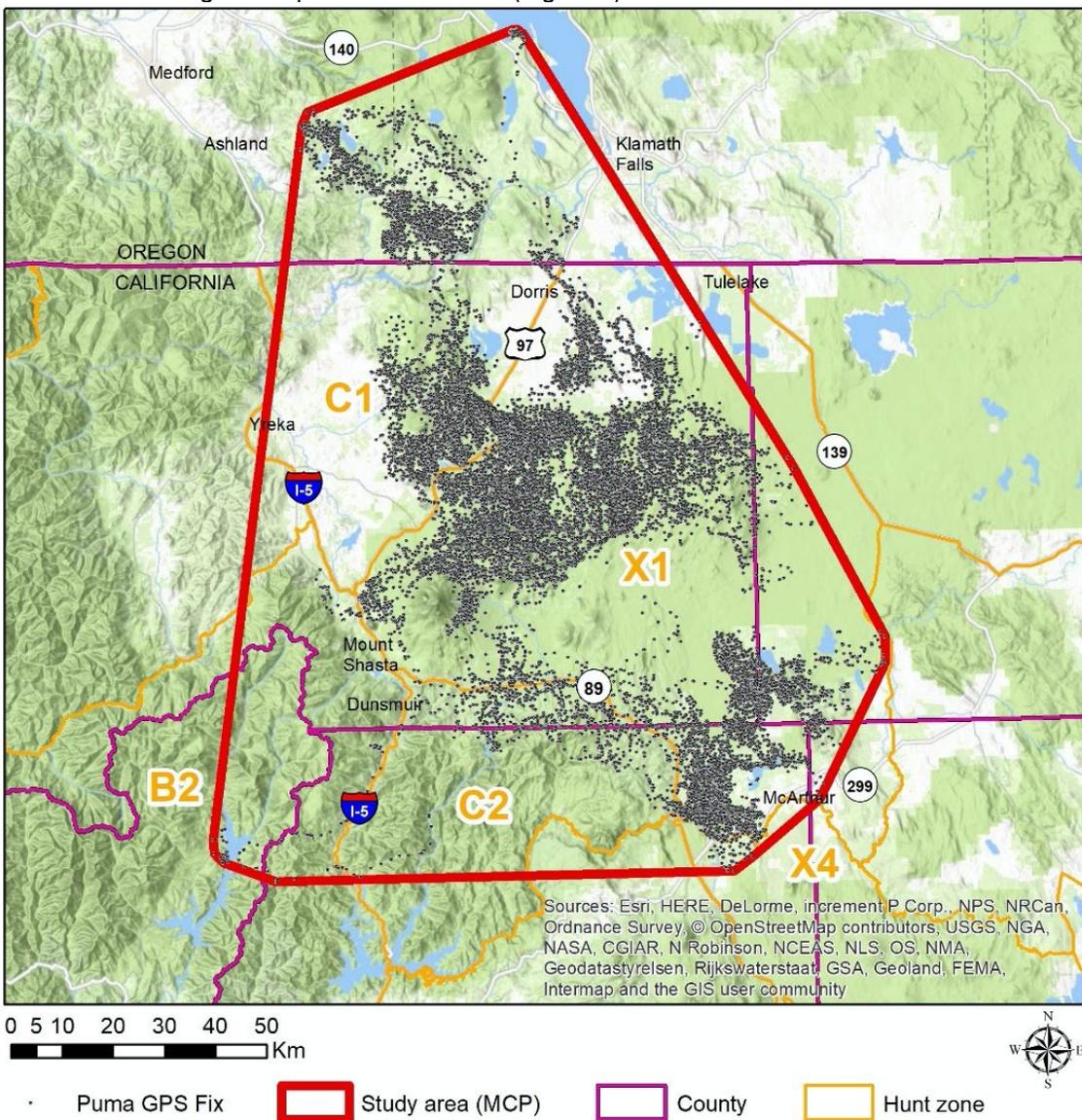


Figure 9. Siskiyou mountain lion study area MCP based on GPS location data from 14 mountain lions monitored between 2017-2020 (from Wittmer et al. 2021).

depicted in Figure 9 (Wittmer et al. 2021) also shows mountain lions crossing several busy highways, including I-5 south of the community of Weed, all along Highway 89, Highway 97 between Grass Lake Summit and Horsethief creek and up near the Oregon border, crossing Highway 66 in Oregon, with some individuals heading into Cascade Siskiyou National Monument near Jenny Creek Wild and Scenic River and making it as far north as Howard Prairie Lake and at least one individual crossing Highway 140 to Upper Klamath Lake.

Participants were asked to describe existing or past research or monitoring efforts, or specific needs or opportunities for research and monitoring related to habitat connectivity or wildlife movement in the region (e.g., species home range and/or movement studies, roadkill monitoring, bridge/culvert monitoring, fish passage assessments). Several Research and Monitoring Areas of Interest were identified (Figure 10), many of which overlap with the priority areas delineated by connectivity planning efforts described above.

Camera Study of I-5 of Potential Crossings between Ashland and California Border (RM01 on Figure 10): A collaborative effort between Southern Oregon University (SOU) and Bureau of Land Management staff at Cascade-Siskiyou National Monument have been monitoring several bridges and culverts on Interstate 5 between Mile Post 0-12 for multiple species (medium to large mammals, plus some small mammals and birds) to support the Southern Oregon Wildlife Crossing Project feasibility study prepared by River Design Group and Samara Group (2022) on behalf of the Southern Oregon Wildlife Crossing Coalition and ODOT to identify priority sites for implementing wildlife crossing infrastructure projects (See Transportation & Infrastructure Section). Species detected at each site monitored are provided in the 2022 feasibility study. There is a need to continue monitoring along I-5, especially during and after construction of crossings. SOU can continue monitoring with student projects on a limited scale with Cascade-Siskiyou National Monument, but there is currently no dedicated funding for this effort. Other partners identified by participants besides those mentioned above include ODFW, USFWS and landowners. Priority Connectivity Areas for both Pacific fisher and marten were identified in this stretch of I-5 by Spencer et al. (2019) in the connectivity models developed for USFWS.

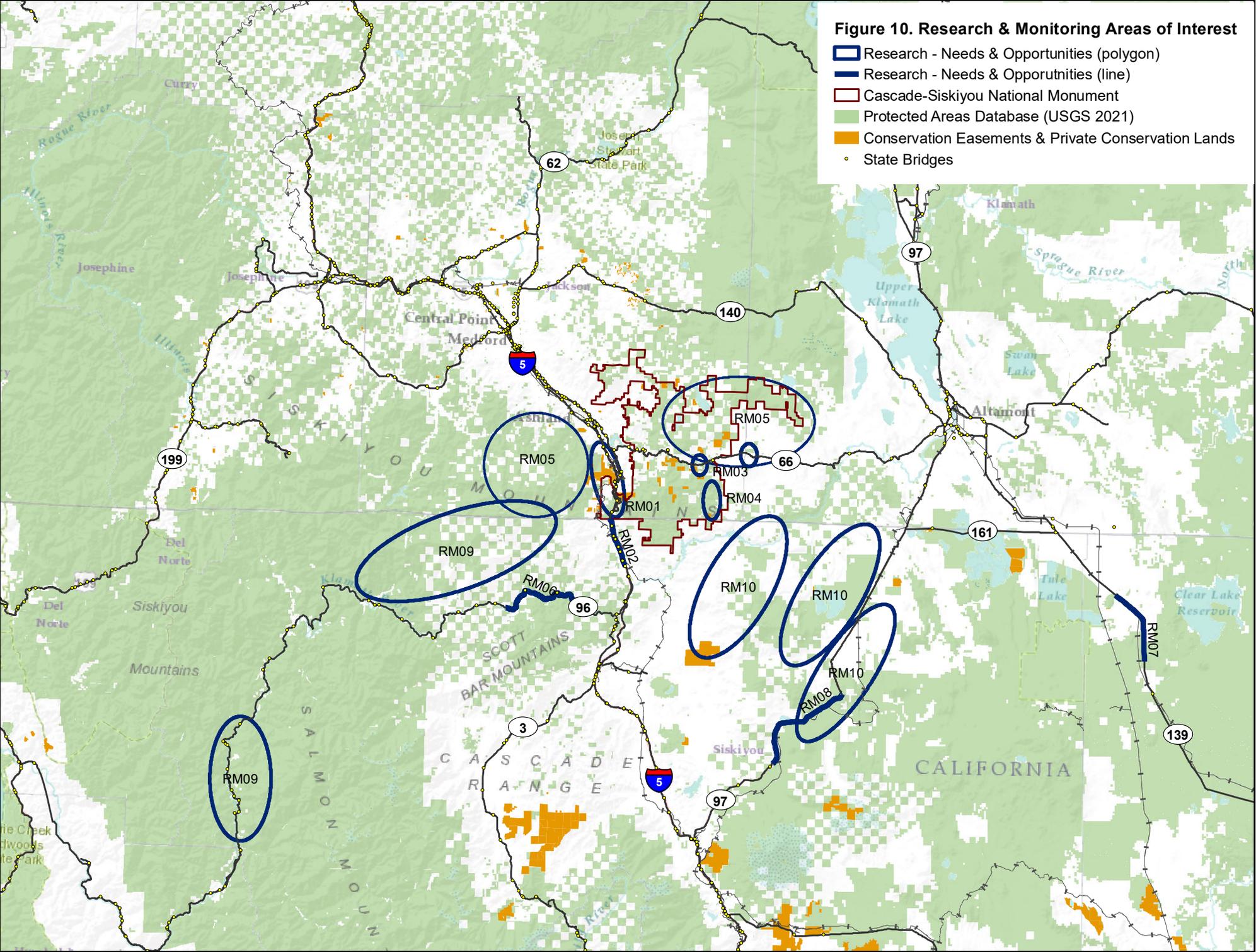
Pacific Forest Trust Mapping Tool (RM-02 on Figure 10): A participant noted that Pacific Forest Trust was funded with a grant from California Wildlife Conservation Board to develop a model/mapping tool for this region that combines spatially explicit climate risk maps with target species habitat. This area is also identified as a Priority Wildlife Barrier for Remediation by CDFW (2020, 2022).

Oregon Spotted Frogs & Pacific Fisher (RM-03 and RM-04 on Figure 10): Two sites were identified that straddle State Route 66 for Oregon spotted frogs and fisher. There is one population of Oregon spotted frogs in the CSNM, but has been in significant decline. Using eDNA, researchers found the next closest population is 12 miles away on the Klamath-Jackson County line. RM04 was also identified as a barrier for Pacific fisher.

Fisher Studies in Ashland Watershed and Cascade Siskiyou National Monument (RM05-A and RM05-B on Figure 10): Historically, fisher was widely distributed in north America and Canada, but now the species is limited to the northwestern part of California and southern Oregon. The east-west trending Siskiyou Mountains form an important connection between coastal and interior north-south ranges. The Rogue River-Siskiyou National Forest is the only forest in Oregon with documented reproduction of the native population of fisher. The USFWS (2014) range-wide status review for the Pacific fisher stated, "The Southern Oregon Cascades Population is relatively close (~25 miles) to the northern California-SW Oregon

Figure 10. Research & Monitoring Areas of Interest

- Research - Needs & Opportunities (polygon)
- Research - Needs & Opportunities (line)
- Cascade-Siskiyou National Monument
- Protected Areas Database (USGS 2021)
- Conservation Easements & Private Conservation Lands
- State Bridges



Population, but is separated by a narrow band of forested habitat and Interstate 5...one male fisher from the N. CA-SW OR population was detected east of I-5 in 2012. Therefore, the OR Cascades and N. CA-SW OR populations may be interconnected by dispersing fishers". A fisher monitoring effort in the Ashland Watershed (RM05-A) between 2010-2016 studied response of fisher to landscape fuel treatments and potential impacts to denning/resting habitat using trap/collar/radio telemetry. The researchers captured 34 individuals and deployed GPS collars on 16 individuals. Average home range for females was 8km²; male home ranges in the breeding season were 60+ km². More than 75 rest sites were located, all in mistletoe brooms in Douglas-fir trees. Of the 15 den sites located, 11 were in cavities in large black oak trees. More fisher telemetry and hair snare work has been conducted east of Interstate 5 (RM05-B) from 2011 to present within and adjacent to the Cascade Siskiyou National Monument, through a collaboration with BLM Klamath and Medford Districts, Oregon State University and the Pacific Northwest Research Station. The goals of this research were to investigate fisher habitat use, den and resting site structure, and conduct population and genetic analyses. The researchers found evidence of extant populations in both the SW Oregon and S Oregon Cascades, and documented breeding between the two populations via DNA analyses of hair surveys. The results of this study provide further validation of the importance of the Cascade-Siskiyou land bridge and justification for improving connectivity across I-5.

Fisher Priority Connectivity Area SR-96 (RM-06 on Figure 10): A fisher connectivity model (Spencer et al. 2019) identified a priority area that crosses State Route 96. The Klamath River meanders along SR-96 in this area and there are a few bridges and culverts in this stretch that should be monitored for fisher movements. Post-fire use of habitat by fisher was also identified as a research need in this area.

Deer and Pronghorn Crossing SR-139 (RM-07 on Figure 10): This stretch of State Route 139 has documented roadkill locations for deer and pronghorn, and the topography in this area is suitable for a wildlife overpass. GPS collar data and roadkill data need to be brought together to define the best location for a crossing. This area is also identified as a Priority Wildlife Barrier for Remediation by CDFW (2020, 2022).

Elk, Mule Deer, Mountain Lion & Marten SR-97 (RM-08 on Figure 10): This stretch of State Route 97 has extensive existing data indicating the need for wildlife crossing infrastructure, including roadkill data from Caltrans District 2, collision data from California Highway Patrol and telemetry data from CDFW. Detailed vegetation mapping of preferred habitat for target species was identified as an additional research need. This area was identified as a Priority Wildlife Barrier for Remediation for target species elk, mule deer, mountain lion (CDFW 2020, 2022). This area was also identified as a Priority Connectivity Area for Pacific marten by Spencer et al. (2019) in the Grass Lake area of SR-97 between Deer Mountain south of the highway and Miller Mountain and Goosenest to the north. This is the same general area where Caltrans is currently constructing a wildlife overpass (See Transportation and Infrastructure Section).

Existing Research & Monitoring Rocky Mountain elk (RMs 09 and 10 on Figure 10): Agency representatives in the Northeastern California Connectivity Symposium (Penrod 2020) conducting elk research identified several Rocky Mountain elk herds that are being monitored in the study area, including unmarked (RM-09) and marked (RM10) herds. In 2020, CDFW captured a number of Rocky Mountain elk in Shasta, Lassen, Modoc, and Siskiyou counties. Each captured elk was tagged and fitted with a GPS collar that was expected to provide data and information for up to five years. The study is intended to help understand how elk use different habitats, their distribution and abundance, survival and recruitment, what types of resources they select, movement behaviors, and causes of mortality. High elk mortality areas have

been identified in the Grass Lake Summit area on SR-97 (see Transportation Infrastructure section), where Caltrans is in the design phase for constructing a wildlife overpass.

Participants were asked, “What are the big picture data gaps in the region that would provide a better understanding of linkage function (e.g., evaluating focal taxa, climate change projections, incorporating refugia concepts, identifying emerging threats)?”

One landscape-scale data gap identified was the need for roadkill surveys of all wildlife species, across taxonomic groups including invertebrates, at the state-wide scale. Oregon’s crash and carcass data comes from ODOT maintenance crews removing carcasses, which are almost exclusively deer, elk, bear and cougars. In California, Caltrans only has consistent state-wide data from crash and carcass data for deer. It was noted that existing community science crowd-sourcing applications are available in California, Idaho and Montana for recording roadkill. Neither Caltrans, nor the state, currently have a system in place for the public to submit roadkill data. It was noted that UC Davis hosts the California Roadkill Observation System (CROS) <https://www.wildlifecrossing.net/california/>, which is a publicly available tool hosted by UC Davis that collects and maps photographs and observations of roadkill along California’s roads and highways. However, it was also noted that the CROS data is not effectively shared, particularly with state agencies like Caltrans, but also with other research institutions and conservation organizations.

Another specific research and monitoring need identified was for research on thermal and hydrological flow tolerances for aquatic species (amphibians) to help delineate climate refugia and plan for aquatic connectivity. It was noted that there are thermal records for salmonids but not for amphibians and other aquatic species. A few of the potential target species identified include foothill yellow-legged frog, Oregon spotted frog, torrent salamander, and Siskiyou Mountain salamander. Potential research partners include ODFW, CDFW, USFS, BLM and universities. Potential funding sources identified for this research need include NFWF, NOAA and NASA.

Recommendations Related to Research & Monitoring:

Centralized Roadkill Database: Research and field staff from Departments of Fish and Wildlife and Transportation in both Oregon and California should be encouraged to record roadkill using standardized methods to a central spatial database that can be used as a scoping tool by DOT biologists and planners to identify potential high value areas for connectivity and public safety and flag these areas for study as part of any planned or programmed transportation improvement projects.

Centralized Wildlife Movement Database: Compile central database of wildlife movement data (collar data, camera trap data, etc) by taxonomic group and species.

Centralized Wildlife Crossing Database: Compile central database of wildlife crossing infrastructure improvements that have been completed, including dedicated wildlife crossings (e.g., bridge, culvert, overpass) and associated infrastructure (e.g., directional fencing, jumpouts), as well as existing structures that have been documented through research to facilitate wildlife movement.

Integrate Ungulate GPS Collar Data into Ungulate Migrations of the West Initiative: Collect all GPS collar data for migrating ungulates in each state. California has already integrated data for several herds and should continue to add data for additional herds in subsequent volumes. Oregon should do the same.

Partner with Agencies: California and Oregon Departments of Fish and Wildlife and Transportation all have research divisions that can partner with other researchers to answer questions on wildlife interactions with roadways. University, non-profit, and tribal researchers can assist states with meeting their research needs, including helping find other partners who might match those resources, whether they're private foundations, other state agencies, or federal agencies.

7. Land Use & Policy

Land use planning and regulatory policies are important tools for maintaining and restoring connectivity. Numerous supportive policies are already in place. Federal, state and local planning processes (e.g., resource management plans, general plans, transportation plans) provide opportunities to insert and formalize policies for conserving connectivity. Similarly, ongoing revisions to existing plans and policies present opportunities to revise designations that are inconsistent with conserving connectivity (e.g., critical linkages zoned for urban land uses). Participation in public planning processes is key to enacting and enforcing policies that can maintain, restore and enhance ecological connectivity.

Ecological connectivity has been receiving increased attention from policymakers at federal, tribal, regional, and state levels of government, who are using a suite of policy tools—including statutory mandates, legislative guidance and non-binding resolutions, regulations, land use planning requirements, mechanisms for interagency coordination, public grants, and financial incentives for private landowners—to restore, maintain, and/or enhance connectivity. The Center for Large Landscape Conservation's [Ecological Policy Compendium Series](#) highlights the most significant federal and state policies that have been enacted since 2007 to support connectivity conservation. Below we highlight recent federal and state policies enacted in Oregon and California, as well as key federal laws that apply to federal land management in the planning area, since the majority of protected land in the study area is administered by USFS and BLM.

Federal Legislation Related to Habitat Connectivity and Wildlife Movement

Guidance for Federal Departments and Agencies on Ecological Connectivity and Wildlife Corridors

On March 21st, 2023, the Biden Administration released a new 11 page memo that establishes a policy “for Federal agencies to promote greater connectivity across terrestrial, marine, and freshwater habitats, as well as across airspaces, to sustain the tremendous biodiversity that exists in the U.S. and enable wildlife to adapt to fluctuating environmental conditions, including those caused by climate change. To the maximum extent practicable, Federal agencies are expected to advance the objectives of this guidance by developing policies, through regulations, guidance, or other means, to consider how to conserve, enhance, protect, and restore corridors and connectivity during planning and decision-making, and to encourage collaborative processes across management and ownership boundaries on.” <https://www.whitehouse.gov/wp-content/uploads/2023/03/230318-Corridors-connectivity-guidance-memo-final-draft-formatted.pdf>

Infrastructure Investment and Jobs Act, U.S. Public Law 117-58, passed with bipartisan support and was signed into law by President Biden November 15, 2021. This huge infrastructure package specifically calls out wildlife crossings and habitat connectivity and allocates funding for improving infrastructure to support wildlife movement. The budget also addresses surface transportation, programmatic infrastructure investments, project level investments, planning and asset management, federal and tribal lands, and

several other provisions. [Section 1310, Wildlife Crossings Program](#) under project level investments would provide a competitive wildlife crossing grant program specifically to reduce wildlife-vehicle collisions and improve habitat connectivity for terrestrial and aquatic species. The program funds planning, engineering and design, construction, acquisition, research on wildlife-vehicle collisions, integration of wildlife conservation and transportation plans, and education and outreach. [Text - H.R.3684 - 117th Congress \(2021-2022\): INVEST in America Act | Congress.gov | Library of Congress](#).

Conserving and Restoring America the Beautiful: A Preliminary Report Submitted to the National Climate Task Force (May 6, 2021); signed by U.S. Department of Interior Secretary Deb Haaland, U.S. Department of Agriculture Secretary Thomas Vilsack, U.S. Department of Commerce Secretary Gina Raimondo, and Council on Environmental Quality Chair, Brenda Mallory. Described as a “first step toward developing a national conservation effort that reflects the President’s ambition” of conserving at least 30 percent of U.S. lands and waters by 2030 [as directed in Conserving Our Nation’s Lands and Waters (Section 216) of Executive Order 14008: Tackling the Climate Crisis at Home and Abroad (signed by President Biden on Jan 21, 2021)], this Report articulates eight principles and six “recommended areas of early focus...intended to forge common purpose, support voluntary approaches to conservation, and reflect early inputs and ideas that elected officials, Tribal leaders, and stakeholders have lifted up as opportunities for successful collaboration.” Under the theme of “Expand Collaborative Conservation of Fish and Wildlife Habitats,” the Report states that “...agencies can work with States, Tribes, local communities, and private landowners to establish and expand upon promising initiatives to conserve and restore wildlife migration corridors.” These include “a promising effort to enhance winter range and migration corridor habitat of elk, deer and pronghorn on DOI [Department of Interior] lands,” launched under the Trump Administration (SO3362), that “could be expanded to include other land managers, to build partnerships with working ranches and other landowners, and to conserve corridors and seasonal ranges for other species.” Further, the [USFW] “should expand conservation efforts already identified through partnerships with external stakeholders, including fish passage projects in the National Fish Habitat Action Plan, conservation of at-risk species identified in State Wildlife Action Plans, and bird habitat conservation through the Migratory Bird Joint Ventures.”

Bureau of Land Management Released a Policy to Support Habitat Connectivity on Public Lands (November 15, 2022). This policy, in the form of an Instructional Memorandum, calls for BLM state offices to assess areas of habitat connectivity and conduct planning, on-the-ground management actions, and conservation and restoration efforts to ensure those areas remain intact and healthy, and able to support diverse wildlife and plant populations. BLM’s implementation of the policy will include extensive consultations and collaborations with states, Tribes, and diverse stakeholders, to ensure this effort includes the use of best available science, traditional ecological knowledge, shared conservation goals, and adherence to the BLM’s multiple-use mandate. This policy, which was enacted to advance the America the Beautiful Initiative, directs BLM to incorporate into its planning and decision making the need to maintain the ability of fish and wildlife to move and migrate across landscapes and seasonal habitats.

Indigenous Knowledge Guidance for Federal Agencies: On November 30, 2022, the White House Council on Environmental Quality and the White House Office of Science and Technology Policy jointly released new government-wide guidance and an accompanying [implementation memorandum](#) for federal agencies on recognizing and including Indigenous Knowledge in federal research, policy, and decision making. In addition, on the same day the [Biden-Harris Administration Announced New Steps to Strengthen Tribal Co-Stewardship of Public Lands and Waters](#) during the White House Tribal Nations Summit. Since Secretary Deb Haaland and Secretary Tom Vilsack signed Joint Secretary’s Order 3403 in 2021 committing

to Tribal and federal co-stewardship of federal lands, waters and wildlife, the Interior Department and USFS have signed over 20 new co-stewardship agreements with Tribes, Alaska Native Corporations and consortiums, with more than 60 additional agreements under various stages of review. The new steps announced and ongoing efforts like this help advance the [America the Beautiful initiative](#), supporting Tribally led priorities to conserve, connect and restore lands and waters.

Native American Fish and Wildlife Society (NAFWS) Resolution 19-002: Support for the Protection of Wildlife Corridors (May 23, 2019); *signed by NAFWS President David Reiter*. The Resolution supports the Wildlife Corridors Conservation Act and “the inclusion of Tribes in such legislation and that it provides resources to assist Tribes with their wildlife and habitat connectivity efforts on tribal lands.” It further calls upon the “Interior Department to make Secretarial Order 3362 [see entry below, 2019] inclusive of the nation’s federally-recognized Tribes.” Finally, the Resolution supports collaborative efforts amongst Tribal, state, federal and private land managers to protect wildlife corridors and other habitat connectivity needs across large landscapes on and off Tribal lands.”

Department of the Interior Secretarial Order (SO) 3362: Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors (February 9, 2019); *signed by USDI Secretary Ryan Zinke*. SO 3362 directs appropriate agencies within the Department of the Interior (DOI), which include the Bureau of Land Management, U.S. Fish and Wildlife Service, National Park Service, and U.S. Geological Survey, to “work in close partnership with the states of Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming to enhance and improve the quality of big-game winter range and migration corridor habitat on federal lands....” The DOI agencies are to “[a]ssess state wildlife agency data regarding wildlife migrations early in the planning process for land use plans and significant project-level actions that bureaus develop,” and to “[e]valuate and appropriately apply site-specific management activities, as identified in state land use plans, [or] site-specific plans...that conserve or restore habitat necessary to sustain local and regional big-game populations.” The Order describes “minimizing development that would fragment winter range and primary migration corridors,” as one of several potential measures to conserve or restore habitat.

Department of Interior (DOI). Departmental Manual, Part 523 Chapter 1: Climate Change Policy (523 DM 1) (December 20, 2012). The Office of Policy Analysis amended DOI’s Manual to state “The Department will integrate climate change adaptation strategies into its policies, planning, programs, and operations,” and offer a list of 11 policies, among which “[c]onsistent with existing laws and regulations, it is the Department’s policy to:

- Promote landscape-scale, ecosystem-based management approaches to enhance the resilience and sustainability of linked human and natural systems
- Advance approaches to managing linked human and natural systems that help mitigate the impacts of climate change, including:
 - a. Protect diversity of habitat, communities and species;
 - b. Protect and restore core, unfragmented habitat areas and the key habitat linkages among them;
 - c. Anticipate and prepare for shifting wildlife movement patterns;
 - d. Maintain key ecosystem services;
 - e. Monitor, prevent, and slow the spread of invasive species (defined in Executive Order 13112 as alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health); and
 - f. Focus development activities in ecologically disturbed areas when possible, and avoid

ecologically sensitive landscapes, culturally sensitive areas, and crucial wildlife corridors.”

U.S. Forest Service. Final Rule. National Forest Land Management Planning System (36 CFR Part 219) (April 9, 2012). This Final Rule “sets forth process and content requirements to guide the development, amendment, and revision of land management plans to maintain and restore [National Forest System] land and water ecosystems while providing for ecosystem services and multiple uses.” Affecting 155 national forests, 20 grasslands, and one prairie, the rule states: “Ecosystem Integrity. The plan must include plan components [*sic*], including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including structure, function, composition, and connectivity, taking into account: (i) Interdependence of terrestrial and aquatic ecosystems in the plan area. (ii) Contributions of the plan area to ecological conditions within the broader landscape influenced by the plan area. (iii) Conditions in the broader landscape that may influence the sustainability of resources and ecosystems within the plan area. (iv) System drivers, including dominant ecological processes, disturbance regimes, and stressors, such as natural succession, wildland fire, invasive species, and climate change; and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change. (v) Wildland fire and opportunities to restore fire adapted ecosystems. (vi) Opportunities for landscape scale restoration.”

The Rule defines connectivity as “[e]cological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change.”

PENDING: Recovering America’s Wildlife Act (H.R.2773/S. 2372) sponsored by Representatives Dingell (D-MI) and Fortenberry (R-NE) was introduced in April 2021. The strongly bipartisan Act would provide \$1.3 billion annually from the general fund of the treasury each fiscal year to a competitive grant program administered by state fish and wildlife departments to fund “techniques, tools, strategies, or collaborative partnerships that accelerate, expand, or replicate effective and measurable recovery efforts for species of greatest conservation need and species listed under the Endangered Species Act of 1973 (15 U.S.C. 1531 et seq.) and the habitats of such species.” The Act would also provide \$97.5 million annually to Indian Tribes for proactive conservation actions to restore Tribal species of greatest conservation need and to secure those species before listing is warranted under the Endangered Species Act. The fund would support Wildlife Conservation Strategies, habitat conservation, restoration, conservation education, wildlife associated recreation, invasive species control, and law enforcement related to protecting listed and candidate species and their habitats. The latest action was on 6/15/2022; it was received in the Senate; read twice and placed on the Senate Legislative Calendar under General Orders [H.R.2773 - 117th Congress \(2021-2022\): Recovering America’s Wildlife Act of 2021 | Congress.gov | Library of Congress](#).

Oregon Legislation Related to Habitat Connectivity and Wildlife Movement

Oregon: HB 2834. An Act Relating to Wildlife Corridors (June 7, 2019); *signed by Governor Kate Brown*. The Act recognizes that “biodiversity and habitat connectivity play a vital role in Oregon’s economy” and “in addition to other benefits, wildlife corridors provide ecosystem services such as pollination, air and water purification, carbon sequestration and disturbance prevention,” such that “formally designating and

protecting wildlife corridors is a crucial strategy for bolstering Oregon’s ecosystem resiliency and for ensuring the long-term viability of wildlife population[s] and communities.”

The Act requires the ODFW to “develop a plan, to be known as the Wildlife Corridor Action Plan, to preserve long-term habitat connectivity for wildlife in Oregon. The plan shall provide guidance for all state agencies to develop benchmarks for the designation and protection of wildlife corridors....” The Plan is to include “[a] list of areas for which designation of wildlife corridors, land acquisition or other agency actions are of high priority to protect wildlife movement or habitat connectivity,” as defined by ORS 496.004 and be updated every 5 years. The Department of Transportation is to establish a program in concert with the Plan to reduce wildlife-vehicle collisions where identified corridors “intersect with proposed or existing public roads.” This program shall be established no later than Dec. 31, 2023, with the first report regarding the status and effects of infrastructure projects due to the legislature no later than Sept. 15, 2022.

Oregon Department of Motor Vehicles. Watch for Wildlife License Plate (June 2019). The Oregon Department of Motor Vehicles (DMV) authorized a new Watch for Wildlife license plate to support wildlife crossings and habitat connectivity projects in conjunction with Oregon Wildlife Foundation. In accordance with DMV policy, plates are to be issued once an initial 3000 are sold, with additional startup costs provided by the Foundation. Funds collected from the plate are to support efforts for safe migration as determined by the Foundation.

PENDING: Safe Passage for People and Wildlife (House Bill 2999) Representative Ken Helm recently introduced a new bill that would allocate another \$5 million to wildlife crossings in the new Oregon Legislative session. House Bill 2999 strengthens the Oregon Department of Transportation wildlife-vehicle collision program and invests \$5 million in the Oregon Department of Fish & Wildlife’s efforts to support wildlife mobility and habitat connectivity. The bill’s hearing in Rep. Helm’s Agriculture, Land Use, Natural Resources, and Water Committee was held February 9, 2023.

PENDING: Recovering Oregon’s Wildlife Fund (House Bill 3159) Representative Ken Helm recently introduced a new bill that would dedicate funding through an increase to the state transient lodging tax to implement the Oregon Conservation and Nearshore Strategy which includes a section on habitat connectivity.

California Legislation Related to Habitat Connectivity and Wildlife Movement

Over the past few decades, California has increasingly recognized the importance of identifying, maintaining, and restoring wildlife movement corridors, habitat linkages and landscape connectivity with statutory authority and legislative intent found in California Fish and Game Code Sections 1797, 1850, 1851, 1852, 1930, 1930.5, 1931, 1932, 1932.5, 2053, 2055, 2780, 2787, 2789, 2820; Public Resources Code Sections 29705, 32510, 33105.5, 33204.4, 37015, 71154, 75055, 80076, 80130, 80132; and Street and Highways Code Sections 800 and 2704.09. Older policies that protect working rangelands, such as the Land Conservation Act of 1965, better known as the Williamson Act (Government Code Section 51243) also provide significant connectivity value. Recent legislation pertaining to connectivity in California includes:

California Safe Roads and Wildlife Protection Act (AB 2344) signed into law September 30, 2022 by Governor Newsom, takes a comprehensive approach to addressing ecosystem connectivity from a transportation perspective and has four main components:

- Caltrans, must consult with CDFW to identify ecological “connectivity areas” throughout the state highway system where the construction of wildlife crossing structures would reduce wildlife-vehicle collisions or enhance wildlife habitat connectivity. These areas, along with an inventory of transportation projects that include wildlife passage features, must be identified by July 2024 and updated every two years.
- For any major transportation project that falls within an identified connectivity area, Caltrans will consult with CDFW to identify ways to maintain or restore habitat connectivity. This may include the use of compensatory mitigation credits to improve connectivity as part of a construction project, if CDFW concurs.
- Caltrans will develop a list of connectivity-related projects as well as guidelines for implementation by hosting, in part, one or more public workshops. This step, in addition to other implementation steps for the law, will become part of a new Transportation Wildlife Connectivity Remediation Program.
- Finally, the law requires Caltrans to update appropriate design guidance, including the Highway Design Manual, by July 1, 2025, to incorporate design concepts for wildlife crossings and related standardized plans and specifications. This manual serves as a critical guide for how the state approaches the design of almost every component of transportation infrastructure.

The California Legislature appropriated \$118 million to the state’s Wildlife Corridor and Fish Passage Program and other connectivity initiatives in its fiscal year 2022 budget, providing the funding capacity to begin implementing the Safe Roads and Wildlife Protection Act.

California’s Nature Based Solutions Executive Order No. N-82-20 declared that “it is the goal of the state to conserve at least 30 percent of California’s land and coastal waters by 2030 in a manner that protects and restores biodiversity, enables enduring conservation measures on a broad range of landscapes, builds climate resilience, reduces risk from extreme climate events, and contributes to the state’s efforts to combat climate change. Wildlife connectivity contributes to the preservation and restoration of biodiversity by ensuring that wildlife has the opportunity to move through the landscape to forage, find mates and reproduce, seek shelter from stochastic events like flooding or wildfires, and adapt to the impacts of climate change”. The recently released **Pathways to 30 x 30 California: Accelerating Conservation of California’s Nature** (California Natural Resources Agency 2022a; [30x30 | California Nature](#)) reinforces the state’s commitment to conserving connectivity. The plan identifies several conservation priorities to protect and restore biodiversity, including two that are specific to connectivity (1) *Protect areas that are adjacent or linked to existing conserved areas to support large, interconnected watersheds and seascapes*; and (2) *Ensure conservation and restoration of river corridors that are essential to fish and wildlife movement and that serve as climate refugia for native species*. Appendix B, Near-Term Actions to Jumpstart 30 x 30 includes several priority actions focused on connectivity, such as:

- *Strategically coordinate acquisitions to increase connectivity between conserved or restored habitats to provide wildlife corridors.*
- *Implement watershed-scale restoration projects that connect land and coastal water habitats; fish and wildlife corridors to connect already conserved landscapes and waterways.*
- *Execute regional advance mitigation projects between Caltrans, CDFW, and others for transportation modernization projects that create co-benefits for wildlife connectivity and species climate resiliency.*

Pathways to 30 x 30 California’s Appendix F highlights several existing conservation planning efforts specifically focused on improving wildlife connectivity in the state. The 2021–2022 California Budget Act

includes several funding streams to advance 30x30, including \$105 million dedicated for wildlife corridors and fish passage projects.

California Wildlife Connectivity Actions; Compensatory Mitigation Credits (SB 790) was signed into law by Governor Newsom September 28, 2021. This bill requires CDFW to work with Caltrans to provide compensatory mitigation credits to transportation improvement projects on the state highway system that integrate improvements for fish and terrestrial wildlife passage to improve local and regional habitat connectivity, and other environmental improvements. In order to determine the value of compensatory mitigation credits, the Department of Fish and Wildlife “may consider all of the following: (1) The measurable improvement to habitat connectivity and wildlife migration, including improving the ability of wildlife to safely cross built infrastructure, such as roads, that inhibit such connectivity or migration. (2) The value of the habitat connected by the wildlife connectivity action. (3) Benefits to affected species, including... improved genetic diversity and breeding opportunities, removed migration barriers, and improved access to additional latitudes and altitudes of potentially suitable habitat to adapt to climate change. (4) Improved connectivity in critical terrestrial habitat linkages. (5) The use or value of the particular location in improving connectivity and migration, including...topography, watercourse presence, vegetative cover, mortality data, or other factors that increase the likelihood of use, or value of, a particular location for connectivity or migration.” [SB-790 Wildlife connectivity actions: compensatory mitigation credits. \(ca.gov\)](https://leginfo.ca.gov/pub/07_01_2018/bills_0001_0100_0100.html).

California: AB 149. An Act Relating to Transportation (July 16, 2021); *signed by Governor Gavin Newsom*. The Act authorizes the Wildlife Conservation Board to “name a non-vehicular wildlife crossing if at least 25 percent of the funding to construct the crossing derives from a state source.” In doing so, “[t]he Wildlife Conservation Board shall consult with the Department of Transportation or other appropriate entities on the design of lettering and placement of any sign that displays the name of a non-vehicular wildlife crossing.” The Act also stipulates that “the Wildlife Conservation Board may adopt criteria for the implementation [of the related sections in the bill].”

California: AB 2087. Regional Conservation Investment Strategies (September 22, 2016); *signed by Governor Jerry Brown*. The Act creates the state’s Regional Conservation Investment Strategy (RCIS) Program “to inform science-based nonbinding and voluntary conservation actions and habitat enhancement actions that would advance the conservation of focal species, including the ecological processes, natural communities, and habitat connectivity upon which those focal species depend.” A RCIS assessment can be created by any public agency to establish species-level biological goals, objectives and actions, such as land protection, habitat restoration, installation of wildlife crossings, or fish passage barrier removal. Once approved by the CDFW, a RCIS can serve as the basis for a Mitigation Credit Agreement, under which additional entities can gain transferrable mitigation credits based on implementation of conservation or habitat enhancement actions.

California: AB 498. An Act to Amend Sections 1797.5, 1930, and 1930.5 of the Fish and Game Code, Relating to Fish and Wildlife (October 8, 2015); *signed by Governor Jerry Brown*. This Act states: “It is the intent of the Legislature that the Wildlife Conservation Board use various funds to work with the department [of Fish and Game] to complete a statewide analysis of wildlife corridors and connectivity to support conservation planning and climate change adaptation activities.” Moreover, “[I]t is the policy of the state to promote the voluntary protection of wildlife corridors and habitat strongholds in order to enhance the resiliency of wildlife and their habitats to climate change, protect biodiversity, and allow for the migration

and movement of species by providing connectivity between habitat lands. In order to further these goals, it is the policy of the state to encourage, wherever feasible and practicable, voluntary steps to protect the functioning of wildlife corridors through various means, as applicable and to the extent feasible and practicable, those means may include, but are not limited to:

- a. Acquisition or protection of wildlife corridors as open space through conservation easements.
- b. Installing of wildlife-friendly or directional fencing.
- c. Siting of mitigation and conservation banks in areas that provide habitat connectivity for affected fish and wildlife resources.
- d. Provision of roadway undercrossings, overpasses, oversized culverts, or bridges to allow for fish passage and the movement of wildlife between habitat areas.”

Other Regulations: Participants were asked to identify regulatory drivers that could influence connectivity conservation and stewardship. Habitat Conservation Plans, Natural Community Conservation Plans, and advance mitigation programs all entail regulatory processes that can result in land conservation through permanent protection and/or improved management. California and Oregon both have Forest Practices Acts that regulate timber harvests, which were updated in 2022 and include provisions for stream buffers to protect fish and amphibian habitat, design standards for roads, and restrictions on logging on steep slopes, among other things. The regulatory environmental compliance process through federal and state laws, like the California Environmental Quality Act and the National Environmental Policy Act, influence agencies, developers and landowners to make better decisions when it comes to conserving connectivity.

Participants identified designated critical habitat for Northern spotted owl (USFWS 2008) as another regulatory driver that can help ensure landscape connectivity and stewardship in the focus area. This species depends on mature and old-growth forests for nesting, roosting, and foraging, and is considered an indicator species of forest ecosystem health. The NWFP Record of Decision (Interagency SEIS Team 1994) required USFS and BLM to apply the Standards and Guidelines for Management of Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl. Northern spotted owls are listed as threatened under the federal and California Endangered Species Acts (USFWS 1990, USFWS 2008, USFWS 2011, USFWS 2021). Habitat loss and fragmentation have contributed to the decline of Northern spotted owl populations throughout the species’ range. Extensive critical habitat has been designated for the recovery and persistence of the northern spotted owl within and adjacent to the Cascade-Siskiyou focus area (Figure 11).

The northern spotted owl is one of several federally listed species with designated critical habitat in the Cascade-Siskiyou focus area (Figure 11). Other federally listed species with designated critical habitat in the focus area include bull trout (USFWS 2005), Cook’s Lomatium and large-flowered woolly meadowfoam (USFWS 2010), Lost River sucker and shortnose sucker (USFWS 2012), marbled murrelet (USFWS 2016b), Oregon spotted frog (USFWS 2016c), coho salmon (NOAA 2008) and vernal pool fairy shrimp (USFWS 2006). All federally and state listed species, including those without designated critical habitat, must be addressed as part of the environmental review process for any proposed action that may adversely affect these species or their habitat.

Land Use Planning Context

The Cascade-Siskiyou focus area is complicated jurisdictionally. This landscape includes vast unincorporated lands in Josephine, Jackson and Klamath Counties in Oregon, and Del Norte and Siskiyou Counties in California; as well as several towns and cities, with the largest being Grants Pass, Medford, Ashland, and Klamath Falls in Oregon, and Yreka and Weed in California. The planning area also overlaps

the ancestral homelands of the Klamath, Shasta, Takelma, Latgawa, Modoc, Yahooskin-Paiute, Tolowa, Karuk and Yurok peoples. There are extensive protected lands in the focus area (Figure 12) with the majority administered by the USFS and BLM. National Forests in the focus area include all or parts of the Rogue River-Siskiyou, Klamath, Six Rivers, Fremont-Winema, and Modoc NFs. The BLM also administers extensive (often checkerboarded) lands, mostly in Oregon, as well as the Cascade-Siskiyou National Monument. There are numerous designated Wilderness Areas and Wild and Scenic Rivers, as well as extensive Inventoried Roadless Areas covered by the 2001 Roadless Area Conservation Rule that prohibits roadbuilding. The National Park Service, USFWS, and various state agencies also administer considerable land here. In addition, there are extensive easements and private conservation lands, particularly in and around Cascade-Siskiyou National Monument. The Pacific Crest Trail winds through many of these land designations, providing an iconic social connection to the land. Workshop participants identified several land use and policy needs and opportunities in the Cascade-Siskiyou focus area that may provide opportunities for conserving connectivity.

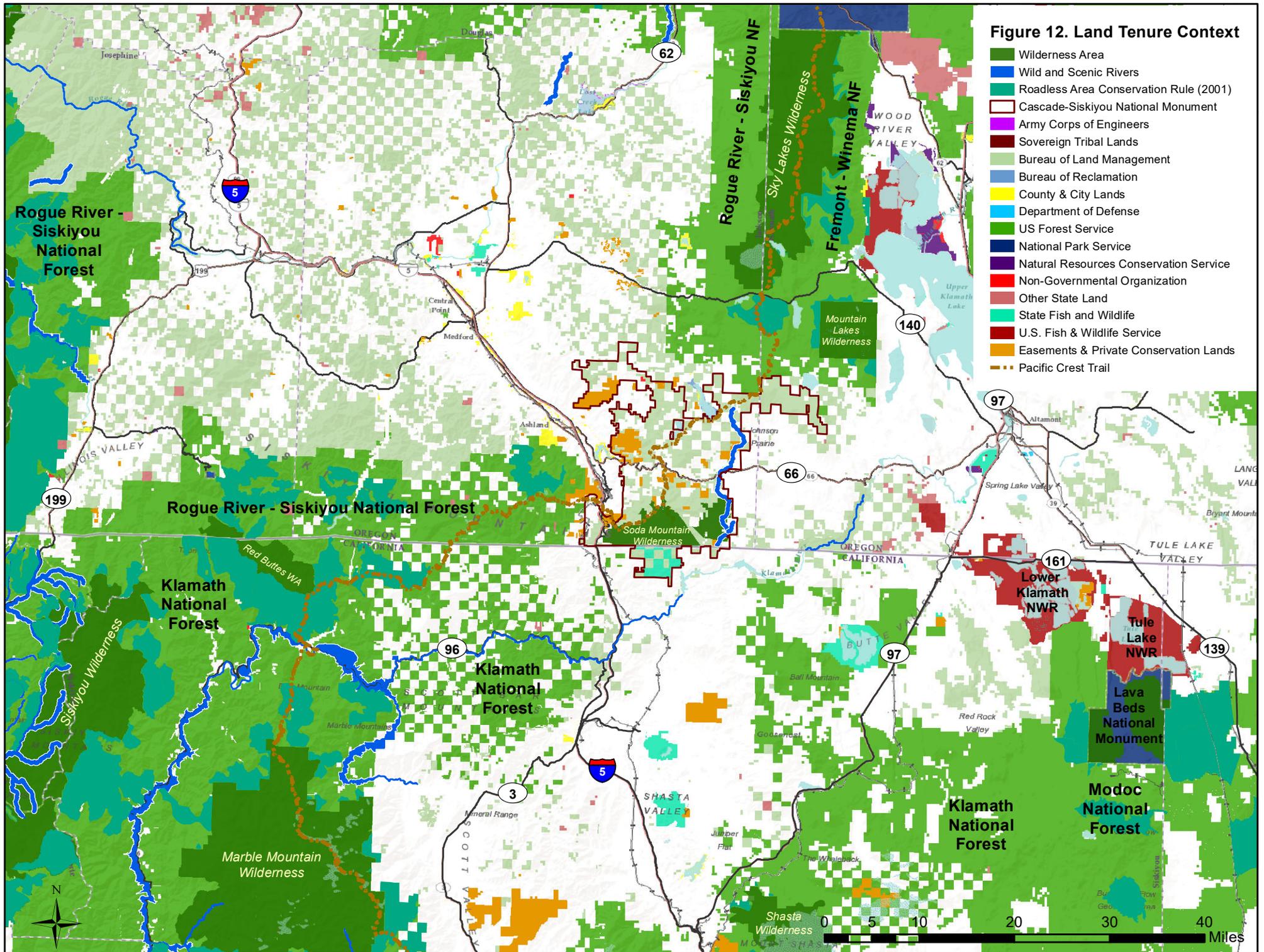
Land Use Plans & Processes

As mentioned above, a great deal of the land in the focus area is administered by the USFS and BLM. Participants identified several USFS Land and Resource Management Plans (LRMP) governing land management in the focus area that are being revised, providing opportunities to participate in public planning processes to promote land management designations that conserve connectivity, and ensure that resource extraction activities don't compromise critical linkages. Updates to LRMPs involve an environmental review process under the National Environmental Policy Act (NEPA) that requires agencies to prepare a detailed Environmental Impact Statement for public review and comment.

The **Northwest Forest Plan** (NFWP; 1994) covers 24 million acres of public land, including 19 national forests managed by the USFS and 7 Bureau of Land Management (BLM) districts in California, Oregon, and Washington. The NFWP (1994) amended existing forest plans on 19 national forest units across Washington, Oregon and California, including **Klamath, Rogue River-Siskiyou, Fremont-Winema and Six Rivers National Forests** in the Cascade-Siskiyou focus area. The NFWP (1994) and those underlying forest plans, which are all more than 25 years old (USFS 2020), are required to be updated under the National Forest Management Act of 1976, following the 2012 Planning Rule, which specifically requires standards and guidelines to maintain or restore connectivity, as described above in the federal policies section. The 2020 Bioregional Assessment of Northwest Forests, with supporting documents including science syntheses, guides on the planning process, maps and GIS data, are available at <https://www.fs.usda.gov/detailfull/r6/landmanagement/?cid=fseprd677501&width=full>. For more information about the process to update national forest plans, visit the [Modernization of Forest Plans in the Northwest Home Page](#).

The **Cascade-Siskiyou National Monument Resource Management Plan** (RMP; BLM 2008) recognized that "Mature forests in the monument provide a key connectivity link between other areas of late-successional forest in the Oregon Cascades, the northern California Cascades, and the Siskiyou Mountains. The Old-Growth Emphasis Area (OGEA) is located at one of two connectivity "hotspots" in Oregon as identified in the Northwest Forest Plan (USDA/USDI 1994)". BLM (2008) also identified habitat fragmentation and loss of connectivity, particularly in OGEAs and Riparian and Aquatic systems, as key threats to biodiversity and the ecological integrity of the Monument. The primary goal for OGEA

Figure 12. Land Tenure Context



management in the Monument is to maintain, protect, and restore historic conditions of late-successional and old-growth forest ecosystems in order to promote habitat and enhance connectivity for old-growth associated species. Map 8 in the RMP (BLM 2008) showed an area of Reduced Connectivity (8,890 acres) that is bisected by State Route 66, where the primary objective is to accelerate the development of late-successional habitat characteristics through thinning and subsequent prescribed burning. The riparian and aquatic habitat fragmentation resulting from high road densities, dams and diversions, loss of floodplain connectivity and extirpation of beaver have all contributed to reduced aquatic and terrestrial connectivity. BLM (2008) stated that checkerboard ownership (Map 8 in the RMP) limits restoration opportunities for aquatic systems, but there are now several conservation easements and private conservation lands in the identified area of reduced connectivity that offer opportunities for public/private partnerships to restore connectivity, as well as the Wild & Scenic designation of a section of Jenny Creek in 2019. The Transportation and Access section of the RMP (BLM 2008) discusses road closures to reduce habitat fragmentation and increase connectivity. Workshop participants understand that the RMP for the Monument (including the expansion area designated in 2016) is expected to be revised sometime soon.

Southwestern Oregon Record of Decision and Resource Management Plan (blm.gov) (BLM 2016) applies to all other BLM-administered lands in the focus area in Oregon, except the Cascade-Siskiyou National Monument (Medford District), the Upper Klamath Basin and Wood River Wetland (Klamath Falls Field Office), because those lands have their own independent RMPs. Shockingly, the terms habitat connectivity, linkage, or wildlife corridor are not specifically mentioned in the RMP (BLM 2016), with only a few references to fish and wildlife movement included:

- Manage for large blocks of northern spotted owl nesting-roosting habitat that support clusters of reproducing owls, are distributed across the variety of ecological conditions, and are spaced to facilitate the movement and survival of owls dispersing between and through the blocks.
- Remove or modify human-caused fish passage barriers to restore access to stream channels for all life stages for native aquatic species.
- Design livestock fencing to prevent the passage of livestock without stopping the movement of wildlife.
- Locate turbines away from colonies where bats hibernate, breed, and raise their young; locate turbines outside of bat migration corridors or flight paths between colonies and feeding areas.

The **BLM Northern California District**, Arcata and Redding Field Offices are in the early stages of jointly revising their current resource management plans, with the Redding Resource Management Plan (1993) overlapping the Cascade-Siskiyou focus area. The revised resource management plans will be combined into the Northwest California Integrated Resource Management Plan (NCIP). Initial planning began in 2016 but was formally terminated in April of 2019 due to catastrophic wildfires, which affected a significant portion of the planning area, including BLM-administered land in eight counties in northwestern California. The NCIP planning process was restarted early in 2021 and the public scoping phase was completed in June 2022. Connectivity was captured in the [Northwest California Integrated RMP Scoping Report \(2022\)](#), specifically “Commenters expressed the importance of wildlife corridors on wildlife species’ connectivity, stability, recovery, and resilience. They requested that the NCIP identify wildlife migration and potential habitat corridors, including avian and big game migration corridors. Further, commenters requested that the range of alternatives identify and analyze different areas for potential habitat corridors.” The NEPA ePlanning website for the current planning process <https://eplanning.blm.gov/eplanning-ui/project/2012803/570> includes existing and nominated ACECs and Wild and Scenic River Eligibility reports, among other things, while the historical 2016-related documents can be found at <https://eplanning.blm.gov/eplanning-ui/project/63960/510>.

State Planning Efforts: The Oregon Conservation Strategy (ODFW 2016) and California State Wildlife Action Plan: A Conservation Legacy for Californians (CDFW 2015) both highlight the importance of connectivity to maintain biodiversity and restore populations of imperiled species. In fact, both Oregon's Draft Priority Wildlife Connectivity Areas (ODFW 2022) and California's Terrestrial Connectivity Areas (CDFW 2019), as described above in the research and monitoring section, support implementation of these plans. USFWS requires State Wildlife Action Plans to be updated every 10 years in order to remain eligible for State Wildlife Grants funding, with the next update scheduled for 2025. Currently, ~\$70 million is appropriated annually by Congress to implement the plans. State Fish and Wildlife Departments may award grants and contracts to non-profit organizations, local government agencies, colleges and universities, and other state departments to help implement the plans. Priority actions could include integrating the state-wide Connectivity Areas (ODFW 2022 and CDFW 2019a) into all applicable state agency plans. Furthermore, Oregon's climate adaptation frameworks (Department of Land Conservation and Development 2021) and California's climate adaptation strategies (California Natural Resources Agency 2009, 2014, 2018, 2022b) identify maintaining habitat connectivity as an important adaptation strategy to conserve biodiversity and support ecological functions as the climate changes.

Local General Plans: Partner participation in local land use policies, such as County and City General Plan updates, provide opportunities to develop wildlife linkage overlay zones and associated ordinances that can help maintain connectivity. County General Plans for Josephine, Jackson and Klamath Counties in Oregon and Del Norte and Siskiyou Counties in California are particularly important. While General Plans are an ideal place to establish policies to facilitate connectivity conservation, connectivity science is rarely addressed by local land use planners engaged in the development review process or land use policy work. As such, habitat connectivity and ecological corridors are often missed in the environmental review process. Regulation of land starts with the applicable general plan that establishes policies and expectations. Land Use regulations (zoning, subdivision regulations) flow out of and need to be consistent with general plan policies. A development proposal that is consistent with the zoning and general plan is inherently much harder to challenge than a proposal that needs zoning and general plan amendments. Consequently, incorporating habitat connectivity and ecological corridors as biological resource overlay zones with associated ordinances in general plans throughout the focus area is an important strategic action to help maintain connectivity.

Local land use decisions, such as general plan amendments and zoning changes that lead to higher density development patterns or subdivision of large parcels into smaller parcels, can degrade or even sever critical connectivity areas. Habitat connectivity issues raised in the local land use and policy development or refinement process (e.g., general plan updates, Specific Plans) will usually have a greater chance of being effective than issues first raised during the final environmental review process. Wildlife movement issues can often be addressed if potentially disruptive actions are identified early enough in the planning process. Local jurisdictions can direct development away from critical linkages through the development review process.

Recommended Actions Related to Land Use & Policy:

Adopt and Enforce Strong Policies: Encourage the adoption and enforcement of strong policies to maintain and restore connectivity at federal, state, regional, county, and city levels.

Engage in Resource Management Plan Revisions and propose designated areas that emphasize connectivity (e.g., Wilderness, Wild and Scenic Rivers, Special Management Areas, Areas of Critical Environmental Concern, etc.).

Sign up for email updates to participate in the NEPA process for the NWFP and RMP revisions [USDA Forest Service \(govdelivery.com\)](https://www.govdelivery.com).

[Contact your local BLM Office](#) to engage in public review processes for Resource Management Plan revisions, as well as on-the-ground projects that may support or hinder habitat connectivity and fish and wildlife movement, such as timber sales, development of recreation opportunities, and restoration projects.

Work with the BLM and USFS to integrate connectivity data and science into LRMP planning processes. With the Redding and Arcata Field office currently revising their RMP, there is an important opportunity for the BLM to work with partners to advance the goals of the BLM Habitat Connectivity Instruction Memorandum and develop robust, stakeholder supported, and science-based planning direction for habitat connectivity. This action step might include using current science to identify and designate Areas of Critical Environmental Concern (ACECs) in locations adjacent to potential wildlife crossing sites and other areas critical for the movement of priority species. Similar opportunities will exist for engaging USFS planning staff when the Northwest Forest Plan is revised.

Serve on a BLM Resource Advisory Council (RAC): There are two RACs in the planning area -- the Western Oregon RAC and Northern California RAC each composed of 15 members that serve three-year terms and meet in formal sessions two to three times per year. Members are chosen for their interest or expertise in natural resources and public land management, including such individuals as conservationists, ranchers, outdoor recreationists, state and local government officials, Tribal officials, and academics. The application to serve is available at www.blm.gov/get-involved/resource-advisory-council/apply. For additional information, contact Western Oregon RAC Coordinator Kyle Sullivan ksullivan@blm.gov or Northern California RAC Coordinator Jeff Fontana jfontana@blm.gov.

Ensure connectivity considerations are integrated into federal ecosystem restoration projects funded by the Legacy Roads and Trails Act, the Bipartisan Infrastructure Act and the Inflation Reduction Act. Data on species movement or barriers to species movement should be considered in restoration project NEPA analysis, used to prioritize specific projects for management, and help inform the design of management prescriptions. Examples include prioritizing areas for forest, aquatic, and riparian restoration treatments that are critical for the movement of Threatened, Endangered and Sensitive species, and installing wildlife friendly fencing in known ungulate movement corridors (Wurtzebach et al., 2021).

Identify opportunities for using the Land and Water Conservation Fund to secure federal land acquisitions and conservation easements on parcels that are important for ecological connectivity. Within the USFS, proposals for acquisitions are advanced by USFS Regions and evaluated at the USFS Washington Office based on a set of [criteria](#), including climate resilience (which includes connectivity) and partnership support. Proposals for BLM LWCF land acquisitions can be advanced at state offices, following criteria established by the Dingell Act. NGOs and state agencies can also work with the USFS to use the USFS Forest Legacy program to secure conservation easements for private lands that contain key areas for species movement (Wurtzebach et al. 2021).

Create an Interagency Memorandum of Understanding on Transboundary Connectivity to facilitate and ensure regular communications among federal and state agencies focused on transportation, land use, and policies to keep all apprised of projects on the horizon that may create potential opportunities or

constraints for protecting, conserving, maintaining and restoring ecological connectivity and wildlife movement.

Identify and support Ambassadors for Connectivity (e.g., Tribes, academic scientists, non-profit organizations, agencies) to bring connectivity concerns to the forefront with County Board of Supervisors, and commissions of agency, such as the Board of Forestry to further connectivity conservation as part of these planning processes.

Identify Land Use Monitors: A system of monitors for tracking local planning processes and land use actions is needed. Each County in the Cascade-Siskiyou focus area (e.g., Jackson, Josephine, Klamath, Siskiyou) should have at least one monitor (e.g., organization, individual) who can “rally the troops” as necessary. Monitors should focus on specific jurisdictions and at-risk areas, be on information distribution lists for general plan amendments and, for specific areas of concern, proposals for zoning and other land use regulatory changes as well as specific development proposals that may impact or sever important connectivity areas.

Participate in General Plan Updates at the city and county level to ensure connectivity science, such as Oregon’s Draft Priority Wildlife Connectivity Areas (ODFW 2022) and California’s Terrestrial Connectivity Areas (CDFW 2019a) are integrated into these planning processes. Advocate for the development of wildlife linkage overlay zones and associated ordinances to maintain connectivity, both within and beyond the planning boundaries.

Expand Communications: Utilize existing list serves (e.g., KS Wild, Klamath Forest Alliance, Wildlife Salmon Center, NWFP) and expand existing communication channels to broadcast announcements that affect habitat connectivity (e.g., Forest Plan Amendments, Timber Harvest Plans) and encourage participation in public planning processes.

8. Transportation & Infrastructure

Wildland fragmentation by roads, railways, and other linear infrastructure is recognized as one of the greatest threats to biodiversity (Noss 1983, Harris 1984, Wilcox and Murphy 1985, Wilcove et al. 1986, Noss 1987, Reijnen et al. 1997, Trombulak and Frissell 2000, Forman and Deblinger 2000, Jones et al. 2000, Forman et al. 2003). Increased ‘barrier effects’ between populations or suitable habitats have been documented for several wildlife species when there are multiple linear impediments (e.g., railways, roads, pipelines) to movement (Skogland 1986, Vos et al. 2001, Waller and Servheen 2005, Dorsey et al. 2015, Barrientos and Borda-de-Água 2017). Linear infrastructure creates discontinuities in natural vegetation, alters animal behavior (due to noise, artificial light, human activity), and contributes to wildlife-vehicle collisions (Messenger 1968, Niemi 1969, Klein 1971, Stapleton and Kiviat 1979, Muehlenbach 1979, Lyon 1983, Noss and Cooperrider 1994, Forman 1995, Forman and Alexander 1998, Rich and Longcore 2006). Ungulates like deer and elk that make seasonal migrations between winter and summer ranges account for the majority of wildlife-vehicle collisions (Huijser and Begley 2019, Shilling et al. 2021, Kauffman et al. 2022ab). Highway lighting is particularly impactful on nocturnally active species like mountain lions (Beier in Rich and Longcore 2006). Direct effects of roads include mortality, habitat loss and reduced connectivity (Clevenger et al. 2001). When roads, railways, or other linear infrastructure limit dispersal, it can have significant and far-reaching consequences (Riley et al. 2014, Benson et al. 2019, Gustafson et al. 2017), especially for

wide-ranging species that disperse long distances and attempt to cross busy freeways and highways, which puts them at increasing risk of vehicle collisions.

As described in the Research and Monitoring section, both California and Oregon have identified priority wildlife barriers that bisect areas important for wildlife movement and habitat connectivity (Figure 5).

California Priority Wildlife Barriers (CDFW 2020, 2022) identified linear segments of infrastructure that currently present barriers to wildlife populations, using available empirical information including existing connectivity and road crossing studies, collared-animal movement data, roadkill observations, and professional expertise. The 2022 report used criteria identified by participants at the Northeast California Connectivity Symposium (Penrod 2020) to evaluate 146 priority barriers. The Draft Oregon Connectivity Assessment and Mapping Project identified draft **Potential Transportation Mitigation Areas** (ODFW 2022) based on where: 1) the Priority Wildlife Connectivity Areas intersect the state highway system; 2) crossing structures would benefit multi-species connectivity priorities; and 3) collision densities with large-bodied wildlife are intermediate or high. In addition, both ODOT and Caltrans participated in the **Wildlife Vehicle Collision Reduction and Habitat Connectivity Transportation Pooled Fund Study**, which identifies cost-effective solutions that integrate highway safety and mobility with wildlife conservation and habitat connectivity. This project builds upon public and private partnerships between several state Departments of Transportation, including California and Oregon, the Federal Highway Administration, the Western Transportation Institute – Montana State University (WTI), ARC (Animal Road Crossings) Solutions, Wildlife Connectivity Institute, and US Geological Survey. The project resulted in several recently released reports available at:

- <https://westerntransportationinstitute.org/programs/road-ecology/tpf-5-358-wvc-study/>
- <https://www.wildlifeconnectivity.org/national-study-to-integrate-wildlife-into-transportation>
- <https://www.pooledfund.org/Details/Study/610>

The best time to address connectivity and wildlife barriers is early in the transportation planning process, when the potential need for costly improvements can be identified. Each state has a long-range transportation plan and shorter-term plan (called a state-wide transportation improvement program or STIP) and can be explored to get a sense of where transportation projects are anticipated and whether they may overlap with areas of interest. Expenses related to retrofitting existing highway infrastructure to install new wildlife crossing structures or funding stand-alone crossings projects can be substantial, especially when factoring in costs for environmental compliance, engineering, design and construction. The cost of these projects is often the most significant hurdle in the way of building wildlife crossings. Partnerships are critical to getting wildlife crossings built. Agencies and organizations in the Cascade-Siskiyou Connectivity Partnership can assist with a broad range of activities, such as helping to identify and/or pursue funding for wildlife crossing infrastructure design and implementation, getting local policy measures passed, increasing community support, conserving key private land parcels, or providing in-kind support for research and monitoring.

Strong public-private partnerships have come together in both Oregon and California to work collaboratively to reduce wildlife-vehicle collisions and improve habitat connectivity but, as described below, more efforts are needed. Participants at the symposium were asked to identify an existing or past effort, specific need, or opportunity to address barriers to wildlife movement within the region related to transportation or infrastructure (e.g., retrofit existing bridge, directional fencing, dam removal, maintenance needs, reduce wildlife-vehicle collisions, promote species recovery). Several areas of interest were identified on stretches of highway that may constitute barriers to wildlife movement and/or that warrant additional research (Figure

13). Since planned transportation improvement projects can provide opportunities for integrating wildlife crossing infrastructure, the summaries below include such planned transportation improvement projects by ODOT and Caltrans that overlap areas of interest identified by participants.

I-5 Sexton Pass (TI-1 on Figure 13) was documented by ODOT to have a high density of wildlife-vehicle collisions, measured between 2016-2020, with greater than 8 per mile in the northern part of the area, and 7-8 per mile in the southern half. A workshop participant from ODOT shared that the Department installed wildlife fencing on I-5 from PM 71-72 in 2017-18, which has kept wildlife off the roadway. The wildlife directional fencing was installed as part of the I-5 Glendale to Hugo Paving and Sexton Climbing Lane (ODOT 2011). The fencing directs wildlife to two existing bridges in the area (J. Worsley, pers. comm.). One is for Graves Creek Bridge, which is approximately 300 feet in length spanning the creek and upland habitat to either side of the bridge. The other is for a two-lane county road, Leland Road to the north of the Graves Creek bridge, which directs animals to the shoulder of the road and has been documented to be used by deer (J. Worsley, pers. comm.). There is also a similar bridge to the south of Graves Creek for Sun Valley Road, which may also facilitate some level of wildlife movement. This area is mostly checkerboard BLM land interspersed with private land, and mostly forested except for some rural agricultural lands in the Sunny Valley community. A Priority Wildlife Connectivity Area (DRAFT OCAMP 2022) was identified in the southern part of this area. This area was also identified as a Connectivity Conservation Priority Area for Pacific fisher (Spencer et al. 2019).

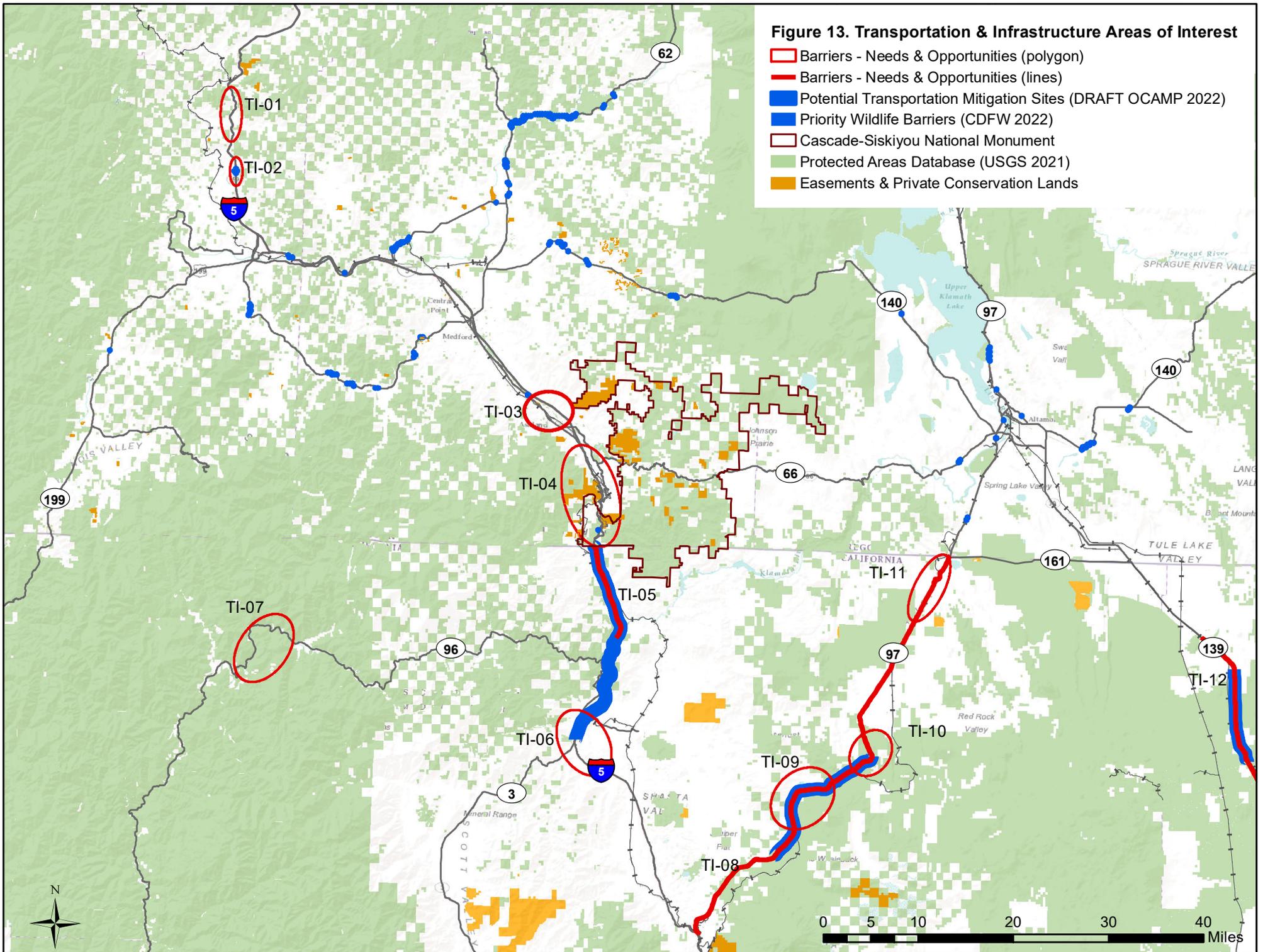


Top: Graves Creek Bridge is one of three locations in Sunny Valley where wildlife can cross under I-5. Middle: Wildlife directional fencing; Bottom: Jumpout (J. Worsley, ODOT).

I-5 Jumpoff Joe Creek (TI-2 on Figure 13) was identified as an area of interest by participants because of a planned ODOT project, which may provide opportunities to include enhancements for wildlife movement. The Oregon Connectivity Mapping and Assessment Project delineated a Priority Wildlife Connectivity Area that crosses I-5 in this area and a Potential Transportation

Figure 13. Transportation & Infrastructure Areas of Interest

- Barriers - Needs & Opportunities (polygon)
- Barriers - Needs & Opportunities (lines)
- Potential Transportation Mitigation Sites (DRAFT OCAMP 2022)
- Priority Wildlife Barriers (CDFW 2022)
- Cascade-Siskiyou National Monument
- Protected Areas Database (USGS 2021)
- Easements & Private Conservation Lands



Mitigation Site was also identified here (DRAFT OCAMP 2022). ODOT's I-5: Monument Dr – N Grants Pass (Project ID 21674) project is intended to remove existing pavement and replace with new asphalt to improve driving conditions, remove trees near the roadway to improve visibility and reduce collisions, and install traffic safety barriers to protect drivers from roadside hazards (ODOT STIP 2021-2024). Although the plans, specifications, and estimate (PSE) documents are complete and the project is funded through construction (ODOT STIP 2021-2024), construction is not expected to commence until 2024. As such, there may still be opportunities for ODFW and others to work with ODOT to integrate wildlife crossing enhancements into the project.

Old 99 (parallels I-5) (TI-3 on Figure 13) was identified by a participant that said ODOT Region 4 wants to install wildlife crossing warning lights in this stretch of highway 99 between mileposts 14 and 15. There are a few planned transportation improvement projects in this area on both State Highway 99 and I-5. The Oregon Connectivity Mapping and Assessment Project delineated a Priority Wildlife Connectivity Area that crosses Old 99 and I-5 in this area; a Potential Transportation Mitigation Site was also identified here (DRAFT OCAMP 2022). ODOT's OR99/I-5 Curb Ramps project (ID 22389) is the effort referred to that calls for flashing lights to be installed and curbs constructed between milepost 14.37 and 15.34, but it is unclear per the project description whether the flashing lights are intended specifically as a wildlife crossing improvement. ODOT's I-5 Ashland – Gold Hill project (ID 20133) is intended to repair or replace culverts on I-5 between mileposts 0 and 40 to address erosion and road embankment problems near culverts, to reduce water and slide issues on the roadway near the culverts. Another planned project I-5 Emergency Fence Repair (ID 22410) is to repair fencing on I-5 at various locations between mileposts 17.6 and 23.5. The culvert repair and replacement project in particular presents a significant opportunity to ensure that culverts are designed for climate resilience to accommodate increased precipitation and debris flows, as well as improving wildlife movement in priority connectivity areas along the 40 miles of planned improvements.

I-5 Ashland, OR to OR-CA Border Wildlife Crossings (TI-4 on Figure 13): As described in the summary of presentations above, the [Southern Oregon Wildlife Crossing Coalition](#) (SOWCC) has been working on wildlife crossings on Interstate 5 (I-5) between Ashland, Oregon and the California border in the critical Cascade-Siskiyou land bridge (Frost 2018). This area has been identified as a critical landscape connection by numerous assessments including the Oregon Conservation Strategy (ODFW 2016), all the connectivity-related studies reviewed in Frost (2018), connectivity conservation priorities for Pacific fisher and marten (Spencer et al. 2019), and a connectivity climate assessment (Nunuz and Lawler *in press*). A Priority Wildlife Connectivity Area and Potential Transportation Mitigation Site have also been identified here (DRAFT OCAMP 2022).

SOWCC raised funds to retain River Design Group and Samara Group (2022) to conduct an alternatives analysis and conceptual designs for eight potential locations for wildlife crossing improvements including Neil Creek, Barron Creek, Wall Creek, Mt Ashland Exit, Siskiyou Summit, Bear Gulch, Mariposa Preserve, and South Overcrossing (Figure 14). The [Southern Oregon Wildlife Crossing Project Conceptual Design Report](#) (River Design Group and Samara Group 2022) was intended to provide details for the preferred alternative at each site to fulfill the requirements of the "Scoping" phase of ODOT's project delivery and prepare for the "Project Initiation" phase (ODOT 2017). The report also provides a priority ranking among the sites to inform a corridor-wide implementation strategy.

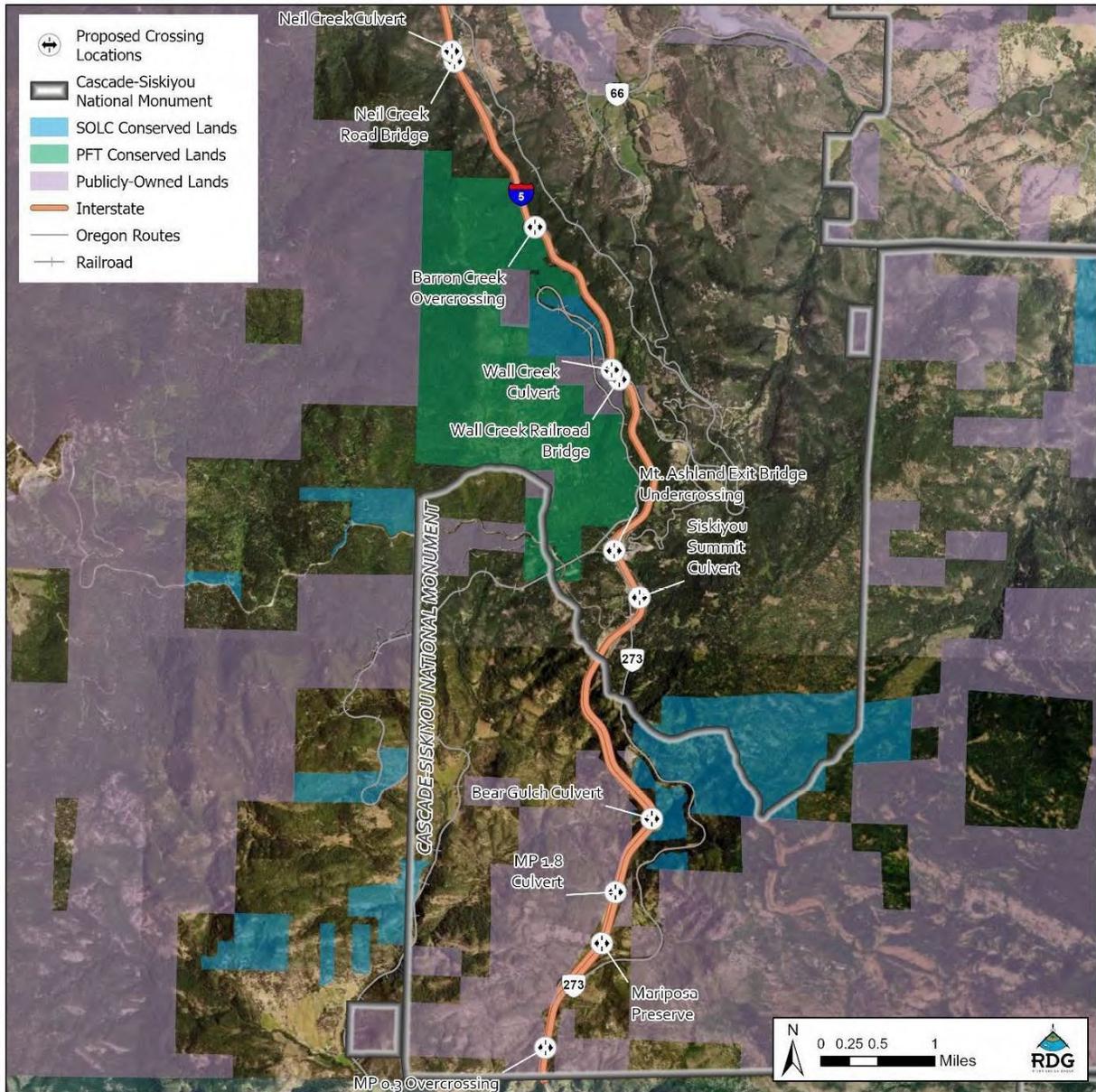


Figure 14. Potential locations for wildlife crossing improvements for Southern Oregon Wildlife Crossing Project (from Samara Group and River Design Group 2022).

A decision matrix was developed to compare the recommended alternatives between sites within the corridor that took into consideration land ownership and scale, biodiversity, road density and proximity, and wildlife behavioral considerations. Samara Group led the development of the matrix, which was part of a collaborative process that involved stakeholder interviews and a series of partner meetings and design workshops with SOWCC members, existing monitoring data provided by Southern Oregon University and Cascade-Siskiyou National Monument, species behavioral considerations, and spatial analyses (River Design Group and Samara Group 2022).

The camera trap monitoring data collected by Southern Oregon University and BLM at the Monument have documented several target mammal species at many of the proposed crossing sites such as elk, black-

tailed deer, Pacific fisher, black bear, mountain lion and bobcat. The Oregon Conservation Strategy identifies the segment of I-5 extending south of Ashland to the California border as Crucial Terrestrial Habitat for landscape connectivity, which supports habitat for over 20 species addressed by the Strategy (ODFW 2016). Other target species identified by workshop participants for this area include mountain quail, reptiles and amphibians such as California and mountain kingsnake, black salamander, and tailed frog.

River Design Group and Samara Group (2022) ultimately completed full conceptual designs for eight projects to improve wildlife passage and habitat connectivity in this stretch of I-5, including overcrossings at Barron Creek, Wall Creek, Bear Gulch, and Mariposa Preserve, undercrossing retrofits at Neil Creek Road, Mt. Ashland Exit, Siskiyou Summit and Bear Gulch, and fencing to direct wildlife to the structures and vegetation enhancements to make them more inviting to a diversity of species.

At the final corridor strategy review meeting with SOWCC, two of the overcrossings were prioritized for the first phase of implementation to reduce dangerous wildlife-vehicle collisions while also supporting landscape connectivity and wildlife movement for the greatest diversity of species (River Design Group and Samara Group 2022). These include a wildlife overpass at Barron Creek north of the Siskiyou Summit, and an overcrossing at Mariposa Preserve to the south of the Summit.

The Barron Creek Wildlife Overcrossing was prioritized to support species associated with high elevation conifer forests. The location for the overcrossing at Postmile 8.7 was selected due to the favorable topography and highway geometry, as well as habitat quality on either side of I-5 that includes drainages likely to attract wildlife. The wildlife overcrossing design is proposed to be a minimum of 150 feet wide and 200 feet long, and would be vegetated with evergreen and deciduous trees, large shrubs, and understory species, as well as downed woody material, rock piles, boulders and seasonal pools. Solid walls a minimum of 8 feet tall are proposed at the edge of the crossing to buffer wildlife from road noise, lights and vehicle exhaust. Fencing 3.9 miles in length would be installed to direct wildlife to the overpass between milepost 9.2 to the north of the overpass and milepost 7.8 to the south of the structure. Both sections of fencing would tie into several existing culverts that convey streams and may provide passage for smaller species, including North Fork Barron Creek (24-inch corrugated pipe culvert), Barron Creek (48-inch pipe culvert), South Fork Barron Creek (36-inch pipe culvert), Slide Creek (48-inch pipe culvert), and Cougar Creek (36-inch pipe culvert). Contiguous existing public and private conservation lands occur at this location to the west of I-5, but land to the east of the freeway is privately owned in many relatively small lots (but there may be opportunities for conservation easements or purchase of timberlands in this area).

Mariposa Preserve Wildlife Overcrossing was prioritized to support species associated with oak woodland and chaparral habitats. This area also has some of the highest number of deer-vehicle collisions in the southern part of the focus area. The location for the overcrossing at milepost 1.6 is entirely within the Cascade-Siskiyou National Monument, with publicly owned land in close proximity on both sides of I-5. Construction for the wildlife overpass would fit entirely within ODOT's right-of-way. The overcrossing design is proposed to be roughly 150 feet wide, with a crossing length of approximately 380 feet and solid walls a minimum of 8 feet tall at the edge of the crossing to buffer wildlife from road noise, lights and vehicle exhaust. The Mariposa overpass would be vegetated similar to the Barron Creek Crossing with woody material, rock piles and boulders to provide cover for smaller species, and seasonal pools to attract wildlife. Fencing roughly 2.4 miles in length would be installed to direct wildlife to the overpass between milepost 0.6 to the south of the overpass and milepost 1.8 to the north of the structure. Both sections of fencing will

also tie into existing culverts to convey water flows, including two unnamed tributaries (both 36-inch pipe culverts) and Indian Creek, which has perennial flows (60-inch pipe culvert).

These two priorities have been included in ODOT's STIP and are highlighted on ODOT's Transportation Project Tracker as I-5: Southern Oregon Wildlife Overcrossings (i.e., Project number: 23100), with the following description "Complete design for two wildlife crossings at or near milepost 8.7 near Barron Creek and milepost 1.1 near the Mariposa Preserve on Interstate 5 (I-5) between Ashland, Oregon and the California border to avoid collisions between animals and vehicles." ODOT's I-5 Ashland – Gold Hill culvert repair and replacement project (ID 20133) between mileposts 0 and 40 also presents a significant opportunity to ensure that culverts are designed for climate resilience to accommodate increased precipitation and debris flows, as well as improving wildlife movement in priority connectivity areas, including all eight projects evaluated in the SOWCC Conceptual Design Report (River Design Group and Samara Group 2022) to improve wildlife passage and habitat connectivity along this stretch of I-5.

I-5 Hotspot CA Border South (TI-5 on Figure 13) is also part of the important transboundary Cascade-Siskiyou land bridge identified in all of the connectivity studies summarized in Frost (2018), regional connectivity climate assessments (The Nature Conservancy 2020, Nunez and Lawler *in press*), as well as Irreplaceable and Essential Corridors identified in California's Terrestrial Connectivity layer (CDFW 2019a) and a California Essential Habitat Connectivity Area between Cottonwood Creek and Wadsworth Flat (Spencer et al. 2010). Three participants from the 2020 Northeast California Symposium (Penrod 2020) identified this stretch of I-5 as an area in need of dedicated wildlife crossings for wide-ranging species such as Pacific fisher, black bear, deer, coyote, cougar, wolf, elk and other species.

This area has also been identified as an important focus area for wildlife-transportation mitigation efforts, and is continuous with the Southern Oregon Wildlife Crossing Coalition's focus areas described above. There is a 2.5-mile road segment identified as Caltrans District 2's worst deer-vehicle collision hotspot, and mountain lion and black bear have also been struck in this area (Huijser and Begley 2019). This area of interest overlaps roughly half of a 23.3-mile-long California Priority Wildlife Barrier (CDFW 2020, 2022) that stretches from the Oregon border to Yreka, which was identified for remediation to benefit target species such as mule deer, mountain lion, and gray wolf. Huijser and Begley (2019) recommended modifying an existing bridge at Cottonwood Creek and adding wildlife fencing to funnel wildlife use to the bridge. There are currently no planned transportation improvement projects planned in this stretch, but the Cottonwood Creek Bridges (ID 02 0175R) for the north and southbound lanes at milepost R63.65R have been identified as a Caltrans Adaptation Priority 3 (Caltrans 2020), which may provide opportunities for improving climate resilience and wildlife movement when these bridges are upgraded. For wide-ranging species like ungulates and large carnivores, it is recommended that large dedicated wildlife crossing structures (e.g., bridges, overpasses) be located no more than about a mile apart (Mata et al. 2005, Clevenger and Wierzchowski 2006). Thus, this roughly 10-mile stretch of the critically important Cascade-Siskiyou land bridge requires at least a few dedicated wildlife overpasses to improve safe passage and appreciably reduce wildlife-vehicle collisions. The Siskiyou 5 Clear Recovery Zone project ([Siskiyou 5 CRZ](#)) is currently being implemented to improve roadside safety at 14 locations from milepost R9.93 to R68.10, so as to reduce the severity of collisions where vehicles run off the road, but should also have provided mitigations for reducing dangerous wildlife-vehicle collisions.

I-5 Hotspot South of Yreka (TI-6 on Figure 13): At the workshop, a participant noted that this area has high roadkill numbers, especially with large charismatic species. Huijser and Begley (2019) identified this area as one of the worst deer-vehicle collision hotspots in California. This roughly 6.3-mile segment of concern includes two of Caltrans District 2 worst deer-vehicle crash hotspots, and one mule deer carcass

removal hotspot, with the carcass hotspot ranked the highest for remediation in District 2 (Huijser and Begley 2019). The northern part of this area of interest is also included as part of the Priority Wildlife Barrier for remediation between the Oregon border and Yreka (CDFW 2020, 2022). The worst deer-vehicle collision hotspot is in the southern part of this area, located to the south of the State Route 3 interchange. Huijser and Begley (2019) recommended upsizing existing culverts and a livestock underpass, adding designated wildlife crossing structures, and adding wildlife fencing to funnel wildlife use to the structures. Numerous next-step suggestions and caveats to the recommendations for mitigation at each location, along with maps, are included in Huijser and Begley (2019).

Caltrans has four projects in this area, two of which are currently being implemented including the Siskiyou 5 Clear Recovery Zone Project described above, and the Yreka Rehab pavement project. The other two projects currently being planned are associated with State Route 3; another linear barrier west of I-5, which includes a drainage project between mileposts 39.39 and 46.79 (expected to begin 2026/27) and the pavement resurfacing Montague CAPM project located between milepost 48.0 and 54.187 (scheduled 2025/26). All of these projects should be more closely examined to assess potential opportunities to improve wildlife movement and driver safety. In addition, since the area between the Oregon border and Yreka is identified as a Priority Wildlife Barrier (CDFW 2020, 2022), this stretch may be a good candidate for the Caltrans Regional Advanced Mitigation Program -- meaning mitigation could be directed to I-5 for these upcoming transportation improvement projects to improve safety. A Caltrans representative at the workshop suggested using mitigation to install fencing to guide animals to existing structures. This area also has several Caltrans Adaptation Priority bridges and culverts (2020):

- Yreka Creek culvert (02 0160) on I-5 at PM R45.61 identified as Priority 2
- Yreka Creek Bridge (02 0143) on I-5 at PM R46.79 identified as Priority 1
- Yreka Creek Bridge (02 0151) on SR-3 at PM L49.99 identified as Priority 1
- Greenhorn Creek culvert (02 0010) on I-5 at PM R46.05 identified as Priority 3

State Route 96 Portuguese Creek and Cade Creek Fish Passage Project (TI-7 on Figure 13): At the May 2022 workshop, a participant from Caltrans noted that State Route 96 is a very curvy road without a lot of traffic, and it is susceptible to landslides on an annual basis. They also noted that Caltrans has initiated a series of fish passage improvement projects on Portuguese and Cade Creeks to replace existing culverts with new bridges that will also be passable for terrestrial wildlife.

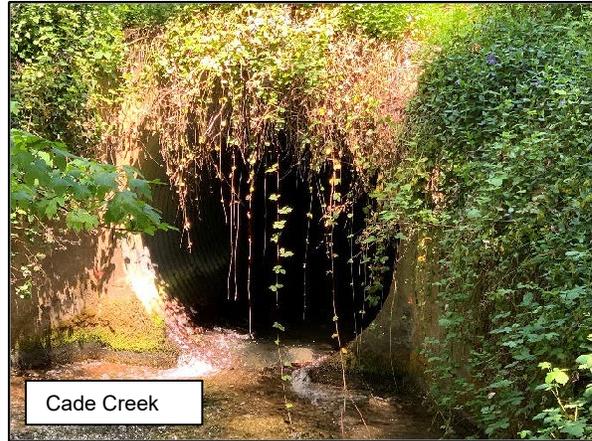
The environmental compliance documents for the Portuguese Creek and Cade Creek Fish Passage Project (Caltrans 2021) provide information on the purpose and need for the project, details on the improvements, and which species are intended to benefit. The project is needed because the Portuguese Creek (PM 57.0) and Cade Creek (PM 43.5) culverts were built in the 1940's and, in addition to structure deterioration, the culverts have been identified as a significant passage barrier (CDFW 2019b) to miles of potential habitat for anadromous fish species that use the Klamath River and its tributaries. The purpose of the project is to upgrade these structures to meet current highway standards and fish passage criteria, as mandated by state and federal law, including recontouring and restoring the stream channels upstream and downstream of the new bridges (Caltrans 2021). Per the State Highway Operation and Protection Program (SHOPP), the project is scheduled to begin construction 10/31/2023 (Caltrans 2022). Specific improvements planned include:

Cade Creek: Replace the existing culvert that is approximately 86 feet long and 8 feet in diameter with a clear-span bridge that is approximately 101 feet long and 44 feet wide, and recontouring and restoring the stream channel for a distance of approximately 86 linear feet upstream and 55 linear feet downstream (Caltrans 2021).

Portuguese Creek: Replace the existing culvert that is approximately 85 feet long and 14 feet in diameter with a clear-span bridge that is approximately 100 feet long and 44 feet wide, and recontour/restore the stream channel for a distance of approximately 70 linear feet upstream and 103 linear feet downstream (Caltrans 2021).

After construction, each of the stream channel restoration sites up and downstream from the new structures will be planted with native riparian species, such as big-leaf maple, white alder, black cottonwood, Pacific madrone, oak, and arroyo willow.

The project is intended to benefit several species. Anadromous salmonids are the primary targeted beneficiaries, including the federally and state-threatened coho salmon (Southern Oregon Northern California Coast Evolutionary Significant Unit (SONCC-ESU), Chinook salmon (Upper Klamath and Trinity rivers ESU) that is currently a federal and state candidate for listing, as well as steelhead (Klamath Mountains Province ESU) and summer-run steelhead, both of which are state Species of Special Concern and Forest Service Sensitive species. Cade Creek, Portuguese Creek, and the nearby reach of the Klamath River are designated as critical habitat for SONCC coho salmon, and are within hydrologic units designated as Essential Fish Habitat for salmon. Correcting these fish passage barriers (CDFW 2019b) will provide access to anadromous salmonids of 2.58 miles of stream habitat in Cade Creek and 2.78 miles of stream habitat in Portuguese Creek (Caltrans 2021). Both streams also provide rearing habitat for other native fish, northwestern pond turtle, and a variety of amphibians and aquatic invertebrates. Habitat for several other special-status species also occurs in the area, including Pacific fisher, Humboldt marten, and ring-tailed cat (Caltrans 2021), all of which may benefit from safer passage with the new bridges.



Caltrans has other projects planned in the area that should be more closely examined to determine whether they provide opportunities to improve fish and wildlife passage. One SHOPP project is for improvements to Scott River and Thompson Creek bridges between PM 52.48 and 71.23, which is scheduled for 2025/26 (ID 16613; Caltrans 2022). The Thompson Creek Bridge is (02 0068) is also identified as a Caltrans Adaptation Priority bridge (Caltrans 2020). Another SHOPP project (ID 19484; Caltrans 2022) is a major damage-permanent restoration project on Highway 96 between milepost 47.4 and 47.8, to be scheduled 2027/28.

State Route 97 Barrier to Movement (TI-8 on Figure 13): State Route 97 is the second most-traveled route in Siskiyou County, with annual average daily traffic averaging 6,300 vehicles a day (3600-9000 AADT). Most of this traffic is freight vehicles transporting agricultural and timber products; it's also an alternative route when I-5 is closed due to winter storms and has fewer sections with steep grades than I-5 (Bell et al. 2022). All of State Route 97 in California was identified as a barrier needing additional research at the 2020 Northeastern California Connectivity Symposium. This determination was based on Caltrans District 2 roadkill data, California Highway Patrol collision data, and CDFW telemetry data for deer and elk (Penrod 2020). As described earlier, CDFW has worked with several research institutions to map established elk and deer migration routes as the animals move between their summer and winter ranges (CDFW 2022 in Kauffman et al. 2022 Volumes 2 & 3). Virtually all of the land on either side of the highway is identified as important connectivity habitat or migration areas, except for the agricultural lands between the communities of Mt Hebron and Dorris (Spencer et al. 2010, CDFW 2019a). CDFW (2020, 2022) identified a 16.7-mile stretch of Route 97 between mileposts 13 and 29.8 as a top Priority Wildlife Barrier for remediation.

Due to the high rate of wildlife-vehicle collisions, Caltrans District 2 and numerous collaborators formed the “State Route 97 Strike Prevention Team” to reduce collisions with wildlife and improve driver safety, restore important migratory corridors for deer and elk, and increase roadway permeability for all wildlife (Bell et al. 2022). Members of the SR 97 Strike Prevention Team include Caltrans, US Forest Service, California Deer Association, California Highway Patrol, Rocky Mountain Elk Foundation, CDFW, Ore-Cal Resource Conservation and Development Area Council, University of California Davis Road Ecology Center, Fruit Growers Supply Company, and other private landowners (Bell et al. 2022).

One of the reports from the Transportation Pooled Fund Study, Improving Connectivity: Innovative Fiber-Reinforced Polymer Structures (Bell et al. 2022), evaluated four locations identified by CDFW and Caltrans along State Route 97 as potentially suitable for a wildlife overpass structure, Grass Lake, Horsethief Creek, Mud Lake, and Grass Lake Summit (Figure 15). Two of these sites were identified as areas of interest at this symposium and are further described below.

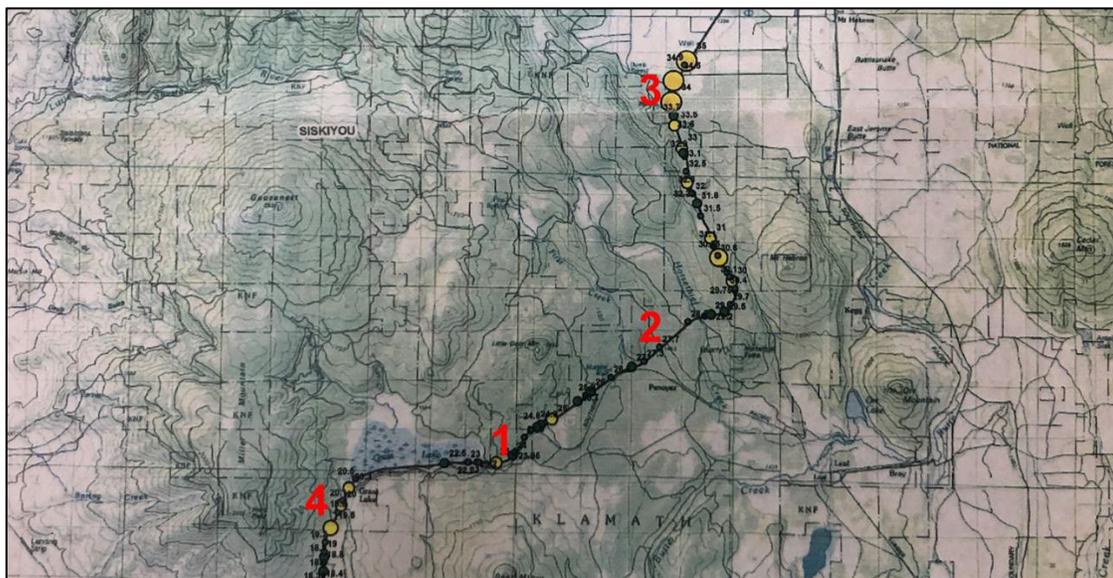


Figure 15: Four locations (bright red numbers) along US Highway 97 identified as potential sites for a Fiber-Reinforced Polymer wildlife overpass design as part of the Transportation Pooled Fund Study including 1) Grass Lake; 2) Horsethief Creek; 3) Mud Lake; and 4) Grass Lake Summit (from Bell et al. 2022)

State Route 97 Grass Lake Summit (TI-9 on Figure 13): This area was identified as a hotspot for wildlife-vehicle collisions at the 2020 symposium (Penrod 2020), per Caltrans Environmental Division. Grass Lake Summit is located within established elk and deer migration routes (Figure 8), as the animals move between their summer and winter ranges and account for most of the wildlife-vehicle collisions in this area (Bell et al. 2022). As described in the Research and Monitoring section and shown in Figure 8, most of the winter range for the Siskiyou Mule Deer Herd is located on the east side of the highway (CDFW 2022 in Kauffman et al. 2022 Vol. 3), while the East Shasta Valley Elk Herd winter range is located west of the highway (CDFW 2022 in Kauffman et al. 2022 Vol. 2). Because both species have migration corridors that cross Route 97 in this area, it has been identified as part of the 16.7-mile-long Hwy 97 Grass Lake Priority Wildlife Barrier (Barrier ID W008; CDFW 2020, 2022).

A participant at the 2022 Symposium noted that Caltrans is working with the Western Transportation Institute on a preliminary design to develop a wildlife overpass for elk and deer in this area, as part of a Transportation Pooled Fund Study. Caltrans received a planning grant from the Wildlife Conservation Board (WCB) to do the planning, environmental clearance and some engineering work. Caltrans officials hope to receive a \$9 million grant from the WCB to cover most of the construction costs.

The Grass Lake Summit site was selected as the most desirable location for designing a fiber-reinforced polymer wildlife overpass as part of the Transportation Pooled Fund Study (Bell et al. 2022) because it was ranked highest in terms of facilitating the most migratory movements of local deer and elk, while also addressing wildlife-vehicle collisions, design and management issues (e.g., permitting, adjacent land security, engineering). (CDFW 2022 in Kauffman et al. 2022 Vol. 2 & 3, Bell et al. 2022). Klamath National Forest lands occur on both sides of the highway in this area. However, the land immediately west of the highway in some areas is owned by Fruit Growers Supply Company, who also serves on the State Route 97 Strike Prevention Team, and would require a conservation easement for long-term land use security (Bell et al. 2022).

The preliminary design for the overpass is roughly 165 feet wide and includes all wildlife crossing design elements (e.g., fence, sound/light barrier, jump-outs) needed for an effective wildlife crossing (Figure 16). Elk and deer were the primary focal species used for design considerations (e.g., the percent slope of the approach to the crossing structure, fencing) to ensure effectiveness for these two native ungulates (Bell et al. 2022). Slopes less than 20% (5:1) can work for an elk crossing, but a slope closer to 10% (10:1) was recommended to provide better visibility across the structure for elk and deer (Bell et al. 2022). However, the design also addresses the needs of other species documented in the area by CDFW, such as gray wolf, cougar, black bear, and smaller mammals such as rabbits, gophers, voles, mice, and squirrels (Bell et al. 2022). This project (EA #1J970) to construct a wildlife crossing between mileposts 20.0 and 28.5 on Route 97 is currently in the development phase according to the Caltrans District 2 Siskiyou County website <https://dot.ca.gov/caltrans-near-me/district-2/d2-projects/d2-siskiyou-county-projects-map>.

Caltrans also has a SHOPP project (ID #22085) to improve drainage on State Route 97 for most of its length (milepost 0.16 to 54.089) that is expected to start 2027/28 (Caltrans 2022), which may provide additional opportunities to implement wildlife movement improvements.



Figure 16: Rendering of US-97 FRP wildlife overpass with Mt. Shasta in the background (from Bell et al. 2022)

State Route 97 Horsethief Creek (TI-10 on Figure 13): A 2022 workshop participant from Caltrans noted that this area is in need of a wildlife overpass. This area bisects a known mule deer migration route and carcasses of deer and other small mammals are regularly collected in this vicinity (Bell et al. 2022). As described in the Research and Monitoring section and shown in Figure 8, a migration corridor for the Siskiyou Mule Deer Herd that crosses State Route 97 in this area, and part of their winter range is also bisected by State Route 97 here (though most of the herd's winter range is located east of the highway; CDFW 2022 in Kauffman et al. 2022 Vol. 3). The East Shasta Valley Elk Herd also has migration corridors, winter range and stopover habitats west of State Route 97 in this vicinity (CDFW 2022 in Kauffman et al. 2022 Vol. 2), though collisions with elk are not as frequent in this area (Bell et al. 2022). This area is also part of the 16.7-mile-long Hwy 97 Grass Lake Priority Wildlife Barrier (Barrier ID W008; CDFW 2020, 2022).

This area was one of the four general locations evaluated for a polymer-reinforced wildlife overpass as part of the Transportation Pooled Fund Study (Figure 15; Bell et al. 2022). The potential location evaluated for this structure was on an embankment near where the highway crosses Horsethief Creek. The Horsethief Creek site tied for second place with the Mud Flat site in the value matrix used for the site selection process. While it ranked lowest for the safety criteria (because elk collisions are rare), it was one of two locations ranked highest in terms of design and management issues, and it ranked second highest in

conservation value because it provides connectivity for multiple species and supports local movements and migration corridors for deer (CDFW 2022 in Kauffman et al. 2022 Vol. 2, Bell et al. 2022).

The Caltrans drainage improvement project (SHOPP ID#22085; Caltrans 2022) on State Route 97 described above may provide additional opportunities to implement wildlife movement improvements.

State Route 97 Mule Deer Massacre (TI-11 on Figure 13): At the workshop, a participant from Caltrans noted this area is a mule deer roadkill hotspot. In the Caltrans-commissioned Large Mammal-Vehicle Collision Hot Spot Analysis, Huijser and Begley (2019) identified a 0.3-mile segment in this area near Indian Tom Lake as one of District 2's worst mule deer carcass removal hotspots. Most of the land within this area of interest is private, but BLM land and the Lower Klamath National Wildlife Refuge are located to the east and Klamath National Forest and BLM land to the west.

The Caltrans representative at the workshop noted that pavement work on Route 97 in this area may provide an opportunity to utilize mitigation funds to address this collision hotspot and improve safety. The SHOPP pavement project name is Dorris CAPM between milepost 45 to 54.089 (ID 19921; Caltrans 2022). The Caltrans drainage improvement project (ID#22085) may also provide opportunities to integrate wildlife movement considerations as mitigation.

State Route 139 Perez to Jump Scales (TI-12 on Figure 13): This area was prioritized as a hotspot for wildlife-vehicle collisions by four participants at the 2020 NE California symposium, with mule deer being the main species of concern (especially during winter and migration), but pronghorn, elk and carnivores were also identified as focal taxa (Penrod 2020). As described in the Research and Monitoring section, the Modoc Interstate Mule Deer Herd migrates from their winter range near Clear Lake Reservoir in California north to Oregon in Klamath and Lake counties for the summer, so there are migration corridors and stopover sites along the highway as well (Figure 8; CDFW 2022 in Kauffman et al. 2022 Vol. 2). There are high concentrations of mule deer road kills following heavy snow events in the Tule Lake Basin, and in areas of dense woody vegetation adjacent to the roadway. There are also resident mule deer and pronghorn populations along State Route 139 and resident populations of elk in the Tule Lake Basin, so there is potential for vehicle collisions with both elk and pronghorn (Caltrans 2014). Huijser and Begley (2019) identified two of Caltrans District 2's worst mule deer carcass removal hotspots in this area. As such, the area from Perez to Jump Scales (milepost 30.4-40.5) is identified as a 10-mile-long Priority Wildlife Barrier for mule deer and pronghorn (Barrier ID W009; CDFW 2020, 2022). Huijser and Begley (2019) recommended adding designated wildlife crossing structures and directional fencing to funnel wildlife to the structures, as well as animal detection systems to alert drivers when wildlife are near the roadway.

A participant at the 2020 symposium made reference to the draft [Transportation Concept Report for State Route 139](#) (Caltrans 2014). Caltrans received over 40 written comments to express concern regarding the deer crossing issue from agencies, organizations and members of the public through the public review process for this TCR (Caltrans 2014). The local game warden and coordinator for the Highway 139 Stewardship Team confirmed roughly 100 deer-vehicle collisions in January of 2008 (letter from A. Freitas in Caltrans 2014). Due to the severity of the issue, the Highway 139 Stewardship Team was formed, whose members include CDFW, Caltrans, California Deer Association, USFS, California Department of Forestry and Fire, Modoc County Fish and Game Commission, Modoc County Transportation Commission, and citizens of Modoc County (letter from A. Freitas in Caltrans 2014). Suggestions made for remediating the

wildlife movement barrier and improving safety include fencing, electro mats, animal warning systems, wildlife crossings and jumpout ramps.

Any proposed solution to high deer-vehicle collisions in this area will require partnerships for design, engineering, implementation and financing. Coordination with stakeholders of the Highway 139 Stewardship Team and transportation ecology experts regarding SR 139 is underway with District 2 environmental staff (Caltrans 2014). In fact, this area was also put forth by Caltrans and CDFW as a candidate for the polymer-reinforced wildlife overpass design as part of the Transportation Pooled Fund Study, but the traffic volume was far less than for State Route 97 (Bell et al. 2022) and thus the site was not selected.

Recommended Actions Related to Transportation & Infrastructure:

Engage in Transportation Planning Processes at the State, Regional, County and Local Levels.

State-wide and regional transportation planning analyses and studies precede initiation of studies for specific transportation improvement projects. Knowing the details and timing of these processes and how they interact is essential for interested agencies, non-profits, and other potential partners to be involved in project scoping and nomination to address wildlife barriers.

Oregon Department of Transportation is currently in the process of [updating its long range, 20-year Oregon Transportation Plan](#). Interested parties should engage immediately to help influence inclusion of wildlife connectivity considerations in the plan. Subscribe to ODOT:

https://public.govdelivery.com/accounts/ORDOT/subscriber/new?topic_ido=ORDOT_751

Track Transportation Improvement Projects: Several upcoming transportation projects were highlighted above that overlap areas of interest identified by participants at this symposium. Both Caltrans and ODOT have online systems that show planned and programmed projects:

ODOT Transportation Project Tracker <https://gis.odot.state.or.us/tpt/>

Caltrans State Highway Operation and Protection Program 10-Year Project Book
<http://projectbook.dot.ca.gov/>

Support ODOT and [Southern Oregon Wildlife Crossing Coalition](#) to help fund and advocate for designs, environmental surveys and permitting, and construction of the two prioritized overcrossing projects specified above, as well as the other six wildlife crossing improvements in the [Southern Oregon Wildlife Crossing Project Conceptual Design Report](#) (River Design Group and Samara Group 2022). Coordinate with agencies and organizations in the Cascade-Siskiyou Connectivity Partnership that purchase land or conservation easements to initiate conversations with landowners to the east of the Barron Creek Wildlife Overcrossing.

Support Caltrans, the Highway 97 Strike Prevention Team and Highway 139 Stewardship Team to help fund design, engineering, permitting and construction of prioritized wildlife crossings.

Work with Transportation Agencies to Identify Where Climate Adaptation Priorities for State Highways Overlap Areas Important for Connectivity and can provide Multiple Benefits: Caltrans and

ODOT will need to adapt their infrastructure to be more resilient to climate change, which may provide additional opportunities for integrating wildlife crossing infrastructure. Caltrans recently conducted climate change vulnerability assessments for each Caltrans District in 2019 to identify areas of the state highway system that are likely to be vulnerable to climate change. These assessments were followed by Adaptation Priorities Reports for each District in 2020/2021 (2020 Adaptation Priorities Reports | Caltrans) that identify the facilities with the greatest potential risk to climate impacts. These District-level reports provide a separate prioritization for bridges, large culverts, small culverts, and roadways and highlight the top priorities in each category for detailed climate adaptation assessments.

Check out [A Toolkit for How Land Trusts Can Contribute to Highway Infrastructure Projects for Wildlife](#) (Paul et al. 2023). This new resource from the Center for Large Landscape Conservation is a compilation of lessons learned and best practices in action by land trusts engaged in wildlife crossing structure projects, and includes many diverse examples and links to allow for further examination.

9. Restoration & Stewardship

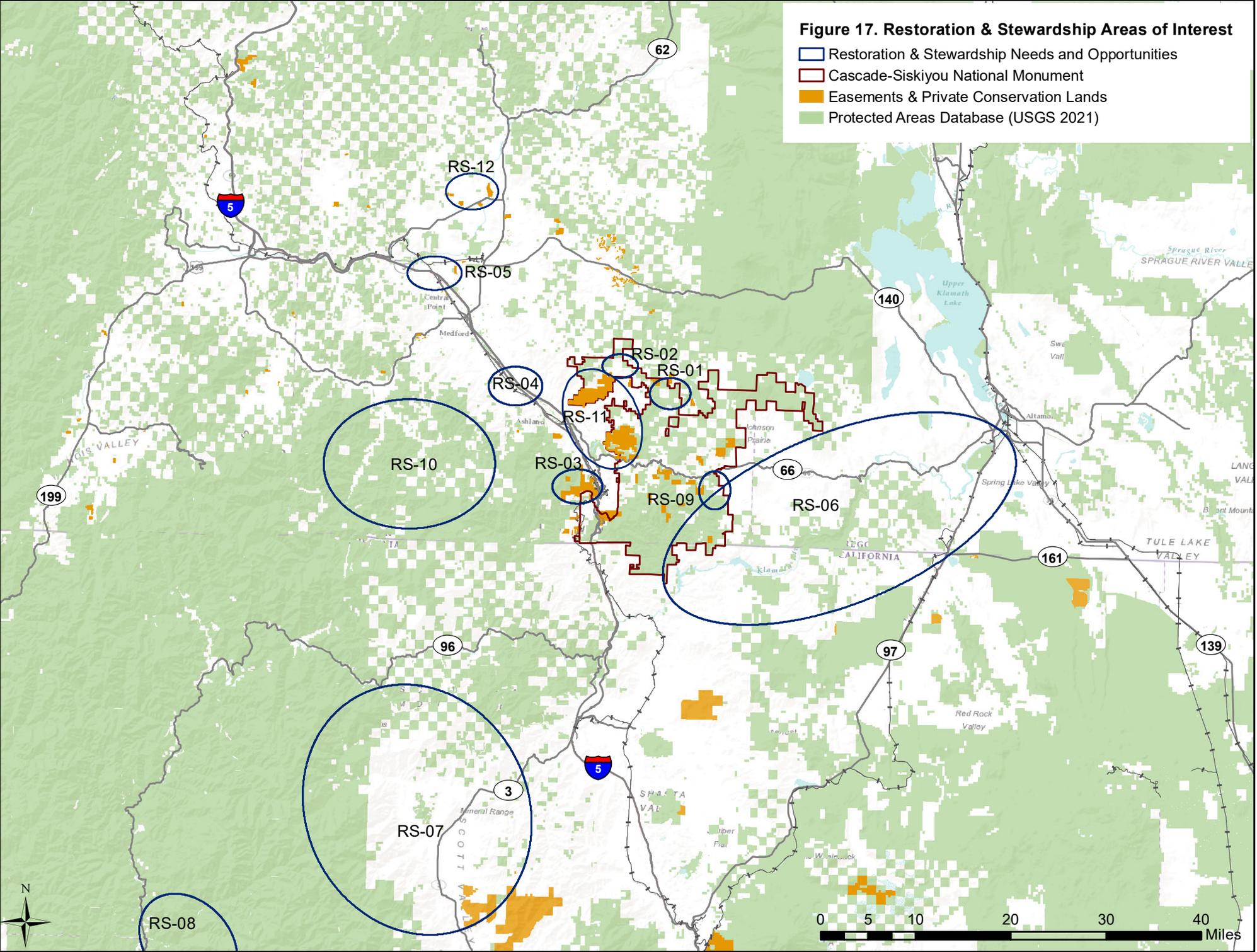
The Cascade-Siskiyou Connectivity Partnership can assist with restoring priority habitats and creating a conservation stewardship legacy. Many participating agencies and organizations conduct habitat restoration and stewardship activities on both public and private lands. The Partnership can help facilitate restoration of degraded habitats through private and public partnerships. Restoring riparian ecosystem functions is especially important in an era of climate change (Seavy et al. 2009), as they offer cool, shady areas as refugia from increasing temperatures, and connect many ecological zones, giving plants and animals room to move. The term stewardship speaks to the importance of long-term conservation, monitoring and adaptive management, which are essential to maintain and restore connectivity and the ecological processes on which biodiversity depends. Stewardship of public and private working lands is also integral to maintaining and restoring landscape connectivity.

Participants were asked to identify and describe existing or past efforts, or specific needs or opportunities to restore or steward land to improve habitat connectivity and wildlife movement in the region. Several Restoration and Stewardship Areas of Interest were identified (Figure 17) and are described below.

Vesper Meadows (RS01 on Figure 17) are two interconnected upland wet meadows situated in the headwaters of both the Rogue River and Klamath River basins within the outer boundary of the Cascade-Siskiyou National Monument. Vesper Meadows overlaps with draft Priority Wildlife Connectivity Areas identified by the Oregon Connectivity Assessment and Mapping Project (ODFW 2022). Over 1,000 acres have been protected under conservation easement by the Southern Oregon Land Conservancy, which are stewarded by the organization Vesper Meadows to maintain/restore biodiversity with an emphasis on native plant communities, wild foods and imperiled species. Vesper Meadows prioritizes Tribal partnerships and community engagement in all of their programs, and is creating a local/regional volunteer corps that works across land ownerships to do restoration and stewardship. Vesper Meadows works with their parent organization, The Understory Initiative, on grassland and meadow restoration activities (e.g., seed collection, invasive weed pulls, native food plant tending). With support from USFWS Partner's Program, they are working with The Beaver Coalition to restore Latgawa Creek using beaver-based restoration strategies. With funding from ODFW's Forest Stewardship Program, they're embarking on a long-term effort to restore a recently clearcut 80-acre parcel. They are partnering with the Siletz and Grande Ronde

Figure 17. Restoration & Stewardship Areas of Interest

- Restoration & Stewardship Needs and Opportunities
- Cascade-Siskiyou National Monument
- Easements & Private Conservation Lands
- Protected Areas Database (USGS 2021)



Indigenous communities on their Tribal Partnership and First Food Restoration and Native Plant Stewardship Programs. Vesper Meadows is at the forefront of community-based restoration and stewardship, and hosts several events and activities for connecting people to the land, [Upcoming Events — Vesper Meadow Education Program](#).

The Crest at Willow-Witt Ranch (RS02 on Figure 17) is an educational non-profit organization based on a 445-acre working ranch within the outer boundary of the Cascade-Siskiyou National Monument that is “committed to land conservation and restoration, alternative energy, sustainable agriculture, and sharing that knowledge and experience with others” through self-guided tours, public events, school programs, summer camps, and wildlife and habitat studies. The Crest provides education to youth in the community through place-based lessons, including field studies on the western pond turtle population. A ranch-wide restoration plan includes guided efforts, such as cattle-exclusion fencing to protect and enhance wetland and meadow habitats (supported by USDA’s Conservation Reserve Enhancement Program); a riparian restoration effort with Oregon State University Extension Service and local elementary schools; and a 30+ year effort to restore a forest monoculture of white fir with over 7,000 seedlings of ponderosa pine, Douglas-fir, incense cedar, and sugar pine to resemble the forest’s previous diversity. Habitat on [Willow-Witt Ranch](#) supports imperiled species such as sandhill cranes, western pond turtle, northern harriers and great grey owls. A workshop participant said the land is being stewarded to protect a high-elevation population of western pond turtles that have likely moved to higher elevations due to climate change, and that there is a need to protect other areas in the watershed for this special-status species. The Ranch also overlaps with draft Priority Wildlife Connectivity Areas identified by the Oregon Connectivity Assessment and Mapping Project (ODFW 2022).

Mount Ashland Demonstration Forest (RS03 on Figure 17) is an 1,120 acre-property in the upper Rogue River basin along the Siskiyou Crest immediately west of Interstate 5. Pacific Forest Trust purchased this strategic property in 2020 to maintain and restore essential connections for species such as Pacific fisher, wolves, and northern spotted owl between the Cascade-Siskiyou National Monument, the Rogue River-Siskiyou National Forest and other protected and conserved lands, such as the adjacent 2,000-acre Mountcrest Forest. The project creates an integrated landscape of properties that are being managed across boundaries for climate adaptation, critical wildlife habitat, and watershed values. In partnership with the Oregon Watershed Enhancement Board (OWEB), ODFW, USFWS, and the Land Trust Alliance, Pacific Forest Trust is restoring and stewarding the forest, meadows, wetlands and woodlands to provide live-in and move-through habitat for many species and to increase climate resilience using cultural burning and other approaches. This property overlaps with the draft Priority Wildlife Connectivity Areas identified by the Oregon Connectivity Assessment and Mapping Project (ODFW 2022) in an area being monitored by SOU for wildlife movement (RM01 on Figure 10), and there are wildlife crossing improvements planned by ODOT with support from the Southern Oregon Wildlife Crossing Coalition (TI-04 on Figure 13). [Pacific Forest Trust](#) protects land in fee and also has several other conservation easements in the Cascade-Siskiyou focus area. They pioneer financial incentives for landowners to steward and protect, conserve and restore forests for climate resilience, water security, and fish and wildlife habitat.

Bear Creek Floodplain Reconnection Project (RS04 on Figure 17) is one of several priority restoration projects identified as part of the [Bear Creek Restoration Initiative](#), which is a forum that has engaged multiple entities to discuss and coordinate restoration activities along Bear Creek and its tributaries. The Bear Creek Floodplain Reconnection project identified at the symposium overlaps with a draft Priority Wildlife Connectivity Area and a Potential Transportation Mitigation Site identified by the Oregon

Connectivity Assessment and Mapping Project (ODFW 2022). Some of the target species that occur in this area and will benefit from restoration efforts include coho and Chinook salmon, summer steelhead, monarch butterflies, Pacific lamprey, beaver and bald eagles (Rogue Valley Council of Governments 2019). The Rogue River Watershed Council is seeking a grant from the Oregon Watershed Enhancement Board to implement the Bear Creek Floodplain Reconnection Project, in partnership with the Freshwater Trust. The workshop participant that identified this Area of Interest said that the City of Talent, just north of Ashland, is planning to provide community outreach for the effort and hopes trails, wildlife viewing platforms and interpretive signage are integrated into the project design to effectively engage the community as land stewards. A Talent City Council Member, Jason Clark, offered to serve as an ecological ambassador to local governments so as to convey the importance of connectivity to key stakeholders and decision makers.

Kirtland Ponds Lagoon Shorebird Habitat Enhancement (RS05 on Figure 17): Rogue Valley Sewer Services is working to enhance mudflat habitat for shorebirds at its south sewage lagoon, which is no longer needed for sewage management. The project is located off of Kirtland Rd. in Jackson County and involves habitat enhancement of roughly 14 acres for public access and usage. The official project title is Wetland Habitat Creation, Enhancement, and Public Access at Rogue Valley Sewer Services Lagoon. They are partnering with Rogue Valley Audubon, whose members serve on the advisory council and who have provided letters of support for grant application for the planning and design phase. Other potential implementation partners include Watchable Wildlife, Klamath Bird Observatory, and Rogue River Watershed Council. This project also overlaps with a draft Priority Wildlife Connectivity Area identified by the Oregon Connectivity Assessment and Mapping Project (ODFW 2022).

Klamath Dam Removal and Restoration (RS06 on Figure 17) effort is the focal project of the Klamath River Renewal Corporation (KRRRC), a private, independent non-profit 501(c)(3) organization tasked with implementing the largest dam removal and river restoration effort ever performed in the United States – and possibly the world (<http://www.klamathrenewal.org/>). The primary goal of removing the dams is to restore aquatic connectivity and reopen access to more than 400 miles of historical anadromous fish habitat, including critical spawning areas. The plan is to remove the four hydroelectric dams located on the Klamath River, three in California and one in Oregon. This landscape-scale restoration effort overlaps with Essential Connectivity Areas identified in California (Spencer et al. 2010) and a draft Priority Wildlife Connectivity Area identified by the Oregon Connectivity Assessment and Mapping Project (ODFW 2022). There are two separate but companion agreements that address the terms of the dam removal. The Klamath Hydroelectric Settlement Agreement is focused on restoring river flows, and the Klamath Basin Restoration Agreement focuses on habitat restoration and community sustainability. The Settlement Agreement is supported by governments, Tribal nations, irrigators, fishers, and conservation groups; 42 organizations signed the Klamath Agreements in 2010. In 2021, KRRRC contracted with [RES](#) to implement the restoration agreement, which covers the design, construction, and long-term management of 18,000 linear feet of high-priority tributaries that will be reconnected to the Klamath River. It also includes revegetation of 2,200 acres of ground surfaces that will be exposed once reservoirs behind the dams are drawn down. Together these efforts have and will involve decades of collaboration amongst numerous Tribal Nations (Yurok, Karuk, Hoopa Valley, Shasta, and Klamath), natural resource agencies, conservation organizations, scientists, landowners, and others.

Scott River Restoration Plan (RS07 on Figure 17): The Scott River Watershed overlaps with California Essential Habitat Connectivity Areas (Spencer et al. 2010), priority connectivity areas identified for Pacific fisher and marten (Spencer et al. 2019), and connectivity areas identified as important for climate adaptation (The Nature Conservancy 2020). The Scott River also provides vital aquatic connectivity,

supporting a Core, Functionally Independent Population of Southern Oregon Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*), one of the most productive natural stocks in the Klamath River basin (National Marine Fisheries Service 2014, SRWC 2018).

The [Scott River Watershed Council](#) (SRWC) completed a restoration plan in 2018 entitled, Watershed-scale Floodplain Restoration to Enhance and Increase Juvenile Coho Salmon Off-Channel Summer Rearing and Overwintering Habitat in the Scott River Watershed- Phase I Planning Project, which “identified and prioritized high-value restoration sites where coho rearing habitat can be enhanced within key cold water reaches of the Scott River system. The long-term objective of the Project is to provide a guiding document to assist practitioners in optimizing restoration funding opportunities to restore both quantity and quality of slow, deep-water habitats during both baseflow and winter high flows, improve floodplain connectivity, and increase or create habitat complexity within instream and off-channel areas, including side channels, alcoves, and ponds”. SRWC is currently working with local landowners and other partners to implement one of the priority restoration projects identified in the 2018 report, the Scott River Tailings reach, to restore floodplain connectivity for salmonid migration. SRWC has conducted analyses of this 1-mile reach (approximately 100 acres) for existing conditions to identify restoration options to restore riverine processes, off-channel wetted areas and connection pathways that can provide aquatic connectivity and refuge for rearing juvenile salmonids.

With funding from Bella Vista, Nomellini, CDFW and USFWS, [California Trout](#) (Caltrout) is also working with its partners (Siskiyou Farm Bureau, Siskiyou County, Cooperating Safe Harbor landowners, Timbervest, The Nature Conservancy, Scott River Water Trust, NOAA/NMFS, Shasta Valley/Siskiyou RCD, Coho Recovery Group, UC Davis Center for Watershed Sciences, Watercourse Engineering Inc.) on several aquatic restoration projects in the Scott River watershed. Caltrout recently increased instream complexity and reconnected the South Fork Scott River to off-stream floodplain habitat. Their Mill-Shackleford fish passage project will remove a partial barrier and open up access to over a mile of critical juvenile coho salmon rearing habitat. Caltrout is also implementing a fish passage project at Scott Bar, and completing an instream restoration project at Menne Ranch.

Lower Salmon River Mine Tailings (RS08 on Figure 17): The Salmon River watershed is a major tributary to the Klamath River located in the Klamath Mountains, with nearly the entire forested watershed managed by the Klamath and Six Rivers National Forests. The Salmon River watershed is rich in biodiversity and provides live-in and move-through habitat for countless species, as well as providing connectivity between coastal and interior forests (SRRC 2022). Most of the watershed is identified as Large Natural Habitat Areas in California’s Terrestrial Connectivity layer (CDFW 2019a). Though the great majority of the watershed is managed by the forest service, there are legacy impacts from extensive historical gold mining that degrade habitat conditions within the floodplain and riparian corridor, particularly for salmonids and other aquatic species, primarily due to mine tailings. There are no dams between the Salmon River and the ocean, providing generally unimpeded access to anadromous fish, though there are fish passage barriers that have been prioritized for remediation (CDFW 2019b).

The [Salmon River Restoration Council](#) (SRRC) has been engaged in habitat restoration efforts in the Salmon River watershed since 1992 and has sponsored nearly 2,200 restoration-related workshops, workdays and field trips since its inception. The mission of the SRRC is to “assess, protect, restore and maintain the Salmon River ecosystems with the active participation of the local community, focusing on restoration of the anadromous fisheries resources and the development of a sustainable economy. They provide assistance and education to the general public and cooperating agencies by facilitating

communication and cooperation between the local communities, managing agencies, Native American Tribes, and other stakeholders.” Their Salmon River Community Restoration Program Annual Work Plan (SRRC 2022) described two major efforts: (1) Complete Salmon River In-stream and Floodplain Restoration Action Plan, including project and/or reach prioritization; and (2) Work with managing agencies to begin development of programmatic NEPA for floodplain and mine tailing restoration projects.

Jenny Creek Restoration and Dam Removal (RS09 on Figure 17): Jenny Creek is a tributary to the Klamath River that begins in Oregon and currently empties into the Iron Gate Reservoir in California, which is slated to be removed under the Klamath Basin Dam Removal and Restoration agreements described above. Jenny Creek is located within and adjacent to the Cascade-Siskiyou National Monument, in an area of exceptionally high biodiversity. Part of Jenny Creek flows through the Soda Mountain Wilderness, which was designated in 2009 after extensive restoration along Jenny Creek and surrounding meadows following the acquisition of the Box O’ Ranch by Medford BLM. In 2019, Congress designated 17.6 miles of Jenny Creek in Oregon as “Scenic” under the Wild and Scenic Rivers Act.

Upper Applegate Watershed Restoration (RS10 on Figure 17) effort on the Rogue River-Siskiyou National Forest is a project of the [Rogue Forest Partners \(RFP\)](#), whose partners include USFS, USFWS, Oregon Department of Forestry, Klamath Bird Observatory, TNC, NRCS, BLM, Oregon State University, Lomakatsi Restoration Project, and Southern Oregon Forest Restoration Collaborative. The partnership initiated several restoration treatments in the Upper Applegate watershed beginning in 2021 (some controversial), as part of a 6-year effort funded through the Oregon Watershed Enhancement Board. The Final Decision Notice (2020) authorized 3 miles of road restoration, decommissioning 3-4 miles of OHV trails, riparian restoration on 100 acres, botanical enhancements on 6,108 acres, commercial thinning of 1,520 acres, non-commercial thinning on 3,290 acres, prescribed fire 4,428 acres, fuel maintenance on 5,660 acres, McKee Trail restoration and 2.1 miles of motorized trail (<https://www.fs.usda.gov/detail/rogue-siskiyou/landmanagement/projects/?cid=fseprd662282>).

The Sampson Creek Preserve and the Grizzly Peak Preserve (RS11 on Figure 17) are located within the Rogue Valley Foothills and together comprise over 9000 acres of privately owned conservation land managed by the Selberg Institute. Federal lands managed by the Bureau of Land Management, now part of the Cascade-Siskiyou National Monument (CSNM), abut the preserves at many points along the boundaries. Because the CSNM and the preserves share a common goal of conserving the area’s numerous biological and ecological values, the combined matrix of public and private lands increases habitat connectivity across the landscape and provides continuity from the valley floor to the Cascade plateau. Both preserves contain a mosaic of plant communities that greatly contributes the area’s biodiversity. However, both preserves are dominated by oak woodlands. Oregon’s oak woodlands are an imperiled ecosystem. Across western Oregon and adjacent northern California, the vast majority of our region’s oak woodlands and grasslands have been severely degraded or lost to development. Those oak-dominated areas that remain are threatened by numerous factors and very few are in public ownership, where their natural values are more likely to be sustained. According to the ODFW, less than 1% of the historical extent of oak and grassland habitats in the state are currently protected. Conservation and effective stewardship of Sampson Creek’s and Grizzly Peak’s relatively intact oak communities will significantly contribute to sustaining this imperiled ecosystem and the many species that rely upon it.

Essentially, the Sampson Creek Preserve and the Grizzly Peak Preserve both encompass a relatively intact, complete and rare cross-section of the native ecosystems that historically occupied the interior valleys and foothills of southwest Oregon. Conservation of these lands will not only offer a refuge for the

area's many plants and animals, but will also offer opportunities for scientific research and outdoor education with the goal of better understanding this unique ecosystem and the many species that depend on it for their survival. Keeping the lands undeveloped and unfragmented will also provide critical connectivity in this important Cascade-Siskiyou linkage corridor.

Agate Desert Conservation Area (RS12 on Figure 17) includes an assemblage of fee-owned, mitigation bank, and Conservation Easement properties in the Agate Desert Landform in Southwest Oregon, held for conservation by Southern Oregon Land Conservancy, The Nature Conservancy, ODFW, BLM, City of Medford, ODOT, and Resource Environmental Solutions. The Agate Desert contains vernal pool-mounded prairie, grassland, chaparral, and oak woodland. The Agate Desert Preserves and Conservation Areas are a remnant of a formerly larger landform, which supported chaparral and grassland dependent birds, in addition to providing food and habitat for migrating waterfowl. The Agate Desert lies within Southern Oregon Land Conservancy's Agate Desert-Middle Rogue Focus Area and is in the North Medford Area Conservation Opportunity Area of the ODFW.

These preserves are home to three species that are listed under the federal Endangered Species Act. The vernal pool fairy shrimp is a charismatic invertebrate that breeds in the pools and was listed as threatened by the USFWS in 1994 in California. In 1998, vernal pool fairy shrimp were discovered in the vernal pools in the Agate Desert and the Table Rock areas of Jackson County, Oregon, and the listing was expanded to include these populations. Vernal pool wetlands were designated by USFWS as Critical Habitat in 2003 for the vernal pool fairy shrimp. Cook's lomatium and large-flowered woolly meadowfoam were listed as endangered by the USFWS in 2002. A recovery plan for the three species was finalized in 2005 and Critical Habitat for the two plants was designated in 2010. Other special status plants and animals occur within the Agate Desert such as the hairy water flea and Greene's popcorn flower.

Recommended Actions Related to Habitat Restoration and Stewardship:

Work with ODOT and Caltrans to restore vegetation at the approaches and through crossing structures, when possible, to guide wildlife to and through the structures. Many existing bridges and culverts, that were built primarily for flood control, may facilitate wildlife movement and could be enhanced to improve connectivity with habitat restoration. New wildlife crossings installed by ODOT and Caltrans will also need habitat restoration following construction. Habitat restoration efforts should consider the needs of multiple native species likely to use a given area.

Support federal land managers and large landholders in long term restoration efforts to address legacy impacts (e.g., clear cuts, mine tailings)

Assist interested landowners with habitat enhancement projects to improve habitat quality and functional connectivity through cooperative programs such as Partners in Restoration.

Maintain and restore riparian ecosystem functions through habitat restoration efforts and establishing stewardship buffer zones along streams and rivers.

10. Strategic Connectivity Conservation Investments

Integrating wildlife crossings into our transportation networks is meaningless if land on either side of the structure is not protected from habitat conversion. Although acquisition and conservation easements protect land in perpetuity, conserving a linkage does not necessarily require buying it. Effective conservation on private lands can be very different, depending on context. For example, where there are working landscapes that provide functional connectivity, there are ways to support landowners to maintain and enhance landscape permeability. Conversely, where there are highly sensitive habitats or areas under tremendous pressure at choke points, these areas may be targeted for acquisition or conservation easements.

Symposium participants were asked to identify specific needs and opportunities to protect and conserve habitat connectivity and wildlife movement in the region (e.g., designated critical habitat, mitigation needs for particular projects, conservation plans or initiatives). Several areas of interest and opportunities were identified (Figure 18), though not all are mapped due to the sensitivity of the information.

New Forest Timber Company (CI-1, CI-2, CI-3, CI-4 and CI-5 on Figure 18): The Klamath Forest Alliance, along with other conservation groups, have been working for several years to broker a conservation purchase of private forestlands owned by New Forest Timber Company, formerly owned by Fruit Growers Supply Company, which includes a checkerboard of private forest land within the boundaries of both the Klamath (KNF) and Rogue River-Siskiyou National Forests (RRSNF). Locations of interest include the headwaters of Elliott Creek, which includes high-value old-growth stands; and some areas in the upper Little Applegate Watershed off of Beaver Creek Road. These acquisitions may be eligible for funding through the Land and Water Conservation Fund.

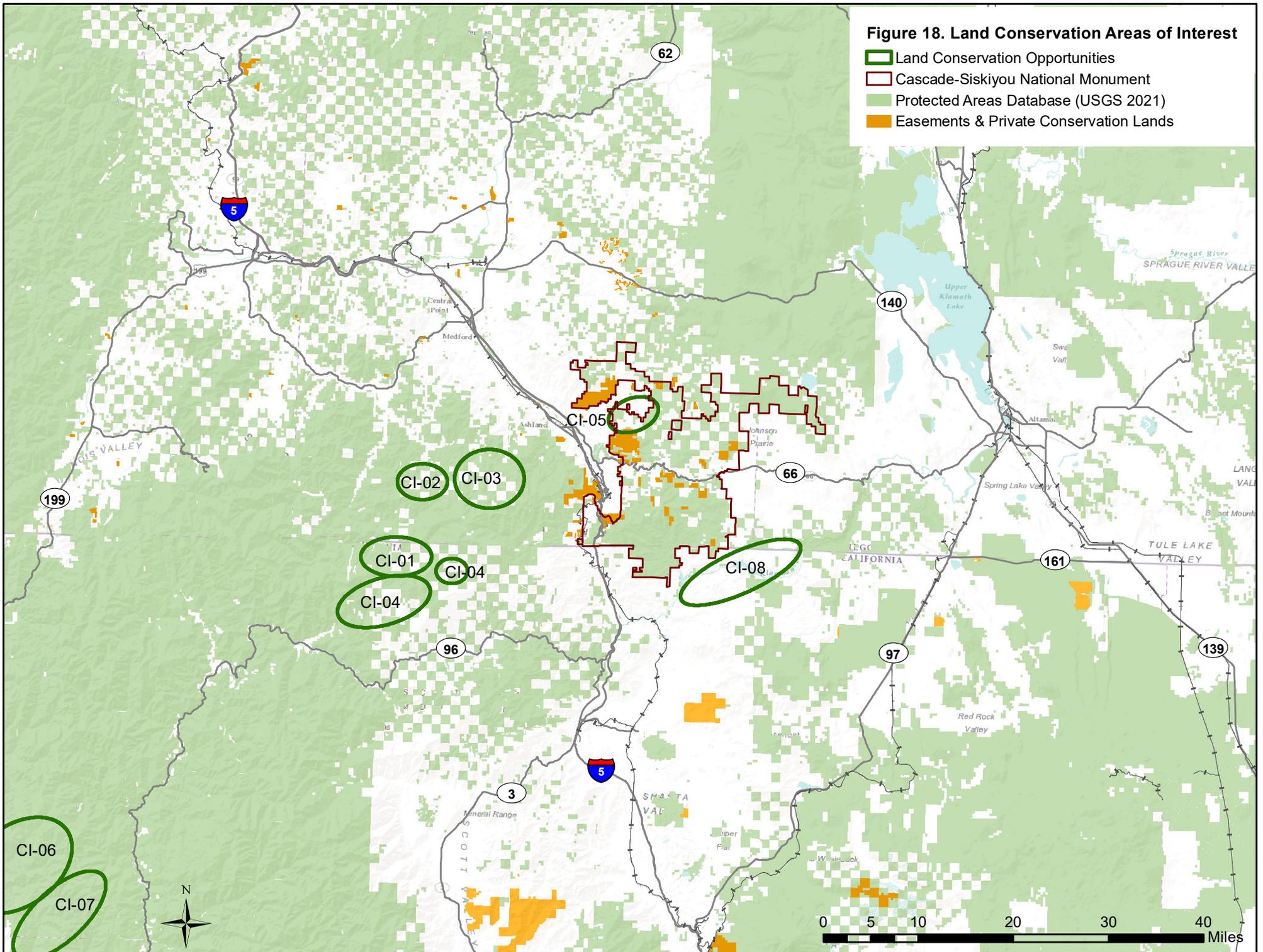
New Forest was interested in selling three separate areas CI-1, CI-2, and CI-3 on Figure 18, within the RRSNF, which if acquired, could eventually be transferred to the RRSNF. Yet, currently the agency is pursuing only two parcels along the PCT at Wards Fork Gap and Donomore Meadows. CI-1 includes the old-growth headwaters of Elliott Creek. CI-4 on Figure 18 is the New Forest lands within Klamath National Forest.

New Forest also has holdings within the Cascade-Siskiyou National Monument (CI-5 on Figure 18) on Tom Spring Mountain near the Selberg Institute's Sampson Creek Preserve. If acquired, these parcels could eventually be transferred to the BLM using the Land and Conservation Fund.

Federal Land Transfers to and/or Co-management with Yurok and Karuk Tribes (CI-6 and CI-7 on Figure 18): An opportunity to protect and conserve core habitat and connectivity was identified in the upper Blue Creek Watershed on the Six Rivers National Forest. The Yurok Tribe is working on land legislation and a co-management agreement between the Tribe and the Six Rivers National Forest in two areas: 1) Upper Blue Creek and Crescent City Fork, Late-Successional Reserve lands (CI-6 on Figure 18); and 2) East Fork Blue Creek Wilderness Area (CI-7 on Figure 18). The Yurok Tribe is drafting legislation to request transfer of all lands on the Six River National Forest that are within Yurok Ancestral Territory. The Upper Blue Creek and Crescent City Fork areas would be solely under Yurok ownership and stewardship, while lands within the East Fork Blue Creek Wilderness would be co-managed by the Yurok and Karuk Tribes. This repatriation of ancestral tribal lands would require legislation and an Act of Congress.

Figure 18. Land Conservation Areas of Interest

- Land Conservation Opportunities
- Cascade-Siskiyou National Monument
- Protected Areas Database (USGS 2021)
- Easements & Private Conservation Lands



This proposed federal land transfer to the Tribe/s would build upon a 47,097-acre acquisition from Green Diamond Resource Company by the Western Rivers Conservancy and the Yurok Tribe to establish the Blue Creek Sanctuary in the lower Blue Creek Watershed and the Yurok Community Forest. These lands are located along the eastern side of the Wild and Scenic Klamath River, one of the West's most iconic landscapes and a lifeline for fish, wildlife and people. The Sanctuary and Community Forest are entirely within the Tribe's ancestral territory and the Blue Creek watershed contains the most sacred of religious sites known to Yurok. The Blue Creek Sanctuary and Yurok Community Forest lie in a key location to maintain and restore habitat connectivity in the North Coast Ecoregion, and provide one of the best linkage opportunities between coastal and interior forests in California. The Blue Creek Sanctuary is contiguous with over five million acres of land administered by the US Forest Service in the Six Rivers, Klamath, Shasta-Trinity, and Mendocino National Forests, and makes a significant contribution to linking this expansive block of habitat to Redwood National and State Parks on the coast, which support approximately 40,000 acres of old-growth redwood forest.

The overarching goal of the Blue Creek Sanctuary is to provide for the long-term enhancement and protection of Blue Creek, a vitally important coldwater tributary of the Lower Klamath River. Blue Creek provides over 25 miles of habitat for anadromous runs of coho salmon, Chinook, steelhead, coastal cutthroat trout, and Pacific lamprey, as well as a significant coldwater refuge for migrating salmonids from throughout the Klamath Basin. The primary management goal for the Sanctuary is to restore old-growth forests and aquatic habitats to benefit native fish and wildlife, with special emphasis on imperiled species such as coho salmon, marbled murrelet, northern spotted owl, Humboldt marten, Pacific fisher and mardon skipper butterfly. The Sanctuary is being managed to maintain and enhance the ability of Blue Creek to continue to play its vital ecological role of moderating temperatures of the mainstem Klamath River, providing exceptional refugia habitat for anadromous fish, and to restore functional connectivity of late-successional forests at the landscape scale to reconnect coastal and interior forestlands.

The 47,097-acre land acquisition occurred in multiple phases and transactions. Phase I, completed in 2011, encompasses 22,237 acres in three Lower Klamath watersheds (Pecwan, Ke'pel, and Weitchpec), which are managed as part of the Yurok Community Forest and provide income to the Tribe through sustainable forestry while also protecting and enhancing the cultural, wildlife, riparian, and carbon sequestration values of these lands. Phase II acquired lands encompass 24,860 acres of coastal forests within the Blue Creek Watershed, the Bear Creek Watershed, and on Starwein Ridge. Lands within the Blue Creek Watershed (14,790 ac) are managed as a fish and wildlife Sanctuary devoted primarily to enhancing and restoring healthy resilient riparian and old-growth forests, that once dominated this watershed. Lands within Bear Creek (6,444 ac; located upriver from Blue Creek), and on Starwein Ridge (3,626 ac; located downriver and northwest of Blue Creek), are managed as units of the Yurok Community Forest. The Bear Creek Unit and portions of the Blue Creek Sanctuary are also generating income through the sale of carbon credits to provide long-term carbon sequestration benefits.

Klamath Dam Removal Parcel B Lands (CI-8 on Figure 18): There are two general categories of land ownership in the hydroelectric reach of the Klamath Dam Removal Project, [Parcel A and Parcel B lands](#). As defined in the amended Klamath Hydroelectric Settlement Agreement (KHSA), Parcel A lands in Oregon and California "are not directly associated with the Klamath Hydroelectric Project, and generally not included within the existing project boundary." Parcel B lands in Oregon and California are "associated with the Klamath Hydroelectric Project and/or included within the FERC project boundary" (KHSA, 2016). After

completion of the proposed dam removal actions, “ownership of these [Parcel B] lands, which are within the CI-8 polygon on Figure 18, will be transferred to the respective States, as applicable, or to a designated third-party transferee.” The amended KHSA also states that “It is also the intent of the Parties that transferred lands shall thereafter be managed for public interest purposes such as fish and wildlife habitat restoration and enhancement, public education, and public recreational access.”

Other areas of interest discussed but not mapped:

- A large private inholding within the RRSNF in the Upper Applegate watershed, near the Mule Mountain trail area, has high quality oak woodland on an extensive property.
- There are a number of Department of State Lands (DSL) land holdings that support high biological diversity and have been for sale, including Woodcock Mountain in the Illinois Valley, and other holdings in the Colestin and along the Rogue River.
- Interest in conserving forest lands owned by Weyerhaeuser and Chinook surrounding the Willow Witt property (described in the Restoration & Stewardship section), which supports a large western pond turtle population.
- Numerous opportunities to purchase and restore degraded timberlands that have been “handed down the chain” of multiple corporate ownerships (e.g., Sierra Pacific, Weyerhaeuser, Green Diamond)

In addition to federal and state agencies, participants identified the following organizations that are actively engaged in land acquisitions and easements in support of connectivity conservation in the region:

Southern Oregon Land Conservancy (SOLC) preserves and cares for over 12,400 acres in the Rogue River Basin with a strategic focus in six areas, including the Agate Desert-Middle Rogue, Applegate Valley, Cascade Foothills, Colestin-Siskiyou Summit, Little Butte Creek and Upper Illinois River. Connectivity to already conserved lands is one of the criteria SOLC uses to identify potential projects. SOLC is currently working on revising and expanding their conservation opportunity areas to include all of the Cascade-Siskiyou “land bridge” and the Siskiyou Crest.

Pacific Forest Trust is a non-profit organization focused on working forest conservation easements; visit <https://www.pacificforest.org/conservation-projects/> to see a map of their conservation easements in the Cascade-Siskiyou focus area. The Trust pioneers new sources of financial return for landowners to steward and protect their forests to conserve forests, advance climate solutions, protect water sources, and maintain wildlife habitat.

RES, who is implementing the restoration agreement for the Klamath Dam Removal and Restoration project (described in the Restoration & Stewardship section), can also hold properties in fee title and works in mitigation banks and bonding. A participant from RES explained that if there’s a solid assurance on funding but it’s not yet in hand, they have the ability to purchase properties and hold them until funding is available.

Western Rivers Conservancy buys land along the West’s finest rivers and streams to conserve habitat for fish and wildlife, protect key sources of cold water and provide public access for all to enjoy. Based out of Portland, they work in both Oregon and California and have several projects in the Cascade-Siskiyou focus area. They have worked closely with the Yurok Tribe for over a decade in the lower Klamath to conserve the Blue Creek Sanctuary and Yurok Community Forest (described in the Restoration & Stewardship

Section), where they used several strategies to purchase over 47,000 acres from Green Diamond Resource Company. These include creative funding sources, such as “cap and trade” funding for land acquisitions; California State Water Board that provided a 0% interest loans for forest acquisition; and a Carbon Project revenue that allowed them to re-pay the loan and will keep providing funding to the Tribe for the life of the 100-year life of the project. New Market tax credits were also an avenue for community development projects, like the Yurok Community Forest. Other grants (e.g., Wildlife Conservation Board Forest Conservation Grant, Caltrans Environmental Enhancement & Mitigation Program, Coastal Conservancy) also helped fund the purchase.

The mission of the **Selberg Institute** is to help conserve the unique ecosystems of the greater Cascade-Siskiyou landscape for the benefit of all, through land stewardship, advocacy, education, and scientific research. The Institute initiates and supports ongoing efforts in, scientific research, public awareness, community engagement, land acquisition and stewardship. Selberg Institute owns and stewards two key parcels with outstanding habitat and connectivity values, the [Sampson Creek Preserve](#) and the [Grizzly Peak Preserve](#), which together total nearly 9,200 acres of protected land.

The **Klamath Forest Alliance's** [Connecting Wild Places Program](#) works to document, identify, promote, protect and defend important wildlands and connectivity corridors. The Alliance doesn't directly purchase land but rather facilitates the conservation of important private lands, such as the New Forest Timber Company lands described above.

Recommended Actions for Strategic Connectivity Conservation Investments:

Identify opportunities for using the Land and Water Conservation Fund to secure federal land acquisitions and conservation easements on private parcels that are important for ecological connectivity. Within the USFS, proposals for acquisitions are advanced by USFS Regions and evaluated at the USFS Washington Office based on a set of criteria, including climate resilience (which includes connectivity) and partnership support. Proposals for BLM LWCF land acquisitions can be advanced at state offices, following criteria established by the Dingell Act. NGOs and state agencies can also work with the USFS to use the USFS Forest Legacy program to secure conservation easements for private lands that contain key areas for species movement.

Conduct Parcel Analysis of Priority Connectivity Zones: Land conservation research and fine-scale parcel analyses are needed to identify priority connectivity zones in the planning area and help guide strategic conservation efforts of agencies and organizations that do acquisitions and easements. These parcel-level analyses could follow the California Wildlife Conservation Boards Conceptual Area Protection Plan format, which identifies multiple attributes at the parcel level, such as designated critical habitat, recorded occurrences of listed and sensitive species, GPS collar data, land use and zoning, land cover and vegetation types, and hydrological features.

Develop Conceptual Conservation Strategies: Participating agencies and organizations who acquire and conserve land should work collaboratively to develop a map of conceptual conservation strategies for lands with no conservation status in priority connectivity zones, ideally informed by the fine-scale parcel analyses described above. The conceptual strategy should try to identify potential funding opportunities (e.g., Federal Section 6 funds for critical habitat; state sources such as WCB or Coastal Conservancy; local county bonds, mitigation banks, development dedications, etc.) for particular areas located in high priority

linkage zones and the jurisdictions of each participating agency/organization, so as to more strategically plan conservation investments. Resource Conservation Districts, Counties, and non-profit organizations that work with ranchers and farmers that may be interested in conservation easements should ideally also participate in this process.

Conserve and Enhance Key Connectivity Areas through outright purchase or acquisition of conservation easements from willing sellers and prioritize choke points. Easements should have the financial resources to monitor and enforce the terms of enacted agreements

Partner with Tribes to acquire lands within their ancestral territories to support their goals of land management and stewardship.

Check out [A Toolkit for How Land Trusts Can Contribute to Highway Infrastructure Projects for Wildlife](#) (Paul et al. 2023). This new resource from the Center for Large Landscape Conservation is a compilation of lessons learned and best practices in action by land trusts engaged in wildlife crossing structure projects, and includes many diverse examples and links to allow for further examination.

11. Connectivity Outreach and Education

Outreach and education are vital to maintaining and restoring connectivity – both to change land use activities that threaten wildlife movement and to generate appreciation for the importance of the linkages and the ecological/evolutionary processes and ecosystem services they sustain. The Cascade-Siskiyou Connectivity Symposia have engaged wildlife biologists, botanists, landscape ecologists, wildlife and transportation agencies, land managers and planners, land trusts and conservancies, conservation organizations, and others. It is our hope that participating agencies and organizations will act as ambassadors to reach out to the general public and decision-makers when opportunities arise to help establish and foster public advocacy for connectivity conservation. Educating communities will raise awareness and build support around this issue, provide a base of volunteers who can work to implement specific projects in key linkages (e.g., erosion control or riparian planting), and develop the next generation of linkage land stewards. We need to organize new constituencies, empower old partners and utilize the unique abilities of each constituency to institutionalize support for the critical linkages that still remain functional in this region.

Recommendations for Outreach & Education:

Develop Outreach Campaigns that highlight the importance of maintaining ecological connectivity and encourage residents at the urban wildland interface to become active stewards of the land. Topics may include living with wildlife, predator-safe enclosures for livestock and pets, landscaping, fencing, water conservation, noise and light pollution.

Keep Connectivity in the Press: Oregon and California Departments of Transportation have several wildlife crossing projects planned or underway that could be highlighted in the press to educate the public on the need for connectivity and the actions that are being taken on the ground, and the wildlife that these projects will benefit. Some recent examples include this story on the Southern Oregon Wildlife Crossing

Coalition's efforts on I-5, <https://www.ijpr.org/environment-energy-and-transportation/2022-02-18/animal-crossings-could-be-coming-to-southern-oregons-i-5-corridor>; and this coverage of Caltrans' efforts to build a wildlife overpass on State Route 97 <https://www.siskiyoudaily.com/story/news/2022/08/31/animal-crossings-northern-california-highways/7943113001/>.

Highlight Connections Between Efforts: When describing their conservation projects and initiatives, participants in the Cascade-Siskiyou Connectivity Partnership should draw connections between their efforts (e.g., land acquisition, wildlife crossings, habitat restoration) and the Oregon's Priority Wildlife Connectivity Areas and Transportation Mitigation Areas and California's Terrestrial Connectivity Areas of Conservation Emphasis and Priority Wildlife Barriers.

12. Funding for Connectivity and Fish and Wildlife Passage

The following funding programs and opportunities were identified by participants at the symposium that address various aspects of conserving habitat connectivity, including planning and design, land acquisitions and easements, research and monitoring, and improving fish and wildlife passage. This list is not exhaustive.

[America the Beautiful Challenge 2023](#) The National Fish and Wildlife Foundation recently released a Request for Proposals that consolidates funding from multiple federal agencies (Department of the Interior, Department of Defense, USFS, and Natural Resources Conservation Service) and the private sector to enable applicants to conceive and develop large-scale, locally led projects that conserve, connect and restore the lands, waters, and wildlife upon which we all depend.

[Bipartisan Infrastructure Law - Competitive Grant Programs | Federal Highway Administration \(dot.gov\)](#) United States Department of Transportation (USDOT) and FHWA have a variety of competitive grant programs used to fund various types of transportation projects and activities, many of which can support wildlife crossing infrastructure improvements.

Bureau of Land Management issues financial assistance through grants and cooperative agreement awards to institutions of higher education, non-profit organizations, state and local governments, foreign entities and Indian tribal governments for projects that meet the BLM mission and falls in line with the DOI's top priorities. Several programs are available: <https://www.blm.gov/services/financial-assistance-and-grants>.

CDFW's Big Game Grant Program funds are generated through the purchase of game tags that are used in programs and projects that benefit big game species (bighorn sheep, bear, deer, elk, pronghorn antelope, and wild pig). "Projects" refers to research and habitat restoration or enhancement activities that benefit big-game species. These projects may be conducted solely by CDFW staff or in partnership with outside entities (<https://wildlife.ca.gov/Grants/Big-Game>).

California Environmental Enhancement and Mitigation Program (EEMP) administered by the California Transportation Commission funds environmental enhancement and mitigation projects directly or indirectly related to transportation projects, including land acquisition. EEMP projects must fall within one of three categories: highway landscape and urban forestry; resource lands; or roadside recreation. Projects funded

under this program must provide environmental enhancement and mitigation over and above that otherwise called for under the California Environmental Quality Act (<https://catc.ca.gov/programs/environmental-enhancement-mitigation>).

California Forest Improvement Program encourages private and public investment in, and improved management of, California forest lands and resources. Cost-share assistance is provided to private and public ownerships containing 20 to 5,000 acres of forest land. Cost-shared activities include management planning, site preparation, tree purchase and planting, timber stand improvement, fish and wildlife habitat improvement, and land conservation practices (<https://www.fire.ca.gov/grants/>).

California Wildlife Conservation Board's Wildlife Corridor and Fish Passage Program funds planning and implementation projects that improve passage for fish and wildlife. Example projects for this program include the construction of wildlife crossings, restoration of habitat in wildlife corridors, removal of instream impediments to fish passage, etc., and planning projects that provide design and environmental review for wildlife corridor or fish passage restoration projects. Other programs that may contribute to conserving connectivity include Acquisitions and Conservation Easements, Forest Conservation, and Climate Adaptation. For more information, visit <https://wcb.ca.gov/Grants>.

Caltrans Advance Mitigation Program authorizes Caltrans to plan and implement advance mitigation solutions for its future transportation projects to reduce delays by proactively obtaining environmental mitigation in advance of – rather than during – transportation projects. The primary goal of the Program is to address longer-term future environmental mitigation needs resulting in improved environmental, economic, and project delivery outcomes. By consolidating the forecasted mitigation needs of multiple future transportation projects, Caltrans can potentially provide strategically placed and environmentally sound replacement habitat and shorten project delivery timelines, resulting in both time and cost savings. Ultimately, the Program aims to help Caltrans meet conservation goals in addition to regulatory requirements (<https://dot.ca.gov/programs/environmental-analysis/caltrans-biology/strategic-biological-planning-advance-mitigation-innovation/advancemitigation>).

Federal Lands Access Program (FLAP) was established in 23 U.S. Code 204 to improve transportation facilities that provide access to, are adjacent to, or are located within federal lands. FLAP supplements state and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators. The program is designed to provide flexibility for a wide range of transportation projects (<https://flh.fhwa.dot.gov/programs/flap/>).

Federal Lands Transportation Program was established in 23 US Code 203 to improve the transportation infrastructure owned and maintained by the following Federal Lands Management Agencies: National Park Service, Bureau of Land Management, U.S. Forest Service, USFWS, U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, and independent federal agencies with land and natural resource management responsibilities (<https://flh.fhwa.dot.gov/programs/fltp/>).

Federal Wildlife Crossings Pilot Program - \$350 million. BIL provides \$60 million in FY22 and \$350 million over four years for the Wildlife Crossing Safety program. BIL establishes a pilot program to provide grants for projects designed to reduce wildlife-vehicle collisions and improve habitat connectivity. It also requires the Secretary to update a 2008 study on wildlife vehicle collisions, including the causes and impacts of wildlife collisions as well as solutions and best practices for reducing wildlife collisions and improving habitat connectivity.

Klamath Cascades Fish Passage Advisory Committee (FishPAC) is a joint effort between the Caltrans, CDFW, National Marine Fisheries Service, USFWS, and other interested advocates of fish passage efforts. FishPACs cooperatively share science and data related to known fish barriers, and develop methods to prioritize locations for assessments, and biological priorities for remediating. The FishPACs track the status of active and funded fish passage barriers until they are remediated, track post-construction fish passage effectiveness, identify and prioritize barriers to fish passage, and support the implementation of meaningful, long-term solutions for fish passage projects (<https://www.cafishpac.org/klamath-cascades-fishpac>), including funding. Fish passage projects may provide opportunities for integrating terrestrial wildlife passage considerations with project development and priority locations for fish passage improvements.

Nationally Significant Freight and Highway Projects (INFRA) awards competitive grants for multimodal freight and highway projects of national or regional significance to improve the safety, efficiency, and reliability of the movement of freight and people in and across rural and urban areas. Eligible uses include projects that improve safety and enhance resiliency. Total available funding is \$8 billion (FY22-FY26) [INFRA Grants Program | US Department of Transportation](#).

Land and Water Conservation Fund was established by Congress in 1964 to fulfill a bipartisan commitment to safeguard natural areas, water resources and cultural heritage, and to provide recreation opportunities to all Americans. The fund invests earnings from offshore oil and gas leasing to help strengthen communities, preserve history and protect the national endowment of lands and waters. On August 4, 2020, the Great American Outdoors Act (GAOA) was signed into law, authorizing \$900 million annually in permanent funding for LWCF. Prior to the passage of GAOA, funding for LWCF relied on annual Congressional appropriations. Several [LWCF Programs](#) support connectivity conservation.

Mule Deer Foundation's purpose is to ensure the conservation of mule deer, black-tailed deer, and their habitats. The Foundation works to *restore, improve and protect* mule deer habitat (including land and easement acquisitions); *encourage and support* responsible wildlife management with government agencies, private organizations and landowners; *promotes* public education and scientific research related to mule deer and wildlife management; support regulated hunting as a viable component of deer conservation; and develop programs to recruit youth (<https://muledeer.org>).

National Culvert Removal, Replacement, and Restoration Program - \$1 billion. BIL Includes \$200 million in FY22 and \$1 billion overall for a National Culvert Removal, Replacement, and Restoration Program to provide grants to states, local governments, and Tribes to address anadromous fish passage as well as provide funding for certain freshwater impacts to marine fish and shellfish species. [National Culvert Removal, Replacement, and Restoration Grants \(Culvert AOP Program\) - Fact Sheets | Federal Highway Administration \(dot.gov\)](#)

National Fish and Wildlife Foundation awards competitive grants through their programs to protect and conserve fish, wildlife, plants, and habitats. They have several relevant grant programs, such as Conservation Partners Program, Bring Back the Natives, and Acres for America (<https://www.nfwf.org/programs>).

National Forest Foundation's [Matching Awards Program](#) is a competitive grant program which funds implementation of on-the-ground conservation and restoration projects that have an immediate, quantifiable impact on the National Forest System. There are two award cycles and requirements for matching funds.

Oregon Watershed Enhancement Board (OWEB) is a state agency that provides grants to help Oregonians take care of local streams, rivers, wetlands, and natural areas. OWEB's mission is to help

protect and restore healthy watersheds and natural habitats that support thriving communities and strong economies. OWEB has several grant programs that can support several aspects of connectivity conservation and stewardship, such as acquisition, technical assistance, forest collaboratives, monitoring, restoration, and stakeholder engagement.

[Oregon Wildlife Foundation | Grants \(myowf.org\)](#) offers small grants to the ODFW, tax-exempt organizations, volunteer groups with a fiscal sponsor, and qualified individuals for projects that fall within the following areas: fish and/or wildlife habitat restoration; public access preservation, restoration, or improvement; natural resource or outdoor education; invasive species removal or control; and studies that support improved fish/wildlife management. They have four application opportunities in 2023.

Regional Conservation Partnership Program is a Natural Resources Conservation Service program that seeks to co-invest with partners to implement projects that address regional natural resource concerns. Partners must apply to either the Critical Conservation Area (CCA) or state/multi-state funding pool. The Cascade-Siskiyou Connectivity focus area is identified as a CCA. This program awards \$300 million annually. It requires a 50% match, which can be in any combination of cash and in-kind (<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp/>).

Resource Conservation Districts work with state, federal, and local partners to create publications that help local residents make smart conservation and land management choices. These resources can benefit anyone from students to farmers to land managers, and are developed with the public interest in mind. (<https://carcd.org/rcds/find/>). [Regions and Directory of Districts - Oregon Association of Conservation Districts \(oacd.org\)](#)

Rocky Mountain Elk Foundation works to permanently protect quality elk range, migration corridors and calving areas while seeking to open or improve quality public access opportunities. Their conservation tools include land acquisitions and exchanges, conservation easements, contributions, and other means through their Land Protection and Habitat Stewardship Programs. The Foundation's Project Advisory Committee Grant Program funds habitat enhancement, wildlife management and research projects in all states with wild and free ranging elk herds (<https://www.rmef.org/grant-programs/>).

Tribal Transportation Program is authorized under the Federal Lands Highway Program, and is jointly administered by the Bureau of Indian Affairs and Federal Highway Administration. Tribes can use this to do transportation improvements and projects of their own on the State Highway System or county roads. Partnerships with tribes are important because tribes may not have the capacity to do the actual work but they are able to get the money needed to fund the project. Having more partners improves an entity's chances of obtaining grant funding. (<https://www.fhwa.dot.gov/fastact/factsheets/tribaltransportationfs.cfm>).

University of California Cooperative Extension is a statewide network of natural resources, forestry, and agriculture science staff that are dedicated to conducting research and extending results to farmers, ranchers, forest land owners, students, teachers and interested citizens. The UC Cooperative Extension has offices that serve every county in California (<https://ucanr.edu/About/Locations/>).

U.S. Forest Service engages in a wide range of Grants and Agreements such as [Stewardship](#), [Great American Outdoors Act](#), [Collaborative Forest Landscape Restoration](#), <https://www.fs.usda.gov/working-with-us/secure-rural-schools> and [Research](#).

Wildlife and Sport Fish Restoration Program (WSFR) administered by US Fish and Wildlife Service has several [grant programs](#) that distribute millions of dollars annually to state agencies and Tribes to manage fish, wildlife, and habitats, evaluate and enhance species of greatest conservation need, and provide recreational opportunities.

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Appendix 1. Symposium Agenda

Cascade-Siskiyou Connectivity Symposium

Southern Oregon University
Stevenson Union, Rogue River Room
118 Siskiyou Blvd, Ashland, OR 97520

Wednesday May 4th, 9:00 AM-5:00 PM

Coffee, juice and breakfast items available around 8:30 a.m.

9:00 Welcome & Participant Introductions

9:10 How Traditional Ecological Knowledge (TEK) Helps Inform and Connect
Samantha Chisolm Hatfield (enrolled Siletz; Cherokee), Department of Fisheries, Wildlife and Conservation Sciences, Oregon State University

9:30 Oregon Connectivity Assessment and Mapping Project (OCAMP): Linking Landscapes
Rachel Wheat, Oregon Department of Fish & Wildlife

9:50 Federal/State Policies Related to Connectivity & Pacific Northwest Climate Connectivity
Jessica Walz Schafer, Wildlands Network

10:10 Integrating Traditional Ecological Knowledge into Restoration and Stewardship Efforts
Tim Hayden, Yurok Tribe

10:30 Break

10:40 Undamming the Klamath River – the Path to Restoration
Gwen Santos & Dave Coffman, RES

11:00 N. Region plan to reduce wildlife-vehicle collisions and increase roadway permeability
Eric Rulison, California Department of Transportation

11:20 Safe Passage, Roads & Wildlife
Meghan Fagundes, Oregon Department of Transportation

11:40 Southern Oregon Wildlife Crossing Coalition Feasibility Study
Amy Amrhein, SOWCC & Leslie Bliss Ketchum, Samara Group

12:00 Southern Oregon University Wildlife Camera Study on the I-5 Crossing Locations
Karen Mager, Maya Smith & Alex Zenor

12:30 Lunch will be provided

1:15 Ecological Connectivity in the Greater Cascade-Siskiyou Landscape

Evan Frost, Wildwood Consulting

2:00 Afternoon Breakout Sessions:

Land use & Policy - Joseph Vaile & Jessica Schafer / Alexi - Notes

Transportation & Infrastructure - Leslie Bliss-Ketchum & Amy Amrhein / Mari - Notes

Conservation Opportunities - Lyndia Hammer & Steve Wise / Paul - Notes

Restoration & Stewardship - Tim Hayden & Maia Black / Allee - Notes

Research & Monitoring - Rachel Wheat & Melissa Butynski / Michael - Notes

4:00 Summarize Information Gathered from Breakout Sessions, Wrap up and Next Steps

4:45 Adjourn ~ *Please join us for a beer and wine social*

Appendix 2. List of Participants

Name	Affiliation
Amrhein, Amy	Southern Oregon Wildlife Crossing Coalition
Axel Hunnicutt	California Department of Fish & Wildlife
Belson, Paul	Southern Oregon Land Conservancy
Bliss-Ketchum, Leslie	Samara Group
Butynski, Melissa	Center for Large Landscape Conservation
Carey, Greg	Independent
Chase, Dan	RES
Chenoweth, Joshua	Yurok Tribe
Chisholm Hatfield, Samantha	Oregon State University
Clark, Jason	Siskiyou Biosurvey
Colin Reynolds	Wildlands Network
Collay, Daniel	Crest at Willow Witt
Costello, Greg	Wildlands Network
Crosse, Liza Jaimet	Siskiyou Crest Coalition
Dean, Stan	Independent
Dotson, Michael	Klamath Siskiyou Wildlands Center
Dungannon, Tyler	Oregon Hunters Association
Fagundes, Meg	Oregon Dept of Transportation
Frost, Evan	Wildwood Consulting
Godwin, Steve	Medford Bureau of Land Management
Gustafson, Allee	Klamath Siskiyou Wildlands Center
Hayden, Tim	Yurok Tribe, Dept. of Natural Resources
Hammer, Lyndia	Southern Oregon Land Conservancy
Hunter, Howard	Friends of the Cascade-Siskiyou National Monument
Joslin, Nick	Mt Shasta Bioregion Ecology Center
Kanim, Nadine	US Fish and Wildlife Service
Klym, Melanie	Samara Group
Kristeen Penrod	Center for Large Landscape Conservation
Lennard, Spencer	Independent
Lovechio, Alexi	Klamath Siskiyou Wildlands Center
Mager, Karen	Southern Oregon University
Maia Black	Selberg Institute
Maxwell, Stasie	Friends of the Cascade-Siskiyou National Monument
Mergenthaler, Kristi	Southern Oregon Land Conservancy
Mosser, Sara	Rogue Basin Partnership
Moy, Jeanine	Vesper Meadow

Name	Affiliation
Preister, Kevin	Independent
Prewett, Paige	Office of Rep. Pam Marsh
Ron Sutherland	Wildlands Network
Ruediger, Luke	Applegate Siskiyou Alliance and Klamath Forest Alliance
Rulison, Eric	CalTrans
Santos, Gwen	RES
Schafer, Jessica	Wildlands Network
Smith, Maya	Southern Oregon University
Trail, Pepper	Retired scientist
Trammell, Jamie	Southern Oregon University
Uhtoff, Pat	Vesper Meadow, volunteer
Vaile, Joseph	Klamath Siskiyou Wildlands Center
Villella, John	Siskiyou Biosurvey
Wheat, Rachel	Oregon Department of Fish & Wildlife
Williams, Jack	Trout Unlimited
Willis, Dave	Soda Mountain Wilderness Council
Willow, Suzanne	Willow Witt Ranch
Willow, Suzanne	Willow Witt Ranch
Wise, Steve	Southern Oregon Land Conservancy
York, Dan	RES
Zenor, Alex	Southern Oregon University

Research and Monitoring Datasheet

Name: _____

Name and describe an existing or past research or monitoring effort, or specific need or opportunity for research and monitoring related to habitat connectivity or wildlife movement in the region? (e.g., species home range and/or movement studies, roadkill monitoring, bridge/culvert monitoring, fish passage assessments). List sources of information.

What funding programs are available to address the identified research and monitoring need or opportunity to improve wildlife passage in the region? Ex. grant opportunities, local sources, partnerships.

Identify existing or potential partners for implementing the identified need or opportunity for research and monitoring in the region. Indicate key or essential partners with an *

Is there a location or study area associated with this need or opportunity? If yes, please draw the study area or location of the identified need or opportunity, or existing effort on the map. Below, please write the unique Personal Location ID associated with the feature you drew on the map (your 3 initials and a sequential number for each shape drawn on the map, eg. KLP-1, KLP-2).

Personal Location ID: _____

Please indicate if there is formal spatial data in GIS to represent this, and if it's available to share publicly. Provide contact for attaining data, if available.

For existing, past or current research, what species have been documented using recognized linkages in the region (e.g., GPS collars, camera stations, track stations)? Please provide citations and/or contact information.

Is there research for particular focal species that meet one or more of the following statements? Which species? List sources of information.

- Dispersal is vital to metapopulation persistence of the species.
- The species has a localized distribution at the spatial scale of this planning area.
- The species has a short dispersal distance or dispersal is habitat-restricted.
- The species has specialized habitat requirements.
- The species represents an ecological process (predation, pollination) or a disturbance regime (requires frequent low-intensity fires) that you want to conserve.
- The species might become locally extirpated due to fire or other catastrophic events in a core area and would need connectivity to recolonize.
- The species needs habitat connectivity to maintain genetic diversity.
- The plant could suffer reproductive failure due to the loss of a fragmentation-sensitive pollinator or seed disperser.
- The species is known to be reluctant to use culverts under roads and is a useful umbrella species for the many (but unknown) species that probably share this trait.

What are the big picture data gaps in the region that would provide a better understanding of linkage function (e.g., evaluating focal taxa, climate change projections, incorporating refugia concepts, identifying emerging threats)?

How are research and monitoring efforts influencing existing land use and policy efforts in the region? How could research and monitoring be better integrated? How can this group help ensure that the latest research and monitoring data are applied to conservation actions to make each more valuable, strategic and beneficial to wildlife connectivity?

Additional comments or other points of discussion:

Land Use and Policy Datasheet

Name: _____

Type: Land Use Policy Other _____

Identify an existing or past effort, need, or opportunity related to land use or policy that may support or hinder (e.g., proposed specific plan) wildlife movement in the region. Is it part of a formal adopted plan or policy? If so, which one?

Is this effort, need, or opportunity identified in a planning effort currently underway? If not, is it possible to integrate it during the planning process (e.g., general plan update, RMP update, watershed plan)? Which planning effort or plan? Who is the lead agency? Where is the project in the planning process? What are the dates for public comment/input?

Is there a location or study area associated with this effort, need or opportunity? If yes, please draw the study area or location of the identified need or opportunity, or existing effort on the map. Please write a unique Personal Location ID associated with the feature you drew on the map and here (your 3 initials and a sequential number for each shape drawn on the map, eg. KLP-1, KLP-2).

Personal Location ID: _____

Please indicate if there is formal spatial data in GIS to represent this, and if it's available to share publicly. Provide contact for attaining data, if available.

Are there monitors tracking proposed development projects or land use changes in the region at the County level? City level? Who is tracking what? Please provide contact if available.

What policies or regulatory drivers operate in the region that could influence conservation and stewardship within it (e.g., MSCP, critical habitat)? How can this group influence existing and future policies to maintain and improve linkage function?

Are there policies or programs at the state/local/federal level that inhibit habitat connectivity and fish and wildlife movement (e.g., Food safety requirements – fences and pesticides, levee management removes riparian corridors)?

Are there upcoming planning efforts that may provide opportunities to integrate policies for conserving connectivity, such as county or city General Plan updates (fencing, lighting, clustering development ordinances), or Resource Management Plan revisions?

Who would be the best ambassadors for connectivity conservation to bring habitat linkages to City Councils as a high priority issue? Please provide type of ambassador (e.g., academic scientist, NGO, agency), name and contact info if available.

Are there existing programs or policies in one state that could be adapted to the other?

What plans or policies can help achieve regional connectivity across county and state boundaries?

What is the possibility of creating a regional inter-agency MOU focused on transportation, land-use and policy for federal and state agencies (OR, CA) to meet periodically to keep one another apprised of projects on the horizon creating potential opportunities or constraints for linkage protection? Is there any existing transboundary planning happening already?

Transportation and Infrastructure Datasheet

Name: _____

Type of Infrastructure: Road/Highway/Freeway Bridge/Culvert

Water infrastructure (e.g., aqueduct, dam) Power Generation & Transmission

Railroad Other, please describe:

Identify an existing or past effort, specific need, or opportunity to address barriers to wildlife movement within the region related to transportation or infrastructure (Ex. retrofit existing bridge, directional fencing, dam removal, maintenance needs, reduce wildlife-vehicle collisions, inappropriate human use, promote species recovery).

What are or were the potential justifications for remediating this barrier to wildlife movement (check all that apply)

Listed species Movement barrier Safety
 Big game Safe passage Other: _____

List focal taxa known or suspected to be impacted this barrier:

Describe any existing data that could support the need for addressing this barrier to wildlife movement.

Describe any research or data needs for addressing this barrier to wildlife movement.

What other types of assessments are needed to inform the needed solution? Ex., Engineering, design, field studies?

Is this need or opportunity identified in an existing plan? Ex., State Transportation Improvement Plan, District 8 Strategic Plan, MSCP, etc. **If yes, which one?**

If not identified in an existing plan, what current or future planning efforts might present opportunities to address this? Who is the lead agency? Where is the project in the planning phase? Are there opportunities for public engagement?

What transportation and infrastructure related funding programs are available to address the identified need or opportunity to improve wildlife passage in the linkage? How were existing or past efforts funded? Ex. transportation related project funding/mitigation features, local measures, advanced mitigation, partnerships.

Identify potential partners for implementing the identified need or opportunity for remediating the barrier to wildlife passage in the linkage. Until wildlife crossings are identified as an eligible project type under one or more Caltrans' asset classes, they aren't eligible for stand-alone funding. Even if a wildlife crossing is identified as a potential mitigation measure, it may still require raising funds outside of traditional state and federal transportation programs for implementation. Partnerships can help make it happen.

Is there a location or study area associated with this need or opportunity? If yes, please draw the study area or location of the identified need or opportunity, or existing effort on the map. Please write a unique Personal Location ID associated with the feature you drew on the map and here (your 3 initials and a sequential number for each shape drawn on the map, eg. KLP-1, KLP-2).

Personal Location ID: _____

Please indicate if there is formal spatial data in GIS to represent this, and if it's available to share publicly. Provide contact for attaining data, if available.

Restoration, Stewardship & Outreach Datasheet

Name: _____

Type: Restoration Public Lands Stewardship
 Private Lands Stewardship Other, please describe _____
 education/outreach

Identify and describe an existing or past effort, or specific need or opportunity to restore or steward land to improve habitat connectivity and wildlife movement in the region (e.g., stream restoration, dam removal). Is it part of a formal plan?

What stewardship or restoration related funding programs are available to address the identified need or opportunity to improve habitat connectivity and wildlife passage in the region? How were existing or past efforts funded? Ex grant opportunities, local measures, advanced mitigation, partnerships.

Identify potential partners for implementing the identified need or opportunity for restoration or stewardship.

Is there a location or study area associated with this need or opportunity? If yes, draw the study area or location of the identified need or opportunity, or existing effort on the map. Please write the unique Personal Location ID associated with the feature you drew on the map and here (your 3 initials and a sequential number for each shape drawn on the map, eg. KLP-1, KLP-2).

Personal Location ID: _____

Please indicate if there is formal spatial data in GIS to represent this, and if it's available to share publicly. Provide contact for attaining data, if available.

List existing plans, policies, or programs that have potential to support restoration, stewardship, or outreach for connectivity in the region (e.g., MSCP, farm plan, watershed plan, NGO conservation programs)?

How can we increase capacity of non-profit and public agencies to manage open space (funding sources often earmarked for acquisition, not stewardship) in connectivity zones in the region? Ex. creative funding approaches (e.g., NCCPs), incentivize management on public lands (e.g., parks pass).

How can we effectively engage the private sector/large landowners of working landscapes in on-the-ground actions to enhance fish and wildlife movement (e.g., voluntary incentive based approach, Agriculture Conservation Easement Program, recruit strategic partners to promote compatible uses)?

How can we effectively engage the community to build political will and a public expectation of linkage protection and stewardship (e.g., traveling exhibit – visual journey through the landscape with companion stewardship brochures, road signs/billboards “Entering Wildlife Movement Zone: this habitat brought to you by [name of agency/landowner/company]”.

How can we keep the wildlife movement and connectivity “in the news”, i.e, what are possible news stories or special interest type stories that we should be promoting with media outlets?

What media outlets should we target?

What outreach tools are needed to convey the importance of habitat connectivity to key stakeholders and decision makers in the region? Outreach products tailored to target audiences (e.g., landowners, planners, agencies, general public)? Who is best ambassador to deliver to each audience?

Additional comments or other points of discussion:

Land Conservation Datasheet

Main contributor(s) name:

Type: Fee Title Acquisition Conservation Easement
 Other, please describe: _____

Identify a specific need or opportunity to protect and conserve habitat connectivity and wildlife movement in the region (Ex. key parcel/s in choke-point, willing seller). Is your organization/agency currently working on this? Are other agencies, organizations involved?

What specific actions are required beyond acquisition/protection of this property? (ie, removal of barrier (specify type), habitat restoration (specify type), etc)

What opportunities exist to establish/protect habitat connectivity in the region? (Check all that apply, explain below):

- | | |
|--|--|
| <input type="checkbox"/> Local support (who) | <input type="checkbox"/> Designated critical habitat (which species) |
| <input type="checkbox"/> Local Land Use Plans | <input type="checkbox"/> Mitigation Needs (What project) |
| <input type="checkbox"/> Conservation initiative/s | <input type="checkbox"/> Part of conservation plan (which one) |

Other opportunities and details (or information from checked items):

Is there a location or study area associated with this need or opportunity? If yes, please draw the study area or location of the identified need or opportunity, or existing effort on the map. Please write a unique Personal Location ID associated with the feature on the map and here (your 3 initials and a sequential number for each shape drawn on the map, eg. KLP-1, KLP-2).

Personal Location ID: _____

Who are the major land owners in important linkages in the region? Are there any individuals that own multiple parcels?

What site-specific plans have been developed in important linkages in the region? i.e., CDFW's Wildlife Conservation Board parcel-specific plans or similar plans.

What funding programs are available for land protection and easements in the region?
Ex. USFWS Recovery Land Acquisition (Section 6), Wildlife Conservation Board, mitigation banks.

What agencies and organizations are actively engaged in land acquisitions/easements for connectivity in the region?

Are there any existing or needed active inter-agency collaborations to strategically plan and implement conservation/protection efforts? Ex. Coordination between agency X, Y and Z to ensure multiple agencies are not contacting the same landowners. Identify gaps where no one is currently working.

How can we make acquisitions and easements more valuable, strategic, and beneficial to wildlife connectivity? For example, what are the fewest number of parcels to achieve a Minimum Viable Linkage (MVL)? MVL is the concept to first make a protected connection between targeted core areas, then make it more robust (wider) with other acquisitions.

Do conservation easement terms provide adequate guidance to support linkage function (compatible vs. incompatible uses, limited development, specific building envelopes, lighting, fencing)?

Additional comments or other points of discussion: