

## Let's talk about beavers: Using social science to reduce conflict and enable coexistence in a changing climate

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**Project End Date:** June 30, 2025

**Project Location:** Oregon (statewide and in target watersheds)

### Abstract

Beavers are landscape engineers. They create habitat for other species, and change the landscape in ways that often help buffer ecosystems and people from the damaging effects of climate change, including drought, flood, and wildfire risks. In part because of these benefits, there is a movement to restore beaver and beaver-modified habitat on the landscape in Oregon. However, beavers can also be controversial because of the damage they can cause to human structures and crops. As such, beavers are a useful case study for how to equitably engage Oregonians in wildlife habitat restoration efforts while simultaneously mitigating human-wildlife conflict and promoting coexistence. In situations like these, social science can support engagement programs that are a) tailored to key audiences' needs, b) coordinated across organizations and agencies, and c) targeted at the specific moment when action is taken. However, this kind of participatory evidence-based approach to behavioral design has not yet been applied to human-beaver coexistence in Oregon. We propose to answer the question: *How can private landowners be supported to take coexistence actions that are mutually beneficial for their needs and beaver populations in Oregon?* We will assemble a community of practice comprising groups that work with private landowners on two dimensions of coexistence in Oregon: human-beaver conflict management and beaver-modified habitat restoration. Together, we will identify a) best practices for landowner engagement (both tried and true strategies and creative new approaches), b) pinch points limiting landowner engagement, and c) opportunities to coordinate future outreach and engagement campaigns. We will use social science methods to execute this project, combining baseline and follow-up interviews, facilitated workshops, and pre-post social network analysis. Results and lessons learned from this project will be shared with ODFW, the community of practice, other stakeholders and rightsholders, and the broader conservation science community to catalyze wider discussion and adoption of human-beaver coexistence strategies, and guide strategic implementation of ODFW's Beaver Habitat Action Plan in the future.

## 1. Project Objectives

The objective of this project is to support ODFW and external collaborators to develop, refine and test engagement strategies for working with private landowners to a) increase participation in beaver-modified habitat restoration and b) increase adoption of nonlethal techniques for managing human-beaver conflict. The project team will work with ODFW and collaborators across the state of Oregon, prioritizing watersheds where private landowner engagement in beaver coexistence is ongoing, upcoming, or could be beneficial.

## 2. Project Measures of Success

The project will lead to the following outcomes:

- 1) **Creation of a mutually supporting community of practice** among government, nongovernment, and private actors related to landowner engagement in human-beaver coexistence.

Evaluation metric: change over time in the structure and activities of the community of practice, measured through social network analysis. For instance, increased connectivity, reduced structural holes, and increased knowledge transfer within the group would indicate a strengthening of the community of practice over the course of the project.

- 2) **Identification of productive engagement strategies** for working with private landowners on human-beaver coexistence.

Evaluation metrics: community of practice members' increased knowledge of engagement strategies, self-efficacy employing these strategies, actual adoption of these engagement strategies, planned future coordination of engagement efforts, and other measures of behavioral diffusion.

- 3) **Integration of private landowner engagement strategies and future opportunities for practitioner network-building** into ODFW's beaver-modified habitat restoration practice.

Evaluation metrics: ODFW's Beaver Habitat and Beaver-Modified Landscapes Action Plan modified to reflect lessons learned from this project; implications for future practice shared with internal staff and external partners.

## 3. Project Background

Beaver are an important species for people and ecosystems in the Pacific Northwest (Pfaeffle et al., 2022), and increasing the number of beaver in Oregon has the potential to support critical ecological restoration and climate adaptation goals. Beaver are valued by many Oregonians in their own right as charismatic and beloved wildlife, and may play a potential role in riverscape resiliency and mitigating the harm from natural hazards like fire, flood and drought, which are exacerbated by climate change (Jordan & Fairfax 2022). Droughts, for example, are projected to be more frequent and pervasive in Oregon due to climate change. Beaver wetlands and beaver-modified habitats can increase groundwater levels and ponding of water on the floodplain that maintain fish and wildlife habitats (e.g., instream flows, riparian vegetation) during critical drought periods. Beaver-modified habitats can provide drought resiliency benefits to agricultural and working lands, including forage production resiliency and wildfire buffering capacity.

Beaver modifications to floodplains can also provide habitat complexity for many other species of wildlife and fish, which may be increasingly important in the face of drought and other

landscape changes. Other species that can benefit from beaver include sensitive, threatened or endangered species such as migratory salmonids (Coho, Chinook, steelhead, chum; ODFW 2007, Carmichael & Taylor 2010, ODFW 2010, ODFW & NMFS 2011, ODFW 2014, ODFW 2021a), lampreys (Pacific, Western River, Western Brook; ODFW 2020), Oregon Conservation Strategy species (dependent on flowing water and riparian, wetland, and/or aspen woodland habitats; ODFW 2016), Columbia spotted frog, Oregon spotted frog, and greater Sage Grouse (Charnley et al. 2020, Donnelly et al. 2016, Cushman & Pearl 2007, Arkle & Pilliod 2015).

And yet, no story is simple: in some cases, beaver modification of habitat may actually pose a challenge for drought resiliency, climate adaptation, species recovery, or other landowner goals. For instance, beaver might eat the young plants put in as part of a riparian vegetation restoration project (Charnley et al. 2020). Many groups are therefore invested in protecting wildlife and stewarding ecosystems that are affected by beaver. This includes Tribes, state and federal agencies, conservation nonprofits, watershed councils, soil and water conservation districts, irrigation districts, and land trusts. For the purpose of this proposal, we use the umbrella term “practitioner organizations” for these groups.

Recognizing the importance of beaver to Oregon, and the challenges associated with their management, ODFW has created a Draft Beaver Habitat and Beaver-Modified Landscapes Action Plan (ODFW 2023) to identify four interconnected pillars of action for advancing landscape-scale beaver habitat restoration in Oregon. These are Pillar 1: Data and Science, Pillar 2: Habitat Restoration, Pillar 3: Beaver Management, and Pillar 4: Outreach and Communication. This proposed project is a priority action in Pillar 4 (Action 4A, ODFW 2023). As described in the Plan, the aim of this work is to better understand how to motivate beaver coexistence actions (i.e., habitat restoration and nonlethal conflict mitigation) to guide collaborative cross-pillar beaver action in the future (ODFW 2023). In so doing, this project can help contribute to wider efforts to provide resiliency to drought and other climate change-related natural hazards.

### ***Objective 1: Increasing participation in beaver-modified habitat restoration***

Despite widespread interest in greater beaver abundance, existing scientific evidence suggests beaver may currently occupy most, if not all, parts of the landscape that are suitable places for them to live. The greatest limiting factors for beaver and beaver-modified habitat in the state seem to be a lack of quality complex habitat (e.g. ponds, marshes, and streams with adequate food sources, bank slope, and peak flow) and habitat connectivity. Much of the beaver habitat in Oregon is currently on private lands (ODFW 2021b), and private landowners will be key players not only in maintaining existing beaver habitat but also in restoring habitat for beaver and enabling beaver-modified habitat.

There is limited human dimensions research on how to engage landowners in creating habitat for beaver. However, a previous study of ranchers’ motivations for engaging in beaver-related habitat restoration (a wider umbrella of restoration activities that includes beaver mimicry) identified six enabling factors for action. These included a perception that beaver-modified habitats or beaver dam analogues have more benefits than costs, and the existence of effective partnerships to foster innovation, flexibility and commitment (Charnley et al. 2020). Scientists, practitioners, and landowners have also been shown to disagree about the credibility and legitimacy of information about beaver-related habitat restoration, and to evaluate different criteria in their decision-making (Pfaeffle et al., 2022).

**Data need:** Opportunities may exist for practitioner organizations in Oregon to better emphasize and build on the social and psychological factors enabling action in their beaver-modified habitat restoration communications with landowners. Currently, however, practitioners are working in discrete watersheds and lack a convening forum focused on engaging private landowner in habitat restoration activities. Moreover, because of the longer-term nature of habitat restoration action (several months or years rather than a one-time decision), it is unclear how widespread behavioral design thinking (such as strategic identification of target audiences and assessment of their needs) is among practitioners working on beaver-modified habitat restoration.

**Project action:** We aim to convene a community of practice to conduct a synthesis of existing efforts to engage landowners in restoring a) habitat for beaver, b) beaver-modified habitat, or c) beaver mimicry. This synthesis will include where this landowner engagement is occurring in the state, how landowners are being engaged, and what is known about the results of those efforts. We will use the findings of this synthesis to foster dialogue around developing and testing new engagement strategies focused on beaver-modified habitat restoration behaviors private landowners can take. This focus will synergize with efforts under Pillar 2 of ODFW's Action Plan to prioritize projects that target beaver-modified habitats and floodplain-riparian processes (ODFW 2023).

***Objective 2: Increasing adoption of nonlethal techniques for managing human-beaver conflict***

A second critical issue is that although beaver can provide many benefits, they can also cause property damage and risk human safety. These impacts disproportionately affect particular groups such as private landowners. Some parts of the landscape, such as more urbanized areas, may also be ecological sinks for beaver. Past research demonstrates that a majority of Oregon landowners are interested in seeing beaver on and around their property, but that landowners whose property has been negatively affected by beaver in the past are more likely to see beaver as a problem (Needham & Morzillo 2011). Further, only 1 in 5 of those surveyed had experienced beaver impact previously, meaning many Oregonians cannot fully anticipate how they would react if a beaver started affecting their property.

This sets up a conundrum: Oregonians in general, and private landowners specifically, are supportive of beaver in the abstract, but become more in favor of lethal management when they experience beaver-related damage. This suggests that one key intervention point for beaver coexistence is to support landowners who are currently dealing with beaver-related property damage to adopt nonlethal beaver management techniques that both align with their beliefs (general support for beaver) and meet their time-sensitive need (stop beaver damage quickly).

**Data need:** No synthesis has been conducted of how practitioner organizations in Oregon are promoting nonlethal management techniques to landowners during human-beaver conflict situations, or preparing landowners to deal with future human-beaver conflict situations.

**Project action:** In convening a community of practice of beaver-related practitioner organizations, we will also synthesize knowledge of existing efforts to engage landowners in nonlethal human-beaver conflict mitigation. As above, this synthesis will include where this landowner engagement is occurring in the state, how landowners are being engaged, and what is known about the results of those efforts. We will use the

findings of this synthesis to foster dialogue around developing and testing new engagement strategies to advance nonlethal conflict management. This collaborative review and ideation process will coordinate with Pillars 1 and 3 of ODFW's Beaver Habitat Action Plan, specifically drawing on the ongoing collation of existing beaver data (presence/absence, distribution, dams, activity) and updates to the beaver damage complaints process as required by the Private Forest Accord (ODFW 2023).

#### **4. Project Implementation Plan**

In this project we take a novel approach to studying outreach about human-beaver coexistence, combining a focus on beaver-modified habitat restoration actions with a focus on human-beaver conflict mitigation actions. In so doing, we seek to build on the lessons learned from past human dimensions research in Oregon (e.g. Charnley et al. 2020 and Pfaeffle et al. 2022 on restoration; Needham & Morzillo 2011 on human-beaver conflict) that suggest people are often supportive of beaver's presence in the state, but are held back from taking beaver coexistence actions because of specific social, psychological, and contextual forces that operate at the moment of action.

For instance, people whose property is being damaged by beaver may want an immediate solution, and may feel that lethal removal of the animal is faster or easier than nonlethal alternatives. In such cases, practitioner organizations would be unlikely to change the landowner's behavior by building tolerance for beaver. Instead, they might be more effective by connecting the landowner to nonlethal management techniques that feel quick and simple. Alternately, landowners with high support for beavers on the landscape may wish to participate in beaver-modified habitat restoration, but may lose momentum and get lost in a lengthy bureaucratic process, or be concerned about a loss of autonomy on their land (Sorice et al 2013). Practitioner organizations could here focus on building lessons from behavioral science into the habitat restoration process, such as public commitment making, celebrations of progress, peer-to-peer learning, and removing barriers to action. By focusing on human-beaver coexistence as comprising both conflict mitigation and habitat restoration, we hope to help organizations identify opportunities to engage interested private landowners to not just encourage beaver onto their lands, but also to navigate and prevent challenges when beaver arrive.

***Our Project Question: How can private landowners be supported to take coexistence actions that are mutually beneficial for their needs and beaver populations in Oregon?***

##### June – December 2023: Baseline Interviews & Social Network Analysis with Practitioners

The first phase of our project will be to gather baseline data about practitioner organizations' existing engagement efforts with private landowners, and the structure of the practitioner network related to beaver coexistence in Oregon. We will conduct interviews with beaver-related practitioners in Oregon to explore their organizations' past efforts to communicate with landowners about beaver, focusing in particular on how they have sought to tailor the content of their outreach to landowners' needs, beliefs, and actions. We will also ask about practitioners' experiences of the network of beaver-related organizations in Oregon, and how that might be structured more effectively. At the same time, we will conduct a baseline social network analysis to map out the structure of how beaver-related practitioner organizations currently interact.

##### October 2023 – April 2025: Community of Practice Dialogue Series

In our second phase, comprising the bulk of the project, we will work with practitioner organizations to explore productive engagement strategies for working with private landowners

on human-beaver coexistence. To achieve this, we will assemble a community of practice comprised of practitioner organizations in Oregon working with private landowners on either human-beaver conflict, beaver habitat restoration, or both. We will facilitate a series of up to 10 dialogues within the community of practice around the topic of landowner engagement in beaver coexistence. To ground each dialogue, we will share de-identified results of our baseline interviews and social network analysis, ask participants to reflect on what this means for their own organization's practice, and discuss how they see other organizations fitting in. Dialogue topics will include: a) best practices for landowner engagement (both tried and true strategies and creative new approaches), b) pinch points limiting landowner engagement, and c) opportunities to coordinate future outreach and engagement campaigns. The project team will take detailed notes on these dialogues, including their content and process, which we will analyze and integrate into subsequent meetings.

The community of practice will be made up of approximately 10-15 representatives of organizations working on human-beaver coexistence and related habitat restoration. At least two of the dialogues will take place in person, including the first gathering of the community of practice and one in-person workshop towards the end of the project. We will focus on recruiting participants that are a) working in watersheds with ongoing or upcoming habitat restoration efforts that could increase beaver presence, and b) actively working with private landowners and interested in reflecting on and refining their engagement process.

Potential practitioner organizations include those who have received past OCRF or OWEB funding to do beaver-modified habitat restoration work, other conservation nonprofits, Tribes, watershed councils, land trusts, industry groups, soil and water conservation districts, irrigation districts, and state and federal agencies. The baseline data collection phase will provide the team with the opportunity to describe the community of practice process to practitioners and assess practitioner interest, and to solicit practitioners' ideas for additional groups to involve so that key groups are not overlooked. Importantly, this community of practice is not a collaborative decision-making or recommendation-making body, as has previously been convened around beaver in Oregon, but is rather a 'learning lab'. As such, participation will be focused not on representing all the relevant stakeholders and rightsholders, but instead on those interested in personal and collective reflection and growth on the topic of engaging landowners in beaver coexistence and conflict management.

Potential focal watersheds and regions for practitioner participants include the Grande Ronde and/or John Day, where ODFW and partners have been restoring beaver and floodplain-riparian habitat for over a decade; the Willamette Valley, where the Mid-Willamette Beaver Partnership has already begun a multi-year community based social marketing planning process around beaver; and the North Coast, where The Beaver Coalition is convening a stakeholder process. Other practitioner partners might be working in areas that have been identified in prioritization processes, e.g. Conservation Opportunity Areas, Native Fish Conservation & Recovery Plan priority areas, ODFW Aquatic Habitat Prioritization Areas, or OWEB Focused Investment Partnerships Areas for Native Fish Aquatic Habitat. No permits are required for this work.

#### March 2025 – June 2025: Reflection and Wrap-Up

To conclude the project, we will gather a second wave of evaluation data and use those data to create space for final reflection. This will include conducting a second social network analysis in the final months of the project to determine whether and how the structure of the network has

changed since the group convened. We will supplement this with additional interviews within participating members to solicit their thoughts on the process and its impacts on their practice. We will also facilitate a final reflection session with the group as a whole in the final workshop.

## 5. Timeline

Task	Timeframe
Hire OSU postdoctoral scholar (0.5 FTE) to help run the project	June 2023
Phase 1. Conduct baseline interviews and social network analysis with practitioner organizations	June-December 2023
Phase 2. Convene a community of practice comprised of 10-15 practitioner organizations in a series of up to 10 dialogues	October 2023-April 2025
Phase 3. Conduct final interviews and social network analysis; Share final reports (e.g. a practitioner guide) and presentations with ODFW, the community of practice participants, and the broader beaver conservation and scientific communities	March-June 2025

## 6. Project Partners

The proposed project is a collaboration between ODFW and researchers at Oregon State University in the USGS Oregon Cooperative Fish and Wildlife Research Unit. OSU researchers will be responsible for conducting the research (e.g. social network analysis, interviews) and sharing back results in a final presentation, written report, and other communications such as materials for practitioner collaborators’ websites. OSU researchers will co-facilitate the community of practice workshops with support from an external facilitator. ODFW staff will be responsible for helping to coordinate connections with Tribal collaborative managers, landowners, and conservation organizations, updating planning and communications materials (e.g. Beaver Action Plan, websites, damage database) in line with OSU researcher input, and participating in regular meetings with the OSU team. The OSU PI, Dr. Megan Jones, has worked closely with ODFW on a series of social science projects since she started her position in January 2022, including initiating a multi-year research study of community engagement in reducing human-bear conflict in Oregon, and assisting ODFW managers with public consultations around summer steelhead in the North Umpqua and Deschutes.

## 7. Project Justification and Outdoor Equity

This project intends to benefit communities and wildlife across Oregon. It aims to help landowners protect their property and reduce their future risk from beaver damage while reinforcing their autonomy to make land management decisions and ability to contribute to a collective public good (beaver habitat restoration). It aims to help Tribal collaborative managers, conservation organizations, and ODFW staff have increased confidence and capacity to communicate effectively with stakeholders about beaver conflict and coexistence. It aims to help beaver by reducing their risk of being killed or dying in relocation efforts. By supporting beaver habitat restoration, the project also aims to benefit the fish, aquatic invertebrates, amphibians, reptiles, and birds who rely on beaver-modified habitat for their own survival.

In this project we will prioritize outdoor equity in four ways. We will integrate recognition equity (acknowledging the rights, values, knowledge systems, and cultural identity of local groups) throughout the project by working closely with and being led by the needs of Tribes. We

will focus on distribution equity (fair distribution of benefits and burdens of conservation between groups) by prioritizing the needs of rural landowners dealing with current or potential property damage from beaver. We will focus on procedural equity (including all relevant groups in project decision-making) through the creation of a community of practice for peer learning. Lastly, we will focus on management equity (the extent to which local people lead management activities) by focusing our communication efforts on watersheds where locally-led, collaborative beaver restoration efforts are ongoing.

## 8. Budget

<b>2 years (June 2023 - June 2025)</b>	<b>June 2023- June 2024</b>	<b>July 2024- June 2025</b>	<b>Total</b>
<b>A. Personnel</b>			
Postdoctoral scholar: 0.5 FTE at \$60,000 annual salary; 3% raise in Yr2	30000	30900	60900
<b>Subtotal Personnel</b>	<b>30000</b>	<b>30900</b>	<b>60900</b>
<b>B. Fringe Benefits for Postdoctoral Scholar</b>			
Postdoctoral scholar: health insurance and benefits with 5% increase in Yr2	10407	10934	21341
<b>Subtotal Benefits</b>	<b>10407</b>	<b>10934</b>	<b>21341</b>
<b>C. Supplies</b>			
Software (social network analysis software and Nvivo)	1332	432	1764
Consultant services e.g. for workshop facilitation, social network analysis, behavioral design training for participants (16 days total at market rate of \$125/hour)	8000	8000	16000
Publication costs		2000	2000
Stipend for hourly graduate student assistant support with research tasks (OSU standard rate of \$13.50 per student plus inflation for 6 weeks per year)	3337	3437	6775
<b>Subtotal Supplies</b>	<b>12669</b>	<b>13869</b>	<b>26539</b>
<b>D. Travel</b>			
Research team travel (including two in-person workshops and various site visits across the state at mileage rate of \$0.625/mile, plus lodging and per diem)	5000	5000	10000
<b>Subtotal Travel</b>	<b>5000</b>	<b>5000</b>	<b>10000</b>
<b>E. Direct Costs (MTDC)</b>	<b>54739</b>	<b>57266</b>	<b>112005</b>
<b>Indirect Base*</b>	54739	17266	72005
<b>F. Indirect Costs (26%)*</b>	<b>14232</b>	<b>4489</b>	<b>18721</b>
<b>G. Total Project Costs</b>	<b>\$72,308</b>	<b>\$65,192</b>	<b>\$137,501</b>

\*OSU PI has an existing cooperative agreement with ODFW as Oregon Cooperative Fish and Wildlife Research Unit faculty, in which some indirect costs are waived each year. This has been calculated into our estimated indirect cost line here, reducing the total indirect fee rate to ~17% of the total direct costs.



## Additional Support

### *OSU and USGS*

This budget includes no support for OSU PI Jones because 100% of her salary is covered by the US Geological Survey as part of her Assistant Professor/Assistant Unit Leader position with the Oregon Cooperative Fish and Wildlife Research Unit at Oregon State University. Conducting research and training graduate students and postdocs are two of the primary missions of the Coop Unit program (<https://www1.usgs.gov/coopunits/>), so duties associated with research collaborations with Oregon Department of Fish and Wildlife are strongly supported by her current position.

This budget includes 0.5 FTE for a postdoctoral scholar for two years, because the remaining 0.5 FTE for the postdoctoral scholar will be covered by OSU PI Jones under a separate grant.

### *ODFW*

This budget includes no support for Adrienne Averett, the primary ODFW collaborator on the project. ODFW is providing support for Adrienne's technical assistance time to attend project meetings, assist the OSU research team, and review documents and products (estimated as an average of 10 hours/month for 24 months), plus workshop supplies support.

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