

ODFW's 3-Year Action Plan for Beaver-Modified Landscapes

August 2022 - 2025



Oregon Department of Fish and Wildlife



June 16, 2023

Introduction

This Action Plan (Plan) outlines the specific goals and strategic actions ODFW will implement, using existing resources, over the next 36 months to advance the protection and restoration of beaver habitat and beaver-modified habitat in Oregon [1]. The Plan's commitments are intended to be additive to the ongoing work of ODFW and our partners including federal, tribal, and state agencies, watershed councils, soil and water conservation districts, non-governmental organizations, and private landowners. Continued engagement and collaboration with our diverse knowledge partners are critical components of this Plan.

Holistic, process-based restoration and using beaver and beaver-modified habitat restoration methods can be tools for addressing limiting factors and optimizing resiliency for Oregon's state sensitive and federally listed fish and wildlife species in a changing climate. For example, beaver dams and floodplain connectivity have been shown to improve instream flows during critical life stages for fish. In addition, wetlands and slow-moving water created by beaver dams provide key habitat for amphibian, reptile, and bird populations.

Protection and restoration of riparian-floodplain vegetative communities and beaver-modified habitats are strategies identified in Oregon's migratory salmonid conservation and recovery plans [Coho, Chinook, steelhead, chum; 2-7] and the statewide conservation plan for lampreys [Pacific, Western River, Western Brook; 8]. The Oregon Conservation Strategy [Strategy; 9] recognizes American beaver and their habitat modifications as important components of Strategy Habitats including flowing water and riparian habitat, wetland habitat, and aspen woodlands habitat as well as off-channel Specialized and Local Habitats [9]. Beaver-modified habitats address key conservation issues caused by disruption of disturbance regimes and altered floodplain function [9]. The benefits of beaver-modified habitats are a component of recommended conservation actions for many of the Strategy's identified Conservation Opportunity Areas [9]. Additionally, Oregon's Connectivity and Assessment Mapping Project (OCAMP) selected beaver as the surrogate species for wetlands and associated woody streamside vegetation structural habitats to model habitat connectivity and identify multi-species Priority Wildlife Connectivity Areas in Oregon [10]. All of these conservation plans establish goals for recovering species and their habitats in balance with the socio-cultural needs of tribal, rural, and urban communities.

This Action Plan commits ODFW to take specific steps that focus on landscape-scale restoration of beaver habitat and beaver-modified habitats, where appropriate, across the state. The Action Plan is structured around four interconnected pillars [*sensu* 11] that will improve adaptive management and coordination across ODFW divisions and the field:

- Data and Science,
- Beaver Habitat and Beaver-Modified Floodplain Restoration (Habitat Restoration),
- Beaver Management, and
- Outreach and Communication.

The Department recognizes that achieving landscape-scale restoration of beaver habitat and beaver-modified habitat in Oregon will take many years. When ODFW has completed the actions outlined in this plan, Oregon will have: (1) a better understanding of current beaver distribution and the opportunities for beaver-modified habitat uplift and (2) accelerated progress towards restoring beaver-modified landscapes.

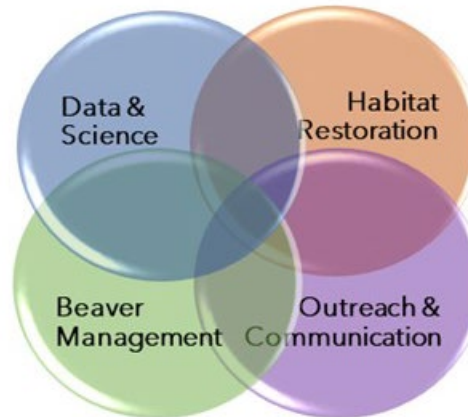
ODFW Mission

To protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations.

Overarching Goal of this Action Plan

ODFW staff will take action in the short term to accelerate the restoration of beaver habitat and beaver-modified habitat at the landscape-scale in Oregon.

Supporting Pillars



Definitions

Beaver Emphasis Areas: The ten watersheds (5th field hydrologic units or 10-digit Hydrologic Unit Codes, HUC10) in which ODFW will focus efforts to implement the actions in this plan and advance beaver-modified floodplain landscapes in Oregon. ODFW staff currently work with partners and citizens statewide on many beaver-related efforts (e.g., data and information, restoration projects, damage concerns, coexistence strategies, etc.; see Box 1). Ongoing and new beaver-focused activities by ODFW staff will continue to occur outside the beaver emphasis areas.

Beaver Habitat: The critical habitat conditions - food, cover, water, and space - that support beaver fitness and population distribution on the landscape. Beavers need sufficient early seral stage riparian vegetation for forage; suitable water depths or pool habitats to avoid predators; instream flow permanence for cover and food accessibility; and adequate lateral and longitudinal habitat quality and stability to support beaver occupancy [12]. Beaver Habitat is a necessary component of Beaver-Modified Habitat.

Beaver-Modified Habitat: Land and waterway alterations by beaver that affect other aquatic, floodplain, wetland, and riparian species (e.g., fish, wildlife, aquatic and terrestrial insects, vegetation communities) and fluvial geomorphology. Such modifications may include building beaver dams, ponding surface water on the floodplain, raising the groundwater table, trapping sediment and aggrading streams, and promoting wetland plant growth.

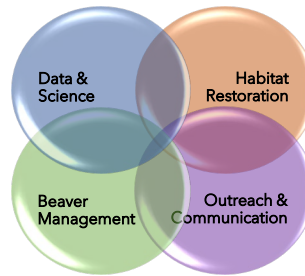
Process-Based Restoration: Habitat treatments by humans using active and/or passive practices (e.g., wood structures, beaver dam analogs, riparian exclusion fencing, etc.) to protect, mimic, and/or initiate riverscape (floodplain-riparian-aquatic) processes and functions [13,14].

Pillars, Goals, Strategic Actions, and Outcomes

The Action Plan Pillars: Data and Science, Habitat Restoration, Beaver Management, Outreach and Communication – provide ODFW with a framework for advancing the restoration of landscape-scale **beaver habitat** and **beaver-modified habitat** in Oregon. The pillar-specific goals and priority actions are listed below.

The list describes Core Actions for ODFW staff to focus their efforts on over the next 36 months. ODFW and partners will also implement supporting actions during this period. Supporting actions are ongoing agency activities, with existing capacity (see Box 1), to collectively assist the plan pillars and the associated actions and outcomes. Each pillar of action is reliant on the other pillars for success. For example, Pillar 1-3 actions will require outreach and communication with partners (Pillar 4) to achieve outcomes and pillar goals.

PILLAR 1: DATA AND SCIENCE



Goal: Improve understanding of current beaver presence, constraints on beaver distribution, and the habitat needs of beavers in Oregon.

Core Actions

- 1A Gather existing ODFW species data related to beaver (presence/absence, distribution, documented dams, activity) into a single location; assess data quality and standardization needed to improve future data collection.

Lead: Wildlife Division Furbearer Program
Completion Dates: Data Gathering – December 2023
Data Review & Standardization – June 2024

- 1B Identify existing protocols for surveying for signs of beaver occupancy such as **beaver-modified habitat**, dam building, etc. Make protocols readily accessible to ODFW field staff and encourage use of protocols when conducting beaver-related and other field surveys to ensure consistency in data collection.

Leads: Wildlife Division Furbearer Program & Cara Ratterman – Identify protocols
Watershed and Program Managers – Coordinate field testing
Adrienne Averett & Cara Ratterman – Create central location for protocols and supporting information.

Box 1: Action Plan Pillars and their Supporting ODFW Staff

The Beaver Habitat Action Plan is supported by existing work and Programs within ODFW including, but not limited to the following staff:

- **Pillar 1 – Data & Science**
 Wildlife District Biologists (Bios), Private Forest Accord (PFA) Beaver Conservation Bios, Wildlife Research Bios, Fish District Bios, Aquatic Inventories Bios, Forest Program Coordinator, PFA Stream Bios, Statewide Instream Flow Bios, East Region Fish Research Bios, Fish Research Evaluation, Data, and Decision Support (REDD) Bios, GIS staff, and Furbearer Program.
- **Pillar 2 - Habitat Restoration**
 Wildlife District Bios, Fish District Bios, East Region Fish Habitat Restoration Bios, Western Oregon Stream Restoration Bios, Regional Habitat Bios, East and West Region Fish Research Bios, NRCS Liaisons, Good Neighbor Authority Coordinator, Water Program staff, Forest Program Coordinator, Land Use and Waterways Alteration Coordinator, Native Fish Conservation and Recovery Coordinators, Oregon Conservation Strategy Coordinators, GIS staff, and Furbearer Program.
- **Pillar 3 – Beaver Management**
 Wildlife District Bios, Furbearer-Carnivore Coordinator, PFA Beaver Conservation Bios, Wildlife Research Bios.
- **Pillar 4 – Outreach & Communication**
 Aforementioned ODFW programs plus Information & Education Division staff.

Completion Date: Protocol Identification [15] - March 2023
Protocol Field Testing - Spring through Fall 2023
Finalized Protocols for Staff - December 2023
Data Storage and Management - Ongoing

- 1C Select one or more drainage(s) (5th field Hydrologic Units, HUC10) in each ODFW watershed district to become a **beaver emphasis area** (BEA) for that watershed. Identify BEA staff leads, assess existing data, and find resources to conduct new surveys in each selected HUC10 (refer to Action 1D). ODFW has 10 watershed districts, resulting in at least 10 **beaver emphasis areas**. *Note: ongoing and new beaver-focused activities by ODFW staff, in collaboration with knowledge partners, will also occur outside the **beaver emphasis areas**.*

Leads: Adrienne Averett - Convenes Watershed Managers, provides context, resources, data to consider in selecting HUC10s
Watershed Managers - Identify lead staff (e.g., Western Oregon Stream Restoration biologists, Eastern Fish Habitat biologists, District Wildlife & Fish biologists, NRCS liaisons) & HUC10s
Adrienne Averett & Watershed Managers: Finalize HUC10 list & map areas
Completion Date: Watershed Leads identified - May 2023
Final HUC10 list & map - June 2023
Data assessment & survey resources identification - Ongoing

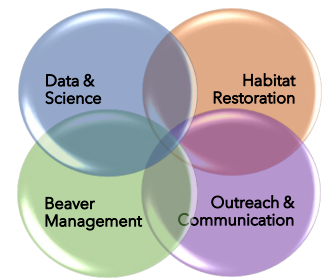
- 1D Within each **beaver emphasis area** (HUC10s identified in Action 1C), conduct field surveys to assess beaver activity and **beaver habitat** use [15], beaver occupancy constraints, and **beaver-modified habitat** availability and restoration potential. Surveys will develop a baseline to evaluate the success of management actions described below (refer to Actions 2B & 3B).

Leads: Watershed Leads (identified in Action 1C)
Completion Date: Variable by watershed; staff capacity & funding dependent
Possible Funding Sources: Private Forest Accord (PFA) subaccount, Good Neighbor Authority, Farm Bill, Pittman-Robertson, BPA, Pacific Coast Salmon Recovery Fund, Bipartisan Infrastructure Legislation, National Fish and Wildlife Foundation, OWEB, OCRF

- 1E As funding opportunities arise, work with partners to increase monitoring of beaver dam analog (BDA) restoration effectiveness (e.g., riverscape habitat, target species, water quality, non-native species distribution responses), natural beaver dam and/or BDA responses to extreme events (drought, wildfire, flooding), and the effectiveness of beaver dam coexistence structures (e.g., pond levelers and culvert exclusion devices) in Oregon [sensu 16].

Leads: Watershed Leads (identified in Action 1C) & Adrienne Averett
Completion Date: Ongoing

PILLAR 2: HABITAT RESTORATION



Goal: Advance prioritized beaver habitat and beaver-modified habitat restoration in Oregon.

Core Actions

2A Develop Beaver Habitat Management Guidance to provide a resource that describes what **beaver habitat** is and to guide strategic, **process-based** floodplain-riparian-wetland **restoration** actions for increasing **beaver habitat**. This will be a stand-alone product that ODFW will provide to staff and interested partners and will seek to incorporate into the Beaver Restoration Guidebook [13] updates and other beaver guidance resources.

Lead: Habitat Division

Completion Date: December 2023

Funding Source: Pittman-Robertson or other funding opportunities

2B In each **beaver emphasis area** (HUC10s identified in Action 1C), coordinate with federal (USFS, BLM, USFWS, NRCS) and other partners to identify and complete projects that maintain and increase **beaver habitat** and **beaver-modified habitat** as well as floodplain-riparian-wetland processes in that HUC.

Leads: Watershed Leads (identified in Action 1C)

Completion Date: Variable by watershed; projects ongoing & funding dependent

Possible Funding Sources: PFA mitigation grants, Good Neighbor Authority, Farm Bill, Pittman-Robertson, BPA, Pacific Coast Salmon Recovery Fund, Bipartisan Infrastructure Legislation, OWEB, OCRF, NRCS, NFWF

2C Revise fish passage rules to add flexibility for beaver flow devices.

Lead: Greg Apke

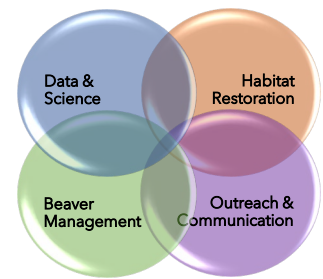
Completion Date: Completed December 2022

2D Assess the representation of beavers and **beaver-modified habitat** in the 2016 Oregon Conservation Strategy [9] as a shared priority. Incorporate best available science into the 2026 revision. Work with stakeholders to continue emphasizing beaver and **beaver-modified habitat** as a key part of the Wetlands and Flowing Water and Riparian Strategy Habitats, as well as providing conservation actions across the landscape to address key conservation issues.

Leads: Emily VanWyk

Completion Date: Fall 2025, pending USFWS approval in 2026

PILLAR 3: BEAVER MANAGEMENT



Goal: *Improve beaver management.*

Core Actions:

- 3A Develop a database form for beaver conflict issues on private land as part of the existing damage complaint report system, including to meet Private Forest Accord (PFA) requirements [17]. This will support efficient complaint response and adoption of non-lethal, coexistence strategies on private lands.

Leads: *Derek Broman (database development)
PFA Beaver Bios (2) & Wildlife Bios (using database)*
Completion Date: *Damage Complaint System - January 2023
Implementation - Ongoing
Reporting - Annually or as required under the PFA*

- 3B In each **beaver emphasis area** (HUC10 identified in Action 1C), coordinate with partners to identify and pursue opportunities for advancing beaver coexistence strategies on private and public lands (Action 2B linkage).

Leads: *Watershed Leads (identified in Action 1C)*
Completion Date: *Variable by watershed; projects ongoing & funding dependent*
Possible Funding Sources: *PFA mitigation grants, Good Neighbor Authority, Farm Bill, Pittman-Robertson, BPA, Pacific Coast Salmon Recovery Fund, Bipartisan Infrastructure Legislation, OWEB, OCRF*

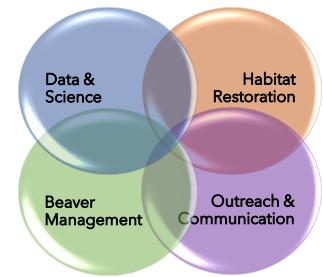
- 3C Implement beaver coexistence strategies in partnership with private and public landowners, including coordination with ODF and private forest owners under the provisions of the Private Forest Accord.

Lead: *Wildlife Division Furbearer Program, PFA Beaver biologists (2), District Wildlife Biologists*
Completion Date: *Landowner coordination, strategy adoption, tracking & reporting outcomes - Annual, ongoing*

- 3D Implement new beaver harvest reporting requirements and track beaver harvest data as described by Oregon's furbearer regulations [18; [OAR 635 Division 50](#)] to support responsible trapping management and implementation of other beaver management authorities.

Lead: *Wildlife Division Furbearer Program, Wildlife District Biologists*
Completion Date: *Implement rule change - Completed June 2022
Collect reporting data - October 2023
Evaluate data to ensure regulations and authorities are appropriate - 2024 and bi-annually thereafter
Report - Annually or as required by the PFA*

PILLAR 4: OUTREACH & COMMUNICATION



Goal: Increase awareness of the benefits of beaver-modified habitat. Increase implementation of human-beaver coexistence strategies across Oregon.

Core Actions

- 4A Coordinate with Oregon State University to conduct a statewide, communication science study to develop, refine and test engagement strategies for working with private landowners to a) increase participation in - and tolerance for - **beaver habitat** restoration and b) increase adoption of non-lethal techniques for managing human-beaver conflict.

Leads: Dr. Megan Jones (OSU), Adrienne Averett (ODFW liaison)

Completion Date: June 2025

Financial Support: OCRF (awarded April 2023)

- 4B Provide financial and technical support to the Beaver Coalition and federal, state, and other partners to update the Beaver Restoration Guidebook [13], develop a Beaver Flow Device Best Management Practices (BMP) Manual that includes Oregon permitting guidance, and develop a statewide Beaver Restoration Assessment Tool (BRAT).

Lead: Adrienne Averett

Team: Greg Apke, Derek Broman, Chandra Ferrari, Tom Stahl, Reva Gillman

Completion Dates:

- April 2023 - Beaver Flow Device BMP Manual version 1.2
- ~January 2024 - Beaver Flow Device BMP Manual Appendix: Oregon Permitting Guidance
- ~June 2024 - Beaver Restoration Guidebook version 3.0
- ~January 2025 - Project plan for Statewide BRAT model calibration, validation, and website access

Financial support: Multiple OCRF grants have already been made by ODFW to support all of the above

- 4C Update ODFW's *Living With American Beaver* website materials (https://www.dfw.state.or.us/wildlife/living_with/beaver.asp) and communicate the new information, as appropriate, through media campaigns and collaboration with partners.

Lead: Adrienne Averett

Completion Date: September 2023 (website), campaigns (ongoing)

- 4D Assist with reestablishing a forum that provides opportunities for interested partners to share information and collectively make progress towards increasing **beaver-modified** landscapes in Oregon.

Lead: Tom Stahl

Team: Adrienne Averett, Sarah Reif, Wildlife Division Furbearer Coordinator

Completion Date: June 2024, annually thereafter

Beaver Emphasis Areas

The four pillars include reference to [Beaver Emphasis Areas](#), which will be how ODFW directly addresses the need for an emphasis on landscape-scale approaches to restoring [beaver habitat](#) and [beaver-modified habitat](#). The core actions related to [beaver emphasis areas](#) are summarized here to draw attention to the interconnections between the pillars.

Pillar	Core Action
Data & Science	<p>1C: Select one or more drainage(s) in each ODFW watershed district to become a beaver emphasis area (BEA) for that watershed.</p> <p>Identify BEA staff leads, assess existing data, and find resources to conduct new surveys in each selected HUC10.</p> <p>ODFW has 10 watershed districts, resulting in at least 10 beaver emphasis areas.</p> <p><i>Note: ongoing and new beaver-focused activities by ODFW staff, in collaboration with knowledge partners, will also occur outside the beaver emphasis areas.</i></p>
Data & Science	<p>1D: Within each beaver emphasis area, conduct field surveys to assess beaver activity and beaver habitat use, beaver occupancy constraints, and beaver-modified habitat availability and restoration potential.</p> <p>Surveys will develop a baseline to evaluate the success of management actions described below.</p>
Habitat Restoration	<p>2B: In each beaver emphasis area, coordinate with federal and other partners to identify and complete projects that maintain and increase beaver habitat and beaver-modified habitat as well as floodplain-riparian-wetland processes in that HUC.</p>
Beaver Management	<p>3B: In each beaver emphasis area, coordinate with partners to identify and pursue opportunities for advancing beaver coexistence strategies on private and public lands.</p>

Table of Plan Actions, Leads, and Timelines

The following table summarizes the core actions, staff leads, and completion dates outlined in this Action Plan. Action Leads may change through time due to position changes, capacity, or other resource (e.g., funding) shifts. The completion date in the table reflects the date when benchmarks and/or deliverables for an action are accomplished.

Pillar	Core Action	Lead(s)	Completion Date
Pillar 2: Habitat Restoration	2C Fish Passage Rule Revision	Greg Apke	January 2023
Pillar 3: Beaver Management	3A Beaver Damage Complaint System & Non-Lethal, Coexistence Response	Furbearer Program PFA Bios Wildlife District Bios	January 2023 Ongoing
Pillar 1: Data & Science	1C Beaver Emphasis Area (HUC10) Selection	Adrienne Averett Watershed Managers	June 2023
Pillar 4: Outreach & Communication	4C Update ODFW's Living with Beaver Website Materials	Adrienne Averett	September 2023 Ongoing
Pillar 2: Habitat Restoration	2A Develop Beaver Habitat Management Guidance	Habitat Division	December 2023
Pillar 1: Data & Science	1B Protocol ID, Field Testing, Finalization, & Data Management	Furbearer Program Cara Ratterman Watershed Managers Adrienne Averett	December 2023 Ongoing
Pillar 1: Data & Science	1A Existing ODFW Data Synthesis & Standardization	Furbearer Program	June 2024
Pillar 4: Outreach & Communication	4B Financial/Technical Support to Partners: <ul style="list-style-type: none"> Beaver Restoration Guidebook Beaver Flow Device BMP Manual Statewide BRAT model project plan 	Adrienne Averett Greg Apke Derek Broman Chandra Ferrari Reva Gillman Tom Stahl	Grants awarded with January 2025 product completion
Pillar 4: Outreach & Communication	4A OSU Beaver Coexistence Community Science Study	Dr. Megan Jones (OSU) Adrienne Averett	June 2025
Pillar 2: Habitat Restoration	2D Beaver & Beaver-Modified Habitat in Oregon Conservation Strategy Revision	Emily VanWyk	Fall 2025; USFWS approval in 2026
Pillar 2: Habitat Restoration	2B Beaver Emphasis Area Partner Collaboration & Project ID (linked to 1C & 1D)	Watershed BEA Leads	Projects ongoing & funding dependent
Pillar 3: Beaver Management	3B Beaver Emphasis Area Partner Collaboration & Coexistence on Private & Public Lands	Watershed BEA Leads	Projects ongoing & funding dependent
Pillar 3: Beaver Management	3C Implement Beaver Coexistence Strategies in Partnership with Private & Public Landowners	Furbearer Program PFA Bios Wildlife District Bios	Annual, Ongoing
Pillar 3: Beaver Management	3D Implement New Harvest Reporting Requirements & Track Beaver Harvest Data	Furbearer Program Wildlife District Bios	Annual, Ongoing
Pillar 4: Outreach & Communication	4D Re-establish a Beaver Coordination Forum	Tom Stahl Adrienne Averett Derek Broman Sarah Reif	Annual, Ongoing
Pillar 1: Data & Science	1D Beaver Emphasis Area Surveys	Watershed BEA Leads	Staff capacity & funding dependent
Pillar 1: Data & Science	1E Effectiveness Monitoring - BDAs, Beaver Dams, Coexistence Devices	Watershed BEA Leads Adrienne Averett	As funding opportunities arise

Summary and Next Steps

ODFW will coordinate internally and with partners to implement this Plan by the completion dates described for each core action. Many of these actions are creating tools or shared information that will support the work of scaling up beaver-modified landscape restoration in Oregon. Progress on the actions identified in this Plan will be tracked as described above and outcomes will be shared with internal staff, the Commission, other partners, and interested members of the public at regular intervals.

References

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https://www.dfw.state.or.us/fish/CRP/coastal_columbia_snake_lamprey_plan.asp
9. Oregon Department of Fish and Wildlife. 2016. Oregon Conservation Strategy. Oregon Department of Fish and Wildlife, Salem, Oregon. Available from
<https://oregonconservationstrategy.org/>

Additional links to specific beaver-modified floodplain information in the Strategy:

- *Key Conservation Issues, specifically under Disruption of Disturbance Regimes, Altered Floodplain Function Goals and Actions, Action 2.6 Support and encourage beaver dam-building activity.*
<https://oregonconservationstrategy.org/key-conservation-issue/disruption-of-disturbance-regimes/>
 - *Specialized and Local Habitats, Off-Channel Habitat:* <https://oregonconservationstrategy.org/strategy-habitats/specialized-and-local-habitats/>
 - *Wetlands Limiting Factors, Habitat Loss and Recommended Approach:*
<https://oregonconservationstrategy.org/strategy-habitat/wetlands/>
 - *Flowing Water and Riparian Habitats, Limiting Factor: Passage Barriers and Channel Complexity:*
<https://oregonconservationstrategy.org/strategy-habitat/riparian-habitats-and-flowing-water/>
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